Exhibit 2

SCHOOL DISTRICT/LOCAL GOVERNMENT ENTITY PLAINTIFFS' OPPOSITION TO DEFENDANTS' MOTION TO EXCLUDE TESTIMONY OF SCHOOL DISTRICT EXPERTS

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1. EXECUTIVE SUMMARY

1. Based on my education, training, and experience, as well as my systematic review of the relevant scientific literature and my analysis of other relevant materials, I offer the following opinions to a reasonable degree of scientific certainty:

A. Defendants' social media platforms cause problematic social media use and cause or contribute to cause other mental health harms among children and youth.

   i. The weight and totality of the evidence examined in my systematic literature review demonstrates that Defendants' social media platforms cause or contribute to cause mental health harms to children and youth.

   ii. A Bradford Hill analysis of the relevant scientific evidence further establishes that Defendants' social media platforms cause or contribute to cause mental health harms to children and youth.

B. Social media use is driven by a combination of psychological, neurological, and technological factors, including but not limited to:

   i. Defendants' social media platforms exploit the brain's fundamental reward-learning processes and promote frequent engagement using low-effort, high reward stimuli (e.g., likes, comments) and intermittent, variable rewards schedules (e.g., push notifications) to promote dopamine-driven reinforcement;

   ii. Defendants' social media platforms exploit the evolutionary drive for social connection and acceptance by scaling social contact, converting social approval into quantifiable metrics (e.g., like counts), gamifying social interactions (e.g., Snapstreaks), leveraging social anxiety and fear of missing out, and amplifying social pressure;

   iii. Defendants' social media platforms use algorithms to aggregate personalized experiences and present it in an infinite scroll format that lacks time or stopping cues and promotes excessive continued engagement; and

   iv. Defendants' social media platforms capitalize on users' limited capacity for emotional regulation and cognitive control by fostering patterns of compulsive and prolonged engagement, as users increasingly rely on social media engagement to modulate negative mood states.

C. Child and youth use of Defendants' social media platforms causes or contributes to mental health harms via numerous pathways and mechanisms, including but not limited to negative social comparisons, displacement of behaviours that are protective of mental health, exposure to harmful experiences, social-emotional contagion, neurobiological and neurocognitive changes, and digital stress.

D. Children and youth are especially vulnerable to the mental health risks presented by Defendants' social media platforms due to the profound physical, social, behavioural, and neurobiological changes taking place during this critical developmental phase.

   i. Given the severe mental health risks described herein, it is my opinion that Defendants' social media platforms are not reasonably safe for children and youth. Defendants should have mitigated these dangers and should have fully informed parents, children and youth about the risks and dangers of their platforms.

   ii. Given the unique vulnerability of children and youth, Defendants' policies allowing users to join their platforms at age 13 are inappropriate, are contrary to the science, and have resulted in millions of vulnerable children and adolescents being exposed to an unreasonable risk of harm.

   iii. Defendants fail to meaningfully enforce their policies regarding minimum user age.

   iv. As a result of Defendants' inappropriate policies for minimum user age, as well as their failure to meaningfully enforce those policies, Defendants have exposed millions of US children to an unreasonable risk of harm.

E. Individual characteristics, including but not limited to sociodemographic, psychosocial functioning, personality traits, neurobiological factors, genetic influences, quality of social media use, digital literacy make some children and youth even more vulnerable to the mental health harms presented by Defendants' social media platforms.

F. Defendants knew or should have known that children and youth are more vulnerable to the mental health risks presented by their social media platforms.

G. Defendants' internal research and documents align with the opinions offered in this report.

2. BACKGROUND & QUALIFICATIONS

2. I graduated with a Ph.D. in Health Psychology from Carleton University in Ottawa, Canada. My doctoral dissertation was in the area of body dysmorphia and eating disorders in high-risk athletes. Upon graduation, I did a postdoctoral fellowship in behavioural medicine at the State University of New York at Buffalo under the supervision of Dr. Leonard Epstein, a clinical psychologist who is pre-eminently recognized for his clinical trials in childhood obesity and smoking (over 600 publications and $100 Million in peer reviewed grant funding at National Institutes of Health). I then returned to Ottawa and retrained for a 2.5-year period to become a registered clinical psychologist. In 2002, I was hired as a clinical scientist at the Children's Hospital of Eastern Ontario Research Institute where I currently work as a Senior Scientist. At the University of Ottawa, I am a Professor of Pediatrics in the Faculty of Medicine, and cross-appointed as a Professor in the School of Psychology, School of Human Kinetics, and School of Population Health. I am also an Adjunct Research Professor at Carleton University in the Department of Psychology.

3. I have been supervising and training undergraduate and graduate students for 23 years at both universities, having trained more than 40 undergraduates, and 26 graduate students in these departments, as well as 4 postdoctoral fellows. My research program has focused on psychosocial, behavioural and biological determinants of eating disorders, obesity and mental health in children and youth. I have also conducted many clinical trials examining novel behavioural and pharmacological interventions in youth presenting with obesity, as well as mental health challenges, including eating disorders. I have held more than $15 million dollars in peer reviewed funding as Principal Investigator and have published more than 200 peer-reviewed papers in strong behavioural science and medical journals. My google Scholar h-index is 60, my i10index is 153, and my research has been cited in academic research almost 18,000 times.

4. I currently serve on the editorial board of two peer-reviewed journals in my area of research: 1) Mental Health and Physical Activity, and 2) Childhood Obesity. I have also reviewed over 200 prospective publications for other behavioural science and medical journals, including prestigious journals such as the Journal of American medical Association, and the Lancet. I am also an advisory board member for the Canadian Centre for Mental Health in Sport, and the Canadian Centre for Healthy Screen Use, as well as member of the digital task force at the Canadian Pediatrics Society.

5. Most germane to this case, I am recognized for my research on sedentary screen time, health and mental health in children and youth. I have conducted (and published) several clinical trials showing reductions in screen time led to improvements in health and mental health in children and youth. More recently, my laboratory was the first to conduct a randomized controlled trial in youth with anxiety and depression symptoms and showed widespread psychological benefits from reducing social media use, including less anxiety, depression, fear of missing out (FoMO), as well as increased sleep and improved body image (Davis & Goldfield, 2024; Thai et al. 2023). In my career, I have published 32 papers on screen time and health and mental health, and at least 8 on social media and mental health indicators, with several more under review.

6. I am a co-principal investigator of the CALM study, a large, 6-site longitudinal study ($6 million) aimed at discovering biological/genetic, psychosocial, familial, and behavioural predictors of trajectory changes, mechanism of change, and treatment responses in children and youth presenting for mental health care. With a proposed sample size of over 3,000 patients, it may be one of the largest and most comprehensive studies ever done in a clinical population of youth mental health. This collaborative scientific network involves more than 60 scientists from many disciplines, including basic scientists and genetic researchers, clinician trial methodologists, implementation science, epidemiologists, neuroscientists, pediatricians, psychiatrists, psychologists, social workers, and more. The role that social media plays in mental health trajectories, including interactive effects on the brain, cognition, and emotion and behaviour, and identifying characteristics that predispose harm will be a research question that my laboratory will personally address.

7. I am also a Principal Investigator of an ongoing 15-year study examining the psychosocial, behavioural and sociocultural determinants in early adolescence predicting eating disorders, obesity, mental health and addictive behaviour in young adulthood (Research on Eating and Adolescent Lifestyle- REAL). We have published many papers from REAL showing adverse associations between screen time with mental health indicators, as well as disordered eating and obesity in youth. Our recent 15-year follow up will include behavioural addictions (including social media addiction) and substance use outcomes. Most longitudinal studies in the literature on social media and mental health and eating disorders span 1-year, so the REAL study provides a unique cohort to examine long term predictors of social media addiction, as well as the potential

bidirectionality of social media and mental health, and identify relevant mediators and moderators to better understand long term impacts, identify which characteristics increase/decrease risk, and why.

8. Additional ongoing clinical studies in my laboratory include social media interventions in youth with internalizing disorders, extending my previous work in this area, as well as mindfulness intervention to reduce disordered eating and promote emotional regulation and well-being in adolescents with obesity. I also have experience with Phase 3 randomized, double-blind, placebo-controlled drug trials aimed at examining the effect of a dopamine reuptake inhibitor (Ritalin) on weight loss and mental health in youth with obesity and associated physiological and psychological mechanisms. This includes food reward/reinforcement, food-impulsivity, disordered eating, and neurocognitive, sensory and behavioural, and psychological mechanisms. I'm also currently co-leading an industry-partnered phase 4 drug trial (Contrave) for weight loss and promotion of mental health and quality of life aimed at identifying neurobiological (fMRI, EEG), physiological, neurocognitive, psychosocial and behavioural mechanisms of action of this agent.

9. Lastly, I have also been a practicing registered clinical psychologist for 23 years, providing assessment and therapy to children, adolescents, and adults across a wide range of mental health disorders, including, but not limited to, anxiety, depression, eating disorders and addiction, including social media addiction and video game addiction.

10. Taken together, I believe my pediatric research and clinical expertise honed over 25 years, indicates that I am well qualified to critically review the literature and draw evidenced-based opinions regarding the causal relationship between social media use, including addictive use, and mental health and well-being, and academic performance in adolescents, the demographic with highest social media use.

11. Additional information about my background, education, and experience is provided in my curriculum vitae, attached hereto as Exhibit A, which includes a list of all publications I have authored in the last 10 years. My fee schedule and testimonial history are attached as Exhibit B.

3. ASSIGNMENT

12. I have been tasked with conducting a comprehensive literature review to reach evidenced-based conclusions regarding the impact of social media use (SMU) on mental health

outcomes in children and adolescents. This review examines drivers (antecedents) of social media use and problematic social media use (PSMU), as well as mechanisms, and a myriad of developmental, sociodemographic, neurobiological, genetic, personality, and social vulnerabilities that either alone, or in combination, can amplify/buffer social media use harms.

4. METHODOLOGY

13. To address the potential causal role that social media and social media addiction play in mental health problems and maladaptive behaviours, two distinct, empirically and conceptually validated methodological approaches were applied. First, I conducted a systematic review of the literature spanning the past five years using pre-specified search terms following the PRISMA reporting guidelines for systematic review and meta-analyses. I elected to focus my review only on meta-analyses of observational (cross-sectional and longitudinal) and experimental studies because this a more robust quantitative and objective approach to estimating true effects compared to reviews that rely on narrative synthesis, which are more subjective in nature, thus more prone to bias. Many, but not all, meta-analytic reviews provided an evaluation of the quality of evidence and risk of bias using various validated methodologies, with most studies classified as moderate to high quality, strengthening my confidence in conclusions drawn. Second, based on the meta-analytic evidence presented and discussed, supplemented with additional research that I am aware of where relevant, and the studies cited in the meta-analyses, I applied a Bradford-Hill analysis. This is a validated epidemiological model designed to infer causality from correlational data based on 9 factors. My opinions and conclusions based on the evidence reported herein are based on the same scientific methods and standards that I apply in my research and scientific practice.

4.1. OPERATIONAL DEFINITIONS

14. This assessment is focused on children and youth, defined by the Centers for Disease Control and Prevention as the developmental period spanning ages 10-24 years (Centers for Disease Control and Prevention, 2019). In alignment with neurological and sociocultural evidence, which shows that the human brain, especially the prefrontal cortex responsible for decision-making, judgment, emotion regulation and impulse control, continues maturing into the mid-20s, the literature reviewed focused on studies with a mean age of up to 25 years (Sowel et al. 2003; Lotter et al. 2024, Casey et al. 2008).

15. Psychologically, this stage, often termed "adolescence and emerging adulthood," is characterized by ongoing identity exploration, instability in residence and relationships, and a focus on self-development, distinct from established adulthood (Arnett, 2000). It is important to note that many meta-analyses combined adolescents and adults in their pooled analysis, making it impossible to separate these groups; however, the mean age in almost all meta-analyses ranged between 13-25 years, largely reflecting our target population, and the demographic with highest social media use.

16. My assessment focuses on two primary exposures: social media use (SMU) and problematic social media use (PSMU). For SMU, I followed the definition proposed by Carr and Hayes (2015), aligned with Haidt (2024), viewing social media as internet-based platforms that enable mass-personal communication that is disentrained and persistent. These channels facilitate the perception of user-to-user interaction and derive their primary value from user-generated experiences. Social media platforms allow users to create personal accounts (often containing personal information and identity markers), interact with others within their network, and establish connections (e.g., friends, followers, subscribers) that influence their experience on the platform. Additionally, these platforms typically incorporate interactive features like commenting, liking, and sharing. Commonly recognized social media platforms that fall under this definition include Facebook, Instagram, Twitter/X, TikTok, Snapchat, YouTube, Reddit, and LinkedIn.

17. Many studies in the literature use the term "problematic social media use" and "social media addiction" interchangeably, while a significant portion differ in their conceptualization and operationalization (Varano et al. 2023). Despite some studies using these terms interchangeably, there are important differences that relate to severity of symptoms that impair functioning based on a continuum. Problematic social media use refers to excessive and potentially harmful social media engagement that impairs daily life (i.e., school, work, relationships etc.) without necessarily exhibiting all the characteristics of a behavioural addiction. In contrast, social media addiction involves more widespread and severe impairment. Thus, PSMU is a broader term that encompasses social media addiction-related behaviours, and greater impairment, while still capturing mild to moderate symptoms and behaviours that lead to less extensive impairment. Although PSMU and social media addiction are not formally included in the of the Diagnostic and Statistical Manual of Mental Disorders-5th edition, researchers have proposed that it could fit under the category of "other specified disorders caused by addictive

behaviour" in the 11th edition of the International Classification of Diseases (Brand et al. 2020; Fournier et al. 2023, Moretta et al. 2022). Like all addictive behaviour, those exhibiting multiple symptoms of behavioural addictions are at higher risk of progressing to more severe forms of addiction (van den Eijnden et al. 2016). PSMU is more widely used in the literature, and because it captures a broader scope of symptoms and impairment, which are typically measured continuously by several validated questionnaires, the term "PSMU" will be used in this report.

18. PSMU questionnaires are based on addiction criteria as defined in the DSM-5 (American Psychiatric Association, 2013), including salience, mood modification, tolerance, withdrawal, conflict, impairment and relapse (Shannon et al. 2022; Griffiths, 2005). Salience refers to an activity becoming a preoccupation in one's life, dominating thoughts and even experiencing cravings when not engaged in the activity. Mood modification refers to the resulting sensations after engaging in the activity, which can range from a "high" to a calming escape (e.g., self-medication coping strategy). Tolerance refers to needing increased engagement in the SMU to achieve previous effects. Withdrawal refers to unpleasant emotional effects when the activity is stopped or reduced. Conflict refers to interpersonal problems or impairments in academic functioning or other negative impacts arising from the addiction. Relapse refers to reverting to previous behaviour patterns once the initial addictive behaviour has been ceased. Some PSMU questionnaires (e.g., Social Media Disorder Scale) have expanded the criteria to include persistence (continued use despite negative consequences), deception (concealing/deceiving others about extent of use), and displacement (displacing other important activities and health behaviours) (van den Eijnden et al. 2016). As discussed below, research suggests that PSMU shares behavioural neural features and mechanisms with substance use disorders (Aydin et al. 2020; Lee et al. 2021) and that social media users can experience cravings (salience) (Stieger & Lewetz, 2018; Casale et al. 2021) and withdrawal, hallmark characteristics that maintain addictive behaviour (Kuss & Griffiths, 2012).

19. The outcomes examined in this review are: (1) mental health, and (2) maladaptive behaviours. The CDC broadly defines mental health as a state of emotional, psychological, and social well-being that allows individuals to cope effectively with life's stresses, realize their abilities, learn and perform well (in school or at work), and contribute to their community (US Centers for Disease Control and Prevention, 2024). Within this framework, I include both (a) positive indicators of emotional and psychosocial well-being outcomes such as subjective well-

being, happiness, and life satisfaction; and (b) negative indicators of mental health such as anxiety, depression, body dissatisfaction, suicide, self-harm, loneliness etc. Although positive and negative indicators of mental health are often moderately correlated, they represent conceptually and empirically distinct dimensions of mental health (Keyes, 2006). Each domain captures unique patterns of psychological functioning, developmental antecedents, and behavioural manifestations, and therefore necessitates separate analytic consideration to avoid conflating differential effects and to accurately characterize intervention impacts.

20. Maladaptive behaviours refer to patterns of action or coping that inhibit an individual's ability to adjust effectively to environmental demands or psychological stressors, often exacerbating cognitive, behavioural, emotional or functional impairments over time (American Psychological Association, 2018). Within this report, the focus is specifically on behaviours such as insufficient sleep duration or quality impairing daily function, disordered eating habits (i.e. dietary restriction or binge eating) that harm health, the hazardous or harmful use of psychoactive and non-psychoactive substances (i.e. tobacco), and acts of intentional self-harm, either suicidal or non-suicidal, used for affect regulation or self-punishment. These actions are deemed maladaptive due to their inherent potential to cause harm, impede adaptive living, and perpetuate cycles of distress.

4.2. LITERATURE REVIEW

21. The evaluation of the evidence was performed using a multisource approach, with particular emphasis on systematic reviews and meta-analyses, which provide the most robust and objective assessments of causal relationships between exposures and outcomes. These methodologies reduce bias and enhance the reliability of inferences compared to narrative synthesis. In addition to published meta-analytic reviews, a curated digital repository of high-quality studies - compiled over years of research and scholarly engagement as a senior scientist - served as a major supplementary resource. This repository includes peer-reviewed literature as well as my own experimental and observational studies.

22. Sections 5.1 ("Social Media Use Epidemiology") and 5.2 ("Drivers of Social Media Use and Addiction") will draw primarily from this curated repository. These chapters aim to present current prevalence estimates and synthesize frameworks that elucidate the behavioural, psychological, and structural mechanisms underlying SMU and its potential for addictive patterns. Particular attention is paid to the how the user-interface design features common to all social media

platforms interact with neurobiology and behaviour to promote excessive use, addiction and psychosocial harms.

23. To ensure inclusion of the most current evidence, a reproducible literature search was conducted in PubMed and PsycINFO, as these databases offer broad and complementary coverage of biomedical and psychological literature. PubMed provides access to clinically relevant and neuroscience-oriented studies, while PsycINFO focuses on psychological, cognitive, and behavioural research. I limited my search to reproducible reviews published in the past 5 years which encompassed the earliest and most current studies of SMU's impact on youth mental health and maladaptive behaviours, published between 2010-2025.

24. The search strategy is presented in Table 1. The first group of terms defines the exposure, using synonyms and platform-specific names (e.g., "social media," "Instagram," "online interaction") to ensure broad coverage. The second group outlines outcomes across three domains: cognitive and academic functioning (e.g., "executive function," "academic performance"), behavioural patterns (e.g., "impulsivity," "problematic smartphone use"), and mental health (e.g., "depression," "anxiety"). The final group restricts results to secondary research ("review" OR "meta-analysis"). Boolean logic was applied to link concepts, using OR to capture term variation and AND to combine key constructs. The query was limited to title and abstract fields and filtered to include reviews and meta-analyses published in the past five years, aligning with PRISMA's guidance on transparency and reproducibility.

Table 1. Search Strategy for Resources Retrieved

Groups	Search Query
Social media	("social media" OR "social networking" OR "online social networks" OR "Facebook" OR "Instagram" OR "Twitter" OR "TikTok" OR "Snapchat" OR "Youtube" OR "social networking sites" OR "internet-based communication" OR "online interaction") AND
Outcomes	(("academic achievement" OR "academic performance" OR "educational attainment" OR "school performance" OR "neurodevelopmental disorders" OR "attention deficit hyperactivity disorder" OR "ADHD" OR "learning disabilities" OR "cognition" OR "cognitive development" OR "executive function" OR "memory performance" OR "working memory" OR "processing speed" OR "cognitive flexibility" OR "brain development" OR "language development" OR "problem-solving skills" OR "attention" OR "impulsivity" OR "impulse control" OR "response inhibition" OR "hyperactivity" OR "cognitive control" OR "distractibility" OR "inattention" OR "task switching" OR "multitasking" OR "executive dysfunction" OR "delay discounting" OR "temporal discounting" OR "immediate reward preference" OR "delayed gratification" OR "intertemporal choice" OR "self-control" OR "reward sensitivity") OR ("maladaptive behavior" OR "problem behavior" OR "risky behaviors" OR "risk behaviors" OR "impulsive behavior" OR "behavioral addiction" OR "problematic internet use" OR "compulsive social media use" OR "internet addiction" OR "nomophobia" OR "problematic smartphone use" OR "excessive screen time" OR "sleep disturbances" OR "sleep deprivation" OR "sleep" OR "substance use" OR "alcohol consumption" OR "binge drinking" OR "smoking" OR "vaping" OR

Groups	Search Query
	"tobacco" OR "energy drinks" OR "stimulant use" OR "cyberbullying" OR "online harassment" OR "sexting" OR "risky sexual behaviors" OR "self-objectification" OR "problematic gaming" OR "gambling disorder") OR ("mental health" OR "mental disorders" OR "psychological distress" OR "depression" OR "anxiety" OR "self-harm" OR "suicide" OR "well-being" OR "stress" OR "emotional distress" OR "loneliness" OR "negative affect" OR "mood disorders" OR "psychosocial health" OR "eating disorders" OR "anorexia nervosa" OR "bulimia nervosa" OR "binge-eating disorder" OR "body dissatisfaction" OR "body image" OR "thin ideal" OR "fitspiration" OR "thinspiration" OR "muscle dysmorphia" OR "orthorexia" OR "disordered eating" OR "weight stigma" OR "body shaming")) AND
Study type	(review OR meta-analysis)
Filters	Published within the last 5 years, Query applied on Title/Abstract

25. Section 5.3 Systematic Review of Relevant Scientific Literature will synthesize the strongest available empirical evidence to support causal inference regarding the harms associated with SMU. To minimize selection bias and ensure methodological rigor, the literature review will follow a strict prioritization of sources, in descending order of evidentiary strength: (a) meta-analyses; (b) umbrella and systematic reviews; (c) scoping reviews; (d) narrative reviews employing reproducible search strategies; and (e) high-quality original studies not yet incorporated into existing reviews for not being published at the time.

4.2.1. EFFECT SIZE CALCULATION AND BENCHMARK

26. The Funder & Ozer (2019) benchmark was applied to guide effect size interpretation of the meta-analyses on observational and experimental studies. This framework addresses limitations inherent in conventional benchmarks, which often dismiss small effects (e.g., $r \approx 0.05–0.15$) as trivial. The Funder & Ozer perspective emphasizes that even small effects can be meaningful, particularly when exposures are behaviours that occur frequently or are sustained over time, such as daily social media use. Given that social media platforms engage billions of users globally, even minor improvements in individual mental health outcomes can accumulate into substantial benefits at the population level. Moreover, Funder & Ozer argue that in complex, multiply determined domains such as mental well-being, large effect sizes are rare. Instead, robust findings often manifest as small but consistent effects that yield incremental insights into how interventions shift individuals' psychological states.

27. To appropriately apply Funder & Ozer's benchmark, which is based on correlation coefficients, effect sizes originally reported as standardized mean differences (e.g., Cohen's d and

Hedges' g), Fisher's Z transformed correlations and odds ratios (OR) in observational studies were converted to Pearson correlation coefficients using the following formulas:

$$r = \frac{d}{\sqrt{d^2+4}} \qquad d = \ln(\mathrm{OR}) \cdot \frac{\sqrt{3}}{\pi} \qquad r = \frac{e^{2Z}-1}{e^{2Z}+1}$$

Where: r, d, OR and z represents, respectively, the Pearson correlation coefficient, standardized mean difference, odds ratio and Z coefficient.

28. For experimental studies, effect sizes were presented as standardized mean differences between intervention and control groups, expressed in standard deviation units. The most commonly reported effect size in experimental research is Cohen's d, with small effects classified as d=0.10 to 0.49, moderate effects ranging from d=0.50 to 0.79, and large effects indicated by d≥0.80. Hedges' g uses the same classification criteria (small, moderate, large) as Cohen's d, but has the additional advantage of correcting for bias associated with small sample sizes.

4.2.2. META-ANALYSIS OVERVIEW

29. A total of 2,174 records were identified through database searches (PubMed: 1,548; PsycINFO: 626), with 220 duplicates removed, resulting in 1,954 studies screened. Following title and abstract screening, 1,767 studies were excluded, and 187 full-text articles were assessed for eligibility. Of these, 44 were excluded due to language, irrelevance of outcomes or interventions, lack of reproducibility, outdated publication, or unsuitable study design. A total 144 review studies met the inclusion criteria and were incorporated into the final review, with no ongoing studies or studies awaiting classification.

30. Across 30 meta-analyses of observational studies investigating the relationship between general SMU and mental health or maladaptive behaviours, 80 effect sizes were observed, accumulating data from over two million observations. The most assessed outcomes included depressive symptoms and related affective states, multiple dimensions of well-being—such as subjective, hedonic, and ill-being—and self-injurious behaviours, including suicidal ideation, suicide attempts, and non-suicidal self-injury. Body image issues, encompassing body satisfaction, dissatisfaction, internalization of thin ideals, and social comparison concerns, were also prominent. Additionally, disordered eating patterns were found in a few meta-analyses. In comparison, 15 meta-analyses focused specifically on PSMU, contributing 54 effect sizes from samples exceeding

one million observations. Anxiety-related conditions such as generalized, social, and attachment anxiety – as well as depression symptoms and well-being indicators were the most frequently reported outcomes. Other commonly evaluated outcomes included sleep disturbances, such as changes in sleep duration and quality.

31. A total of 8 meta-analytic reviews synthesized evidence from experimental studies investigating the causal impact of SMU on mental health/wellbeing (n=6) and body image outcomes (n=2), contributing 32 effect sizes derived from pooled samples exceeding 60,000 observations. Most experiments focused on SMU reduction or abstinence interventions and targeted mental health indicators. These studies predominantly assessed changes in depressive symptoms and various dimensions of well-being following reduced exposure to social media. In contrast, two meta-analyses (4 effect sizes) examined the impact of experimentally manipulating exposure to social comparison on body image and eating disorder symptoms. Given body image outcomes were not well investigated in the reduction/abstinence studies, I included several high-quality recent interventions examining body image outcomes, including two randomized controlled trials from my laboratory.

32. Among the meta-analytical reviews examined (i.e., combining observational and experimental meta-analyses), the majority focused explicitly or predominantly on samples comprised of children and youth, with mean ages between 10 and 25 years. In total, approximately 71% (27/38) of the reviewed meta-analyses focused predominantly on children and youth. Out of the included meta-analyses, 20 conducted a methodological quality or risk of bias assessment. The most used instruments were the Newcastle-Ottawa Scale, and the Cochrane Risk of Bias Tool (RoB 2.0), particularly for randomized controlled trials. Additional tools included the STROBE checklist for observational studies, the Downs and Black checklist for quasi-experimental designs, and the NHLBI Quality Assessment Tool.

33. Exposures and outcomes measurements were heterogeneous – although mostly based on consolidated instruments. General SMU was typically assessed through self-reported frequency or duration metrics, such as daily hours of use. Some studies employed smartphone tracking applications for more objective assessments. Frequency and intensity of SMU was assessed in a minority of studies via questionnaires. PSMU, reflecting compulsive or addictive patterns of use, was commonly measured using validated scales such as the Bergen Social Media Addiction Scale (BSMAS) and the Social Media Disorder Scale (SMDS), which capture symptoms

aligned with behavioural addiction criteria as defined by the Diagnostic and Statistical Manual for Mental Disorders (DSM-5, American Psychological Association, 2013).

34. Mental health outcomes included depression, anxiety, psychological distress, and wellbeing. These were frequently assessed using instruments such as the Center for Epidemiologic Studies Depression Scale (CES-D), the Patient Health Questionnaire-9 (PHQ-9), the Generalized Anxiety Disorder Scale (GAD-7), the State-Trait Anxiety Inventory (STAI), the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), and the WHO-5 Wellbeing Index. Body image and eating-related outcomes were measured using the Eating Attitudes Test (EAT-26), the Eating Disorder Inventory (EDI), and the Eating Disorder Examination Questionnaire (EDE-Q), which also capture body dissatisfaction and internalization of appearance ideals, in addition to disordered eating.

35. Self-injurious thoughts and behaviours were primarily assessed through validated self-report instruments and national surveillance tools. Commonly used measures included the Suicidal Behaviors Questionnaire-Revised (SBQ-R), Suicidal Ideation Questionnaire – Junior (SIQ-JR), Suicide Probability Scale (SPS), and the Inventory of Statements About Self-Injury (ISAS). National surveys such as the Youth Risk Behavior Surveillance System (YRBS) and the Health Behavior in School-aged Children (HBSC) also contributed population-level data. Several studies used survey-based measures, typically assessing suicidal ideation, suicide attempts, or non-suicidal self-injury through binary or frequency-based items. Most assessments referred to lifetime or past-year occurrences and were administered via self-report questionnaires.

36. Sleep outcomes were assessed through self-reports of sleep quality, duration, latency, and disturbances. The Pittsburgh Sleep Quality Index (PSQI) and the Insomnia Severity Index (ISI) were amongst the most frequently used instruments, both of which are well validated. Cognition-based outcomes, particularly in child and adolescent samples, were measured using both questionnaires and performance tasks.

37. Academic performance was most often measured by questionnaires assessing academic achievement, such as the Academic Achievement Scale (AAS), Assessment of Grade Point Average (AGPA), actual GPA, Academic Performance Scale, and a minority used actual report cards of grades, and performance on school-based standardized tests or final exams. Cognitive outcomes are presented in the mechanism section (not in tables) because they were not the focus of this report but nevertheless warrant discussion and analysis. Cognitive-behavioural

measures of cognition and executive functioning included instruments included the Strengths and Difficulties Questionnaire (SDQ), Child Behavior Checklist (CBCL), and Conners' Rating Scales. A smaller number of studies employed performance tasks such as the Continuous Performance Task (CPT), Attentional Networks Test (ANT), and Matching Familiar Figures Test (MFFT), as well as actigraphy for tracking hyperactivity.

4.3. BRADFORD HILL CAUSAL ASSESSMENT

38. This report investigates whether social media use, particularly excessive or problematic patterns, causally contributes to adverse mental health outcomes among youth. To guide this assessment, I applied the Bradford Hill factors, a well-established set of nine principles commonly used in epidemiological research to evaluate causal relationships. These include: (1) strength of association, (2) consistency, (3) specificity, (4) temporality, (5) biological gradient (dose-response), (6) plausibility, (7) coherence, (8) experimental evidence, and (9) analogy. Each factor was independently evaluated using the existing body of evidence, which includes over 50 systematic reviews, as well as recent high-quality longitudinal and experimental studies. My opinions consider both the quantity and quality of evidence, with attention to effect sizes, replication across settings, and risk of bias. While it is not necessary for all nine factors to be satisfied for causality to be inferred, the cumulative strength across multiple dimensions increases confidence in a potential causal relationship. The final assessment summarises the evidence relevant to each factor and provides a reasoned interpretation of whether, and to what extent, social media use contributes to mental health harms among youth.

4.4. ADDITIONAL MATERIALS

39. In addition to my analysis of peer-reviewed scientific publications, I reviewed transcripts and exhibits from depositions of current and former employees of the Defendant social media companies (i.e., Facebook, Instagram, Snapchat, TikTok, and YouTube), Defendants' internal documents, data, and research, and other publicly available information relevant to the issues addressed in this report. The materials I reviewed and considered in forming my opinions are identified throughout this report and in Exhibit C.

5. LITERATURE REVIEW

5.1. SOCIAL MEDIA USE EPIDEMIOLOGY OVERVIEW

40. Social media encompasses a range of online platforms designed to facilitate networking, experience sharing, and virtual interactions. These platforms originally fell into distinct categories, including social networks (e.g., Facebook, Instagram), media-sharing services (e.g., YouTube, Snapchat, TikTok), messaging applications, and discussion forums (Aichner et al. 2021; Bhandari & Bimo, 2022; Gambo & Özad, 2020). While each platform had unique features—Instagram and Snapchat prioritized visual images, Facebook focused on brief textual updates, and YouTube and TikTok centered on video sharing—they all enable users to establish profiles, connect with peers, and receive engagement feedback (e.g., likes, comments, shares). Facebook, Instagram, Snapchat, TikTok and YouTube are now a one-stop-shop for social networking, messaging, video/photo sharing, discussion, etc. Unlike traditional one-way media, social media is inherently interactive, reinforcing peer engagement, particularly among adolescents.

41. Social media has become an integral part of adolescent life. A 2024 Pew Research Center survey found that nearly 95% of U.S. teens (ages 13–17) use at least one social media platform daily (Faverio & Sidoti, 2024). This rapid adoption has been facilitated by the near-universal ownership of smartphones. The accessibility and intentional design of social media has led to prolonged engagement, with many adolescents checking apps frequently (up to 180 times) throughout the day and even during nighttime hours. Teens report daily usage of YouTube (73%), TikTok (57%), Instagram (50%) and Snapchat (48%) (Faverio & Sidoti, 2024). Sixty-two percent find themselves on Instagram almost constantly (Dixon, 2024). Across all five platforms, 46% of teens use at least one of these sites almost constantly (Vogels et al. 2022).

42. This surge in youth social media engagement has coincided with troubling trends in adolescent mental health which can lead to effects in their physical and social well-being. Beginning around 2012, after a period of stability in the early 2000s, rates of teen depression, anxiety, loneliness, self-harm, and suicide in multiple countries began to rise sharply (Twenge, 2020; Twenge et al. 2019). Notably, these increases were most pronounced among girls – the demographic that also tends to use visual social media platforms most intensively (Twenge et al. 2022). For instance, a 2021 CDC study revealed that nearly one in three high school girls had seriously considered suicide, marking a sharp increase compared to previous years (Canady, 2021). The lifetime prevalence of self-harm, suicidal ideation, and suicide attempts was 13.7%, 18%, and

6%, respectively (Lim et al. 2019). Moreover, longitudinal research indicates that about 75% of all adult mental illnesses begin before the age of 18, with roughly 35% starting before age 15 (Caspi et al. 2020), demonstrating that early mental health challenges often persist into later life. Anxiety and depression are the most prevalent forms of mental health problems during adolescence (Georgiades et al. 2019), with prevalence of 13% among 12- to 16-year-olds, representing a 50% increase from 9% seen decades earlier, a shift that coincides with the boom of digital media/social media. Slightly higher rates of anxiety and depression are observed in youth (up to 24 years) (18%) using national statistics (Terlizzi & Zablotsky, 2024). Girls report a higher prevalence of these mental health conditions compared to boys (Georgiades et al. 2019). During adolescence, issues like body image, weight-related concerns, and disordered eating are also prevalent, with prevalence rates as high as 50% in girls and 30% of boys (Bornioli et al. 2019). Without intervention, the mental health issues emerging in adolescence will almost certainly lead to increased adult mental health problems. Such parallel timing between the smartphone/social-media era and deteriorating adolescent mental health indicates that the two phenomena are connected (Twenge, 2020).

43. Many adolescents view social media as a space for connection and creativity, yet a substantial number of them report negative emotional experiences tied to its use. Approximately 38% of teens feel overwhelmed by the “drama” they encounter online, while nearly one-third report feelings of exclusion by friends and pressure to post material that garners likes or comments (Anderson et al. 2022). Another study shows some teens often feel pressure to be constantly online and be up to date (Brandes & Levin, 2014). Furthermore, about 23% of teens state that social media makes them feel worse about their own lives (Anderson et al. 2022), causes additional stress, and an exacerbated sense of emptiness or loneliness (Brandes & Levin, 2014). The instant connectivity to Facebook has users expecting immediate responses and when that response does not come, they are overcome by sadness (Brandes & Levin, 2014). These adverse experiences are particularly pronounced among teen girls, who are more likely than boys to feel excluded or worse about their lives due to social media. This is in part due to sex differences in adolescents’ participation, with girls using social media more frequently than boys (Statistic Canada, 2023). Girls face heightened pressure to curate their online personas meticulously to avoid embarrassment or criticism (Anderson et al. 2022; Jong & Drummond, 2016). These findings based on academic research are remarkably similar to results based on internal research from Meta (formerly Facebook), which

also revealed concerning patterns, with many teen users - especially girls - reporting that Instagram exacerbates body image issues (Wells et al. 2021).

44. The temporal overlap between rising social media use and deteriorating adolescent mental health is further evidence of a causal link. Forty-one percent of teens with the highest social media use rate their overall mental health as poor or very poor compared with 23% of those with the lowest use rate (American Psychological Association, 2024). Social media exposes youth to risks such as intense social comparison and compulsive behaviours driven by platform features designed to maximize user engagement (Pera, 2020). These risks are particularly concerning given that adolescence is a critical developmental period characterized by heightened sensitivity to peer validation, identity formation, and significant neurophysiological changes (Orben, 2020).

5.1.1. PROBLEMATIC SOCIAL MEDIA USE

45. While mild levels of social networking can be benign or even beneficial, researchers have identified a concerning pattern known as problematic social media use (PSMU), often referred to as social media addiction. This condition, which mirrors behavioural addiction is characterized by excessive, compulsive use of social media that interferes with daily life, school/work, or relationships, and causes distress when restricted (Sun & Zhang, 2020; Meng et al, 2022; Chen et al. 2020; Griffiths, 2005; Bányai et al. 2017). Although PSMU is not formally included in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, it is a well-recognized mental health harm and researchers have proposed that it could fit under the category of “other specified disorders caused by addictive behaviour” in the 11th edition of the International Classification of Diseases (Brand et al. 2020; Fournier et al. 2023, Moretta et al. 2022).

46. Similar to internet addiction, it is measured by scales adapted from diagnostic addiction criteria (e.g., salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse) applied to the social media context (Zarate et al. 2023; Shannon et al. 2022; Andreassen & Pallesen, 2014). Salience refers to when a particular activity becomes the most important activity in one’s life, and use persists despite negative consequences. It dominates one’s thinking, even when not engaging in it. Mood modification is the resulting sensations that individuals report after engaging in a specific activity, ranging from a “high” or “buzz” to a calming sense of escape, relaxation or emotional numbing. Tolerance represents an increased amount of the activity needed to achieve effects that were previously felt in past use. Withdrawal symptoms are the unpleasant

effects experienced when the activity is stopped or suddenly reduced. Conflict refers to the interpersonal conflict that arises between the individual struggling with the addiction and the people around them. Finally, relapse describes the tendency for individuals to revert to previous behavioural patterns, even after prolonged periods of abstinence or controlled use (Griffiths, 2005). Research suggests that PSMU and substance use disorders share similar neural mechanisms (Aydin et al. 2020; Lee et al. 2021), with problematic social media users experiencing cravings (Stieger & Lewetz, 2018; Casale et al. 2021).

47. Numerous studies link PSMU to adverse mental health outcomes: higher levels of depression, anxiety, lower self-esteem and well-being, and greater loneliness have been reported among those with addictive or problematic use patterns (Shannon et al. 2022; Ansari et al. 2024). In fact, a recent meta-analysis found that problematic social media use is a stronger predictor of depressive symptoms than time spent on social networking overall (Shannon et al. 2022). This suggests it is not just how long youth spend on social media, but *how* they use it (and whether use becomes problematic) that determines risk. Another meta-analysis found a strong positive correlation between social anxiety and PSMU (Wu et al. 2024) and suggested that frequent communication on social media weakens an individual's offline support system and communication skills, making them prone to developing social anxiety. As discussed in more detail below, younger users are especially vulnerable to developing PSMU, since social media usage peaks during a life stage when identity and social status are in flux and brain circuits governing impulse control and self-regulation are still maturing (Shannon et al. 2022; Crone & Konijn, 2018). Problematic use can manifest in youths' inability to disengage from apps, neglect of offline activities, and feel distress when disconnected (Shannon et al. 2022).

48. According to a recent systematic review and meta-analysis, the global prevalence of PSMU, defined as moderate–to-severe symptomatology on validated SMU addiction scales, among adolescents is 35% and 23% among youth, with a pooled prevalence rate across all ages in North America of 15%. (Cheng et al. 2021). Although adolescents in North America will likely have a higher prevalence than that pooled across all ages, even at the lower end of 15%, and given the epidemiological research shows that 95% of youth own smartphones in Canada and the US (Anderson et al. 2023), this conservatively translates to at least 11 million American adolescents and youth who meet criteria for PSMU (US Census Bureau, 2020).

5.2. DRIVERS OF SOCIAL MEDIA USE

49. Several psychological and neurobiological mechanisms interact with social media design features, many of which are common across platforms, that have been demonstrated to drive high and problematic social media use. The social media features described herein actively shape and sustain engagement by exploiting developmental vulnerabilities to maximize attention and reinforce usage patterns. In this way, social media features – not content – compel excessive engagement.

5.2.1. DOPAMINE-DRIVEN REINFORCEMENT

50. Dopamine is a neurotransmitter that plays a key role in the central nervous system, regulating executive function, arousal, motor control and reward. Pleasurable experiences, whether induced by behaviour or substances, activate the brain reward system, which responds by a releasing dopamine and its pleasurable effects. Earlier research, which found that dopamine governs pleasure/reward, is supplemented by more recent research demonstrating that it is central to motivation, habit formation, and reward learning (i.e., reinforcement). Researchers have recently focused on how motivational drive leads to behaviours that activate the reward system and release dopamine, resulting in dopamine being commonly referred to as the "molecule of more" (Lembke, 2021; Lieberman & Long, 2018). It is not surprising, then, that decades of basic science research in animals and humans indicates that dopamine plays a critical role in the development of addiction, both behavioural and substance-related, via common mechanisms and processes (Solinas et al. 2019).

51. Social media platforms exploit fundamental reward-learning processes in the brain with frequent, low-effort, high-reward stimuli and intermittent/unpredictable reward schedules that promote and reinforce habitual engagement by hijacking the brain's natural reward pathways and leading to patterns of problematic use that resemble other behavioral addictions (Flayelle et al. 2023). Maza et al. (2023) showed that frequent phone checking in adolescence results in increased reward drive and less impulse control over time. Meshi et al. (2013) found that individuals who show greater nucleus accumbens activity in response to social rewards tend to use social media more, suggesting a reinforcement loop where the brain's sensitivity to online social validation can predict and perpetuate heavier use. The highly reinforcing nature of social media is illustrated in a laboratory study that found youth worked significantly harder to get access to social media than

access to palatable (i.e., high-fat, high-sugar) snack foods (O'Donell & Epstein, 2021). This is a striking finding given palatable food and sugar have been previously shown in animals and humans to be so reinforcing that they compete with drugs of abuse (Berridge, 2012; Salamone & Correa, 2012).

52. Reinforcement from social media is often provided on an intermittent schedule, wherein unpredictable variations in social feedback enhance habitual engagement. Notifications and alerts that prompt repeated engagement leverage the variable timing of cues and rewards to reinforce compulsive checking behaviors. Over time, these design elements shape habitual engagement, with users increasingly conditioned to seek stimulation through social media as a default response. These design choices parallel the mechanisms implicated in the development and maintenance of addictive behaviors such as substance use and gambling (Zenone et al. 2022).

53. In a study designed to identify indicators of smartphone addiction through user-app interaction, Noe et al. (2019) examined this relationship in an intensive investigation over 8-weeks using technology to objectively track taps, keystrokes, SMU frequency, etc. Results showed that among 20 app categories tested (e.g., games, music, navigation, sports, travel, social media, lifestyle (dating), communication (messenger), only user interaction with lifestyle apps ($r=0.45$, $P>0.001$) and social media apps ($r=0.421$, $p<0.001$) significantly correlated with smartphone addiction (measured by the Smartphone Addiction Scale). Further analysis revealed that within social media apps, objectively quantified use of Facebook, Instagram and Snapchat all showed significant correlations with smartphone addiction, with Snapchat showing the strongest and most robust correlations across genders (males, $r=0.326$, $p=0.06$, females, $r=0.558$, $P=0.002$). Noe et al. (2019) ultimately determined that, unlike other smartphone apps, smartphone addiction is primarily driven by high social media use.

54. Children and adolescents, whose developing brain reward systems are particularly sensitive to social reinforcement, are especially susceptible to these dopamine-driven feedback loops (Jaworska & McQueen, 2015). Repeated engagement with SMU conditions an automatic response that fosters habitual social media use even in the absence of conscious intention or awareness. This psychological process, known in the addiction literature as incentive salience or incentive learning, (Berridge, 2012; Cameron et al. 2017; Salamone & Correa, 2012) is a potent etiological process in the development and maintenance of addictive behaviours (Salamone & Correa, 2012).

5.2.2. SOCIAL VALIDATION DYNAMICS

55. Human beings are evolutionarily hard wired for social connection and acceptance, which was essential for survival during the time of our hunting and gathering ancestors (Young, 2008; Krach et al. 2010). Peer acceptance and validation is more important during adolescence than at any other life stage (Jaworska & MacQueen, 2015). Peer acceptance functions as a primary reward, and social media platforms capitalize on this in numerous ways, including scaling and gamifying social interaction (e.g., Snapstreaks) and converting social approval into quantifiable metrics (e.g., like counts, comment counts) (Bradley et al. 2019; Shabahang et al. 2022).

56. Empirical research suggests that individuals quickly adapt their online behavior to maximize social rewards by, e.g., selectively curating feeds, taking copious selfies, and spending hours creating and editing posts to elicit positive feedback (Lindström et al. 2021; Ozimek et al, 2023). Neuroimaging research shows that seeing many "likes" on one's own photo triggers strong activation in the nucleus accumbens and other dopamine-associated reward regions in adolescents (Sherman et al. 2016). Conversely, negative experiences, (e.g., lack of responsive engagement) can provoke anxiety and drive compulsive checking behaviors as young people become preoccupied with mitigating social harm.

57. Noe et al. (2019) surmised that Snapchat's gamification features promote high frequency usage by incentivizing users to increase their engagement by sending new material, responding to messages to others, and maintaining Snapstreaks. For example, "friend emojis" appear besides users' friends' names only if they snap each other regularly and when feedback is provided on when the material has been consumed by the recipient (Noe et al. 2019). Another study focused solely on the psychology of Snapstreaks found many instances of users sending images with black screens or simple messages, such as "good morning" or "good night" highlighting the motivational properties of gamification, compelling users to engage with the app (Hristova et al. 2022). This study also provides evidence that quantifying users' interactions increases investment in maintaining streaks, with motivation to maintain streaks growing stronger the longer the streak has been maintained (Hristova et al. 2022). Not only do these gamification features promote frequent user engagement, they also promote addiction (Noe et al. 2019; Hellman et al. 2013).

58. Moreover, social media features that impose social obligations (e.g., "Snapstreaks" and real-time messaging) further reinforce habitual engagement by creating perceived penalties

for disengagement. Over time, these reinforcement cycles cause SMU to become an entrenched habit and returning to the app becomes an automatic response to free moments, leading to increased overall SMU (Noe et al. 2013).

59. Adolescents with higher social anxiety and fear of missing out (FoMO) are particularly vulnerable to these reinforcement loops, exhibiting patterns of excessive use to ensure they feel socially included in the peer group and avoid feeling "out of the loop" (Jo & Baek, 2023). Indeed, FoMO has long been empirically known to be a strong driver of social media use (Przybylski et al. 2013; Davis & Goldfield, 2024). This indicates that self-presentation and peer feedback loops (i.e., posting material and awaiting reaction) are key mechanisms driving engagement.

5.2.3. ALGORITHMIC AGGREGATION AND AMPLIFICATION CONTENT

60. Defendants' social media platforms deploy sophisticated algorithms that personalize their information feeds to guide use. Studies show that these algorithms often aggregate and amplify material and that provokes strong emotional reactions, which sustains prolonged engagement (Lauer, 2021). This mechanism creates "engagement traps," wherein users, including vulnerable adolescents, are exposed to increasingly extreme experiences (Konijn et al. 2007; Plaisier & Konijn, 2013).

61. For example, as reflected in the literature, TikTok's algorithm is addictive. It obtains information via device settings from many sources (e.g., camera, microphone, Wi-Fi connection, contact list and user location) more rapidly than other social media platforms (Pedrouzo & Krynski, 2023). Indeed, an intriguing study revealed that TikTok's highly personalized algorithm driving compulsive use has a neurobiological basis. Su et al. (2021) experimentally examined how personally recommended videos on TikTok (selected from participants' private SMU feeds) modulated brain activity. Specifically, researchers used fMRI to visualize the brains of participants while they watched generic videos recommended to new TikTok users and personally recommended videos taken from participants' TikTok accounts. Participants had not viewed any of the videos before their brain scans. Su et al. (2021) found that user-specific videos activated the dorsolateral prefrontal cortex (dMPFC), posterior cingulate cortex (PCC), and bilateral parietal and temporal regions that collectively compose the default mode network (DMN). Moreover, personalized videos enhanced the functional couplings between DMN and primary visual and auditory regions as well as the frontoparietal network. In addition, both types of videos activated

salience networks that regulate motivational drive, but only personalized videos activated the ventral tegmental area (VTA), a region of the brain's reward system that controls reward processing, motivation and learning. Su et al. (2021) concluded; "these results suggest that the recommender algorithm can discover material to up-regulate the activity of a set of DMN subregions and VTA to reinforce video-watching behaviour. The DMN subregions might serve as the neural underpinnings of the high-level processing of personalized video perception. Su et al.'s data provided a new perspective in "understanding brain activity evoked by the presentation of personalized video, shedding light on the neural mechanisms underlying excessive video use and abuse."

62. TikTok's highly personalized algorithm, which rapidly adapts to user interests (Su et al. 2021) can exacerbate negative mental health conditions by aggregating and repeating a user's exposure to harmful experiences in response to momentary curiosity about, e.g., self-harm or eating disorders (Costello et al. 2023; Orben et al. 2024). Documented cases of adolescents being exposed to self-harm and suicide due to the algorithm makes clear that these recommender algorithms increase risks among vulnerable users (Arendt et al. 2019; Orben et al. 2024). As described throughout this report, this is not unique to TikTok and applies to all Defendants.

63. Recommender algorithms can also aggregate and present images—often manipulated with beautification features--that promote unrealistic beauty standards. A notable case involves Meta's internal research on adolescent mental health, which demonstrated that Instagram use was associated with increased body image concerns and depressive symptoms in teenage girls (Wells et al. 2021). This finding is in line with several studies showing body image problems are associated with social media use (Fioravanti et al. 2022; Holland & Tiggermann, 2016; Kleemans et al. 2016).

64. Features such as infinite scroll and video autoplay reduce natural stopping points, which leads to seamless consumption of material that promotes "flow" and time distortion, thereby prolonging user engagement. For example, one study on social media addiction found that a state of flow, characterized by total focus on the platform, was strongly linked to addictive use, and that habit formation was a direct pathway to dependency (Jo and Baek, 2023). All Defendants employed algorithms and infinite scroll to deliver personalized experiences to users to increase engagement and time spent on the apps.

5.2.4. DEFICITS IN EMOTIONAL REGULATION AND COGNITIVE CONTROL

65. Another key mechanism is the interplay between SMU and adolescents' ability to regulate their emotions and impulses. Adolescence is often marked by physical, neurophysiological, emotional, and social changes, as well as heightened emotions and stress (e.g., academic pressures, identity formation, peer drama). As such, adolescence is among the highest risk periods in human development for addiction and mental health problems. (Casey et al. 2008; Dayan et al. 2010; Somerville, 2013; Hazen et al. 2008; Solmi et al. 2022).

66. Empirical evidence suggests that SMU may serve as a maladaptive coping mechanism, wherein individuals engage in excessive use to alleviate negative emotional states, such as boredom, anxiety, depression or loneliness (Soares et al. 2023). Although this behaviour may provide temporary relief, SMU can exacerbate negative mood states through mechanisms such as unfavourable social comparison and displacement of healthier behaviours, as described in more detail below.

67. Deficits in emotion and self-regulation have been identified as both correlates and predictors of problematic social media use (Soares et al. 2023). In a large-scale study, individuals with poor emotion regulation skills exhibited significantly higher symptoms of social media addiction-like behaviours than those with stronger emotion regulation skills even after controlling for other variables, consistent with the larger addiction research (Elkin et al. 2025). Furthermore, impairments in executive function, particularly impulse control and delay of gratification, have been implicated in compulsive social media use. For example, young individuals exhibiting high delay aversion and poor inhibitory control were found to be 3 to 8 times more likely to develop problematic social media use (Soares et al. 2023).

68. Neuroimaging studies support these findings, demonstrating that excessive social media users exhibit increased neural reactivity to social media-specific reinforcement in brain reward regions coupled with diminished activation in regulatory control regions, indicative of impaired inhibitory processes (i.e., reduced impulse control) (Maza et al. 2023). The tendency to use social media excessively to modulate negative mood states reinforces higher usage and represents a classic addiction-like cycle (Peng & Liao, 2023; Nesi et al. 2021; Doron et al. 2014). In effect, the scientific evidence suggests that social media can both exploit and exacerbate pre-existing self-regulation and mental health problems, creating a vicious cycle.

5.2.5. DRIVERS SOCIAL MEDIA USE: CONCLUSIONS

69. Evidence from empirical academic research indicates that excessive and problematic social media use is driven by an interaction of neurobiological, psychological, and technological user-design mechanisms. Defendants' social media platforms exploit users' reward-learning systems through low-effort, high-reward stimuli and variable reward schedules; leverage the evolutionary drive for social connection by gamifying interactions, quantifying approval, and amplifying social pressure; use algorithmic personalization and infinite scroll that is devoid of stopping cues to fuel prolonged platform use; and capitalize on limited emotional regulation by promoting engagement as a form of mood modulation. Evidence from Defendants' internal research and documents, as described below, reveals that these companies were aware of the harm they cause but have failed to implement effective safeguards. Despite some platforms introducing superficial well-being features, such as "take a break" reminders, these measures do not address the fundamental design elements that elicit and sustain problematic use and can also easily be disabled or bypassed, similar to parent control features (Office of the Surgeon General, 2023). It is important to note that these mechanisms operate interdependently; for instance, design characteristics such as continuous feeds and intermittent social reinforcement via likes and push notifications amplify reward-seeking behaviour (i.e., social media engagement). Similarly, emotionally vulnerable adolescents with underdeveloped cognitive control mechanisms or experiencing mental distress/dysregulation are particularly susceptible to social media engagement (i.e., reinforcement) loops, compelling higher usage and increased risk of addiction.

5.3. <u>SYSTEMATIC REVIEW OF RELEVANT SCIENTIFIC LITERATURE</u>

5.3.1. EPIDEMIOLOGICAL EVIDENCE

5.3.1.1. <u>Mental Health Outcomes</u>

70. The assessment of psychological phenomena, including distress and disorder, has historically been approached through two primary conceptual frameworks: categorical and dimensional. The traditional categorical approach adopted by major taxonomic systems (DSM-5 and ICD-11) to psychological assessment relies on diagnostic criteria to determine the presence or absence of a specific disorder (e.g., major depressive disorder, generalized anxiety disorder, etc.). While this system offers a common language for clinicians and researchers and can facilitate diagnostic reliability to some extent, it has long been heavily criticized for constricting the range

of clinical information that is critical for comprehensive treatment planning, understanding prognosis, and effectively monitoring treatment outcomes (Narrow & Kuhl, 2011). Conversely, the dimensional approach conceptualizes psychopathology as symptoms that exist along a continuum of frequency, severity and/or intensity (Pickles & Angold, 2003).

71. There are numerous conceptual and empirical aspects of a dimensional approach that support its validity over a categorical approach. First, psychological disorders, as defined by prevailing diagnostic systems like the DSM-5 and ICD-11, are fundamentally characterized by clusters of symptoms—that is, specific thoughts, feelings, behaviors, or physiological changes—that cause clinically significant distress or impairment in social, educational, occupational, or other important areas of functioning (Wesselhoef et al. 2013; Shankman et al. 2017). Symptoms are the observable and reportable manifestations of underlying psychological states; they are the very indicators clinicians use to identify the presence and nature of a disorder. The entire edifice of psychiatric diagnosis rests upon the systematic evaluation of symptoms. To claim that symptoms are not reflective of disorders is to ignore the foundational principles of psychopathology (Pickles & Angold, 2003). If symptoms were indeed irrelevant to the definition of disorders, the diagnostic process itself would be rendered meaningless (Pickles & Angold, 2003).

72. The categorical approach conflates the absence of a full-blown, diagnosable disorder with an absence of any harm whatsoever. This represents a fundamental misunderstanding of how psychological distress and dysfunction are conceptualized and assessed in clinical science (Witiger & Samuel, 2005). Emphasizing the spectra of experience over all-or-nothing diagnostic labels reduces stigma often associated with psychiatric diagnoses or "labels" (WHO, 2022). Conceptualizing mental health and psychopathology as binary (sick vs. well) obscures real harm, which encompasses a wide range of negative experiences, including subjective distress, functional limitations, and reduced wellbeing or quality of life (Witiger & Samuel, 2005; Wesselhoeft et al. 2013). These can occur at varying levels of severity, many of which may not meet the stringent, and sometimes arbitrary, cut-offs required for a formal diagnosis. For example, in childhood, the DSM-5 criteria for ADHD requires 6 of 9 symptoms to be met (12 of 18 for the Combined Inattentive/Hyperactive Impulsive subtype). However, arguing that someone who is exhibiting 5 of 9 symptoms is not experiencing impairment or harm is fallacious and lacks empirical support (Witiger & Samuel, 2005).

73. Indeed, symptoms of depression and anxiety in childhood, for example, that fall below the diagnostic threshold have long been empirically associated with functional impairment and shown in longitudinal studies to markedly increase the risk of future episodes that meet the diagnostic criteria (Angold et al. 1999; Wesselhoeft et al. 2013; Fergusson et al. 2005; Rodriguez et al. 2012). Furthermore, a recent systematic review and meta-analysis of 2- to 17-year-olds showed that general psychopathology symptoms remained consistent from childhood into adolescence, indicating that even subclinical symptoms reflect an enduring pattern of distress rather than transient or episodic features (Harris et al. 2024).

74. Relying solely on a categorical approach to diagnoses has been heavily criticized as being conceptually and empirically inadequate to reflect ongoing advances in genetics, neuroscience, cognitive science and behavioural systems, which impedes the study of etiology, treatment and prevention of mental health disorders (Cuthbert & Insel, 2013). Leading psychiatric manuals—DSM 5 and ICD-11—now include severity specifiers where clinicians rate the intensity of symptoms, reflecting the favourability of the dimensional approach and underscoring the shortcomings of exclusively relying on a categorical model (APA, 2013; WHO, 2022). Moreover, section III of the DSM-5, "Merging Measures and Models," shows how firmly the dimensional approach is embedded in routine clinical practice, as it focuses on rating dysfunctional personality traits rather than simply evaluating diagnoses, an approach that helped define stylistic features that characterize individuals with personality disorders, including the severity of maladaptive expressions (Pires et al. 2021).

75. The Structured Clinical Interview for DSM (SCID), widely considered a gold-standard semi-structured interview for categorical diagnoses, has been successfully modified to yield dimensional severity scales for a range of disorders, including major depression, anxiety disorders, and substance use disorders (Shankman et al., 2017). These SCID-derived dimensional scales demonstrated "superior" psychometric characteristics—including reliability and validity—compared to the traditional categorical diagnoses derived from the same instrument, for both current and lifetime psychopathology. (Shankman et al. 2017). This finding was confirmed in a meta-analysis in which "psychopathology," defined dimensionally, demonstrated 15% greater reliability and 37% greater validity compared to when it was assessed categorically (Markon et al. 2011), a pattern of findings that has been replicated in more recent systematic reviews and meta-analyses (Ringwald et al. 2021; Haslem et al. 2020). These findings are critical, as they

demonstrate that dimensional symptom assessment approaches can enable clinicians and researchers to achieve more accurate and reliable assessments, resulting in better-informed treatment planning and sensitive monitoring of treatment outcomes.

76. Furthermore, studying the impact of environmental exposures such as social media use on diagnosed mental disorders at the population level is infeasible – administering structured diagnostic interviews to each study participant is labour intensive and expensive, which undermines the utility of epidemiological research (Lash et al. 2021). The absence of such impractical diagnostic approaches, therefore, should neither be interpreted as an absence of harm nor used to discredit evidenced-based dimensional approaches. Indeed, if only truly diagnostic approaches were used in the study of social media (and other environmental exposures) and mental health, a very limited number of studies would exist, crippling our understanding of these relationships, their pathways, which populations may be most harmed, and the reasons why.

77. The complex and often subtle ways in which social media engagement can affect psychological well-being requires assessment methods that can capture nuance and variability. Dimensional approaches are particularly well-suited to this task, moving beyond simplistic metrics to explore the multifaceted nature of online experiences and their psychological effects. Reflecting this need for nuance, researchers have increasingly adopted or developed dimensional tools to assess various facets of social media use and its psychological correlates.

78. Instruments like the Bergen Social Media Addiction Scale (BSMAS) assess addiction-like symptoms (e.g., mood modification, salience, tolerance, withdrawal, conflict, relapse) on a continuum (Andreassen et al. 2016). This allows for the identification of individuals experiencing varying degrees of problematic engagement, rather than a simple "addicted" versus "not addicted" dichotomy. Studies using such scales report a range of prevalence estimates for problematic or addictive social media use, underscoring that this is itself a dimensional concept. Conceptualizations of maladaptive use have evolved to include constructs beyond mere overuse, such as risky use and individual impairment. As shown below, several meta-analyses found that higher scores on problematic social media use were cross-sectionally and prospectively associated with a broad spectrum of psychological harms characterized by elevated symptoms of anxiety, depression, loneliness, body image dissatisfaction, and suicide and self-harm, reinforcing the idea that sub-clinical symptoms can be markers of psychological impairment.

79. Recognizing the limitations of unidimensional measures of use, researchers have developed scales that assess multiple facets of social media engagement. For example, the Social Media Scale (SMS) was created to measure various dimensions of adolescents' social media use, including impression management, experiences of hostility from others, social comparison, fear of social exclusion, seeking pleasure, connecting with others, passing time, seeking support, and expressing hostility towards others (Twivey et al. 2025). This study found that specific factors—notably social comparison and using social media to pass time—were uniquely and strongly associated with depression, explaining a substantial portion of its variance, far more than generic use measures could. (Twivey et al. 2025). This highlights that specific *types* of engagement, measurable dimensionally, are critical.

80. Standardized dimensional measures of psychological distress, such as the Depression Anxiety Stress Scale-21 (DASS-21), Center for Epidemiological studies (CESD), Generalized Anxiety Disorder Scale, etc., and their various short forms, are frequently employed in research investigating the mental health harms of social media use, as described above and below. These scales provide continuous scores for symptoms of depression, anxiety, and stress, allowing researchers to examine how different aspects of social media use relate to varying levels of psychological distress, rather than just the presence or absence of a disorder that is often arbitrarily established based on number of symptoms.

81. Many studies in SMU employed validated questionnaires with clinical cut-off scores that are indicative of disorders or sub-threshold disorders, such as problematic social media use scales, or social media addiction scales, as well as anxiety, depression and eating disorders. The consistent pattern of findings between categorical and the more widely used dimensional approaches to assessing psychopathology validates the dimensional approach and highlights the robust finding that SMU causally contributes to clinically significant psychological harms, as described in greater detail below.

5.3.1.1.1. Overview

82. Over the past decade, many observational studies have quantified the association between SMU and various mental health outcomes in several population groups. The evidence has been summarised in more than 40 reviews – both scoping and systematic – that were further discussed in three overviews (i.e., umbrella reviews). Orben (2020) synthesized findings from 23 reviews, while Valkenburg et al. (2022) examined 25 reviews, including seven meta-analyses, nine

systematic reviews, and nine narrative reviews. Interestingly, the interpretations and conclusions of these narrative umbrella reviews differ. Older reviews (Orben, 2020) suggest that social media use (SMU) is linked to mild harm on negative affect indicators, with inconsistent effects on well-being and social indicators. In contrast, a newer review (Sala, 2024) based on more studies concludes that SMU poses a greater risk of psychological harm.

83. An alternative, more quantitative and objective approach to synthesizing findings and estimating effect sizes from empirical studies is meta-analytic reviews. Meta-analyses have the advantage of pooling effect sizes on outcomes across studies by converting effect sizes from individual studies to standardized scores on outcomes, thus allowing them to be compared to other studies, even if different measures of the same construct were used (e.g., different depression questionnaires). By aggregating and pooling the data derived from a systematic review, a well-done meta-analysis essentially increases the precision and certainty of statistical inferences. The resulting single best estimate of effect or association is a methodological gold standard used to inform clinical, public health and policy decision making within an evidenced-based framework (Vetter, 2019). However, methodological rigor is critical in meta-analyses, and poorly conducted ones can be misleading or not meaningful, as will be discussed below in the methodological considerations.

84. The summary of pooled effects from meta-analyses between SMU, PSMU and mental health outcomes are presented and discussed in Tables 2 and 3.

5.3.1.1.2. Conceptualizations of SMU, PSMU, and Mental Health Outcomes

85. Overall, SMU and PSMU were iklmeasured through usage duration, frequency/intensity of use, assessed predominantly by questionnaires/scales. In addition to SMU and PSMU, some studies have measured other variables, such as network size, number of clicks etc. (Yin et al. 2019; Huang, 2022).

86. Several studies used a broad and sometimes even boundless operational definition of mental health, which led to the inclusion of a multitude of outcomes including well-being, loneliness, and fear of missing out. Huang et al. (2021) and Yin et al. (2019) lumped together components like life satisfaction and self-esteem to create an aggregated measure of well-being outcome. They also combined depressive symptoms and loneliness to create an aggregated measure of mental health outcome.

5.3.1.2. SMU and Mental Health Outcomes

87. A total of 17 meta-analyses published in the last five years (2020-2025) examining studies published between 2010-2024 evaluated the association between SMU and mental health outcomes (Table 2). The studies yield 35 effect sizes encompassing a sample size of 1,314,610 people. Eighty percent (28 of 35) of the studies reported Pearson's correlation coefficient "r" as effect size. Five studies reported "Hedges' g", one study reported "Fisher Z", and one study reported "odds ratio" (OR). For interpretation purpose, Hedges' g, Fisher Z, and odds ratios were converted to Pearson's correlation r. The number of studies included in the analyses for each outcome ranged from 3 to 90 and the number of people involved in the analyses for each outcome ranged from 859 to 479,215.

Table 2. Pooled correlations between SMU and mental health outcomes

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Ahmed et al. 2024						
Depression	42	47,975	r	**0.102 (0.074, 0.130)*** **		86.52
Anxiety	18	24,657	r	**0.136 (0.083, 0.188)*** **		92.00
Well-being	7	4,273	r	0.004 (-0.175, 0.184)		97.01
Cunningham et al. 2021						
Depression	44	414,231	r	**0.11 (0.086, 0.13)*** **		96.65
Ferguson et al. 2025						
Mental health problems	79	NR	r	**0.061 (0.047, 0.075)*** **		98.80
Fioravanti et al. 2021						
FoMO	19	11,280	Fisher Z	**0.32 (0.23, 0.42)*** **	**0.31**	95.73
Vahedi & Zannella, 2021						
Depression	55	80,533	r	**0.165 (0.13, 0.20)*** **		NR
Marciano et al. 2024						
Hedonic well-being	23	NR	r	-0.01 (-0.09, 0.07)		93.00
Huang et al. 2021						
Mental health	21	4,331	Hedges' g	-0.27 (-0.73, 0.18)	-0.13	NR
McComb et al. 2023						
Self-esteem	NR	NR	Hedges' g	**-0.21 (-0.31, -0.10)*** **	**-0.10**	NR
Mental health	NR	NR	Hedges' g	**-0.21 (-0.34, -0.09)*** **	**-0.10**	NR
Subjective well-being	NR	NR	Hedges' g	**-0.19 (-0.27, -0.11)*** **	**-0.09**	NR
Overall	48	7,679	Hedges' g	**-0.24 (-0.29, -0.19)*** **	**-0.12**	40.03
Ferguson et al. 2021						
Mental health problems	6	NR	r	**0.043 (0.004, 0.082)* **		57.2
Ivie et al. 2020						
Depressive symptoms	12	NR	r	**0.12 (0.04, 0.20)** **		97.38
Zhang et al. 2022						

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Loneliness	90	48,383	r	**0.052 (0.004, 0.100)***		96.39
Liu et al. 2022						
Depression risk	26	55,430	OR	**1.60 (1.45, 1.75)***	**0.13**	72.6
Marciano et al. 2021						
Ill-being	11	NR	r	**0.171 (0.50, 0.286)***		96
Well-being	6	NR	r	-0.051 (-0.194, 0.095)		89
Yang & Feng, 2024						
Time using SNS and subjective well-being	19	6,777	r	-0.002 (-0.044, 0.041)		62.506
SNS use frequency and subjective well-being	9	14,542	r	0.049 (-0.066, 0.163)		96.101
SNS use intensity and subjective well-being	24	10,483	r	**0.064 (0.013, 0.114)***		84.358
Nan et al. 2024						
Social anxiety	27	38,163	r	**0.14 (0.06, 0.22)***		94.74
Wong et al. 2024#						
Affective state	5	NR	r	-0.07 (-0.18, 0.04)		NR
Anxiety	17	NR	r	-0.05 (-0.13, 0.03)		NR
Composite well-being	7	NR	r	-0.09 (-0.20, 0.02)		NR
Depression	13	NR	r	**-0.20 (-0.28, -0.12)***		NR
Life satisfaction	3	NR	r	0.21 (-0.40, 0.82)		NR
Stress	13	NR	r	**-0.11 (-0.15, -0.07)***		NR
Loneliness	17	NR	r	**-0.10 (-0.05, -0.07)***		NR
Fassi et al. 2024						
Mental health symptoms	4	859	r	**0.12 (0.09, 0.15)****		82.67
Internalizing symptoms (community)	49	479,215	r	**0.12 (0.09, 0.15)*****		98.23
Internalizing symptoms (clinical)	NR	NR	r	**0.08 (0.01, 0.15)***		57.83
SM engagement and mental health symptoms (community)	62	65,799	r	**0.12 (0.09, 0.15)****		98.23
SM engagement and mental health symptoms (clinical)	NR	NR	r	**0.14 (0.10, 0.18)*****		82.67

*p<.05, **p<.01, ***p<.001

Note. Converted *r* indicates effect sizes converted to correlation. SNS=social networking site; SM=social media.

positive direction of effect reported by Wong (2024) represent hypotheses that SMU would be associated with better well-being are met (+) and negative correlations represent direction of effects that oppose the hypotheses (-); thus, the direction of association is NOT the actual direction of meta-correlations. Indeed, Wong found higher SMU was associated with higher depression, stress and loneliness.

5.3.1.2.1. Main Findings of the Meta-Analyses

88. As Table 2 shows, a total of 35 effect sizes were reported from the 17 meta-analyses (N=1,314,610). Of these 35 effect sizes, 71% were found to be significant. Based on the Funder & Ozer benchmark, of the 25 studies that showed significant effect sizes, 1 fell below the threshold (r<0.05), 5 were classified as very small (0.05≤r<0.10), 17 as small (0.10≤r<0.19), 1 as medium (0.20≤r<0.29), 1 as large (0.30≤r<0.39), and none reached the very large category (r≥0.40).

89. Based on the direction of the associations, 96% (24 of 25) of the significant effects show that SMU is associated with higher levels of mental health problems (e.g., depressive symptoms and anxiety, N=20) or lower levels of well-being and life satisfaction (N=4). Only one effect suggested beneficial association for well-being (Yang & Feng, 2024), which appeared to be mediated by increased perceived social support, although the effect was considered not meaningful. Of those that indicate that SMU is associated with higher levels of mental health problems, 1 fell below the threshold ($r<0.05$), 3 effect sizes fell into the very small category, 14 fell into the small category, 1 fell into the medium category, 1 fell into the large category (FoMO, $r=0.31$), and none fall into the very large category.

90. No effects showed found that SMU was associated with benefits to mental health. Among the 20 studies showing SMU is associated with poorer mental health, 80% (16 of 20) reported small-to-moderate effects sizes, as defined by Funder & Ozer's benchmark of meaningful correlations at the population level. Of those that indicate that SMU is associated with lower levels of positive mental health indicators (i.e., well-being, N=4), 1 effect size fell into the very small category and 3 fell into the small category. According to Funder & Ozer benchmark, 75% (3 out of 4) are meaningful at the population level. Overall, 34 out of 35 meta-analyses found a positive association between SMU and mental health harms, highlighting a universal pattern that is buttressed by application of quantitative objective analytic techniques.

5.3.1.2.2. Strength of the Associations

91. Results indicate that the effects of SMU on mental health are generally small, but the majority (n=25 of 35) are statistically significant (i.e., $p<0.05$). For example, many meta-analytic studies on the relationship between SMU and depressive symptoms reported small but significant effect sizes of $r=0.11$ (Cunningham et al. 2021), $r=0.11$ (Ivie et al. 2020) and $r=0.17$ (Vahedi & Zannella, 2021) respectively. This suggests that the effect sizes significantly predict lower well-being.

92. A few meta-analytic studies have reported large associations between SMU and mental health outcomes. For example, a 2021 meta-analysis of 19 studies conducted by Fioravanti et al. showed a large and positive correlation between SMU and FoMO ($r=0.31$ from a conversion of Fisher's $Z=0.322$). A recent meta-analysis by Wong et al. 2024 found that SMU had a moderate effect on depression ($r=0.20$) and life satisfaction ($r=0.21$), though significant for depression only.

93. Many methodological limitations undermine the validity of some of the meta-analyses and contribute to the heterogeneity of findings. Research has shown that inappropriate pooling of outcome variables (e.g., well-being, loneliness, fear of missing out, etc.) and of certain sample characteristics, as well as the heterogeneity across studies likely underestimates the effect sizes reported in meta-analyses. For example, Ferguson et al. (2025) pooled a wide range of psychosocial outcomes under the umbrella of "mental health" and reported an effect size (r=0.043) that suggest no association between SMU and mental health outcomes. However, Ahmed et al. (2024) found that SMU was significantly associated with mental health outcomes such as depression (r=0.102) and anxiety (r=0.136), but not well-being (r=0.004). From this example, it can be assumed that if these three outcomes are pooled, well-being effect size would dilute the true effect of SMU on negative mental health indicators (anxiety/depression) or at least pull downward the overall effect size. It is not surprising therefore that an umbrella narrative review by Valkenburg (2022) showed that the use of aggregated outcomes yielded inconsistent associations with SMU, yet even this conclusion is puzzling given the meta-analysis indicated that about 80% of studies show adverse associations with mental health and well-being. This highlights the subjectivity involved in narrative reviews, reinforcing the more objective analyses demonstrated by meta-analysis, at least when done in a rigorous manner. Moreover, mental health theories indicate that low well-being (e.g., low life satisfaction) does not necessary imply a mental health problem (e.g., enduring depressive symptoms) and vice versa. In other words, experiencing mental health problems is not simply the flip side of poor well-being and good well-being is simply not the absence of mental illness; both constructs (mental distress and well-being) are distinct and therefore both groups of outcomes should be analyzed separately (Keyes, 2006; Kross et al. 2021).

94. Data shows that the effects are generally stronger for negative indicators for mental health, such as depressive symptoms or anxiety, and weaker for positive indicators such as well-being and life satisfaction. Almost all (90%) of the meta-analyses showed adverse associations with mental health and well-being.

95. At first glance, the slightly larger effect size found by Fassi et al. (2024) for the relationship between SMU and internalizing symptoms (i.e., anxiety/depression) in community samples (r=0.12) compared to clinical samples (r=0.08) is surprising given the longitudinal evidence that SMU predicts poor mental health, but also that poor mental health predicts higher SMU (Frison & Eggermont, 2017; Houghton et al. 2018). Moreover, those with anxiety and

depression face social isolation, lower self-esteem, and heightened susceptibility to peer influence, negative feedback, and rumination, which may alter SMU and its impact on mental health (Orben et al. 2024). However, Fassi et al. acknowledged several limitations in their review that warrant caution when interpreting this effect. First, they acknowledge that only 8% of the studies were based on clinical samples, and they call for further research to gain a clearer understanding of the effects in clinical populations. More importantly, however, they acknowledge that the correlation in the clinical sample underestimates the true effect due to reduced variability in both the exposure variable (i.e., SMU) and the outcome (i.e., anxiety and depression scores). Distressed patients showed greater SMU, and all patients exhibited high distress (i.e., celling effect), which is why they presented for treatment and are classified as a clinical sample. In epidemiology, when variability of exposure and/or outcome is severely truncated, correlations will be artificially lower (Lee & Pickard, 2013). Community samples will contain greater variability of both SMU and internalizing symptoms, naturally increasing the magnitude of correlations. Another interesting finding from Fassi et al. relates to how SMU was used, rather than solely relying on studying duration, the most widely used measure of SMU. They found slightly stronger meta-correlations for engagement in both clinical and community samples compared to SMU duration, and these relationships were moderated by user perception, but not by active or passive use, or activity.

96. A follow-up study by this team addressed many of the above-noted limitations in a large UK sample of youth (N=3342) and found that those with diagnosed mental health conditions spent significantly more time on social media compared to youth without a mental health diagnosis, and the effect size was moderate and clinically meaningful (Fassi et al. 2025). Consistent with authors' hypotheses, those with internalizing disorders spent more time on social media than those with externalizing disorders. Moreover, Fassi et al. (2025) found that youth with mental health disorders reported significantly lower happiness with the number of online friends and higher social comparisons (and other qualitative aspects of SMU) than those without disorders. Taken together, findings from Fassi et al. (2025) indicate quantity of SMU is a strong risk factor for mental health disorders, and not just symptoms, in youth, and/or perhaps youth with a wide range of disorders are more vulnerable to excessive use and dissatisfaction with many aspects of use.

5.3.1.2.3. SMU and Mental Health: Cross-Sectional vs. Longitudinal Studies

97. Longitudinal studies can offer better insights into causal relationships between social media use and mental health outcomes compared to cross-sectional studies, which only show associations (Caruana et al. 2015). As such, when synthesizing findings, meta-analyses should report separate effect sizes for cross-sectional and longitudinal studies, which helps highlight the distinction between simple associations and potential causal effects. However, the combined effect sizes from both study types can vary. Cross-sectional studies might report smaller or more inconsistent effect sizes due to methodological limitations, whereas longitudinal studies, tracking the same subjects over time, can provide more robust and consistent findings over time (Caruana et al. 2015). However, it's important to note that the methodological quality, sample size, and specific mental health outcomes being studied can also influence these results. It's worth noting that reverse causality can also be observed, in that youth with baseline mental distress sometimes increase their social media use over time (possibly seeking support or distraction online), showing the potential for bidirectionality. As discussed below, though such an effect has been observed, it is not likely the reason for the increase in negative mental health outcomes observed with SMU.

98. Results from the meta-analyses published over the past five years suggest that the strength of the association between SMU with both negative and positive indicators for mental health are comparable between cross-sectional and longitudinal studies. For example, Ahmed et al. (2024) conducted a meta-analysis of 98 studies reporting the associations between SMU and mental health outcomes in almost 102,683 adolescents aged 10 to 24 years. They found that SMU was significantly associated with greater odds of depression and anxiety, and that the effect of SMU on depression was larger in longitudinal studies (n=10, r=0.144) compared to cross-sectional studies (n=35, r=0.090). They also found that the effect of SMU on anxiety was similar between cross-sectional studies (n=14, r=0.138) and longitudinal studies (n=4, r=0.134). More importantly, Ahmed et al. 2024 tested reverse causality and found that this path (i.e., anxiety and depression predicting increased SMU at follow-up) was not significant. Similar findings were reported by a meta-analysis of 26 studies conducted by Liu et al. (2022) which found that the associations between time spent on social media and depression risk was similar between cross-sectional studies (n=21, OR=1.61) and longitudinal studies (n=5, OR=1.57). A previous meta-analysis of 37 studies by Ferguson et al. (2021) also found that the association between screen use more generally

and a global measure of mental health was similar between cross-sectional studies (n=25, r=0.051) and longitudinal studies (n=12, r=0.055). Collectively, there is considerable evidence from multiple systematic reviews showing higher levels of SMU in children and adolescents are longitudinally associated with a greater risk of developing mental health problems, such as depressive symptoms and anxiety. The longitudinal relationship establishes clear directionality in which higher SMU leads to higher emotional distress, thus reverse causation cannot explain these relationships.

99. Overall, studies included in the meta-analyses examining the association between SMU and mental health outcomes adjusted for confounding variables and for baseline mental health in longitudinal studies. For example, Liu et al. (2022) accounted for age, gender, ethnicity, family income, etc. in their meta-analysis. Fergusson et al. (2022) found that 62.2% of studies (n=23 of 33) included in their meta-analysis adjusted for confounding variables, including age, gender, family environment, and baseline mental health for longitudinal studies. They further found that the effect size was stronger for studies that did not use controls (β=0.064) and weaker for those with controls (β=0.038), although neither exceeded the threshold of r=0.10, suggesting that neither effect is meaningful. These findings suggest that studies that did not adjust for confounding variables tend to report stronger effect size than those that did.

100. Our systematic review was able to locate a meta-analysis examining the impact of SMU on mental health and loneliness during the COVID-19 pandemic when public health policy mandated quarantines, lockdowns, school closures, curfews and strict social distancing, hindering in-person socialization for sustained periods of time globally. It is well known that mental health problems increased dramatically during the pandemic, as did social media given digital communication was the main, and sometimes the only, method for youth to socially interact. Given these factors, Wong et al. (2024) hypothesized that higher SMU would be associated with better emotional well-being, characterized as less depression, stress and higher affective state, life satisfaction and overall well-being. Strikingly, results indicated that even in the context of COVID-19 in-person social restrictions, higher SMU was significantly associated with higher levels of depression, stress, and even loneliness, and although the direction of association on all other outcomes of well-being were in the negative direction, they did not achieve significance. These results clearly highlight that even in the context of severe social isolation, greater SMU is

associated with psychological harms—not benefits--indicating that online interaction is not an effective substitute for in-person social interaction.

101. Research has shown that effect sizes are larger on certain sample characteristics and measures. For example, Yin et al. (2019) found a larger effect size on the association between SMU and mental health outcomes in collectivist cultures than in individualistic cultures. They also found a larger effect size for the association between SMU and mental health outcome among females than males. The authors also found a larger effect size for the association between network size with well-being (r=0.13) than that of network size with aggregated mental health outcomes (r=−0.03). The study also found that this association significantly differed by social media platforms, with studies on Instagram reporting stronger adverse associations than those reporting on Facebook or other specific social media platforms.

102. Evidence has also shown that effect sizes vary with the types of SMU behaviours. SMU can be categorized into active use (e.g., posting material and interacting), passive use (e.g., browsing and scrolling), private use (one-to-one), and public use (one-to-many). Active use is generally viewed as more adaptative, whereas passive use is viewed as negative or neutral. According to the active SMU and passive SMU hypotheses, active SMU (e.g., posting, sending messages) leads to increases in well-being and decreases in ill-being, because it elicits likes and support, whereas passive SMU (e.g., browsing, reading messages) results in decreases in well-being and increases in ill-being because it induces more social comparison and envy (Verduyn, 2017). However, a recent critical scoping review by Valkenburg et al. (2022) yields limited support for either hypothesis. However, in their meta-analysis of 141 publications and 897 effect sizes from a population of nearly 150,000 participants, Godard and Holtzman (2024) found that active SMU was associated with greater benefits and passive SMU with more harm. Nevertheless, active use was still correlated with social anxiety, likely due to anxiety about how their posts would be evaluated by peers. Similarly, a meta-analysis by Meier and Reinecke (2021) found that active SMU is significantly associated with greater symptoms of anxiety. However, in contrast to predictions made by the extended active-passive use framework, Godard and Holtzman (2024) did not find significant differences in effect sizes between measures of private, public, and general active SMU, yet a previous study by Thorisdottir et al. (2019) found that passive SMU was more strongly related to symptoms of depressed mood among female adolescents even after controlling for family structure, relative deprivation, parental support and time spent on social media.

5.3.1.2.4. Quality Assessment

103. The meta-analyses included in this review varied in their approach to assessing study quality and risk of bias, with several studies not reporting their quality assessment. Among those that did, different tools were utilized. Ahmed et al. (2024) assessed studies using a modified Newcastle-Ottawa scale (0-10), finding that most studies were of moderate to high quality (39.0% moderate, 46.7% high, 14.3% low). Several studies relied on structured checklists, such as Marciano et al. (2024), who used the STROBE checklist, reporting quality scores ranging from 22 to 40 (median=31), indicating moderate quality, on average. Marciano et al. (2021) also used STROBE, with total scores between 0 and 11, where five studies scored 10 and 25 studies scored 11, categorizing this meta-analysis as high quality. Importantly, Marciano's effect sizes for ill-being in the high-quality review were significantly stronger ($r=-0.17$, $p<0.001$) compared to the meta-analysis on mostly moderate quality studies. McComb et al. (2023) adapted the Downs and Black Quality Assessment Checklist, with an average methodological quality score of 15.26 out of 20, classifying it as moderate quality. Ivie et al. 2020 used the NHLBI Quality Assessment Tool, reporting a mean score of 16 out of 18, indicating high quality. Liu et al. (2022) applied MOOSE and STROBE guidelines, rating studies on an 8-point scale, with scores ranging from 3 to 7 and 19 studies scoring above 5, suggesting moderate quality. Fioravanti et al. (2021) assessed studies based on three psychometric criteria, with 32 studies meeting two out of three, categorizing them as higher quality. Lastly, Fassi et al. (2024) classified 55% of studies as acceptable quality and 45% as questionable quality using the Quality of Survey Studies in Psychology Checklist, overall indicating moderate quality. Overall, the quality assessment of the included meta-analyses varied widely in methodology and reporting, but most studies were classified as moderate to high quality, with some concerns about risk of bias in certain cases. However, it is important to note that in the only 3 meta-analyses rated as high quality, all three reported that more SMU was significantly correlated with higher symptoms of anxiety, depression, and FoMO, with effects ranging from small to large (Marciano et al. 2021; Ivie et al. 2020, Fioravanti et al. 2021).

5.3.1.2.5. SMU and Mental Health Outcomes: Conclusions

104. Taken together, the meta-analyses offer compelling evidence that social media use is causally linked to negative mental health outcomes. Across over 1.3 million participants, a clear pattern emerges: the vast majority of effect sizes, while small, are statistically significant and consistently point in the direction of harm. Notably, 88% of the studies reviewed found that greater

SMU is associated with increased symptoms of depression, anxiety, and fear of missing out, or with lower well-being and life satisfaction. Most importantly, the three highest-quality meta-analyses all report significant and meaningful associations, with some effect sizes reaching moderate to large magnitudes. While methodological variability exists, the weight and consistency of the evidence clearly establishes that SMU negatively impacts mental health.

5.3.1.3. PSMU and Mental Health Outcomes

105. As outlined in Table 3, 12 meta-analyses published in the last five years evaluated the association between PSMU and mental health outcomes. The studies yield 46 effect sizes encompassing a sample size of 1,166,773 people. Almost 90% (41 of 46) of the studies reported Pearson's correlation coefficient "r" as effect size. Five studies reported "Hedges' g" that were converted herein to Pearson's correlation r for interpretation purpose. The number of studies included in the analyses for each outcome ranged from 1 to 136 and the number of people involved in the analyses for each outcome ranged from 236 to 779,884.

Table 3. Pooled correlations between PSMU and mental health

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Ahmed et al. 2024						
Depression	33	23,966	r	**0.297(0.253, 0.341)*** **		90.59
Anxiety	12	10,020	r	**0.278 (0.221, 0.336)*** **		84.5
Well-being	3	2,842	r	**-0.246 (-0.352, -0.140)*** **		87.92
Cunningham et al. 2021						
Depression	20	36,975	r	**0.29 (0.23, 0.35)*** **		95.49
Shannon et al. 2022						
Depression	11	6,038	r	**0.273 (0.215, 0.332)*** **		83.2
Anxiety	9	5,932	r	**0.348 (0.270, 0.426)*** **		91.6
Stress	6	3,872	r	**0.313 (0.203, 0.423)*** **		92.6
Fioravanti et al. 2021						
FoMO	20	14,314	Fisher Z	**0.49 (0.43, 0.55)*** **	**0.454**	92.91
Huang et al. 2022						
Well-being	85	218,118	r	**-0.16 (-0.20, -0.13)***		NR
Happiness	4	1,478	r	**-0.30 (-0.38, -0.21)***		NR
Life satisfaction	30	168,771	r	**-0.11 (-0.18, -0.03)***		NR
Positive affect	3	655	r	**-0.18 (-0.34, -0.01)***		NR
Mental Health	2	471	r	-0.29 (-0.71, 0.28)		NR
Self-esteem	42	45,309	r	**-0.17 (-0.22, -0.13)***		NR
Overall well-being	3	1434	r	-0.29 (-0.65, 0.17)		NR
Distress	136	128,371	r	**0.27 (0.25, 0.29)***		NR
Anxiety	17	32,896	r	**0.30 (0.25, 0.35)***		NR

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Depression	59	59,034	r	**0.31 (0.28, 0.33)***		NR
Overall distress	4	2,033	r	**0.27 (0.01, 0.49)***		NR
Loneliness	29	18,248	r	**0.21 (0.17, 0.25)***		NR
Negative affect	4	1,397	r	0.08 (-0.29, 0.44)		NR
Social anxiety	17	13,033	r	**0.30 (0.24, 0.35)***		NR
Social loneliness	2	1,070	r	0.19 (-0.76, 0.88)		NR
Suicidal ideation	3	660	r	**0.18 (0.02, 0.34)***		NR
Marciano et al. 2024						
Well-being	19	NR	r	**-0.13 (-0.20, -0.06)***		99.00
Longitudinal effect of PSMU on well-being	5	NR	r	-0.07 (-0.17, 0.02)		99.00
Akbari et al. 2021						
Problematic Facebook use and FoMO	11	8,339	r	**0.35 (0.27, 0.42)***		92.85
Problematic Instagram use and FoMO	3	1,019	r	**0.49 (0.32, 0.64)***		91.63
Du et al. 2024						
Generalized anxiety	68	126,688	Fisher Z	**0.388 (0.362, 0.413)*****	**0.370**	95.87
Social anxiety	44	65,410	Fisher Z	**0.437 (0.395, 0.478)*****	**0.411**	96.92
Attachment anxiety	22	11,580	Fisher Z	**0.345 (0.286, 0.402)*****	**0.332**	92.07
FoMO	75	48,659	Fisher Z	**0.496 (0.461, 0.529)*****	**0.459**	95.99
Sepas et al. 2024						
PIU and depression	4	1,119	r	**0.39 (0.30, 0.48)***		64.13
PIU and anxiety	5	1,542	r	**0.36 (0.26, 0.45)***		75.54
PIU and other psychological distresses	2	236	r	**0.47 (0.37, 0.57)***		0.00
PIU and negative symptoms	1	542	r	**0.36 (0.26, 0.46)***		29.48
PIU and general well-being	1	752	r	**-0.20 (-0.26, -0.13)***		NR
IU and depression	9	6,580	r	**0.12 (0.06, 0.18)***		72.64
IU and anxiety	12	3,282	r	**0.13 (0.04, 0.23)***		83.46
IU and other psychological distresses	12	4,848	r	**0.15 (0.08, 0.22)***		82.55
Passive IU and negative symptoms	8	1,132	r	0.064 (-0.017, 0.15)		45.57
Active IU and negative symptoms	8	1,874	r	**0.081 (0.012, 0.15)***		52.33
IU and general well-being	8	3,511	r	**–0.05 (-0.09, -0.01)***		0.00
Wu et al. 2024						
Social anxiety	56	59,923	r	**0.335 (0.304, 0.365)*****		92.91
Yigiter et al. 2024						
Depression	38	14,935	r	**0.321 (0.283, 0.358)***		84.48
Rajesh et al. 2022						
Loneliness	19	7,865	r	**0.231 (0.186, 0.274)****		74.9

*p<.05, **p<.01, ***p<.001 Main findings of the meta-analyses: Anxiety and Depression

Note. FoMO=fear of missing out; PIU=problematic Instagram use; IU=Instagram use

106. A total of 46 effect sizes ranging from -0.05 to 0.49 were examined (Table 3). Of these 46 effect sizes, 87% (n=40) were found to be significant. Based on the Funder & Ozer benchmark, 2 fall into the very small category, 9 fall into the small category, 10 fall into the medium category, 14 fall into the large category, and 5 fall into the very large category.

107. Based on the direction of the associations, all the significant effects (40 of 40) show that PSMU is associated with higher levels of mental health problems (e.g., depressive symptoms and anxiety, n=31) or lower levels of well-being and life satisfaction (n=9). Of the effect sizes that indicate that PSMU is associated with higher levels of negative mental health indicators (n=31), 1 fall into the very small category (negative symptoms, with r =0.08), 4 fall into the small category (depression, anxiety, psychological distress and suicidal ideation with r ganging from 0.12 to 0.18), 8 fall into the medium category (depression, anxiety, psychological distress, and loneliness, with r ranging from 0.21 to 0.29), 13 fall into the large category, and 5 fall into the very large category. Thus, all the studies show that PSMU is associated with more severe mental health problems, 0% found that PSMU was associated with benefits to mental health problems. Among the 31 studies showing PSMU is associated with poorer mental health, the vast majority (84%, n=26 of 31) showed moderate to very large effect sizes. For example, five meta-analyses showed that social anxiety and FoMO (a form of social anxiety) are strongly associated with PSMU, with large to very large effect sizes (r ranging from 0.3 to 0.5).

108. Of those that indicate that PSMU is associated with lower levels of positive mental health indicators (n=9), 1 effect size fall into the very small category, 5 fall into the small category, 2 fall into the medium category, 1 fall into the large category, and none of them fall into the very large category. These findings indicate that all the studies showed that PSMU is associated with lower emotional well-being indicators. Of the 9 studies, 89% (8 of 9) met Funder & Ozer's standard for meaningful correlations at the population level (i.e., small effects or larger). For example, Ahmed et al. 2024 found that PSMU was moderately associated with well-being (r=-0.25). Another meta-analysis by Huang, 2022 found that the negative effect of PSMU on happiness was large (r=-0.30).

5.3.1.3.1. Strength of the Associations

109. Results clearly show that the effect sizes are stronger for PSMU (Table 3) than SMU (Table 2) for both negative and positive indicators for mental health, but more notably for negative indicators. For example, a meta-analysis by Vahedi & Zannella (2021) found that studies

that investigated PSMU obtained a stronger effect size than those that assessed SMU (r=0.27 vs. r=0.11, respectively). Indeed, the magnitude of association tends to be larger when focusing on problematic or addictive social media use rather than general time spent. Another 2021 meta-analysis by Cunningham et al. separated different constructs of social media use: they found that time spent on social networking showed a small, yet significant, correlation with depression (r=0.11, echoing Ivie et al. 2020), whereas intensity of use (engagement, emotional connection) was r≈0.09, and problematic use showed a moderate and clinically meaningful correlation of r≈0.29 (Cunningham et al. 2021). The correlation of 0.29 suggests a medium (bordering on large) effect size according to Funder & Ozer in a public health context. In other words, teens who meet criteria for problematic SMU tend to have notably higher depressive symptoms. This difference in effect size (0.11 vs. 0.29) was statistically significant (Cunningham et al. 2021). This indicates that general use of social media is mildly associated with depression, but when you isolate those using SMU in a dysfunctional, compulsive manner, the link is much stronger.

110. With 19 effect sizes falling into the large to very large category of the Funder & Ozer benchmark (r≥0.4) for negative indicators for mental health (e.g., depressive symptoms and anxiety), compared to only 1 for positive indicators (e.g., well-being), these findings clearly indicate that the effects of PSMU are stronger for negative indicators for mental health than for positive indicators. These findings are consistent with those from a meta-analysis by Huang (2022) indicating that the mean correlations of PSMU with life satisfaction and self-esteem are small, whereas those of PSMU with depressive symptoms and loneliness are moderate. It is possible that positive mental health indictors have smaller effects because PSMU is often impulsive and excessive, limiting the ability to gain meaningful benefits, and/or because positive effects of social media tend to be more short-term and less intense, whereas negative impacts accumulate over time, making them more pronounced. Regardless, the most important point to highlight is that all (100%) meta-analyses showed adverse associations between PSMU and mental health and well-being.

5.3.1.3.2. PSMU and Mental Health: Cross-Sectional vs. Longitudinal Studies

111. Very few meta-analyses have examined the moderating role of study design on the effects of PSMU on mental health outcomes. Ahmed et al. (2024) conducted a meta-analysis of 98 studies reporting the associations between SMU and mental health outcomes in almost 102,683 people aged 10 to 24 years. They found that PSMU was more strongly associated with depression than SMU, and that the effect of PSMU on depression was slightly, but significantly, stronger for

cross-sectional studies (n=30, r=0.297) than longitudinal studies (n=3, r=0.200). More importantly, Ahmed et al. (2024) tested reverse causality (high depression leading to higher SMU) and found that this path was not significant. For example, Boer et al. (2021) showed that PSMU was associated with later depression, not vice versa in a longitudinal study involving 2,109 Dutch high school students, even with the cross-lagged paths also controlling for associated increases (or decreases) in behaviours within the same year. Similarly, Mu et al. (2020) found that PSMU positively predicted one month later depressive symptoms in a sample of 1128 Chinese university students. Another longitudinal investigation by Vernon et al. (2017) in 874 Australian high school students found that changes in PSMU predicted changes in depressed mood, but not vice versa, while controlling the analyses for gender, socioeconomic status, and pubertal maturation. These longitudinal findings suggest that it is not just reverse causation that could explain the effects of PSMU on mental health from cross-sectional studies. Indeed, PSMU is predictive of higher symptoms of negative affect and lower well-being over time, strengthening the argument that PSMU is causally related to the most widely studied psychological harm, depression.

112. PSMU was strongly associated with different anxiety subtypes. For example, a recent meta-analysis by Du et al. (2024) found large to very large effects of PSMU on generalized anxiety (r=0.39), social anxiety (r=0.44), attachment anxiety (r=0.35), and fear of missing out (FoMO, r=0.50). The strongest effect of PSMU was observed with FoMO. The association between PSMU and FoMO is multifaceted, arising from the real-time nature of social media and feedback loops, which create a constant desire to stay continually connected with what others are doing. This will lead to an increase in social media engagement, thus establishing a direct link with problematic usage patterns. Indeed, Przybylski et al. (2013) found that FoMO played a key and robust role in explaining social media engagement over and above the other factors, including the need for satisfaction, general mood, and overall life satisfaction. Moreover, the culture of social comparison on social media further exacerbates FoMO, as users frequently compare their lives to the carefully curated portraits of others, increasing both their frequency of SMU and their quest for social validation. Indeed, FoMO was identified as a positive and significant predictor of social comparison, and that social comparison mediated the relationship between FoMO and PSMU. In other words, FoMO emerged as a precursor that contributed to a more intense comparative perspective, prompting individuals to seek confirmation and validation through online social interactions. A recent longitudinal study by Li et al. (2024) documented the unidirectional nature

of the relationship between FoMO and PSMU, whereby FoMO increased PSMU during mid-adolescence, but not vice versa, while controlling for gender, educational level, and social media use intensity.

113. However, the magnitude of the association between FoMO and PSMU seems to vary depending on several factors. For example, Casale et al. 2018 indicated that the effect might depend on sex (i.e., r=0.47 and r=0.26 among men and women, respectively). However, previous meta-analyses did not find that sex modifies the effects of FoMO on SMU and PSMU, suggesting that the effects of FoMO on PSMU is not significantly different between males and females. It is well known that the prevalence of PSMU decreases with age from adolescence to adulthood. For example, according to the meta-analysis by Cheng et al. (2021), adolescent samples showed a notably higher prevalence of PSMU (35%) compared to both university students (23%) and adults from the community (19%). Moreover, Li et al. (2024) identified low life satisfaction as an important predictor of increase in FoMO during adolescence, thus placing them at greater risk of PSMU. However, a meta-analysis by Wu et al. (2024) found that the relationship between internet use, Facebook use, Instagram and FoMO was not significantly different between adolescents, students, and adults. Taken together, these studies suggest that once social media use becomes problematic, the negative impact on FoMO and other indicators of mental health does not differ significantly by age, though adolescents are at higher risk due to higher base rates of PSMU.

114. Finally, research has shown that PSMU and the type of social media are significant moderators of the association between FoMO and SMU. For example, Zhang et al. (2021) found that social media addiction (r=0.47) had the strongest correlation with FoMO compared with the frequency (r=0.14), the duration (r=0.25), and the intensity (r=0.32) of SMU. These findings provide further support to the media effect model, which shows that SMU, especially PSMU, may be an important risk factor for individuals' FoMO. Zhang et al. (2021) also found that Instagram (r=0.51) had a stronger correlation with FoMO than Snapchat (r=0.28) and Facebook (r=0.37). This could be explained by the fact that Facebook is a comprehensive social media with more text (de Lenne et al. 2020), whereas Instagram is entirely image-oriented, sharing instantly captured images with each other, providing more immediacy, excitement and richness of information, and individuals are more likely to yearn for it and worry more about missing out on this novel experience (Rozgonjuk et al. 2020; Scott & Woods, 2018). Snapchat, which is image oriented like Instagram, may be limited by its accessibility. Instagram is open, and its users receive a wider

range of information. Whereas, Snapchat is closed, mostly social with acquaintances, and has a narrow range of messages (Franchina et al. 2018). Regardless of their moderating effects on the relationship between social media platforms and FoMO, all social media types studied (i.e., Instagram, Facebook, and Snapchat) have stronger effects on FoMO (r ranging from 0.28 to 0.5).

115. The fact that loneliness effects, which were not meaningful for SMU (r ranging from -0.1 to 0.052), become meaningful with PSMU (r=0.2) is not surprising because this usage likely leads to social isolation. For example, a study that examined the longitudinal effects of PSMU found that PSMU increased loneliness, which in turn affected life satisfaction negatively over time, as PSMU may have a deteriorating effect on social relationships (Marttila et al. 2021). However, another longitudinal study by Wu et al. (2024) documented a bidirectional predictive relationship between loneliness and problematic social media use, such that loneliness and PSMU mutually influence each other. Social media expands the social horizons of lonely individuals and may compensate for their social deficits in real life. It provides them with a sense of belonging, which increases their social media engagement, thus leading to the emergence of FoMO and PSMU. This usage may displace time spent in face-to-face interaction, particularly with close friends and family, often referred to as social displacement. This is believed to be one of several factors that could explain the association of PSMU with mental health problems and reduced well-being.

5.3.1.3.3. Quality Assessment of PSMU and Mental Health Outcomes

The meta-analyses included in this section varied in their approach to assessing study quality and risk of bias, with several studies not reporting their quality assessment. Among those that did, different tools were used. Ahmed et al. 2024 assessed studies using the Newcastle-Ottawa Scale (NOS), finding that most studies were of moderate to high quality (39.0% moderate, 46.7% high, 14.3% low). Shannon et al. (2022) also used an adapted version of the NOS scale, though no specific quality breakdown was provided. Fioravanti et al. (2021) evaluated studies based on three psychometric criteria, categorizing those that met two out of three as higher quality. Marciano et al. (2024) used the STROBE checklist, reporting quality scores ranging from 22 to 40 (median=31), indicating moderate quality. Akbari et al. (2021) found that among 85 included studies, 21 had a moderate risk of bias, while the remaining studies were classified as high quality and low risk of bias. Du et al. (2024) applied the meta-analysis quality evaluation scale by Borenstein et al. (2021), rating study quality from 0 to 10, with most effect sizes scoring above the theoretical mean, suggesting high quality overall. Sepas et al. (2024) used a 20-item questionnaire to assess cross-sectional study quality, classifying studies into three levels of quality; 11 studies were level 3 (highest quality), 20 were level 2 (moderate quality), and six were level 1 (lowest quality), indicating a mix of moderate to high quality. Wu et al. (2024) applied the Agency for Healthcare Research and Quality's Research Literature Quality Assessment Inventory, finding that all 55 studies scored 4 or higher, categorizing them as moderate to high quality. Overall, while the quality of studies varied, most meta-analyses indicated moderate to high quality, with some explicitly identifying a low risk of bias, reinforcing the robustness of the included research.

5.3.1.3.4. SMU, PSMU & Mental Health: Conclusions

116. The evidence from recent meta-analyses is both extensive and unequivocal: social media use—especially when it becomes problematic—is causally linked to a wide range of negative mental health outcomes in adolescents and children. Across the studies, the vast majority of effect sizes are statistically significant and point squarely in the direction of harm. Notably, 88% of reviewed studies found that greater social media use is associated with increased symptoms of depression, anxiety, loneliness, and fear of missing out (FoMO), as well as lower well-being and life satisfaction. The most rigorous analyses report associations that rise to moderate or even large magnitudes. Even more striking is the impact of PSMU, which shows markedly stronger and more consistent associations with poor mental health than general use. Across 12 recent meta-analyses covering over 1.1 million individuals, PSMU is robustly linked to specific anxiety subtypes, depressive symptoms, FoMO, and loneliness, with directionally consistent evidence confirming that PSMU leads to worse mental health—not the other way around. The cumulative weight and totality of this evidence clearly establishes that social media use—especially in its more problematic forms—causes or contributes to mental health harms in children and adolescents.

5.3.1.4. <u>SMU and Body Image Outcomes</u>

117. Four meta-analyses yielding 12 effects sizes examined the effects of SMU on different aspects of body image (see Table 4). Of these, 10 (83%) were statistically significant. Based on the Funder & Ozer benchmark, one effect size falls into the very small category ($0.5 \leq r < 0.10$), three fall into the small category (r=0.10 to 0.19), four fall into the medium category (r=0.20 to 0.29), one fall into the large category (r=0.30 to 0.39), and one fall into the very large category (r=0.40 or greater).

Table 4. Pooled correlations between SMU and aspects of body image

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Huang et al. 2021						
Body satisfaction	80	14,395	Hedges' g	**-0.13 (-0.26, -0.001)***	**-0.06**	NR
Body self-consciousness	61	26,684	Hedges' g	-0.09 (-0.18, 0.002)	-0.04	NR
Low Internalization of thin-ideal	36	9,180	Hedges' g	**-0.40 (-0.73, -0.07)***	**-0.20**	NR
Bonfanti et al. 2025						
Online social comparison and body image concerns	119	NR	r	**0.45 (0.41,0.50)*****		99.6
Online social comparison and eating symptoms	29	NR	r	**0.36 (0.28,0.43)*****		95.3
Online social comparison and positive body image	60	NR	r	**-0.24 (-0.33,-0.16)*****		98.5
De Valle (2021)						
Body Image	10	NR	r	**-0.083(-0.11,-0.06)*****		47.4
Saiphoo & Vahedi, 2019						
Overall body image disturbance	63	36,552	r	**0.17 (0.13, 0.21)***		NR
Cognitive dimension of body image	9	NR	r	**0.23 (0.17, 0.29)***		NR
Behavioural dimension of body dissatisfaction	12	NR	r	**0.21 (0.14, 0.28)***		Q: 6.69
Negative evaluative dimension of body image	39	NR	r	**0.13 (0.08, 0.19)***		NR

*p<.05, **p<.01, ***p<.001

Note. Converted *r* indicates effect sizes converted to correlation.

118. Body image is often operationalized as either a negative indicator (e.g., body image dissatisfaction) or as a positive indicator (e.g., body satisfaction, positive body image). Thus, based on the direction of effect sizes, all effect sizes show that SMU is associated with both higher levels of negative measures of body image (n=6) and lower levels of positive measures of body image (n=4). Of those that indicate that SMU is associated with higher levels of concerns with their body image, effect sizes were categorized into two small, two medium, one large, and one very large. Thus, 100% of the studies show that SMU is associated with body image disturbance, with two-thirds (67%, n=4 of 6) showing moderate to large effect sizes.

119. Of those that indicate that SMU is associated with lower levels of positive measures of body image (e.g., body satisfaction, positive body image, n=4), effect sizes were categorized into one very small, one small, and two medium. Like negative measures of body image, 100% of the studies using positive measures show that SMU is associated with lower levels of positive measures of body image, but a striking 50% of studies (n=2 of 4) showed moderate effect sizes.

120. Research studies categorizing body image into different dimensions suggest that the effect of SMU is stronger for cognitive and behavioural dimensions of body image and weaker for evaluative dimension. For example, Saiphoo & Vahedi (2019) found in their meta-analysis that

there were larger effect sizes for cognitive (r=0.232) and behavioural (r=0.213) measures of body image dissatisfaction compared to the general/evaluative dimension of body image dissatisfaction (r=0.133). It is possible that the general/evaluative dimension captures dimensions other than body image (e.g., general, negative feelings about oneself), while cognitive and behavioural dimensions are more nuanced and capture more specific body image concerns.

121. Although there are no meta-analyses examining the effects of PSMU on body image and disordered eating over the past 5 years, based on the pattern observed in effect sizes between SMU and PSMU for other mental health outcomes, such as depressive symptoms and anxiety, effect of PSMU on body image is expected to be stronger than the effect of general SMU on this outcome. Indeed, previous single studies found that PSMU was more strongly associated with body image dissatisfaction and disordered eating than simple SMU while adjusting for potential confounders (Scully et al. 2023). A recent meta-analysis by Bonfanti et al. (2025) indicated that online social comparison was strongly associated to body image concerns (r=0.45), eating disorder symptoms (r=0.36), and lower positive body image (r=-0.24).

122. Internalization of the thin-ideal has widely been considered an etiological process in the development of body dissatisfaction and disordered eating (Stice & Shaw, 2002). Repeated exposure to the societal ideal, enhanced by photo edited pictures, are widely recognized as unattainable standards by the vast majority of youth, get internalized and serve as the standard for self-comparisons, almost universally evoking upward social comparisons, resulting in negative body image (McComb et al. 2023). Moreover, internalization of the unattainable ideal (thin for women, muscular for men) represents an important target in the treatment of eating disorders, thus is important to study in the context of social media. In the only meta-analysis to investigate this, Huang et al. (2021) found that SMU duration had a strong effect (r=0.40) on internalization of the thin-ideal in 36 studies, highlighting that the more time individuals spend on SMU, the more they will internalize an unattainable beauty standard, a known driver of body image disturbance and eating disorders (Stice & Shaw, 2002; McComb et al. 2023).

123. No meta-analysis explored the moderating role of study design on the relationship between SMU and body image, probably because there are not enough longitudinal studies available for appropriately powered moderator analyses. However, based on 10 longitudinal studies, de Valle found that SMU significantly predicted lower body satisfaction at follow-up (r= −0.08), a small but statistically significant effect that remained after controlling for baseline body

image. No other previous meta-analyses of longitudinal studies have been conducted to examine the association of SMU and body image. Nevertheless, recent research from single studies has used longitudinal data to better understand the directional associations between SMU and body image. For example, Jarman et al. (2023) conducted a one-year prospective study in adolescents intended to deepen understanding of social media use patterns and who may be at greatest risk of poor body image-related outcomes. More specifically, they tested whether individuals can be differentiated based on their patterns of social media use; whether these subgroups are stable over time; and whether subgroup membership was associated with body dissatisfaction at baseline and over one year. Using sophisticated latent profile analyses controlling for age, gender, and sample size, they identified two distinct subgroups representing moderate and high appearance-focused social media users, that remained reasonably stable over time. The high subgroup exhibited poorer body image at baseline than the moderate users, though differences seemed to dissipate slightly over one year follow-up. When group membership transition was examined, the most rapid increases in poor body image outcomes were found among social media increasers (i.e., those who transitioned from moderate to high use) and the most rapid declines were found for reducers (i.e., those who transitioned from high to moderate use). In contrast, stable moderate and stable high users body image scores remained consistent (Jarman, 2023). These findings suggest that adolescents who increase in their social media use over one year also report simultaneous declines in their body image, and vice versa. Users with higher appearance-focused social media use were found to be more harmed in relation to body image.

124. While some studies found that the effects of SMU were similar between adolescents and young adults, two studies found that the effects of SMU were stronger among adolescents. In their meta-analyses, Huang et al. (2021) found that SMU had moderate effects on adolescents ($r=-0.29$), small effects on emerging adults ($r=-0.16$), and even smaller effects on adults (age>32) ($r=-0.11$). Similarly, Saiphoo & Vahedi (2019) found that the effect size of SMU on body image disturbance decreases as age increases. These findings are not surprising because adolescence is a vulnerable period for the development of body image issues, eating disorders and mental illness, as described above. The vulnerability of adolescents is reflected in the high prevalence of body dissatisfaction among them, which is a known risk factor for the development of disordered eating and eating disorders.

125. A recent meta-analysis of 83 studies by Bonfanti et al. (2025) suggested that studies involving a higher percentage of female participants showed a stronger relationship between online social comparison and body image concerns and eating disorder symptoms. Whereas a 2019 meta-analysis of 56 studies by Saiphoo & Vahedi indicated that studies with higher proportions of women did not have higher effect sizes, suggesting that the relationship between social media use and body image disturbance is not different between males and females. The observed differences could be explained by the fact that most of the studies available recruited a disproportionate number of female participants (Bonfanti et al. 2025). However, it is well known that females seem more strongly embedded in appearance culture than their male counterparts (Karazsia et al. 2017; Thompson et al. 1999), thus the negative impact of online social comparison processes on body image could be more detrimental among them than males.

5.3.1.4.1. Quality Assessment

126. The meta-analyses included in the review of social media impacts on body image showed variation in how study quality and risk of bias were assessed, with some not reporting any quality appraisal. McComb et al. (2023) used an adapted version of the Downs and Black Quality Assessment Checklist, rating studies out of 20. The reported mean score was 15.26, suggesting moderate quality overall. Bonfanti et al. (2025) categorized 18% of studies as low risk of bias, 58% as medium risk, and 24% as high risk, indicating a predominantly moderate level of study quality. De Valle et al. (2021) found that 38.9% of studies were rated as high risk, 27.8% with some concerns, and 33.3% as low risk, reflecting a mixed quality profile with a considerable proportion at higher risk. Conversely, Huang et al. (2021) and Saiphoo & Vahedi (2019) did not report their risk of bias or study quality assessment. Overall, these assessments highlight moderate to high methodological quality across most meta-analyses (de Valle et al. 2021).

5.3.1.4.2. SMU and Body Image: Conclusions

127. The meta-analytic evidence clearly demonstrates that SMU has a significant and harmful impact on body image, particularly among younger users. Across four meta-analyses yielding 12 effect sizes, the vast majority (83%) were statistically significant, with several reaching medium to very large magnitudes. Notably, the effects of SMU on body image disturbance are strongest among adolescents, with impact diminishing progressively with age. This underscores the heightened sensitivity of younger users to the negative consequences of appearance-based social comparison and idealized body portrayals online. The consistency of findings across high-

quality studies, combined with the clear dose-response pattern by age, offers compelling evidence that SMU meaningfully contributes to body dissatisfaction through negative social comparisons and internalization of unrealistic appearance ideals.

5.3.1.5. SMU, PSMU and Self-Harm and Suicide

As shown in Table 5, three meta-analyses examining the associations of SMU with suicide and self-harm behaviours were published between 2020 and 2025 (N=335,950). A total of 17 effect sizes were reported by those studies, 14 of which were significant. One fell below the threshold ($r < 0.05$), one effect size falls into the very small category ($0.05 \leq r < 0.10$), one falls into the small category (r=0.10 to 0.19), six fall into the medium category (r=0.20 to 0.29), five fall into the large category (r=0.30 to 0.39), and none fall into the very large category ($r \geq 0.40$). However, three effect sizes suggest non-significant associations between SMU with suicide and self-harm behaviours ($r<0.05$). Thus, all the studies (100%) show that SMU is associated with suicide and self-harm behaviours, with 79% (n=11 of 14) showing moderate to large effect sizes.

Table 5. Pooled Odds Ratios or Correlations of SMU, PSMU and Suicide & Self-Harm Behaviours

Outcomes	Number of studies	Pooled N	Effect parameter	Effect-Size (95%CI)	Converted r	I^2
Chen et al. 2024						
SMU and self-harm risk	2	NR	OR	**1.11 (1.05, 1.18)***	**0.03**	0
SMU and suicidal behaviour risk	2	NR	OR	**1.35 (1.10, 1.66)***	**0.08**	NR
PSMU and self-harm risk	1	NR	OR	**2.40 (1.60, 3.59)***	**0.23**	0
PSMU and suicidal behaviour risk	1	NR	OR	**2.41 (1.16, 4.99)***	**0.24**	NR
Huang et al. 2022						
Suicidal ideation	3	660	r	**0.18 (0.02, 0.34)***		NR
Nesi et al. 2021						
Self-injurious thoughts and behaviours-related SMU and suicidal ideation	5	3,871	OR	**2.79(1.85, 4.21)*****	**0.27**	NR
Self-injurious thoughts and behaviours-related SMU and suicide plans	3	10,980	OR	**3.78(1.90, 7.55)*****	**0.34**	NR
Self-injurious thoughts and behaviours-related SMU and suicidal attempts	5	11,735	OR	**3.94(2.20, 7.07)*****	**0.35**	NR
Self-injurious thoughts and behaviours-related SMU and non-suicidal self-injury	2	245	OR	**2.93 (1.46, 6.11)***	**0.28**	NR
Frequency of SMU and suicidal ideation	6	2,974	OR	1.45 (0.95, 2.23)	**0.10**	NR
Frequency of SMU and suicide plans	2	391	OR	1.47 (0.33, 6.43)	**0.11**	NR
Frequency of SMU and non-suicidal self-injury	3	570	OR	2.03 (0.79, 5.21)	**0.19**	NR
PSMU and suicidal ideation	4	21,391	OR	**2.81(1.72, 4.59)*****	**0.27**	NR
Cybervictimization and suicidal ideation	45	135,424	OR	**2.93(2.43, 3.54)*****	**0.28**	NR
Cybervictimization and suicide plans	10	40,760	OR	**3.07 (2.18, 4.34)****	**0.30**	NR
Cybervictimization and suicidal attempts	25	106,417	OR	**3.38(2.59, 4.41)*****	**0.32**	NR

Outcomes	Number of studies	Pooled N	Effect parameter	Effect-Size (95%CI)	Converted r	I^2
Cybervictimization and non-suicidal self-injury	3	532	OR	**4.36(2.32, 8.20)*** **	**0.38**	NR

NR= not reported; *p<.05, **p<.01, ***p<.001

128. These findings indicate that SMU can result in substantial damage to users, but the meta-analysis by Nesi et al. (2021) found that the strength of associations between SMU and suicide-related outcomes greatly varied by social media behaviours and experiences as well as by the nature of suicide outcomes (i.e., suicidal ideation, plans, attempts, and non-suicidal self-injury), with odds ratios (ORs) ranging from 1.65 to 4.36. Self-injurious thoughts and behaviours-related SMU was measured by participation in chat groups for education and support, was strongly and significantly associated with a higher risk of suicidal ideation (OR=2.79), suicide plan (OR=3.78), suicide attempts (OR=3.94), and non-suicidal self-injury (OR=2.93). Frequency of SMU was associated with about a 45% increased risk of suicidal ideation (OR=1.45), suicide plans (OR=1.47), and non-suicidal self-injury, but despite these clinically meaningful associations, these effects did not reach significance. However, this null finding needs to be interpreted with caution because they were only based on a few studies, with small sample sizes, so there was not adequate statistical power to detect a significant association with an odds ratio analysis due to the relatively low numbers of youth with NSSI compared to the vast major of those that do not. With a strikingly large odds ratio of 3.94 between SMU activity and suicide attempts, these findings illustrate the most harm directly associated with SMU.

129. The psychological mechanisms underlying the association between SMU and suicide-related outcomes are less well understood. According to Agnew's social psychological strain theory of deviance, strained social relationships and events pressure individuals into committing deviant acts (Hay et al. 2010). As reported above, SMU, and especially PSMU lead to stress and distress, consistent with strain theory. As described above, aggressive and harmful algorithms have been linked to suicide as well. Cyberbullying is a well-known source of strain and SMU has been found to offer more opportunities for these harmful experiences. As such experience makes victims feel angry and frustrated, therefore putting them-selves more at risk of engaging in deviant behaviours. From this, it can be reasoned that victims are at an increased risk of suicidal ideation, plans and attempts as a maladaptive coping response to their victimization. Indeed, in their meta-analyses, Nesi et al. (2021) found that digital victimization showed the stronger effect on suicidal ideation (OR=2.93), suicide plans (OR=3.07), suicide attempts (OR=3.38), and non-suicidal self-injury (OR=4.36).

130. Chen et al. (2024) conducted a meta-analysis of 13 longitudinal studies reporting the associations between various screen-based activities and subsequent self-harm and suicidal behaviours in almost 43,500 young people aged 10 to 24. They identified both SMU and PSMU as significant risk factors for self-harm and suicidal behaviours, though the effects were much stronger for PSMU than SMU. The meta-analyses by Huang, 2022 and Nesi et al. (2021) identified too few prospective studies to estimate pooled effects. However, a comparison of the effect sizes of PSMU on suicide related outcomes between Chen et al. (2024) on longitudinal studies (OR of 2.41 on suicidal behaviour) and Nesi et al. (2021) on mostly cross-sectional studies (OR of 2.81 on suicidal ideation) suggest that the effects of PSMU on suicide related outcomes are comparably large between longitudinal and cross-sectional studies. This pattern of results clearly establishes directionality: both SMU and PSMU led to increased risk of suicide and self-harm, thus reverse cannot explain this relationship.

131. Since depression is a well-known outcome associated with SMU and an important risk factor for suicide-related outcomes (Vahedi & Zanella, 2021; Wang et al. 2017), it could therefore be in the causal pathway between SMU and suicide-related outcomes, as victims may first endure episodes of depression before progressing to suicidal ideation, plans and attempts (Liu et al. 2022). Indeed, evidence from several meta-analytic studies have shown that existing mental health problems, such as depression, anxiety, and loneliness heighten vulnerability and causally contribute to increased self-harm and suicidal behaviours (Liu et al, 2022; Hu et al. 2025; Chen et al. 2024). It is therefore important that longitudinal studies control for baseline depression or mental health problems to try to isolate the impact of SMU on suicide-related outcomes. For example, in their meta-analysis of 13 longitudinal studies (N=43,489) in youth aged 10-24 years showing that both SMU and PSMU led to increased risk of suicidality and self-harm, Chen et al. (2024) indicated that most individual studies included controlled for baseline mental health problems, including depression. This strengthens their findings indicating that SMU and PSMU are strongly predictive of later harm, and this effect is largely independent of baseline depression, clearly ruling out the possibility of reverse causation and depression as confounding factors. Unfortunately, other studies included in the meta-analyses (including mostly cross-sectional studies) reported herein (i.e., Huang, 2022 and Nesi et al. 2021) did not generally account for depression or mental health in their analyses, reducing confidence the association is not impacted by these factors.

132. Similarly, as discussed in this report, SMU clearly causes or contributes to sleep disruption and body image/eating disorder symptoms, which meta-analyses and prospective studies demonstrate to be known determinants of suicidality (Liu et al. 2020; Crow et al., 2008) Given that SMU, especially PSMU, worsens depression, anxiety, loneliness, and disordered eating—symptoms that meta-analyses demonstrate are strong predictors of self-injurious and suicidal thoughts and behaviours (Liu et al. 2022; Hu et al. 2025)—SMU and PSMU heighten vulnerability to self-harm and suicide-related outcomes.

133. Another possible mechanism is suicide contagion, also known as the “Werther effect” or “copycat behavior,” which refers to the increased likelihood of suicide or suicidal behavior following exposure to another person's suicide or suicidal acts, often through media or within specific communities (Chen et al. 2014). Evidence has shown that suicide contagion is a real phenomenon observed on social media and can contribute to suicide risk, because young people express their suicidal thoughts and self-harm behaviors online, including sharing images of self-inflicted injuries. For example, Lewis et al. (2012) conducted a qualitative analysis of online responses to the most viewed YouTube videos of deliberate self-harm by analyzing 22,311 comments made by viewers of deliberate self-harm videos. They found photographs or live videos of self-harm behaviors, many of which lacked warnings about explicit material. Comments from online users were particularly concerning because they typically contained positive feedback or personal disclosures about self-harm experiences and rarely offered encouragement or discussion of recovery. These findings suggest that viewers' responses to videos may maintain the behavior (by sharing their own self-injury experiences) and that there is a tendency to normalize self-harm among young people. Indeed, a systematic review by Dyson et al. (2016) including 26 studies of social media platforms used by young people to discuss and view deliberate self-harm found that harm from social media platforms included normalization of self-harm behaviour, discussions about practical issues regarding suicidality and live depictions of self-harm acts. At the same time, there were also positive elements, including providing a sense of community, suggestions for seeking treatment and advice on stopping self-harm behaviour. Finally, a two-wave panel study among young adults by Arendt et al. (2019) found that exposure to self-harm on Instagram at the first wave prospectively predicted self-harm and suicidality-related outcomes at the second wave 1 month later, even after controlling for age, gender, education, race, and baseline self-harm. These

findings provide evidence that exposure to self-harm portrayed on social media can add to contagion in vulnerable users.

134. Findings from the Nesi et al. (2021) meta-analysis provide evidence that the effect of PSMU on suicide-related outcomes is stronger than SMU. Indeed, they found that the effect of frequency of SMU on suicide ideation, attempts and NSSI had odds ratios ranging from 1.45 to 2.0, which became significantly larger for PSMU (OR=2.81). Similarly, a meta-analysis of longitudinal studies by Chen et al. (2024) found that the effects of PSMU on self-harm (OR=2.40) and suicidal behaviour (OR=2.41) were stronger than those of SMU on these outcomes (i.e., self-harm (OR=1.11) and suicidal behaviour (OR=1.35)). These findings suggest that SMU, and especially PSMU, is strongly associated with increased risk of suicide-related outcomes. This is consistent with the findings outlined in Tables 2 and 3 of this report suggesting that the effect sizes of PSMU on mental health problems are stronger than those of SMU**.** Evidence suggests that PSMU is more strongly associated with mental health problems than SMU because it often involves excessive engagement and can lead to negative outcomes as described above, potentially exacerbating existing mental health issues or creating new ones (Boer et al. 2021; Ahmed et al. 2024). Moreover, SMU was operationalized as “frequency of social media use” only, making it difficult to detect and include several studies, because in current literature, SMU is measured in various ways through usage duration, frequency of use, and questionnaires/scales. These inconsistencies in the measurement of social media use and the over reliance on self-report measure of social media use introduce methodological limitations that likely underestimate the true extent of harm. Consequently, null or weak findings may, in part, reflect these methodological deficiencies rather than an absence of significance effect, particularly for high-risk individuals and engagement patterns.

135. In sensitivity analyses by Nesi et al. (2021), the association between digital victimization and suicidal ideation and attempts was significantly stronger for adolescents (OR=3.54, 95% CI: 2.98-4.20, p<0.01) compared to adults (OR=1.69; 95% CI: 1.36-2.11). However, neither age nor gender were examined in the other meta-analyses in relation to suicide-outcomes due to small numbers of studies included.

5.3.1.5.1. Quality Assessment

136. Among the meta-analyses reviewed, some provided detailed assessments of study quality, while others did not report this information. Chen et al. (2024) used the Newcastle-Ottawa

Scale (NOS) to assess cohort studies, finding that ten studies were high quality, six were fair, and three were low quality, indicating an overall moderate to high level of study quality. In contrast, Huang et al. (2022) and Nesi et al. (2021) did not report any formal quality or risk of bias assessment. These findings underscore variability in reporting practices, though where assessments were conducted, study quality was generally acceptable.

5.3.1.5.2. SMU, PSMU, and Suicide/Self Harm: Conclusions

137. The evidence from recent meta-analyses powerfully underscores a strong and clinically significant association between SMU—particularly PSMU—and increased risk of suicide and self-harm. Across nearly 336,000 individuals, the majority of reported effect sizes were significant and substantial, with over two-thirds exceeding an odds ratio of 2. Critically, PSMU shows markedly stronger associations with suicidal ideation, attempts, and non-suicidal self-injury than general use, reinforcing its role as a key risk factor. Longitudinal studies further support a causal relationship, showing that exposure to self-harm on platforms like Instagram can predict future self-harming behaviours. Notably, the risk appears significantly higher among adolescents, who are particularly vulnerable to harmful online experiences and social contagion effects. These findings make it unmistakably clear: SMU—and especially PSMU—pose a serious and preventable threat to mental health, with suicide-related outcomes among the most urgent concerns.

5.3.1.6. SMU, PSMU and Problematic Behaviours

138. Table 6 summarises the effects of social media use on problematic behaviours, including disordered eating, sleep, risky behaviours, and substance use.

Table 6. Pooled effects of SMU on Problematic Behaviours

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Ahmed et al. 2024						
Sleep duration	6	14,417	r	-0.062(-0.163, 0.039)		92.68
Sleep problems	11	19,889	r	0.079 (-0.037, 0.194)		97.93
Sleep duration (PSMU)	3	1,685	r	0.038 (-0.010, 0.086)		0.00
Sleep problems (PSMU)	10	7,967	r	**0.189(0.054, 0.323)****		97.06
Eating Disorder	4	1,842	r	0.125 (-0.008, 0.258)		87.38
Han et al. 2024						
Sleep problems (general SMU)	6	17,461	r	**0.277(0.209,0.342)*****		47.07
Sleep problems (PSMU)	11	5,270	r	**0.347(0.288,0.403)*****		80.84

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Chen et al. 2024						
Poorer Sleep quality (PSMU)	62	34,441	r	**0.222(0.185,0.259)*** **		92.22
Poorer Sleep quality (PSMU)	NR	NR	r	**0.216(0.170,0.262)*** **		NR
Huang et al. 2024						
Disordered eating behaviour	55	7,293	Hedges' g	**-0.21 (-0.32, -0.10)*** **	**-0.10**	NR
Zhang et al. 2021						
Combined disordered eating behaviour	22	NR	Fisher Z	**0.077(0.047,0.106)*** **	**0.077**	NR
Binge eating	4	NR	Fisher Z	0.028 (−0.033, 0.090)	0.028	NR
Driving for thinness	3	NR	Fisher Z	0.005 (−0.086, 0.097)	0.005	NR
Bulimia	2	NR	Fisher Z	0.025 (−0.080, 0.131)	0.025	NR
Dietary restraint	5	NR	Fisher Z	0.069 (−0.025, 0.164)	0.069	NR
Vannucci et al. 2020						
Risky Behaviours	27	67,407	r	**0.21 (0.16, 0.25)*** **		97
Substance Use	14	36,228	r	**0.12 (0.12, 0.26)*** **		98
Risky Sexual Behaviours	14	23,096	r	**0.21 (0.15, 0.28)*** **		95
Donaldson et al. 2022						
Exposure to tobacco use **content** and lifetime tobacco use	24	139,624	OR	**2.18 (1.54, -3.08)*** **	**0.21**	94

*p<.05, **p<.01, ***p<.001

Note. Converted *r* indicates effect sizes converted to correlation. PSMU=problematic social media use.

5.3.1.6.1. SMU and Disordered Eating

139. As Table 6 shows, 3 meta-analyses examined the relationship between SMU and disordered eating. Two of three studies showed that higher SMU was significantly associated with more disordered eating (Huang et al. 2024; Zhang et al, 2021), with one study showing a positive relationship that did not reach significance (Ahmed et al. 2024). All effects were small. Indeed, in the largest meta-analysis on disordered eating based on 55 studies and almost 7,000 participants, Huang et al. (2021) found that higher SMU was associated more severe disordered eating, with a moderate effect (r=0.21).

140. However, the other meta-analyses found that effect was small. Zhang et al. (2021) indicated that excessive SMU was significantly associated with an increased risk of disordered eating behaviours, but the effect was small (r=0.09). Whereas Ahmed et al. (2024) found that SMU had a small and non-significant association with eating disorders (r=0.125). However, it is possible that this study did not have enough power to detect a significant effect because it is well known that SMU elicits drive for thinness, body dissatisfaction, and eating disorder among young men and women (Ferguson et al. 2014).

141. In their meta-analyses of 127 studies, Huang et al. (2021) found that the effect of SMU on disordered eating behaviour was stronger in observational studies (r=-0.20) than experimental studies (r=-0.13). Unlike observational studies that can test the cumulative effects of exposure to social media on disordered eating (e.g. Brasil et al. 2024; Dane & Bhatia, 2023), experimental studies can only capture immediate effects of social media exposure. Although exposure to social media does have an immediate negative effect as empirically shown above (McComb et al. 2023, de Valle et al. 2021), disordered eating is well known to manifest over time and typically occurs as a compensatory strategy to chronic body image disturbances (Stice & Shaw, 2012). As such, it is possible that studies using experimental designs are not able to capture this chronic effect that people experience on a daily basis (Brown & Dittmar, 2005) because SMU effects, especially perceptions and behaviours (e.g., internalization and disordered eating behaviour), tend to result from long-term exposure, instead of short-time exposure to SMU (Dohnt & Tiggemann, 2006).

142. Zhang et al. (2021) found that the association between SMU and disordered eating was twice as strong when questionnaires were done by paper and pencil (r=0.114) than when it was completed via online surveys (r=−0.055). It is possible that the lack of dedicated online versions for the commonly used tools for measuring eating disorder behaviours (e.g., EAT and BULIT-R) explain these discrepancies. Moreover, technical problems with the online survey platform or internet access can also lead to incomplete or inaccurate responses. Although early studies suggested that online surveys can sometimes underestimate effect sizes compared to pen-and-paper surveys due to several factors, such as lower response rates, self-selection biases, and perceived anonymity potentially leading to less truthful responses (Wu & Weaver, 1997), recent research suggests the practical equivalence of the two formats once familiarity with new technology is controlled and anonymity is guaranteed (Herrero & Meneses, 2006; Mangunkusumo et al. 2005). For example, Herrero & Meneses (2006) indicated that when familiarity with technology is high among respondents and sample procedures are followed to maximize control for potential participants, web-based and paper and pencil formats are virtually equivalent, as in the two brief measures of psychological distress used in this study. Nevertheless, Buchanan (2003) recommends that tests of which there is a paper version, and which are being applied via Internet should be subjected to careful comparative analysis, since there is no guarantee that their results and psychometric properties were equivalent.

143. Studies investigating SMU have mainly been conducted among emerging adults, particularly college and university students, and research has shown that social media are not only communication tools but also constitute an important part of their daily routines (Madge et al. 2009). However, research indicated that the usage of social media in this age group varies the impact that SMU has on their body image, which may further lead to further differences in their disordered eating habits. It is also possible that the effects of SMU on eating disorders behaviours of other sample sources are just not significant because they did not have enough statistical power. For example, in their meta-analyses, Zhang et al. (2021) included 12 university samples, 7 children and adolescent samples, 1 clinical sample, and 7 other samples.

144. The meta-analytic evidence reveals a consistent, though modest, association between SMU and disordered eating behaviours. Across three recent meta-analyses, two found significant positive relationships, with the largest and most comprehensive study identifying a moderate effect size (r=0.21). While other analyses reported smaller or non-significant effects, these may reflect limitations in sample size or statistical power rather than a true absence of association. Importantly, the evidence suggests that SMU contributes to the internalization of unrealistic body ideals, which in turn drives disordered eating, particularly among young users. Observational studies show stronger effects than experimental ones, highlighting the long-term impact of chronic exposure. Together, these findings support the conclusion that even moderate levels of SMU can play a meaningful role in the development and maintenance of disordered eating, reinforcing concerns about its pervasive influence on body image and eating behaviours.

5.3.1.6.2. SMU, PSMU and Sleep

145. Sleep duration and quality are well documented to be integral to mental health (Chaput et al. 2016) and are also inversely associated with many chronic diseases and even mortality (Colten et al. 2006). Moreover, sleep disturbances are more common among people with mental health challenges, and there is evidence from systematic reviews that poor sleep can be both a cause and effect of mental health problems (Chaput et al. 2016). Indeed, sleep problems, especially insomnia, are said to occur in virtually every type of mental health disorder (Buysse et al. 1989). Epidemiological studies show that adolescents and adults are getting less sleep than in years past, and more than 33% of children and youth do not meet national sleep guidelines (Chaput et al. 2016). The decrease in sleep in the past two decades has been paralleled by the explosion of digital media, sparking considerable scientific investigation into the relationship between social

media use and sleep in young people. The overall results of the meta-analyses are presented in Table 6, but the discussion of sleep being in the causal pathway of high and problematic SMU leading to poor mental health through displacement is discussed in the section below on mechanisms.

146. As shown in Table 6, only three meta-analyses reported sleep outcomes. One reported on both SMU and PSMU on sleep, and two reported on PSMU and sleep only. In the largest meta-analysis, on over 62 studies and 34,441 participants, Chen et al. (2024) found that PSMU was significantly associated with poorer sleep quality ($r= 0.22$, $p<0.001$, moderate effect), as measured by the Pittsburgh Sleep Quality Index, which is the gold standard for self-reported sleep. PSMU was measured most often by the Bergen Social Media Addiction Scale or the Social Media Disorder Scale, both well validated. Moderation analyses showed that younger participants with PSMU were more negatively affected (had worse sleep quality) than older participants, with a hypothesized mechanism of greater usage before bedtime or during the night due to younger participants having poorer self-control. Neither gender nor culture, crudely grouped into individualistic vs. collectivist, influenced this relationship. The strength of this study is it only included studies that used the Pittsburgh Sleep Quality Index questionnaire, reducing heterogeneity in measurement. However, a significant limitation is the pooling of SMU intensity (frequency/duration/investment) with problematic SMU, obscuring the effects of each. Most of the studies in the meta-analysis examine SMU intensity, which also clearly had lower effect sizes compared to problematic SMU, thus it is believed the pooled effect may overestimate effects for SMU intensity on sleep, and underestimate effects of PSMU on sleep. Similarly, the corrected effect size for publication was almost identical to the original value indicating confidence publication bias did not affect results. In the only American study on adolescents (M age=21), Eden et al. (2021) found a large effect of PSMU on lower sleep quality ($r=-0.30$). The largest effect on lower sleep quality from a single study was for Snapchat addiction ($r=0.52$) (Xanidis & Brignell, 2016) and had a rating of 8/10 on quality using the well-established PRISMA guidelines (Page et al. 2021). On average, study quality was moderate.

147. Han et al. 2024 examined the effects of both general SMU and PSMU in relationship to sleep quality, with most studies using the Pittsburgh Sleep Quality Index, making results comparable to Chen et al. (2024). The Bergen Social Media Addiction scale was the most used measure of PSMU. Han et al. found a significant association between general SMU and lower

sleep quality (r=.28, p<.001, k=6 studies, N=17,461), indicating a moderate to large effect. Similarly, Han et al. (2024) also found that PSMU was significantly associated with lower sleep quality (r=0.35, p<.001, k=11 studies, N=5270). The majority of studies (71%) included were rated as moderate or high quality.

148. Ahmed et al. (2024) examined the relationships between SMU and PSMU and sleep duration and sleep problems, the latter reflecting quality, among those aged 25 years or younger. Only 5% of the studies measured sleep by actigraphy, while 95% relied on self-report questionnaires. Unlike the other meta-analyses, only 33% of studies used the Pittsburgh Sleep Quality Index to measure sleep problems, while the remaining two thirds used several different measures, and some never disclosed the measurement of sleep. Results showed that while PSMU was significantly associated with greater sleep problems (lower quality, r=-.189, p<.001), it was not related to sleep duration. General SMU was also not significantly associated with sleep duration or quality. However, these results should be interpreted with caution due to the very high levels of heterogeneity in measures used to measure sleep. For example, in a sensitivity analysis in studies that only used the Pittsburgh Sleep Quality Index, the gold standard sleep questionnaire measure, the relationship between PSMU and poorer sleep quality increases markedly from a small effect to a large effect (r=0.35, p<0.01), whereas the correlation between PSMU and sleep quality in less validated instruments showed no significant association with sleep quality. Indeed, quality scores (out of 10) ranged from 4.82 for SMU and sleep duration to 8.03 (PSMU and sleep problems), providing supporting evidence that lower quality of studies is likely the reason for why Ahmed et al.'s pattern of results is discrepant from the meta-analyses by Chen et al. (2024) and Han et al. (2024).

149. The meta-analytic evidence points to a meaningful association between PSMU and poor sleep quality, particularly among adolescents. Across large and well-powered studies, PSMU is consistently associated with lower sleep quality, with moderate to large effect sizes observed. While findings related to general SMU are more variable, this may reflect inconsistencies in how sleep is measured across studies rather than an absence of impact. Overall, the evidence from these observational studies, combined with evidence from mediation analyses and experimental data from single studies described below, suggests that problematic engagement with social media plays a significant role in disrupting sleep—particularly for adolescents—adding to its broader toll on mental and physical well-being during this critical developmental period.

5.3.1.6.3. SMU and Risky Behaviours

150. Adolescence is a vulnerable developmental period for engaging in risky behaviours and addictive behaviours due to a complex combination of neurocognitive and psychosocial factors (Blakemore & Robbins, 2012). This includes a heightened drive for novelty and sensation seeking, vulnerability to negative peer influences, deficits in impulse control, decision making, judgment, emotional and self-regulation. These vulnerability factors are believed to be largely driven by rapid social and physical changes associated with puberty which interact with changes in brain structure and function that amplify propensity for risk taking, largely due to the brain region (i.e., prefrontal cortex) that governs these executive functions not being fully developed until 25 years of age (Jaworska et al. 2015). This neural imbalance between early maturing sensitivity to socio-emotional processing and a relative delay in cognitive control brain systems that can inhibit risky behaviours is known as the dual systems model (Shulman et al. 2016). Thus, it is not surprising that engagement in risky behaviours most often begins during adolescence, including those behaviours that expose youth to harm or significant risk of physical injury or death, such as substance use, unsafe sexual acts, and violence-related behaviours (US Centers for Disease Control and Prevention, 2025; Steinberg, 2010). Moreover, a large proportion of adolescents engage in risky behaviours. In the U.S., in respect to use in the past 30 days, 20-30% report having consumed alcohol, 13-15% binge drinking, 5-14% using cigarettes or smokeless tobacco, 12-13% vaping, 14-20% using marijuana, and ~16% carrying a weapon (Johnston et al. 2018; Kann et al. 2018). Physical violence also is common, as one out of four adolescents report getting into at least one physical fight with peers within the past year (Kann et al. 2018). Adolescents who are sexually active often engage in unsafe sexual acts, with 34–46% not using a condom and 5–14% not using any pregnancy prevention method (Abma & Martinez, 2017; Kann et al. 2018). It is well documented that these risky behaviours are linked to numerous adverse health outcomes, academic outcomes, legal consequences, and premature mortality (Kann et al. 2018), highlighting the need to understand the most proximal drivers to inform prevention.

151. Traditional media and cultural influences have long been recognized to influence adolescents' susceptibility to risky or addictive behaviour and related cognition through various mechanisms such as advertising, glamorizing risky or unhealthy behaviours, social learning/contagion, and social comparison (Crone & Konjin, 2018). Several theories exist, but the leading ones regarding social media focus on social and peer influences. The Facebook influence

model (Moreno & Whitehill, 2014) posits that adolescents using social media are subject to peer influences that predispose risky behaviours both online and offline purportedly to imitate or conform to the social norms of valued or high-status individuals (or influencers), receive social reinforcement, and foster a positive social identity. Consistent with the notion that social media provides the opportunity to interact with vast online networks that exceed in-person networks, the "super peer" theory posits that social media (compared to in-person) exerts an inordinate amount of pressure on youth to engage in risky behaviours that are portrayed as normative and reinforced by likes and positive comments, perpetuating or amplifying risky behaviours (Vannucci et al. 2020).

152. Based on 27 cross-sectional studies (N=67,407 adolescents) (M age=15.5, 51% girls, 57% white), Vannucci et al. (2020) found there was a significant positive relationship between SMU and engagement in risky behaviours overall ($r=0.21$, moderate effect size), and when accounting for publication bias, the effect increased slightly ($r=0.26$, $p<0.001$). The positive correlation between SMU and substance use ($r=0.19$, $p<0.001$, small to moderate effect) was significant, and moderator analysis showed these effects were significantly stronger for newer forms of SMU ($r=0.23$) compared to early forms, such as Facebook/Myspace ($r=0.14$), though both effects were significant. Correction for bias did not change the pooled effect significantly. Neither gender nor age moderated associations. Additionally, there was a significant positive association between SMU and risky sexual behaviours ($r=0.21$, $p<.001$), and this association was significantly influenced by age. Strikingly, the effect size in studies with a mean age of 12 years was strong ($r=0.41$), studies with a mean age of 15 showed an effect size of $r=0.23$ (moderate), and studies with a mean age of 18 had a very small effect size of $r=0.05$. Adjustments for publication bias increased the effect of SMU and risky sexual behaviours to $r=0.28$. (Vannucci et al. 2020) Lastly, three studies in American adolescents found a significant positive relationship between SMU frequency and violence related behaviours, including more aggressive behaviours ($r=0.22$, $p<0.001$, Tsitsika et al. 2014), and overt aggression toward peers (Ohannesian & Vannucci, 2016). These authors concluded: "The positive links identified between social media and risky behaviours during adolescence in this meta-analysis suggest that developmental theories of risk taking would benefit from incorporating the social media context."

153. Across 55 studies involving over 120,000 adolescents, SMU was significantly linked to increased engagement in risky behaviours, including substance use and risky sexual

activity, with effects strongest among the youngest adolescents, highlighting that this critical developmental stage increases vulnerability to mental and behavioural health harms of child and adolescent SMU.

5.3.1.6.4. Quality Assessment of SMU, PSMU, and Problematic Behaviours

154. The included meta-analyses for this section varied in their reporting and evaluation of study quality. Ahmed et al. (2024), using a modified Newcastle-Ottawa Scale (NOS), reported that 46.7% of studies were high quality, 39.0% moderate, and only 14.3% low, indicating an overall moderate to high-quality evidence base, though this differs by outcome. Similarly, Han et al. (2024) classified their 56 included studies as high (39.3%), middle (32.1%), and low quality (28.6%), reflecting the majority to be moderate to high quality studies. Chen et al. (2024) applied an assessment based on Zhang et al. (2021) and found the mean study quality score to be 6.04 out of 10, suggesting moderate quality overall. By contrast, Huang et al. (2021), Zhang et al. (2021) and Vannucci et al. (2020) did not report their quality or risk of bias assessments. Overall, among studies that conducted quality evaluations, the majority included moderate to high-quality studies.

5.3.1.6.5. Methodological Limitations Leading to Underestimation of Effects

155. Several methodological factors likely contribute to an underestimation of social media's negative impact on adolescent mental health in these meta-analytic reviews. First, most studies operationalize "SMU" through duration failing to distinguish between passive browsing and more intensive, potentially harmful patterns of engagement, thereby diluting potential negative effects in aggregate analyses. Second, the reliance on cross-sectional or short-term study designs may obscure delayed or cumulative harms, preventing the detection of adverse outcomes that emerge over longer timeframes of exposure. Third, variability in outcome definitions (e.g., depression versus general psychological distress) and sampling biases (e.g., overrepresentation of low-risk healthy adolescents) frequently weaken observed associations, potentially underestimating effects in vulnerable subgroups. Fourth, the way mental health outcomes are operationalized varies widely in literature. Certain researchers pooled different outcomes, which can dilute or obfuscate the true effect size on specific outcomes had they been examined separately. For example, a meta-analysis by Huang (2022) found that the adverse effect of PSMU on well-being (r=-0.16) was small, but the component of well-being that had a stronger negative effect was happiness (r=-0.30) only. Positive affect (r=-0.18) and self-esteem (r=-0.17) were also significantly negatively associated with PSMU, but their effects were smaller. These different associations

between PSMU and individual indicators of well-being suggest that they represent different constructs and should therefore not be pooled (Keyes, 2005). Fifth, the vast majority of studies relied on self-reported or questionnaire measures of SMU, and systematic reviews have demonstrated the inherent recall bias that leads to inflated measurement errors, a bias that leans toward null findings (i.e., underestimated effects) due to ubiquitous underreporting (Parry et al. 2021).

5.3.1.6.6. SMU, PSMU and Problematic Behaviours: Conclusions

156. Taken together, the meta-analytic evidence offers persuasive support for a causal relationship between adolescent SMU—particularly PSMU—and a range of harmful behavioural outcomes. Across well-powered studies, SMU is consistently linked to disordered eating, as adolescents internalize idealized body standards, fueling dissatisfaction and unhealthy eating patterns. PSMU shows moderate to large effects on sleep disruption, with consistent findings that adolescents who engage in PSMU experience significantly poorer sleep quality – an outcome with far-reaching consequences for physical and mental health. SMU is also significantly associated with increased engagement in risky behaviours such as substance abuse and risky sexual activity, with the strongest effects observed in the youngest adolescents. Longitudinal and panel data point toward SMU as a driver in the development of these problems. Given the heightened neurodevelopmental vulnerability of adolescence, the weight and totality of the evidence clearly point to SMU, and especially PSMU, as a causal contributor to behavioural health risks during this critical developmental window.

5.3.1.7. <u>Academic Outcomes</u>

5.3.1.7.1. SMU, PSMU and Academic Performance

157. As Table 7 shows, two meta-analyses (N=83,929) examining the relationship between SMU and academic achievement or performance were published and captured by our search between 2020 and 2025. Based on the Funder & Ozer benchmark, one effect size falls into the very small category ($r<0.10$) and the other effect size falls into the small category ($r<0.20$). For example, Salari et al. (2025) found in their meta-analysis of 16 studies that social media addiction is significantly associated with lower academic performance (r=- 0.172). However, a meta-analysis of 18 studies by Kus et al. 2024 found that the effect of general SMU on academic performance was small, positive, but non-significant (r=0. 012 for Cohen's d=0.025). Funder & Ozer demonstrate through advanced statistical modelling that small effects are meaningful at the

population level, which is relevant considering the prevalence of SMU is billions of regular users globally. Moreover, both effect sizes that met Funder & Ozer benchmark reached statistical significance.

Table 7. Pooled Correlations Between SMU, PSMU and Academic Achievement/Performance

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Kus et al. 2024						
Academic performance	18	77,457	Cohen's d	0.03(-0.05, 0.10)	0.012	98.7
Salari et al. 2025						
PSMU and academic performance	16	6,472	r	**-0.17(-0.320,-0.016)***		97.4

*p<.05, **p<.01, ***p<.001

Note. Converted *r* indicates effect sizes converted to correlation. PSMU=problematic social media use

158. These findings suggest that it is PSMU rather than SMU that is associated with lower school achievement or performance. As discussed above, Funder & Ozer demonstrate that small effects are meaningful at the population level, which is relevant considering the prevalence of SMU is billions of regular users globally, and the relatively high prevalence of problematic social media use. Several factors could explain the association between PSMU and lower academic performance, including distraction, time spent on social media instead of schoolwork (discussed in more detail below), and the potential for negative impacts of PSMU on mental health, such as anxiety, depressive symptoms, and lower well-being, which can further hinder academic achievement/performance.

159. The meta-analysis by Kus (2025) did not find a significant effect of SMU on academic performance, but this null finding should be interpreted with caution. Kus et al. highlight potential benefits of SMU when used for academic purposes, such as easy access to school-related information, forming study groups, and sharing ideas, support and resources, which can enhance the learning process and academic performance (Qi et al. 2019). However, when high SMU is used more for personal/recreational reasons, higher or problematic use can undermine academic performance via technostress, exhaustion, fragmented attention and displaced schoolwork (Kus, 2025; Homaid, 2022).

160. Only one study from the US was included in the Solari (2025) meta-analysis. In a sample of 252 youth, Murcia et al. (2015) found that higher scores on PSMU was significantly

associated with poorer study habits and performance (r=-0.23, p<0.05). This effect is in the moderate-sized classification according to Funder & Ozer. It is important to note that this study is 10-years old and was only specific to Facebook addiction. The academic and mental health impacts of child and adolescent SMU and PSMU disrupt and significantly harm the school environment. For example, a recent meta-analysis of 22 studies, by Bottger et al. 2022, found empirical evidence supporting the distracting presence of smartphones, a phenomenon known as "brain drain. Specifically, they found that smartphone use and even the mere presence of a smartphone (not in use) significantly undermines cognitive performance measured by 3 broad domains: memory, attention, and general cognitive performance (r=-0.14, P<0.001). Relatedly, research from my laboratory and colleagues showed that problematic technology use (encompassing SMU and other forms of media) was associated with lower school connectedness and academic performance in 4,837 high school students (Sampasa-Kanyinga, Chaput, Hamilton, 2019), and these findings were replicated in over 10,000 students when examining social media use specifically. These findings and others are further discussed below.

5.3.1.7.2. Quality Assessment

161. The meta-analyses included in this section on social media and effects on academic achievement varied in their approach to assessing study quality and risk of bias. Kus et al. 2024 followed the guidelines of Kitchenham & Charters (2007), with a mean quality score of 8.52 out of 10, and only included studies scoring 8 or higher, suggesting an overall high-quality selection. Salari et al. (2025) applied the STROBE checklist, including only studies scoring 16 or above, categorized as good or average quality, while removing studies below this threshold, ensuring a moderate to high-quality dataset. Overall, these meta-analyses demonstrated rigorous quality control, with inclusion criteria emphasizing moderate to high-quality studies across different assessment frameworks. The tests for publications biases were not significant in either meta-analysis on academic performance.

5.3.1.7.3. SMU, PSMU and Academic Performance: Conclusions

162. In sum, while the overall effect sizes linking SMU to academic performance may appear small, the evidence—particularly in relation to PSMU—is both statistically significant and substantively meaningful when considered at the population level. The consistent association between PSMU and diminished academic outcomes, as demonstrated in recent high-quality meta-analyses, is compelling. Given the global scale of SMU and the growing prevalence of PSMU,

even small effects translate into widespread and measurable harm. While general SMU may show mixed associations, it is clear that patterns of excessive and compulsive SMU undermine academic success.

163. While the mental health harms of child and youth SMU discussed throughout this report undermine academic individual achievement, those outcomes do not exist in a vacuum. As a clinician with over 20 years of experience providing psychological care to school-aged children—including many who have been adversely affected by social media use—and as an educator with an equally long career in academic settings, I have seen firsthand how social media's impact on the mental health and academic achievement of students manifests across a student body and disrupts the broader educational environment. Teachers and administrators may face greater difficulty maintaining engagement, managing behavior, and meeting academic goals when a significant number of students are distracted, emotionally dysregulated, or underperforming. The burden of responding to these issues frequently falls on schools despite having limited mental health support, overextended counseling services, and limited budgets. The rising demand for interventions—such as individualized academic support, behavioral management plans, and mental health referrals—can place substantial strain on educators and school districts that are already facing resource constraints. In this way, the personal impacts of social media use compound into a systemic burden, quietly reshaping the dynamics of learning environments and diverting resources away from instruction toward crisis response and support services.

5.3.2. EXPERIMENTAL EVIDENCE

5.3.2.1. SMU and Mental Health Outcomes

164. A fundamental principle in human subjects research is the avoidance of foreseeable harm. Given mounting evidence that high-volume, prolonged social media use precipitates and exacerbates psychological distress, researchers are ethically precluded from designing experiments that deliberately expose participants to extended or intensified social media engagement. To address this, researchers have adopted a mitigation-focused approach: rather than increasing exposure to social media, interventions are designed to reduce or eliminate its use. Participants are typically assigned to conditions involving temporary abstinence or significant reductions in usage. This design preserves ethical integrity by avoiding intentional harm while providing for the assessment of SMU's causal effects on mental health. Interventions range from full abstinence

(e.g., deactivating accounts) to reduction (e.g., time-limited daily use), with durations spanning from a few days to several weeks.

5.3.2.2. Effect Size Calculation and Interpretation

165. The Funder & Ozer (2019) benchmark was applied to guide effect size interpretation in the present review of social media reduction experiments. This framework addresses limitations inherent in conventional benchmarks, which often dismiss small effects (e.g., r≈0.05–0.15) as trivial. In the context of social media interventions, effect sizes are consistently small but remarkably stable across multiple independent studies, evidencing a reliable relationship. The Funder & Ozer perspective emphasizes that even small effects can be meaningful, particularly when interventions target behaviours that occur frequently or are sustained over time, such as daily social media use. Given that social media platforms engage billions of users globally, even minor improvements in individual mental health outcomes can accumulate into substantial benefits at the population level. Moreover, Funder & Ozer argue that in complex, multiply determined domains such as mental well-being, large effect sizes are rare. Instead, robust findings often manifest as small but consistent effects that yield incremental insights into how interventions shift individuals' psychological states.

166. Effect sizes are reported as standardized mean differences between intervention and control groups expressed in standard deviation units. The most common types of effect sizes in the literature with experimental designs is the Cohen's d effect, where effect sizes of d=0.20 are considered small, moderate effect sizes range from d=0.50 to .79, and large effects are d>0.80. Regarding Hedges' g, the same classification of small, medium and large effects applies as Cohen's d, but the advantage of Hedges' g is that it corrects for biases due to small sample sizes.

5.3.2.3. Main Findings of the Meta-Analyses

167. All 15 pooled effect sizes (100%) presented in five meta-analyses revealed that experimentally reducing social media use led to improved well-being (e.g., positive affect and life satisfaction) or reduced psychological distress (e.g., depression, anxiety and stress) – although of varying magnitude and precision (Table 8).

Table 8. Pooled Effects of SMU Abstinence/Reduction Experiments on Mental Health Outcomes

Outcomes	Number of studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
Lemahieu et al. 2025						
Positive affect	9	1,861	Hedges' g	0.03(-0.11,0.16)	0.01	61.00
Negative affect	9	1,861	Hedges' g	-0.01 (-0.13, 0.10)	0.00	64.00
Life satisfaction	7	4,190	Hedges' g	0.03 (-0.17, 0.22)	0.01	59.00
Ferguson, 2024						
Mental health problems	27	NR	SMD	0.088 (-0.018, 0.197)	0.04	75.20
Liu et al. 2025						
Overall well-being	56	10,106	SMD	**0.23 (0.15, 0.31)*** **	**0.12**	NR
Positive indicators	33	5,428	SMD	**0.23 (0.12, 0.34)*** **	**0.11**	NR
Negative indicators [a]	23	4,678	SMD	**0.24 (0.12, 0.36)*** **	**0.12**	NR
Ansari et al. 2024						
Life satisfaction	8	6,247	SMD	**0.26 (0.10, 0.42)*** **	**0.13**	76.00
Positive affect	4	5,428	SMD	0.18 (-0.18, 0.54)	0.09	73.00
Subjective well-being	14	NR	SMD	**0.21 (0.06, 0.34)*** **	**0.10**	74.00
Psychological well-being	4	NR	SMD	**0.27 (0.09, 0.46)* **	**0.13**	0.00
Ramadhan et al. 2024						
Mental well-being	6	1,261	SMD	0.04 (-0.54, 0.62)	0.02	93.00
Depression	3	459	SMD	**-0.29 (-0.51, -0.07)* **	**-0.14**	20.00
Life satisfaction	5	1,410	SMD	0.20 (-0.12, 0.52)	0.10	83.00
Stress	2	173	SMD	-0.31 (-0.83, 0.21)	0.15	51.00
Burnell et al. 2025						
Overall well-being	91	5542	Hedges' g	**0.17 (0.08, 0.27)**	**0.09**	NR
Positive well-being	38	NR	Hedges' g	0.13 (0.04, 0.21)	0.07	
	13	NR	Hedges' g	0.06 (--0.07, 0.20)	0.03	NR
Positive affect	9	NR	Hedges' g	**0.16 (0.02, 0.30)**	**0.08**	NR
Mental Wellbeing	8	NR	Hedges' g	**0.40 (0.06, 0.74)**	**0.20**	NR
Self-esteem	6	NR	Hedges' g	**0.17 (0.03, 0.31)**	**0.09**	NR
Happiness	2	NR	Hedges' g	-0.02 (-0.17, 0.14)	-0.01	NR
Negative well-being [a]	26	NR	Hedges' g	**0.20 (0.12, 0.29)**	**0.10**	NR
Depression [a]	16	NR	Hedges' g	**0.19 (0.07, 0.32)**	**0.10**	NR
Loneliness [a]	13	NR	Hedges' g	**0.16 (0.04, 0.28)**	**0.1**	NR
Anxiety [a]	9	NR	Hedges' g	**0.28 (0.13, 0.43)**	**0.14**	NR
Negative Affect [a]	5	NR	Hedges' g	0.14 (-0.15, 0.42)	0.07	NR
Stress [a]	6	NR	Hedges' g	**0.23 (0.04, 0.42)**	**0.11**	NR

**p<.05, **p<.01, ***p<.001; SMD: standardized mean difference – usually Cohens' D*
Note. [a]The effect size was reversed – positive values indicate beneficial effects of social media reduction.
Converted *r* indicates effect sizes converted to correlation.

168. Results from the meta-analyses specifically examining depression showed that abstaining from or reducing SMU led to significant reductions in depression scores, with small effect sizes ranging from d= 0.19 (Burnell et al. 2025) to d=0.29 (Ramadhan et al. 2024). Of the four meta-analyses that specifically studied life satisfaction, two of them found reduced SMU led to significant increases in life satisfaction with small effect sizes ranging from d=0.20 (Ramadhan et al. 2024) to d=0.26 (Ansari et al. 2024). In the only meta-analysis with more than two studies that examined intervention effects on stress, Burnell et al. (2025) found that reducing SMU led to a significant reduction in perceived stress with a small effect (d=0.23). Ramadhan et al., 2024 also examined stress but in only two studies with a combined n=173 (d=0.31), which was not significant, though not surprising given the large confidence and lack of statistical power. Except for Ferguson's meta-analysis, which pooled both positive and negative outcomes into a mental health problems composite, the remaining meta-analyses pooled outcomes into positive and negative indicators of mental health, which is a methodological limitation that underestimates the true effects of intervention for many reasons as described below. However, they will be reported here despite having limited meaning.

169. In 4 studies yielding 6 effects for subjective well-being or psychological well-being, 3 of the 4 study effects showed that reducing SMU led to significant improvements in well-being (Liu et al. 2025; Ansari et al. 2024; Burnell et al. 2025), with effect sizes ranging from d=0.13 to 0.40, while one meta-analysis found very small and negligible effect of reduced SMU on emotional well-being (Ramadhan et al. 2024). However, it is important to note that despite being a recent meta-analysis, Ramadhan et al. (2024) only included 6 studies whereas the meta-analyses by Liu et al. (2025), Ansari et al. (2024), and Burnell et al. (2025) included 56, 14, and 38 studies, respectively. Thus, these larger meta-analytic studies are clearly more impactful and representative of the literature due to including more studies.

170. The remaining studies pooled outcomes as either positive indicators of mental health or negative indicators of mental health. Three meta-analyses examined intervention effects on positive affect or positive indicators of mental health, with two of them showing that reductions in SMU led to increased positive affect (Liu et al. 2024) or positive indicators of mental health, with effects ranging from d=0.18 to 0.23 (Liu et al. 2024; Ansari et al. 2024). The meta-analysis by Lemahieu et al. (2025) showed null effects on positive affect but is severely limited by the small number of studies by comparison, along with other methodological limitations described below.

171. Three meta-analyses pooled negative indicators of mental health (i.e., anxiety/depression), with the significant larger studies based on 23 and 26 studies showing much stronger intervention effects (d=0.23, Liu et al. 2024) and (d=0.20, Burnell et al. 2025) compared to the much smaller meta-analysis which showed weak and insignificant effects (9 studies) (Lemahieu et al. 2025).

172. The Ferguson et al. (2025) meta-analysis inappropriately pooled all the outcomes into one outcome variable, a methodological flaw that undermines its validity according to rigorous meta-analytic methodological standards (Vetter et al. 2019; Walker et al. 2021).

173. In the only study to appropriately report separate effects for individual outcome indicators that comprise positive and negative mental health indicators, Burnell et al. (2025) found that restricting SMU led to significant improvements in positive subjective wellbeing indicators, characterized by increases in self-esteem (d=0.17), mental wellbeing (d=0.40), but effects on happiness were not significant, though not surprising given only two studies were included. Regarding negative indicators of mental health, results from Burnell et al. (2025) showed that restricted SMU led to significant reductions in a global measure of negative wellbeing (d=0.20), as well as 4 of the 5 indicators that comprise this measure, such as reductions in Depression (d=0.19), loneliness (d=0.16), anxiety (d=0.28), and stress (d=0.23). This meta-analysis found few moderation effects by age, gender, or type of intervention, although, female participants were found to derive greater benefits to self-esteem from SMU restriction compared to males. Length of intervention was not widely examined beyond the composite measures, which did not yield significant findings, but this finding should be interpreted with caution given length of intervention analysis included very short-term abstinence studies known to produce withdrawal effects with longer reduction studies, thus functionally comparing apples to oranges. A more fruitful analysis would have been to stratify analyses by type of intervention and length of intervention to avoid conflating length of intervention with type of intervention. Critically, no moderation analysis was performed on intervention adherence or objectively verified vs self-reported adherence to SMU restriction, a significant limitation given intervention adherence strongly predicts outcomes from pharmacological and behavioural interventions (Edgcomb & Zima, 2018; Cugelman et al. 2011).

5.3.2.4. <u>Quality Assessment of Experimental Evidence of SMU and Mental Health Outcomes</u>

174. The majority of results from these meta-analyses of experimental studies indicate small yet significant intervention effects (d=0.10 to 0.40). According to Funder & Ozer's model,

such effects can accumulate over repeated occasions or across large populations to yield clinically significant impact at the population level over time. The quality of studies varied between studies, but most were of moderate quality, on average. Specifically, Lemahieu et al. (2025) used the established Downs and Black risk of bias model and found 70% of the studies were fair, while only 30% were "good" quality, thus findings from this meta-analysis should be interpreted with caution. Liu did not report on quality of studies or risk of bias. Ferguson (2025) did not follow a validated risk of bias framework, but evaluated study on subjectively determined criteria that the authors believed were indicative of "best practices" but no references were provided in support of this criteria, making quality difficult to evaluate. Burnell et al. (2025) also applied the Downs and Black model and reported a mean score of 17/24, indicating moderate quality. Ansari et al. used the Cochrane Collaboration Tool-Risk of Bias 2-version and reported approximately 40% of the studies were of high or moderate quality, with most studies losing quality points due to bias in reporting outcomes. Ramadhan used the Cochrane Collaboration tool-risk of bias version 2, and reported 4/7 studies were low risk of bias, 1/7 moderate, and 2/7 high risk, indicating moderate to high quality, on average.

5.3.2.5. <u>Exploring Sources of Heterogeneity</u>

175. All reviewed meta-analyses reported substantial heterogeneity in effect sizes, indicating significant variability across studies, suggesting that some people benefit more than others from intervention. This variability reduces the precision of summary effects, increases the risk of inaccurate conclusions, and may dilute or obscure relevant effects, which are often overlooked (Vetter et al. 2019). In social media reduction and abstinence interventions, heterogeneity likely results from methodological and sample-related differences, which are examined below.

5.3.2.5.1. Underestimation Due to Erroneous Outcome Aggregation

176. A common source of heterogeneity in mental health meta-analyses arise from aggregating or pooling theoretically distinct constructs into a composite score without preserving their properties. The description of what constructs were pooled in the meta-analyses is presented in Table 9.

Table 9. Constructs Blended for Analysis in Experimental Social Media Studies

Study	Outcome	Operationalization
Lemahieu et al. 2025	Positive affect	Affect scales (e.g., PANAS)
	Negative affect	Affect scales (e.g., PANAS)
	Life satisfaction	Life satisfaction scales (e.g., SWLS)
Ferguson, 2024	Mental health composite	Composite of depression, anxiety, mood, mental well-being, self/body esteem, positive/negative affect, life/day satisfaction, happiness, loneliness, and stress
Liu et al. 2025	Overall well-being	Aggregated from both positive and negative indicators of well-being (below)
	Positive indicators	Composite of hedonic (e.g., life satisfaction, positive affect), eudaimonic (e.g., purpose in life), and social well-being (e.g., perceived social support)
	Negative indicators	Composite of anxiety, loneliness, and depression
Ansari et al. 2024	Life satisfaction	Life satisfaction scales (e.g., SWLS)
	Positive affect	Affect scales (e.g., PANAS)
	Subjective well-being	Composite of happiness, life satisfaction, and positive affect
	Psychological well-being	Composite of purpose in life, flourishing, personal growth, and self-acceptance
Ramadhan et al. 2024	Mental well-being	Aggregated from various scales measuring general psychological functioning and emotional state (unspecified tools)
	Depression	Composite of validated depression inventories across studies (e.g., CES-D, BDI)
	Life satisfaction	Life satisfaction scales (e.g., SWLS)
	Stress	Perceived stress scales (e.g., perceived stress scale)
Burnell et al. 2025	Overall well-being	Aggregated from various scales measuring 5 positive and 5 negative well-being indicators
	Positive well-being	Composite of validated scales assessing life satisfaction, positive affect, mental well-being, self-esteem, and happiness
	Negative well-being	Composite of validated scales assessing depression, loneliness, anxiety, negative affect, and stress

177. Ferguson (2024) conducted one of the broadest meta-analytic reviews of experimental studies linking social media use to mental health outcomes. However, a key methodological limitation was his aggregation of disparate outcome measures (e.g., depression, anxiety, self-esteem, affect, body image and life satisfaction) into a single composite indicator of "mental health". He justified this by citing high intercorrelations between these constructs and the aim of reducing Type I error from selective reporting. This approach led to among the highest degree of statistical heterogeneity (an indicator that studies are too different from each other), masking intervention-specific effects on discrete constructs. The meta-analyses described above and depicted in Tables 2 and 3 clearly demonstrate stronger effects between SMU and negative indicators of mental health compared to SMU and positive indicators of mental health. Thus, the pooling of these positive indicators of well-being with negative outcomes dilutes the effects of intervention on negative indicators.

178. Liu et al. (2025) found that effect sizes for specific negative outcomes were notably stronger than Ferguson's aggregated estimate (Cohens' d=0.088). In Liu's model, social media detox yielded a relevant and statistically significant effect on negative indicators such as depression and anxiety (Cohens' d=0.239), and on positive indicators like life satisfaction and self-esteem (Cohens' d=0.231). Ramadhan et al. (2024) similarly demonstrated that depression outcomes were most responsive (Cohens' d=-0.29), while effects on life satisfaction and stress were non-significant.

179. These findings demonstrate that blending disparate constructs may result in underestimation of true effects. While some domains (e.g., depression) are sensitive to short-term behavioural interventions, others (e.g., global life satisfaction) may be more stable and less amenable to change in response to reducing or removing SMU. When meta-analyses do not preserve this distinction (blending outcomes into composites), they are at significant risk of drawing inaccurate or overly conservative conclusions (Armstrong & Westerhout, 2017).

5.3.2.5.2. Underestimation by Blending Cumulative Exposure and Brief Abstinence Studies

180. All abstinence studies were short-term, with some interventions lasting a few days and others lasting 7 days (or longer). Short-term abstinence interventions that measure change in mental health and well-being symptoms over a few days may conflate therapeutic disconnection with initial psychological costs, such as withdrawal symptoms or FoMO. Indeed, Thrul et al.

(2025) conducted a moderator analysis comparing effects of abstinence/reduction intervention length of less than or more than one week using the same data from Fergusson's meta-analysis. Thrul et al.'s re-analysis revealed that very-short interventions (<1 week) led to a decrease in mental health (Cohens' d=-0.175, 95% CI [-0.31, -0.04]), whereas interventions lasting for one week or more led to improved mental health scores (Cohens' d=0.156, 95% CI [0.03, 0.28]).

181. This pattern of findings highlights the potential withdrawal effect. More specifically, FoMO and withdrawal symptoms appear to be central contributors to the short-term adverse effects observed during digital abstinence (Brown & Kuss, 2020; Eide et al. 2018). Participants accustomed to frequent digital engagement often exhibit elevated anxiety or restlessness upon sudden disconnection (Hall et al. 2019). This emotional response mirrors withdrawal responses observed in both substance-based addictions and behavioural addictions, wherein brief interruptions can intensify negative affect before any psychological benefits emerge with continued abstinence (Fernandez et al. 2020). Consequently, interventions limited to one week or less may systematically underestimate the potential positive outcomes of digital detoxification, as participants may not be afforded sufficient time to physiologically and emotionally recalibrate.

182. Thrul et al. (2025) also modeled the intervention effects as a function of duration of social media abstinence/reduction and identified a curvilinear pattern, revealing that stronger benefits are observed for longer interventions with optimal mental health benefits at three weeks of intervention (Figure 1). Unfortunately, effects for even longer durations were poorly estimated given the lack of studies, but given the trend to psychological benefits increases with the length of SMU reduction/abstinence, it stands to reason these benefits would be maintained or perhaps strengthened over time (assuming lower use of SMU is maintained).

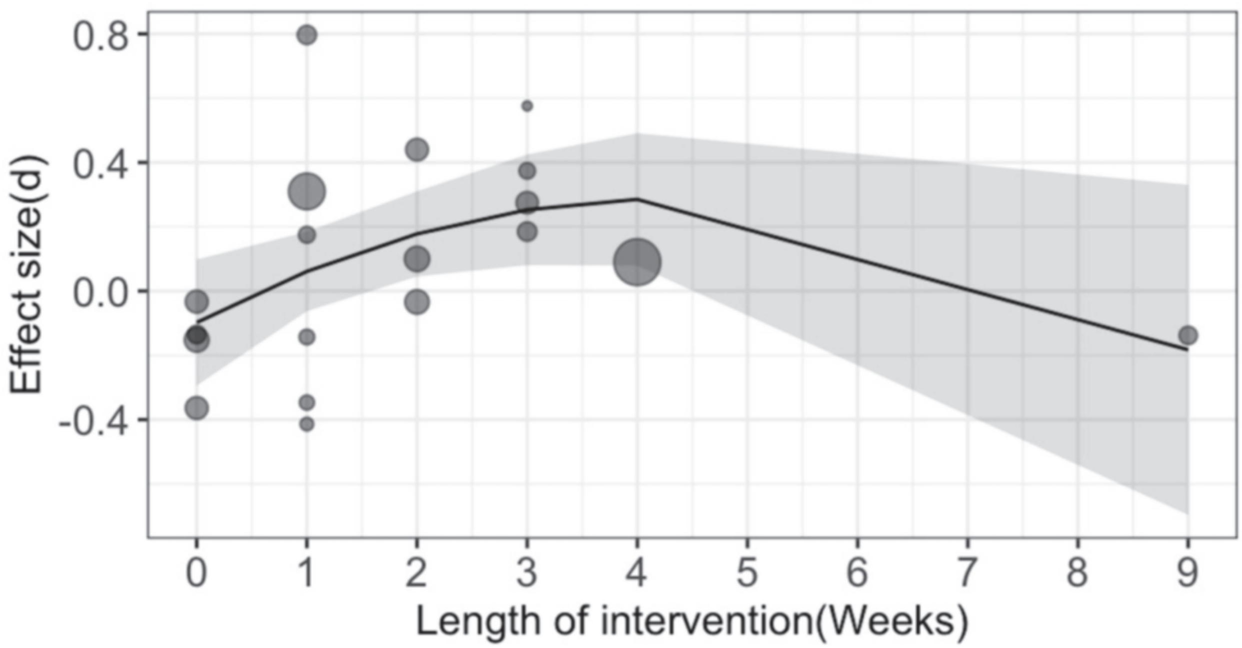


Figure 1. Plot of curvilinear relationship between social media use reduction / abstinence intervention length in weeks and effect size on mental health outcomes (k=19 studies) (Thrul et al. 2025)

5.3.2.5.3. Effect Obfuscation by Blending Type of Intervention

183. Full-abstinence protocols instruct participants to cease using one or more social media platforms entirely. These are arguably the simplest to implement logistically, yet the literature demonstrates highly variable results (some even negative) due to the FoMO or withdrawal processes discussed above. Lemahieu et al. (2025), for instance, focused solely on full abstinence in their meta-analysis and reported mostly null effects for positive affect, negative affect, and life satisfaction. The narrower scope and the short durations typical of these studies are confounded by withdrawal effects from sudden cessation, which may explain these neutral pooled estimates. Moreover, full long-term abstinence is not a realistic solution for most youth in the current digital era.

184. A middle ground is the strategy of limiting social media to a certain daily amount (e.g., 30 min/day) or restricting it to specific times. This approach seeks to reduce overexposure without triggering FoMO as acutely as full abstinence. In Liu et al.'s analysis, reduction-based interventions produced moderate but generally positive effects, often in the d=0.15-0.23 range for outcomes like life satisfaction or depressive symptoms. For participants without clinical-level distress, a reduction strategy strikes an optimal balance between preserving beneficial aspects of digital connectivity with moderate use, a concept known as the Goldilocks Hypothesis. As shown

in the observational evidence, mild SMU was associated with little harm, in contrast to heavy or problematic use. Moreover, the contrasting effects of meta-analyses that only studied abstinence (Lemahieu et al., showing no effect on mental health due to confounding of withdrawal) with small beneficial effects for reduction studies (Liu et al. 2025), clearly demonstrates these disparate effects emanating from different intervention designs should not be pooled, and doing so obscures the true effect of each type of intervention.

5.3.2.5.4. Underestimated Effects of SMU Reduction Interventions Due to Floor Effects

185. As reported in Table 8 and the discussion above, most experimental studies show that reducing SMU leads to significant reductions in mental distress and increases in well-being, with small effect sizes. It is critical to note that these intervention effects occurred in populations of children and youth who are, on average, healthy and not showing any elevated symptoms of emotional distress and, as such, have little room for measurable improvement from intervention. These "floor" effects observed in the general population underestimate effects reflecting casual relationships between SMU and mental distress in experimental studies, functionally (and artificially) attenuating treatment effects and reduced statistical power to detect change.

186. A more rigorous test of the experimental hypothesis that reducing social media use improves mental health would involve the selective recruitment of individuals experiencing psychological distress, such as those with symptoms of depression or generalized anxiety. These populations stand to benefit most from interventions and provide a more sensitive context for detecting changes in mental health outcomes. Targeting these populations maximizes the potential for clinically meaningful outcomes while maintaining ethical standards, and avoids unnecessary exposure to harm (i.e., examining causality on mental health by increasing social media exposure).

187. Three randomized controlled trials addressed these "floor effect" limitations by evaluating intervention effects in those with elevated distress. Hunt et al. (2018) found that reducing SMU to 30 minutes per day for 4 weeks (n=143 participants), with SMU objectively verified by participants' sending screenshots of daily SMU using screen time tracking features embedded in smartphones, showed that depression symptoms reduced more than controls, with a small effect size. However, when they performed a sub-group analysis of the impact of SMU reduction on those with elevated depression scores at baseline, the intervention effects became large and clinically significant. Specifically, Hunt et al. (2018) divided youth above (high depression) or below (low depression) a clinical cut-off score of 14 on the well validated Beck

Depression Inventory. In the high depression group, reducing SMU led to reductions in depression scores from 23 at baseline to 14.5. This reflects a 37% symptom reduction, exceeding the 17.5% (6-7 point) symptom reduction considered to represent the smallest change from treatment that is considered clinically meaningful, a threshold known as the minimal clinically important difference (MCID) score. In contrast, youth high in depression in the control group showed no change in depression symptoms. Youth with low depression in the intervention group still showed a significant reduction in depression scores relative to low-depression controls, though a small effect, despite exhibiting very low symptoms (i.e., BDI=5).

188. Building on these findings, Hunt et al. (2021) conducted a replication study but added a third group to the experimental design to assess whether type of use (active vs. passive) influenced intervention response. The authors randomized 150 transitional aged youth (undergraduate students) to one of 3 groups: 1) SMU reduction to 30 min/day but with more active posting from baseline, 2) SMU reduction to 30 min/day with no instruction to change to active or passive use, or 3) control group who could use social media as much as they wish. Results replicated Hunt et al.'s previous finding that reduced social media led to greater reductions in depression compared to controls. Surprisingly, the group who only reduced SMU showed significantly greater reduction in depression compared to the group who reduced SMU and was told to increase their active use, although this active use group still showed therapeutic benefits compared to control, and effects were small as expected. However, when they examined moderation effects of baseline depression, the intervention effects for those with high depression scores relative to controls with high depression scores become very large (Cohen's d=1.9 for SMD change, d=2.7 at 4 weeks only), reflecting 25% reduction in depression symptoms, where controls with high depression increased symptoms from baseline to 4-weeks. Specifically, the mean Beck Depression Score (BDI) in the intervention group with high depression at baseline was 19.8 (SD=2.89), and decreased to 14.8 (SD=5.41), whereas the control group with high depression at baseline had a BDI score of 24.0 and that increased to 28.6 post-intervention. This translates to mean difference in pre-/post-change scores of 7.5, and a mean difference between groups of 13.8 at 4 weeks. Both of these effects are large intervention effects that exceed the MCID threshold denoting clinical significance (Jaeschke et al. 1989), and remarkably, this high degree of clinical benefit occurred in only 3 weeks of reducing SMU, highlighting its causal relationship to depression in those who are experiencing depression symptoms. Conversely, there were only weak

benefits from SMU reduction in those not depressed, likely due to floor effects, as discussed above. Interestingly, this effect was not observed for the reduction + active SMU group in that those with high baseline depression showed no change from intervention in depression scores, and a further sensitivity analysis reported that those with very active use showed an increase in symptoms. This is the first study to experimentally examine how changing active vs. passive use within a context of SMU reduction impacts mental health. Hunt et al. (2021) concluded that reducing SMU but maintaining the same degree of active use has very strong therapeutic effects on depression among those with high baseline depression. However, increasing active use within a context of SMU restriction beyond what is typical will yield little benefit and could be harmful or counter-productive in some vulnerable youth.

189. Similarly, we (Davis & Goldfield, 2024) conducted an experimental SMU manipulation study on 219 youth modeled after Hunt et al.'s study, except our study targeted youth with some symptoms of distress. We also used a more liberal SMU restriction; we limited SMU to 1 hour per day (instead of 30 minutes used by Hunt et al. 2018). Our manipulation check showed good adherence, though not perfect, as participants in the experimental condition used SMU an average of about 75 minutes for the 3-week intervention period, representing about a 50% reduction from baseline ($p<0.001$), whereas controls who had unrestricted access to SMU showed no change in SMU. Like Hunt et al. our intervention showed small but statistically significant beneficial effects on depression, anxiety, and FoMO, and we extended the literature to be the first to demonstrate increases in sleep (45 minutes/night) and enhanced body image relative to control (Davis & Goldfield, 2024; Thai et al. 2024). However, when we examined intervention effects in those with higher baseline distress relative to controls with high baseline distress, effect sizes became much larger and clinically significant. For example, in those in the experimental group scoring above the clinical threshold in anxiety measured by the Generalized Anxiety scale (GAD-7), reduction of SMU led to a 33% reduction in anxiety symptoms, exceeding the minimal clinically important difference score of 4 points (Plummer et al. 2016), whereas controls showed no change in anxiety symptoms (Cohen's $d=0.64$, moderate-sized). Conversely, the differences in change scores on anxiety between intervention and controls in those with low anxiety at baseline was minimal (Cohen's $d=0.07$), highlighting the floor effect observed in the meta-analyses reported above. These effects between those high and low anxiety are displayed in the figure below.

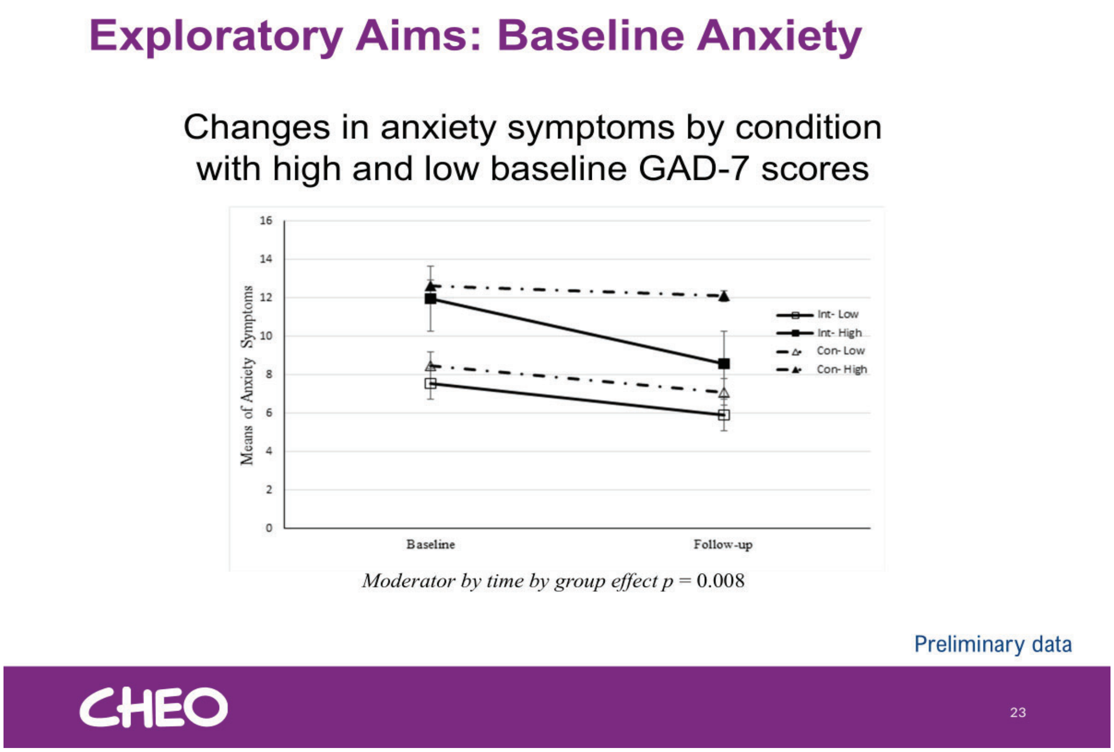


Figure 2. Changes in anxiety symptoms by condition with high and low baseline GAD-7 scores Davis & Goldfield (2024).

5.3.2.6. <u>SMU and Mental Health Outcomes: Conclusions</u>

190. Taken together, the experimental evidence demonstrates a causal link between SMU and poor mental health is present in rigorous studies, though the consistency of therapeutic effects is likely limited or negated by methodological limitations. Our study findings and those of Hunt et al. (2018, 2021) clearly demonstrate that effects increase to the moderate to very large range. These effects reflect symptom reduction that is clinically significant, indicating a strong causal relationship between SMU and anxiety and depression when the pervasive limitation of floor effects observed in all experimental studies is properly addressed.

5.3.2.7. <u>Experimental Studies on Body Image: Acute and Sustained Interventions</u>

5.3.2.7.1. Acute Interventions

Table 10. Pooled Effects of Social Media Exposure Experiments on Body Image Outcomes

Outcomes	Number of Studies	Pooled N	Effect parameter	Effect Size (95%CI)	Converted r	I^2
de Valle et al. 2021						
Appearance-ideal images on body/image vs non- appearance images)	24	3,816	Hedges' g	**-0.61 (-1.06, -0.15)****	-0.29	98.6
Appearance-ideal images on body image (vs. non-appearance images) - outliers removed	24	3,816	Hedges' g	**-0.28(-0.35,-0.20)*****	-0.14	34.8
McComb et al. 2023						
Overall	48	7,679	Hedges' g	**-0.24(-0.29, -0.19)*****	-0.12	40.0
Body image	NR	NR	Hedges' g	**-0.31(-0.41, -0.22)*****	-0.15	NR

NR=not reported

191. In the only meta-analysis to experimentally examine the acute effects of social media exposure on body image, de Valle et al. (2021) examined 24 experimental samples comparing the effect of appearance-ideal social media images to non-appearance-related control conditions (n=3816); 21 experimental samples examining the effect of contextual features (e.g., comments and captions) accompanying appearance-ideal social media images (n=3482); and 14 experimental samples investigating the effect of appearance-ideal images versus other appearance images on social media (n=2641). As indicated in the above table, results showed that social media appearance-ideal images had a moderate-to-strong negative effect on body image (Hedges' g=−0.61, p<0.01), and these effects were significantly more damaging in higher- than lower-risk contexts (Hedges' g=−0.12, p<0.01). High risk-contexts included features such as comments (and "likes"), captions that endorse the appearance-ideal, and the inclusion of other ideal image types in addition to the appearance-ideal images. More specifically, the appearance-ideal images were accompanied by either idealising comments (i.e., those reinforcing the ideals present in the image), fitspiration comments or captions, objectifying slogans, a high number of likes/follows, weight loss encouragement messages, and hashtags indicating that the person in the image did not enhance their appearance. Some of the appearance-ideal pictures represented actual celebrities and "influencers" while others were not celebrities. Low-risk context included exposure to the appearance-ideal but were accompanied with more neutral or positive comments and captions that contrast with the ideal (i.e., self-compassion quote/travel/non- idealised (i.e., 'reality') images), disclaimer comments or captions (i.e., those highlighting the idealised nature of the images), body-

positive comments or captions, empowering slogans, comments rejecting the appearance-ideal, a low number of likes/follows, weight loss discouragement messages, and/or icons indicating that photo manipulation had taken place. Although significant, this contextual effect indicating greater harm to body image when exposure to the appearance-ideal is in a context that socially reinforces the ideal on SMU (from family and peers) was small.

192. The meta-analysis by McComb et al. (2023) was designed to test social comparison theory as an explanation of how social media exposure may harm body image in 48 experimental studies and more than 7,500 participants and nearly 120 effects. Consistent with social comparison theory, when participants were exposed to images of attractive people to induce upward social comparisons, their rating of body image, well-being, and self-esteem were significantly lower than when images elicited downward social comparisons or control images. Interestingly, in the 36 effect sizes that compared upward comparison targets vs downward comparison targets, the effect size was smaller (g= -0.16, p=0.006) than the comparison of upward social comparison to neutral content (g= -0.27). Similar to de Valle et al, there were no differences in effects on body image in studies that allowed participants to use their personal social media in comparison to neutral image controls. Neither gender nor age moderated these effects, though both were limited in variability, which as discussed above, biases effects toward the null hypothesis (Lash et al., 2021). Given it is well known that the majority of comparisons on social media are upward in nature due to the "firehose" of portrayals of influencers and models that represent the unattainable societal ideal, further beautified by filters and photo editing software, it is not surprising that previous systematic reviews and meta-analyses have long reported harms in the form of body dissatisfaction and disordered eating from high SMU (Holland & Tiggerman 2016).

5.3.2.7.2. Quality Assessment of Experimental Evidence of SMU and Body Image

193. In terms of study quality, in de Valle (2021), none of the studies were assessed as being at 'high risk' of bias due to the randomisation process, but 17 studies (47.2%) were rated as having 'some concerns', mostly due to there being insufficient information to determine whether the allocation sequence was concealed prior to participants enrolling and being assigned to a condition, and to determine whether assignment to conditions was random. Absence of reporting this information, which results in a lower quality of score, does not mean authors violated these procedures, only that they did not report them. Similarly, McComb et al. (2023) adapted the Downs and Black Quality Assessment Checklist (Downs & Black, 1998) to assess the quality of studies

included in the meta-analysis. Each study was scored out of 20, with higher scores indicating greater quality. The overall methodological quality of the studies was M = 15.26, SD = 1.88, indicating moderate to high quality, on average. The items with the lowest scores were "Power" and "Blinding of Participants," due to several studies not reporting sufficient information addressing these criteria, similar to de Valle et al. (2021). Results from the meta-regression indicated that the overall effect size was not affected by study quality,

194. Taken together, these meta-analyses provide strong evidence of a causal link between acute exposure to appearance-ideals commonly portrayed on social media and body image disturbances, an effect that is exacerbated when exposure is accompanied by social approval and endorsement of these images, which is commonplace. It is important to note these effects were demonstrated in the laboratory in mere minutes, and some of the studies simply had participants use their social media platforms as they normally would and did not manipulate exposure to the ideal yet found the same effects. Given brief exposure (minutes) leads to greater body image dissatisfaction, the authors concluded that it is reasonable to believe that repeated exposure to the appearance-ideal in visual-based platforms such as Instagram/Facebook/TikTok accumulate over time, leading to long-term damage to body image, increasing vulnerability to eating disorders (Danthinne et al. 2020; de Valle et al. 2021).

5.3.2.7.3. Sustained Reductions/Abstinence

195. No published meta-analyses have quantified the effects of either social media abstinence or reduction on the effects of body image and disordered eating, but this has been an area of inquiry in several recent experimental studies. Two studies examined abstinence (de Hesselle & Montag 2024 and Mikami et al. 2024), two studies from my laboratory examined SMU reduction (Thai et al. 2021; Thai et al. 2023), and one study compared instruction on promoting adaptive use versus abstinence. Only one study examined abstinence on disordered eating (Dondzilo et al. 2024)

196. In a pilot study, we randomized 38 transitional-aged youth (17-25 years) presenting with elevated symptoms of anxiety/depression to the intervention (n=16), where SMU was restricted to 60 minutes/day, or to the control group (n=22), where SMU was not restricted. SMU on smartphones was objectively monitored via screen-time trackers in participants' smartphones submitted daily during baseline (1-week) and intervention (3-week) periods. Results indicate that the intervention participants showed a significantly greater increase in appearance esteem over the

4 weeks compared to controls (p<0.001), with a large effect size (partial eta-square ηp 2=0.253). However, we did not find a significant between-group difference on change in weight esteem (small effect), which may have been partially owing to the lack of statistical power from the small sample size, and the fact that no weight-loss occurred.

197. Thus, we conducted a follow-up study that was more adequately powered and modeled after our pilot regarding design and procedures. This study randomized 220 youth (median age 17-19 years, 76% female) to the same intervention and control conditions. Manipulation checks of objectively measured SMU on smartphones showed strong adherence to the SMU restriction goal of 1 hour per day, assessed via daily screen shots, resulting in over a 50% reduction in use from baseline (mean=168 min/day to 78 min/day for the 3-week intervention) for the intervention group, whereas controls (no SMU restriction) averaged 180 min/day at baseline, and 188 min/day during the 3-week intervention period (p<.001). Compared to the controls, the intervention group yielded significant increases in both appearance (p<0.022,) and weight esteem (p<0.026), both of which were small effects (Thai et al. 2023).

198. de Hesselle & Montag (2024) examined the effects of 14-day abstinence (vs. no abstinence control) from SMU on mental health and well-being, including body image, in 86 transitional-aged freshman, 35 randomized to control and 51 randomized to social media abstinence. The abstinence group was instructed to uninstall social media apps, but this was not monitored or verified by the investigators, who were forced to rely on self-reported abstinence (a serious limitation in most abstinence studies). Results showed that the abstinence group showed significantly greater reductions in body dissatisfaction compared to controls after controlling for potential confounders (b=-0.95, P=0.029), but no intervention effects were observed for other body image variables after controlling for confounders, perhaps due to low statistical power to detect group differencing owing to a small sample size, similar to Thai et al. (2021). In the other abstinence study, Dondzilo et al. (2024) examined the effect of 7-day social media abstinence on eating disorder symptoms measured by the widely used and validated Eating Disorder Examination-Questionnaire short-form. They specifically focused on SMU on smartphones because it can be verified by screenshots and is by far the most prevalent medium by which youth access SMU (Dean, 2021). Manipulation check showed good, but not perfect, adherence to the abstinence condition (774 SMU minutes/week at baseline to 188 minutes/week 7 days after intervention), whereas controls showed little change (1060 minutes/week at baseline and 1135

minutes/week post-intervention). Results showed the abstinence group reported significantly greater reductions in total disordered eating scores ($p<0.002$, $d=0.63$, moderate to large effect) compared to controls who showed no significant change ($p=0.77$, $d=0.07$, small effect). Regarding symptom change between groups, the abstinence group showed a 33% decrease in eating disorder symptoms from abstinence compared to 2.9% reduction for controls. This level of symptoms reduction in disordered eating is considered clinically meaningful, if sustained.

199. Lastly, Mikami et al. (2025) compared the impact on mental health and well-being of two interventions relative to control (change a behaviour not influencing mental health); a tutorial aimed at promoting more adaptive SMU or an abstinence condition among 329 Canadian adolescents and young adults. SMU was verified by screenshots of use daily and self-report over 4 timepoints over 6 weeks (baseline, 2, 4, and 6-weeks). Both interventions involved administration of 3 instructional modules around 15 minutes in length and contained videos, graphics, and activities for participants to engage with the material. The tutorial intervention group was designed to promote more adaptive SMU based on cognitive behavioural therapy techniques such as reducing cognitions leading to self-presentation pressures, trying online behaviours to connect with others in a meaningful and positive manner, digital literacy skills around understanding that posts/pictures may be curated and digitally enhanced so as to combat social comparisons, and being encouraged to unfollow or mute accounts that were leading to unhealthy social comparisons. Lastly, the tutorial involved coaching on how to engage with people in SMU in which they wanted to deepen their friendship and prioritize effective active engagement over passive scrolling. The abstinence condition was encouraged to cease or reduce SMU as much as possible for the full 6-week study duration. They were shown videos and testimonials of people deriving mental health benefits from taking a break from SMU, encouraged to delete their social media apps or use software to restrict SMU to certain hours/day, and coached on self-statement helping to combat urges to check their SMU. Controls got information on the history and culture of social media but were not asked to change behaviour. Both interventions resulted in less SMU, less active and passive use, and less overall social comparisons in comparison to controls. However, only the tutorial group showed significantly greater reductions in FoMO and loneliness and negative social comparisons relative to controls, whereas the abstinence group showed greater reductions in depression relative to controls, but the adaptive tutorial intervention group did not. Surprisingly and counter-intuitively, neither intervention group significantly influenced body

image despite the reductions in social comparisons in both groups. Mikami et al. stated it was not surprising given the goal of the tutorial group was to connect with friends in more meaningful ways.

5.3.2.7.4. SMU Experiments on Body Image: Conclusion

200. The experimental evidence clearly demonstrates that both short-term exposure to appearance-ideal on social media and everyday engagement with these platforms can significantly harm body image, particularly in high-risk contexts laden with social approval cues. While no meta-analyses have yet captured the full impact of SMU reduction or abstinence on body image and disordered eating, recent experimental studies have shown that even brief interventions—such as limiting daily use or abstaining altogether—can lead to small but significant improvements in body satisfaction, self-esteem, and reductions in disordered eating symptoms. Collectively, these findings demonstrate that regular engagement with appearance-focused social media material poses a tangible risk to psychological well-being, especially in young and vulnerable users.

5.3.3. EPIDEMIOLOGICAL AND EXPERIMENTAL EVIDENCE REVIEW: CONCLUSION

201. The weight and totality of the evidence examined in my systematic literature review demonstrates that Defendants' social media platforms cause or contribute to cause mental health harms to children and youth.

5.4. MECHANISMS AND PATHWAYS: HOW SMU IMPACTS THE MENTAL HEALTH OF CHILDREN AND YOUTH

5.4.1. MECHANISMS LINKING SMU AND POORER MENTAL HEALTH AND WELL-BEING

202. Several mechanisms have been proposed to explain how high SMU or PSMU may lead to psychological harms. The most well-studied and evidenced-based mechanisms of harm are based on Social Comparison Theory and Displacement Theory, but additional mechanisms include quality of use factors such as online risky behaviours, harmful experiences (algorithmic aggregation of fitspiration and thinspiration ideals, eating disorders, and self-harm; sexualization/objectification of adolescents; and social contagion), digital stress and neurocognitive (inattention, impulsivity/inhibitory control). As noted by Orben et al. (2024), these mechanisms are not mutually exclusive, and their relative strength will vary between individuals,

outcomes, social media platforms studied (visual vs. non-visual) and interact with other developmental vulnerabilities that amplifies harm (Orben et al. 2024; David & Goldfield, 2024). Figure 3 depicts the various mechanisms studied and their pathways linking SMU, PSMU, and SMU addiction and 3 classes of outcomes; 1) mental health and well-being; 2) maladaptive behaviours (disordered eating, self-injurious behaviours/suicidal ideation, risky behaviour and substance use) and 3) academic performance/achievement.

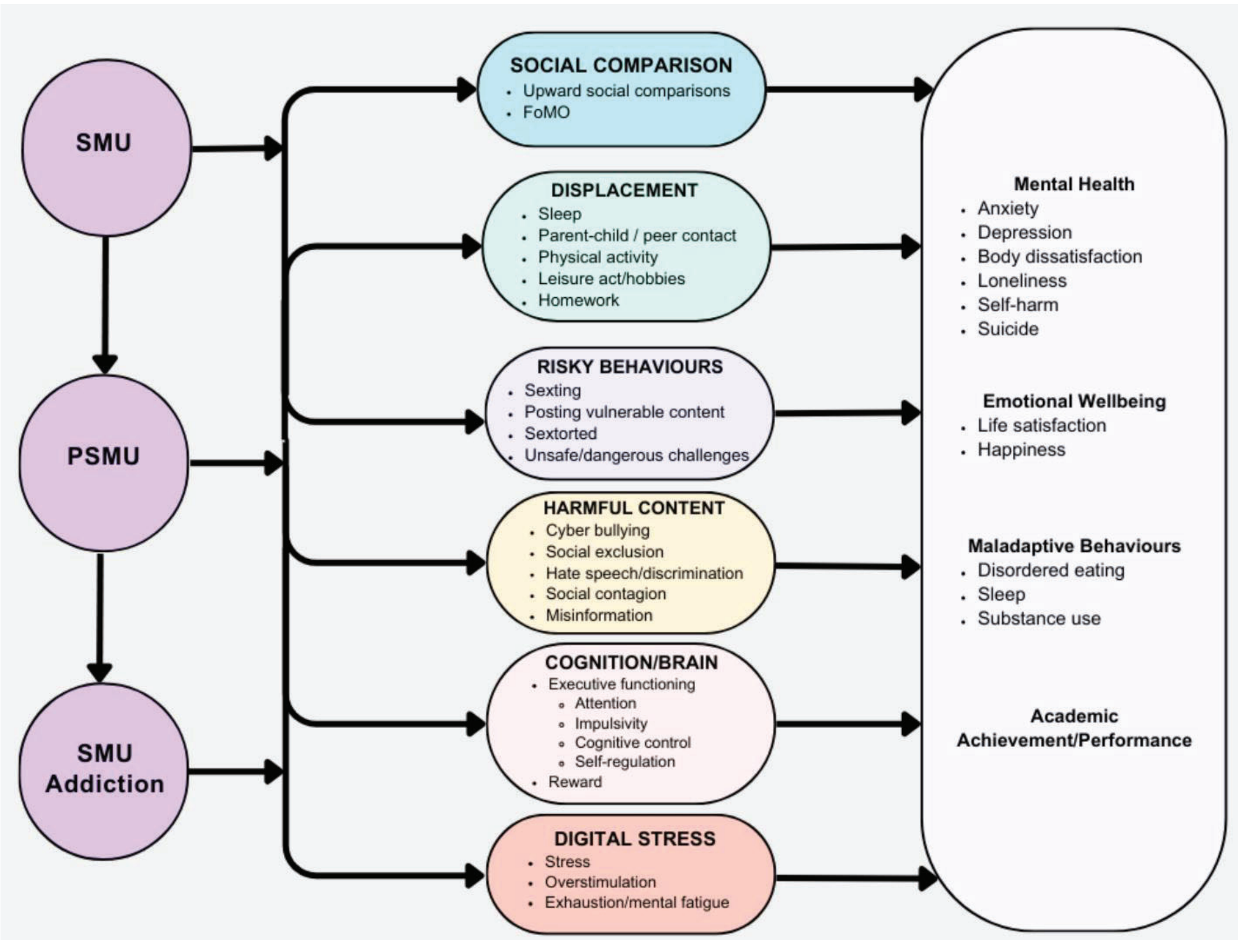


Figure 3. SMU, PSMU and social media addiction are connected to several mechanisms of harm which are connected to outcomes.

5.4.2. SOCIAL COMPARISONS AS A MECHANISM OF HARM

203. Social comparison theory posits that humans have an innate motivation to compare themselves to others, driven by the need to establish accurate self-appraisal (Festinger, 1954). Adolescence and young adulthood are a time when self-comparisons are at their peak, reflected by a natural developmental process involved in identity formation and self-concept (Erikson, 1950).

There are two main types of social comparisons: upward and downward. Upward social comparison occurs when someone compares themselves against someone who they perceive to be superior, often motivated by self-improvement but commonly results in feelings of reduced self-esteem and heightened negative emotional states (e.g., envy, anxiety, depression, etc.). Conversely, downward social comparisons occur when the individual compares themself to another who they perceive to be inferior, predominantly motivated by self-enhancement, resulting in enhanced mood and self-perceptions of appearance and/or abilities (Festinger, 1954). In a meta-analysis of over 60 years of research on social comparisons, data show that individuals predominately tend to make upward (i.e., negative) social comparisons, leading to contrast judgments and negative evaluations, which are more potent when the comparison targets were a close connection (i.e., similar to oneself). This tendency for upward social comparison is stronger in adolescents and young adulthood and weakens with age (Callan et al. 2015). Females have been found to engage in more upward social comparison than males. Given upward negative comparisons are implicated in the development of many psychological disorders, this likely explains the higher rates of anxiety, depression, body dysmorphia and eating disorders in females compared to males.

204. Media exposure has long been documented to lead to body image disturbance and eating disorders due to repeated exposure to, and internalization of, unattainable beauty standards. However, social media provokes more frequent and extreme upward comparisons because users frequently present idealized versions of themselves, including using beauty filters and body modification features to manipulate their images (McComb et al. 2023; Yoon et al. 2019). The result of such posts is an online social environment that predominantly elicits upward social comparisons and limits downward comparisons that could enhance self-evaluation (Midgley et al. 2020) with overwhelmingly negative impacts on body image and mood (Kim et al. 2021). Indeed, as described above and depicted in Tables 2 and 3, one of the most consistent findings from the meta-analysis is that higher social media use and PSMU are associated with moderate to large sized effects on greater internalization of unrealistic ideals and more severe body image disturbances. Moreover, these effects are more pronounced on image-based social media platforms and appearance-focused use (Saiphoo & Vahedi, 2019; Huang et al. 2021; de Valle et al. 2021). Interestingly, in meta-analysis of laboratory experiments that manipulated ideal images vs. other images on social media, it is not surprising that exposure to the ideal images produced stronger negative effects on body image, and these were potentiated when images were associated with

comments and captions, highlighting the harmful effects of context in social media (de Valle et al. 2021).

205. Although higher social media use is often found to be associated with more frequent upward social comparisons in observational studies (Yoon et al. 2019), the most compelling mechanistic data to support social comparison as an explanatory mechanism comes from a recent meta-analysis aimed at establishing causality via examination of experimental evidence that manipulated exposure to upward social comparisons on social media. Specifically, McComb et al. (2023) showed in 48 studies among 7,679 adolescents and young adults (mean age=22.4 years, 75% female), that manipulated exposure to upward social comparison targets in the laboratory resulted in significantly stronger negative effects than downward social comparison and controls on body image (g=-0.31), mental health (g=-0.21), self-esteem (g=-0.21), and subjective well-being (g=-0.19). McComb et al. did not find any age or gender effects. However, the majority of studies were in adolescents or young adults, and only 25% of the pooled analysis was male, limiting statistical power to detect differences. Strikingly, several studies manipulated exposure to upward social comparisons by simply allowing participants to use their personal social media platforms in the lab as they would in their natural environment. This natural use of social media produced comparable negative psychological effects as the manipulated/filtered images designed to evoke upward social comparisons via text and appearance-based images (McComb et al. 2023). In one of these laboratory studies that compared those who browsed their social media in the lab vs. control, results revealed that participants experienced immediate negative effects on their self-evaluations after viewing each post, and that these effects were cumulative and resulted in declines in self-esteem, mood and life satisfaction. Similarly, Kim et al. (2021) found that SMU was associated with greater upward social comparisons, and contrastive upward social comparisons leading to emotions (i.e., envy, depression) mediated the relationship between problematic social media use and lower self-esteem.

206. A few experimental studies have examined the effects of reducing or abstaining from social media on social comparisons to evaluate the degree of causality. As predicted, abstaining from social media for 2 weeks significantly reduced social comparison compared to controls among users aged 17-29 years (Mikami et al. 2024), likely through exposure to less triggers to socially compare due to reduced usage.

207. Taken together, these findings from meta-analytic experiments and observational studies provide compelling evidence that higher social media use causally contributes to negative mental health impacts via exposure to idealized images and over-representation of positive experiences that evoke upward (unfavourable) social comparisons. Moreover, these processes happen quickly (minutes) and appear to cumulate with exposure.

5.4.3. DISPLACEMENT THEORY

208. Displacement theory was initially developed to explain why television viewing is associated with poorer physical and emotional development (Neuman, 1988) but has recently been applied to the social media context. Briefly, displacement theory posits that the excessive amounts of time spent on these platforms (national average>3 hrs/day) harms mental health and undermines academic performance by displacing time spent in healthy behaviours (sleep, physical activity, in-person social interaction with friends and hobbies) known to promote mental health, cognition and brain health (Kraut et al. 1998).

5.4.3.1. Displaced Sleep

209. One of the most widely investigated and empirically supported health behaviours that is displaced by social media is sleep. Sleep duration and sleep quality are well documented to be integral for the promotion of good mental health and well-being. For example, a meta-analytic review by my close colleague, Dr. Jean-Philippe Chaput, from our Healthy Active Living & Obesity Research group at our Children's Hospital and University of Ottawa showed that in 141 articles (110 unique samples), including 592,215 children and adolescents, longer sleep duration was associated with better emotion regulation and emotional well-being, quality of life, and better academic achievement (Chaput et al. 2016). Moreover, meta-analytic studies of longitudinal findings show the lower sleep duration and sleep problems predict self-injury and suicide, even after controlling for poor mental health (Liu et al. 2021), highlighting sleep disruption's causal link to self-injurious thoughts and behaviours. Thus, identifying modifiable determinants of sleep, such as social media, is of paramount importance.

210. Approximately 80% of adolescents use social media and other digital technologies before bedtime (Hysing et al. 2015). This may adversely affect sleep duration or quality in many ways. First, the use of these devices may directly displace, delay, or interrupt sleep time, resulting in inadequate sleep quantity (Brautsch et al. 2023). The sound of notifications and vibrations from social media may interrupt sleep. Second, the screens of smartphones and tablets emit blue light,

which can suppress the production of melatonin, the hormone responsible for regulating sleep-wake cycles (Brautsch et al. 2023). Third, consuming emotionally charged materials, distress from unfavourable comparisons, or engaging in online exciting or stressful interaction, can increase emotional arousal, making it challenging to fall asleep. This emotional arousal can also lead to disrupted sleep and nightmares (George et al. 2024). Indeed, our group and others have shown that social media is associated with later bedtime in adolescents and less sleep duration and poorer quality in a dose-response manner (Sampasa-Kanyinga et al. 2019; Sampasa-Kanyinga et al. 2020). These epidemiological findings from individual studies are supported by meta-analytic reviews of cross-sectional and longitudinal observational studies showing moderate-to-large effect sizes (using Funder & Ozer's criteria) for general SMU (r=- 0.28) and PSMU (r=0.35) (Han et al. 2021). Moreover, colleagues in my research group have conducted mediational studies showing that the relationship between high SMU and poorer mental health is mediated through reduced sleep, whereby SMU leads to less sleep (or greater sleep problems like insomnia), which in turn leads to greater depressive symptoms and poorer mental health/well-being (Sampasa-Kanyinga et al. 2018). The negative impacts of social media on mental health via reduced sleep quality was also demonstrated in a recent systematic review of both cross-sectional and longitudinal studies (Alonzo et al., 2021), findings that align and support the meta-analyses reported above.

211. Experimental studies provide the strongest evidence of causal relationships. To my knowledge, the only experimental evidence examining the relationship between social media use and sleep has been conducted in my laboratory. More specifically, Davis and Goldfield (2024) randomized 220 youth aged 17-25 years to either reduce SMU to 1 hour per day or to a control group that were allowed to use SMU as usual, with no restrictions. We objectively verified strong adherence to the intervention via daily screenshots of SMU measured by the screentime function embedded in smartphones, strengthening the internal validity of the findings. Results confirmed the manipulation of SMU, with the intervention group reducing approximately 50% from baseline, and control showing no changes across the 4-week study period. Results showed that the intervention group that reduced SMU reported spontaneous increase in sleep by about 30 minutes/night, whereas controls reduced sleep by 15 minutes/night, representing a net surplus of 45 minutes/night (Davis & Goldfield, 2024), and these increases in sleep were associated with reductions in anxiety, depression, and FoMO. Taken together, these findings offer compelling experimental and observational evidence that high social media use directly contributes to reduced

sleep, which in turn plays a key role in worsening mental health outcomes – including suicidality – highlighting sleep displacement as a critical pathway through which social media exerts its mental health effects.

5.4.3.2. <u>Displaced Quantity/Quality of Parent-Child Relationships</u>

212. Another mechanism of harm from social media is displacing time spent socially interacting between parents and children and engaging in recreational activities as a family (Throuvala et al. 2021). Adolescence is a developmental period in which there is a marked shift of influence and relatedness from parents to peers, a developmental process known as individuation (Branje et al. 2021; Mahler, 1974). However, parent-child attachment and relational strength has long been recognized as a critical factor in risk and resilience models for mental health and well-being during adolescence. Decades of research show that strong parent-child and peer-to-peer attachments can act as strong protective factors against internalizing and externalizing behaviours in response to adverse childhood experiences and stressors (Achenbach & Dumenici, 2001), making them relevant risk/protective and mechanistic factors in the context of social media.

213. In a study from my laboratory of almost 10,000 students aged 11-20 years (48% female), using social media for more than 2 hours per day was associated with greater odds of negative relationships between mother and daughter (OR=1.79), father and daughter (OR=1.56), and father and son (OR=2.19), but not mother and son (OR=1.17). However, using social media less than 2 hours was not significantly associated with parent-child relationships. These effects held after adjusting for confounders, including controlling for total screen time (Sampasa-Kanyinga, Goldfield, Clayborne & Colman, 2019).

214. A recent systematic review replicated our findings, showing that social media use was associated with lower family-connectedness, with stronger negative associations between social media use and communication within families than with affinity indicators (Tariq et al. 2021). Similarly, a recent systematic and meta-analytic review found that in 75 studies that included 110,601 children and youth (aged 6-25 years), PSMU was associated with poorer parent-child relationships (r=-0.27), and this relationship was significantly stronger than for excessive internet addiction (r=0.12), supporting that social media addiction is more harmful to parent-child relations. Moreover, similar to the results from the systematic review by Tariq et al. 2021, effects sizes were stronger for PSMU and communication (r=-0.23) than for PSMU and affinity (r=-0.10). It should be noted that virtually all studies are cross-sectional.

5.4.3.3. Displaced In-Person Time/Quality of Peer Relations

215. Social media was designed to promote social connection between friends by providing instant connection opportunities not constrained by time or geography. It has been theorized, with some empirical support, that greater social media and greater numbers of friends/followers online stimulate feelings of social connection and support that can promote well-being (Yin et al. 2019) and could buffer against harmful experiences (Frison et al. 2016). However, the increasing reliance on digital communication among adolescents has raised concerns regarding its impact on social competence by which excessive digital interaction may displace and thus erode the socio-emotional skills cultivated through face-to-face communication (Sala et al. 2024). Moreover, nonverbal cues, such as facial expressions and body language, play a crucial role in social interaction and emotional regulation. The absence of these cues in digital exchanges can hinder adolescents' ability to interpret nuanced emotions, potentially impairing relational depth (Orben et al. 2024).

216. Consistent with these findings, systematic review and meta-analytic data suggest social media is also associated with greater loneliness and less peer connectedness in a bidirectional manner (O'Day & Heimberg, 2021.; Zhang et al. 2022). These scientists explained that high social media use displaces quality of time spent socially interacting and communicating in-person with friends, factors known to promote relational bonding, support and social connectedness that may alleviate loneliness. Longitudinal research also shows that greater loneliness leads to greater SMU motivated by a desire for social connection, thus creating a cycle (O'day & Heimberg, 2021.; Zhang et al. 2022). Similarly, meta-analytic data suggest problematic SMU is negatively associated with peer relationships and positively associated with peer problems (r=-0.19) (Adriannie et al. 2024), with the explanatory hypothesis that this relationship is likely bidirectional: that PSMU displaces quantity and quality of peer interactions and that poor peer relations or more peer problems are risk factors for developing PSMU.

217. Very few studies have experimentally examined how abstaining from or reducing SMU spontaneously impacts time spent in substitute behaviours, but the evidence available indeed supports displacement theory. Using an intensive diary study of time (re)allocation, Allcott et al. (2020) experimentally demonstrated that abstaining from Facebook led to spontaneous increases in time spent socializing with friends and family, whereas controls (non-abstinence) showed no changes in this regard. Interestingly, this abstinence effect on greater social interaction was more

pronounced in light Facebook users compared to heavy users, but active vs. passive use, time of peak use did not influence impact on displaced social activities.

218. Taken together, some correlational and experimental evidence support that high and problematic social media use may displace time spent in in-person social interaction with peers, reducing the quality of peer relationships and attachment, relational dynamics that are known to heighten vulnerability to mental health difficulties.

5.4.3.4. Displaced School-Connectedness/Homework Engagement

219. Decades of research has shown that youth with elevated levels of media use, historically TV viewing, computer use and video game playing, displaces time spent in doing homework, reading and cognitively stimulating learning activities that in the long-term leads to lower levels of academic attainment (Anderson et al. 2001; Sharif et al. 2010, Wiecha et al. 2001). Although Facebook has long been known to be associated with less studying and lower GPA in university students (Al-Menayes, 2015; Kirschner & Karpinski, 2010), less research exists in adolescents. Given the well-known findings that early adolescence marks a considerable increase in SMU (aged 11-15 years, Public Health Agency of Canada, 2021; Shimkhada & Ponce, 2024), and that it marks a time in which academic performance has implications for future academic trajectories (Pike & Saupe, 2002), understanding the extent to which younger adolescents are impacted by SMU in terms of academic outcomes is important to examine.

220. As discussed above, SMU, especially PSMU, is associated with poorer academic performance. Several studies have investigated the research question on whether high social media may displace time doing schoolwork or levels of school connectedness. In a sample of 10,076 adolescents living in Ontario, my colleagues showed that after controlling for sociodemographic characteristics and substance use, SMU>2 hours/day was inversely correlated with school connectedness in middle school students ($\beta = 0.402$; 95% CI 0.199, 0.605) and with academic performance in both middle school ($\beta = -0.153$; 95% CI -0.299, -0.006) and high school ($\beta = -0.203$; 95% CI -0.323, -0.083) students (Sampasa-Kanyinga et al. 2019). Similarly, Twenge et al. 2018 found in a large population database of over 1 million participants that high digital media use was associated with less time spent doing homework and less time in recreational non-screen activities such as spending time with friends and pursuing hobbies. Twenge theorized that high digital media use displaced time in homework and with friends, and this may mediate the effect of high digital media use and poorer mental health. These findings align with findings from

a nationally representative sample of 40,389 U.S. 8th and 10th graders. Results showed that adolescents with higher amounts of time in interactive SMU had lower grades, but interestingly, this association does not appear to be due to less time in homework, raising the possibility that high SMU may affect academic performance through other mechanisms, such as sleep.

221. Taken together, there is converging evidence that SMU and particularly PSMU displace time spent on homework, diminish connectedness to school, and reduce motivation to excel, contributing to lower academic achievement.

5.4.3.5. Displaced Physical Activity

222. Physical activity is an evidenced-based protective factor against mental health disorders. Even randomized controlled trials showing moderate-to-vigorous physical activity interventions yield comparable benefits on anxiety and depression as pharmacotherapy or psychological interventions (Singh et al. 2023). Several observational and experimental studies have examined the possibility that SMU leads to mental health problems through displaced physical activity. Using data from the Monitoring the Future survey, in a nationally representative sample of 43,994 American 8th, 10th and 12th grade students, Shimoga et al. 2019 showed that frequent use of SMU was associated with lower likelihood of vigorous physical activity in sedentary and moderately active students. Similarly, Sampasa-Kanyinga found among 9,388 7th-12th grade high school students in Ontario, Canada, that using SMU for more than 3 hours/day for boys and 5 hours/day for girls was associated with lower odds of meeting the national physical activity guidelines (i.e., 60 minutes of moderate-to-vigorous physical activity). However, Morningstar et al. (2023) found the SMU intensity (frequency) was associated with greater physical activity in a large epidemiological study involving many countries.

223. Only a few experimental studies have investigated high SMU as a possible mechanism of displaced physical activity. Brailovskaia et al. 2020 found among 246 adolescents and young adults (mean age 24.15 years) that reducing Facebook use by 20 minutes per day led to significantly greater increases in physical activity such as cycling or jogging (and reduced smoking) compared to controls at 4 weeks post-intervention and at 3-months post intervention. Brailovskiai replicated this initial finding in a 4-arm randomized controlled trial in 2023, which also showed that when participants who reduced SMU were instructed to increase their physical activity, this led to more pronounced and sustained mental health benefits compared to controls or the reducing-SMU-only condition. Interestingly, only the SMU reduction group showed reductions

in smoking behaviour, replicating her original finding, with a presumed mechanism of viewing less smoking material as a result of reduced social media exposure.

224. Evidence from large cross-sectional and experimental studies suggest that high SMU displaces physical activity, which in turn, is known to increase vulnerability to developing poor mental health and wellbeing. Together, this growing body of evidence paints a strikingly consistent picture: SMU, particularly PSMU, is not only associated with poorer mental health, but it also undermines key protective factors across multiple domains of adolescent life. From disrupted sleep—now recognized as a critical mediator linking SMU to depression and reduced well-being—to strained parent/child and peer relationships and weakened school connectedness, the adverse effects of high SMU are broad and consequential. These patterns hold across large-scale observational studies, systematic reviews, and emerging experimental work, reinforcing the robustness of these associations. Altogether, these findings underscore that SMU can erode the social, emotional, and behavioural foundations essential for healthy youth development.

5.4.4. HARMFUL EXPERIENCES ON SOCIAL MEDIA AS MECHANISM OF HARM

5.4.4.1. <u>“Fitspiration” and “Thinspiration”</u>

225. Social media can also adversely impact children and youth by promoting unrealistic and potentially dangerous body ideals through recommender algorithms that aggregate this content and present it to users in an “infinite scroll” that promotes time distortion and prolonged engagement. Trends such as “fitspiration” and “thinspiration” expose adolescents to idealized and often digitally altered body images, encouraging unhealthy behaviours to attain unrealistic standards (Jeronimo & Carraca, 2022). Cataldo et al.’s research (2021) suggests that the idealization of extremely thin and toned bodies has contributed to the rise of exercise addiction, excessive control of eating habits, appearance-related anxiety, low self-esteem, isolation, and, consequently, lower quality of life. Similarly, in a systematic review of 20 studies on the effects of “fitspiration” exposure on young and adolescent women, Jeronimo and Carraca found that exposure led to increased social comparison and body dissatisfaction. However, Nuss et al.’s (2024) systematic review found that “fitspiration” exposure did not affect physical activity behaviour, perhaps because of the perceived unattainability of the idealized body types shown online. This suggests that “fitspiration” exposure is ineffective in promoting healthy physical activity habits and instead fosters passive comparison and negative body image. An analysis by Talbot and colleagues (2017) found that social media posts with the tags #thinspiration and

#bonespiration (which idealises the portrayal of protruding bones) contained more thin, objectified bodies when compared to fitspiration and suggests that exposure to such material may reinforce harmful thin ideals and potentially promote disordered eating behaviours. In fact, they cite that a search for the hashtag 'bonespo' on Instagram results in over 130,000 posts, quickly exposing users to a variety of materials in the pro-eating disorder community.

5.4.4.2. <u>Eating Disorders, Self-Harm, and Poor Mental Health</u>

226. Social media algorithms personalize feeds to reinforce harmful experiences such as eating disorders and self-harm. On TikTok, over 20 million users follow eating disorder-related accounts, and videos with related hashtags have amassed 13.2 billion views (Center for Countering Digital Hate, 2022). The Center for Countering Digital Hate conducted an experiment using TikTok accounts registered as 13 years old, the platform's minimum age. Within 2.6 minutes of engaging with material related to body image and mental health, the algorithm recommended suicide-related material. Within 8 minutes, eating disorder-related material appeared. On average, the accounts received videos related to body image and mental health every 39 seconds. Many videos promoted harmful behaviours, such as weight-loss drinks, "tummy tuck" surgeries, chewing gum to suppress your appetite, and images of razor blades. Users with vulnerable account names (account names that contain vulnerable messages such as "lose weight") received three times as many harmful videos and 12 times as many self-harm-related videos as standard teen accounts.

227. The potential harm to young adults from repeated exposure to negative messaging, eating disorder promotion, and self-harm content is severe. Research by Rounsefell and colleagues (2019) found an association between social media use and increased body dissatisfaction, which in turn leads to disordered eating patterns and, in extreme cases, self-harm. These findings are further substantiated by Dane and Bhatia's (2023) scoping review on the relationship between social media usage, body image, and eating disorders among young people (ages 10-24), which identified social media use as a plausible risk factor for eating disorder development. Evidence from 50 studies across 17 countries suggests that social media fosters social comparison, internalization of thin/fit ideals, and self-objectification, all of which contribute to poor mental health (Dane and Bhatia, 2023).

228. Similarly, a study (Kleemans et al. 2016) investigated the effect of manipulated social media photos on young girl's body image found that manipulated photos of girl's bodies

were favoured over original photos. Alarmingly, participants described the manipulated photos as realistic and struggled to detect the reshaping of bodies, although they could identify photos where beauty filters were used. This raises concerns for adolescents' abilities to distinguish between real and edited photos, partially explaining the negative impact on body image that enhanced photos exert (McComb et al. 2023; de Valle 2021).

5.4.4.3. Sexualization and Objectification

229. Exposure to sexualized images and those manipulated with beautification features on social media contributes to further self-objectification, body dissatisfaction, and mental health challenges among adolescents. In an experimental study by Vendemia & Fox (2024), youth were exposed to images of either sexualized peers, non-sexualized peers, or landscapes. The group who was exposed to images of sexualized peers reported the highest levels of appearance-related and sexually objectifying commentary and displayed high dehumanization of the individuals in the photos. Similarly, Ghaznavi & Taylor (2015) found that sexually suggestive images featuring ultra-thin and bony women in revealing clothing tended to receive higher levels of social endorsement. These patterns reflect how social media environments can normalize and reward harmful beauty ideals and objectification.

5.4.5. EFFECTS OF SOCIAL-EMOTIONAL CONTAGION ON SOCIAL MEDIA

230. The American Psychological Association (APA, 2018) Dictionary of Psychology defines social contagion as "the spread of behaviours, attitudes, and emotions through crowds and other types of social aggregates from one member to another." While research on the role of social media in facilitating social contagion has produced mixed results, there is clear evidence that social media significantly contributes to the dissemination and adoption of certain behaviours and emotions (Martinez et al. 2023).

231. Notably, Facebook's Core Data Science Team conducted an experiment involving nearly 700,000 Facebook users. Kramer et al. 2014 examined whether emotional states can be transferred to others through a process emotional contagion. Specifically, the study examined whether exposure to verbal messaging differing between positive and negative emotional valence influenced the emotional state of others, assessed by their own posting of verbal expressions that were consistent with emotions to which they were exposed (i.e. evidence of emotional contagion or not). The experimental manipulation involved two conditions; one that reduced exposure to positive messages in participants' own News Feed, or the other that reduced exposure to the

number of negative messages in participants' News Feed. The degree to which posts were positive or negative was measured by whether the post had at least one positive or negative word in it. Each of these experimental conditions was compared against separate control conditions, one involving a proportional reduction in randomly selected messages (regardless of being positive or negative) of the positive group, and 2.24% in the negatively reduced control.

232. The study found that users who had exposure to more negative emotional messages reduced in their feeds, posted more positive emotional expression relative to controls. Conversely, when exposure to positive emotional messages was reduced, users' posts expressed more negative emotions. Importantly, Kramer et al. (2014) found a very small effect size (d=0.001) but they acknowledge that "given the massive scale of social networks such as Facebook, even small effects can have large, aggregated consequences" (Prentice & Miller, 1982; Bond et al. 2012), which perfectly aligns with Funder & Ozer's conceptualization applied in this report. Kramer et al. (2014) further conclude: "we provide experimental evidence that emotional contagion occurs without direct interaction between people (exposure to a friend expressing an emotion is sufficient) and in the complete absence of nonverbal cues." These findings clearly substantiate that SMU can causally contribute massive scale emotional contagion, and this occurs without the user even being aware of it, providing strong experimental evidence of a mechanism of psychological harm. It is also important to note that the Dr. Inder Verma, the Editor-in-Chief of the journal in which this manuscript was published, issued an editorial expression of concern, stating that Facebook conducted this study without obtaining informed consent from participants, contrary to best practices under the US Department of Health and Human Services Policy for the Protection of Human Research Subjects (the "Common Rule").

233. Children and youth are particularly susceptible to social contagion due to their heightened sensitivity to peer influence and social pressure. A study by Swedo et al. 2021 examined the correlation between exposure to social media materials discussing a high volume of suicides in Ohio and suicidal behaviours among students in grades 7-12. The findings indicated that this exposure was significantly associated with increased odds of suicidal ideation and attempts. Similarly, research by Spinola et al. 2024 found a significant correlation between social media exposure to non-suicidal self-injury (NSSI) and engagement in self-harm, with 8.7% of UK participants stating that social media played a role in their self-harming behaviours.

234. Research findings on the impact of SMU on harmful behaviours are not uniformly negative. In a systematic review, Dyson et al. 2016 analyzed studies examining the use of social media to discuss and view self-harm-related material. While some studies found that social media reinforced self-harming behaviours, others highlighted its potential benefits in fostering a sense of community and support. One study reported that 41.8% of participants felt that belonging to an online group had reduced their self-harming behaviour. However, four high-quality studies identified potential risks, including an increased likelihood of suicidal ideation among users who belonged to multiple online communities with a high proportion of suicidal members. Another study found that 11% of respondents claimed that membership in an online self-harm group triggered self-harm behaviours (Dyson et al. 2016). Seong et al. 2021 also found mixed results in a survey of Korean students from grades 6-9 with a history of self-harm. They found that posting about self-harm was associated with increased odds of lifetime suicidality, whereas passively viewing such material did not show the same correlation (Seong et al. 2021). Niederkrotenthaler et al. (2022) suggest that the framing of the suicidal materials may be more important than material itself, with narratives focused on hope and recovery reducing suicidal ideation vulnerability in individuals.

235. While research on social media's role in social contagion has yielded mixed results, a consistent thread across the evidence is that the way content is framed, shared, and engaged with can meaningfully influence users' emotional states and behaviors—particularly among vulnerable youth. Facebook's own research (Kramer et al. 2014) provided early experimental evidence that emotional contagion can occur at scale without users' awareness or direct interaction, underscoring the platform's knowledge of this psychological mechanism and its potential for harm. These findings, coupled with evidence linking social media exposure to increased risks of self-harm and suicidality in adolescents, highlight the significant risks of harm that children and youth face on Defendants' social media platforms.

5.4.6. NEUROBIOLOGICAL AND NEUROCOGNITIVE MECHANISMS

5.4.6.1. SMU and Neurobiological Mechanisms

236. Adolescence is a developmental period in which brain structure and connectivity are highly plastic in the second decade of life, with enduring impacts on cognition. (Walhovd et al. 2015). As discussed above (and below), early adolescence may be a particularly vulnerable period because of brain maturation imbalances: reward and emotion-processing regions (e.g., the

limbic system) develop sooner than cognitive control regions (prefrontal cortex). This maturational imbalance can leave youth biologically predisposed to seek novel social rewards online while lacking full capacity for impulse control and risk evaluation (Orben; Blakemore, 2023). There is significant neurobiological evidence to support the maturational coupling hypothesis (aka structural correlational networks) (Alexander-Bloch et al. 2013), which states that structural brain changes and connectivity are a coordinated process that reflects an interaction between environmental exposures and biology that impact specific neural functions. As such, interest in the effects of social media use (SMU) on the adolescent brain is garnering increased scientific interest. Humans are hard-wired for social connection, and in the digital era, this often occurs via SMU (Alexander-Bloch et al. 2013, Vogels et al. 2022).

237. As discussed elsewhere in this report, several neuroimaging studies provide compelling evidence that SMU is adversely associated with reward, social-emotional processing and cognitive control (self-regulation) centres of the brain (Meshi et al. 2013, 2015, 2016). Building on these initial studies, a recent review of the relationship between SMU and functional connectivity, brain structure and function, Wadsley and Ihssen (2023) examined 28 studies that incorporated structural (anatomical) MRI, resting-state fMRI, and task-based fMRI. Results showed that higher SMU was associated with greater activation in diverse neural networks, including mentalizing network, self-referential cognitive network, and salience and reward networks, and the default mode network, replicating and extending the early studies by Meshi and colleagues. Some of these studies indicate that the brain reward response to social reinforcement (i.e., likes) is even stronger than brain responses from potent primary reinforcers such as palatable food or money, highlighting the strong addictive properties of SMU. However, Wadsley and Ihssen (2023) caution against a causal interpretation because most studies used cross-sectional designs. Thus, it is uncertain if high SMU leads to adverse changes in brain structure or function, or whether these neural features make youth engage in more SMU. However, a few high-quality longitudinal studies and one experimental study effectively address the issue of causality.

238. For example, in a large sample of youth (n=4,227), higher screen media use was associated with accelerated maturation (unfavourable outcome) characterized by a thinner cortex, reduced volume, and more complex patterns in sulcal depth. These effects were strongest effects in the visual cortex and areas that govern sensory processing and higher order executive functions (i.e., prefrontal cortex and posterior cingulate; Paulus et al. 2019). Interestingly, when screen type

was considered, SMU showed a distinct neural profile that was associated with reduced hippocampal thickness, lower inferior-temporal cortical gray matter volume, and importantly, lower scores on fluid intelligence and greater psychopathology.

239. In a longitudinal study using an fMRI task of anticipation of social rewards, Maza et al. (2023) showed in a sample of 178 12-13-year-old adolescents who engaged in high (habitual) SMU checking showed divergent responses at baseline and altered brain development over time compared to moderate or low SMU checkers. Specifically, habitual checkers showed hypoactivation of the amygdala, posterior insula ventral striatum, dorsolateral prefrontal cortex (DLPFC) in response to anticipation of social feedback (simulating social media), whereas those with nonhabitual SMU checking showed hyperactivation in these same brain regions. Interestingly, these patterns reversed over time whereby habitual SMU checkers showing longitudinal increases in activation in these brain regions and nonhabitual checkers showing decreases in activation. Maza et al. (2023) hypothesized that the increased activation in the DLPFC may make it more difficult to control impulses to check their social media, and thus recruit PFC regions greater over time in attempt to gain cognitive control or self-regulation. Moreover, Maza et al. state that the repeated social reinforcement of SMU, functionally priming the salience and motivation brain reward networks, may override inhibitory control exerted by the DLPFC, creating a feedback loop that drives excessive checking and higher SMU.

240. Achterberg et al. (2022) conducted a longitudinal study in 189 adolescents and young adults examining the longitudinal relationship between SMU, wellbeing and brain structure. Results show that structural brain differences between high and low social media users: higher social media use across time was related to higher baseline cortical thickness in lateral prefrontal cortex (LPFC) and medial prefrontal cortex (MPFC), and individuals with high social media use showed stronger decreases in the LPFC (cortical thickness) and TPJ (surface area), compared to individuals with stable low social media use across time. It is important to note the LPFC region of the brain governs executive functioning and cognitive control, so this finding of accelerated thinning of the cortex suggest these adolescents will exhibit greater difficulties in regulating behaviour and controlling impulses as a result of high SMU, consistent with findings from Paulus et al. (2019)

241. In the only truly experimental neuroimaging study examining the impact of changes in SMU duration on functional brain connectivity (assessed via fMRI), Hu et al. (2022) instructed

light SMU users to increase their daily use of social media by 2-hours/day for 4 weeks, while heavy users functioned as the control group and were told to maintain heavy use of SMU over the 4-weeks. Strikingly, baseline results showed that heavy users exhibited poorer functional connectivity compared to light users, but these group differences were attenuated at 4-weeks after light users increased their SMU. Moreover, this increase in SMU had widespread negative impact on "almost all brain networks." This study, evaluated as high-quality by the systematic review from Wadsley and Ihssen (2023), provides the strongest evidence of a causal link between SMU and poorer functional brain outcomes.

242. Many studies have investigated the impact of PSMU on the brain, and these are also nicely presented and summarised in the review by Wadsley and Ihseen (2023). Not surprisingly, they found the PSMU was associated with even more pronounced and broader impacts on brain function, connectivity and structure in brain regions that modulate self-referential processing, attentional networks, and even deficits inter-hemispheric communication networks.

243. Taken together there is converging evidence that high SMU is both cross-sectionally and longitudinally associated with adverse changes in brain function, connectivity, and structure in dopamine reward centres, socio-emotional processing and cognitive control regions. The longitudinal and experimental evidence, derived from methodologically rigorous studies, clearly indicate directionality of higher SMU and more frequent checking leading to brain changes indicative of heightened sensitivity to social reinforcement and punishment, and simultaneous reduction in self-regulation. This neural imbalance is believed to amplify risk of mental health harms and problematic use of SMU (Crone & Konjin, 2018). These prospective and experimental studies rule out the possibility that results can be attributed to reverse causation, although bidirectional relationships may occur. Regarding the mechanistic links, not many studies except for Paulus et al. (2023) and perhaps a few others reported how changes in brain structure or function correlated with behavioural indicators of cognition or mental health. However, decades of research have shown that deficits in these brain regions observed from higher SMU and PSMU leads to an increased risk of psychopathology, and pose a biological predisposition to risky behaviours, addiction and even poorer academic functioning (Tereshchenko, 2023; Marciano et al. 2021; Maza et al. 2023). Indeed, Wadsley and Ihssen (2023) concluded that the results obtained from their systematic review of 28 studies indicates that brain responses to high and problematic

SMU are similar to that observed in the substance addiction literature, and provide support for the addictive potential of SMU, as well as neurobiological underpinnings of cognitive deficits.

5.4.6.2. SMU, PSMU and Neurocognitive Mechanisms

244. Several systematic reviews and meta-analyses have documented adverse associations between multiple digital media forms such as excessive or problematic use of internet, smartphone and videogaming on cognitive development in children and adolescents (Thorrell, 2024; Moshel et al. 2024; Werling et al. 2023). The dynamic nature of social media, characterized by repeated checking and near constant connectivity (Vogels et al. 2022), driven by FoMO and many design features (discussed above), intermittent delivery of reward, and potent stimulation of brain reward centres, has sparked research on the impacts of SMU on neuro-cognitive development. This is an important area to examine to determine whether the adverse impacts from SMU on brain structure and function summarised above actually translate to behavioural deficits in neuropsychological functioning. In examining how high or PSMU may negatively impact key executive functions such as attention, self-regulation, emotional regulation, impulsivity, several mechanisms have been proposed. As demonstrated above, SMU adversely impacts brain regions that govern these executive functions. Additionally, high or problematic use involves repeated exposure to stimuli and social interaction that is short, simple to process, contain brief interaction requiring minimal concentration, and responses that are received immediately. This dynamic combined with the common practice of simultaneous use of multiple social media platforms (SMU multitasking), may habituate (reinforce) users to instant gratification, and lead to interruption of thoughts and intentions that may undermine attentional processes and self-regulation (Soares et al. 2023). Moreover, as brief and simple interaction is repeated over time, it has been proposed that when adolescents are forced to engage in tasks that require sustained mental effort, these tasks will be perceived as boring or overwhelming, reducing task persistence, leading to procrastination and pursuit of more immediately rewarding activities (Boer et al. 2020). As discussed above, SMU has a negative impact on sleep, digital stress/overstimulation, mood and anxiety, all of which are well known to lead to cognitive decrements (Ahmed et al. 2024; Doron et al. 2015; Keles et al. 2020).

5.4.6.2.1. SMU and Neurocognitive Mechanisms

245. The most widely studied domains of neurocognitive functioning are attention fragmentation (inattention) and various forms of impulsivity and poorer self-regulation. These are core characteristics of Attention Deficit Hyperactivity Disorder (ADHD) (American Psychiatric

Association, 2013). Several studies provide cross sectional and prospective evidence that high, and especially problematic SMU, is associated with greater ADHD symptoms and behaviours. In a study called, “I can’t live without you”, Pancani et al. (2023) examined the association between delay-discounting, a phenomenon whereby a smaller immediate reward is preferred for a larger delayed reward (i.e., delay of gratification task) with smartphone usage. They found that those who preferred to communicate via smartphone (vs in-person) were more likely to show greater discounting (i.e., poorer delay of gratification), whereas those who were more aware of negative consequences of smartphone communication showed less discounting (better delay of gratification). Although not specific to SMU, as described above, adolescents communicate more through SMU than by texting (Noe et al. 2018).

246. Several other large cross-sectional findings show that higher SMU is associated with ADHD symptoms such as poorer attention, self-regulation and impulsivity (Barry et al. 2017; Levine et al. 2007; Boer et al. 2020; Firth et al. 2019). Generally, these associations show small effects but became moderate sized and clinically meaningful with problematic social media use (Andreasson et al. 2016; Merelle et al. 2017; Van den Eijnden et al. 2016; Wu et al. 2013). This pattern of results is remarkably consistent with the SMU, PSMU and mental health outcomes (reported above), indicating PSMU is associated with more harm. Given cross-sectional studies cannot ascertain a determination of causality and cannot rule out the possibility of reverse causation, longitudinal studies need to be considered.

247. Only a few, high quality, well-controlled epidemiological studies have been conducted, but the existing findings demonstrated significant associations between SMU and ADHD symptoms and behaviours. For example, in a sample of 8,000 adolescents aged 11-15 years, McNamee et al. (2021) demonstrated dose-response relationships between SMU and behavioural (conduct) problems and ADHD symptoms (inattention and hyperactivity) several years later (16-20 years) on the widely used and validated Strengths & Difficulties Questionnaires. Importantly, the negative impact of SMU on ADHD persisted after controlling for many potential confounding variables, such as age, sex, sociodemographic factors, and ADHD symptoms at baseline. Similarly, Wallace et al. (2023) used data from a 5-year population-based longitudinal cohort of nearly 4000 Canadian high school students, rigorously modeled using multivariate multilevel mediation analyses, to investigate the association of screen time (i.e., social media, television, video games, computer use) with ADHD symptoms via different potential behavioural

and neuropsychological mediators (i.e. impulsivity, response inhibition, working memory). They examined direct and indirect between-person, concurrent within-person, and lagged-within-person effects of screens on ADHD symptoms. Results showed that increases in screen time in a given year were associated with an exacerbation of ADHD symptoms within that same year (within-person association), over and above potential common vulnerability (between-person association). Impulsivity proved to be the most robust mediator in the association of screen time with ADHD symptoms at both between and within-person levels. Importantly, when types of screen time were examined, only social media use displayed a significant lagged-within-person association with ADHD symptoms mediated by changed increases impulsivity (response inhibition measured on a Go/No-Go task), indicating an enduring influence on an objective measure of behavioural impulsivity from increased SMU. Importantly, this longitudinal impact of SMU on ADHD symptoms remained after controlling for a wide range of relevant confounders, bolstering confidence of the causal associations observed. Using a very similar methodological and analytical approach. Boers et al. 2020, however, found that SMU intensity (frequency of active use) did not predict change in ADHD symptoms among 543, 11–15-year-old Dutch adolescents. In some ways, this is not surprising given the measure of SMU was just frequency of active use and not duration of SMU which would capture passive use as well, which some research shows is the component of SMU that is more harmful (Thorisdottir et al. 2019). There is longitudinal evidence that media multitasking involving SMU significantly predicted higher inattention 3-6 months later in a large sample of adolescents aged 11-16 years, a study that was replicated by the same authors (Baumgartner et al. 2018). Interestingly, this study showed that the relationship between higher screen multi-tasking and ADHD symptoms was stronger in younger adolescents, consistent with many findings in the mental health literature (Orben & Blakemore, 2023), underscoring how the risk of harm may be higher in "tweens".

5.4.6.2.2. PSMU and Neurocognitive Mechanisms

248. There is growing research on the effects of social media use on processes such as self-regulation, emotion regulation, self-control and impulsivity given these are well documented to be potent determinants of mental health problems, ADHD behaviours and addiction (Crone & Konjin, 2018; Jaworska & MacQueen 2015). In line with majority of research on SMU, a recent systematic review of 45 cross-sectional studies in over 34,000 participants showed that in the vast majority of studies, higher scores on PSMU was significantly associated with poorer self-

regulation (San Martin Iniguez et al. 2024), with most falling in the moderate to large effects using Funder & Ozer's benchmarks when individual studies are examined. In comparison to general SMU, the larger effects between PSMU and poor self-regulatory abilities are consistent with the pattern of results for SMU and mental health. These reviews are limited by the pre-ponderance of cross-sectional designs. However, Boer et al. 2020 showed the PSMU but not SMU intensity predicted greater increases in ADHD symptoms over time (using a validated ADHD questionnaire) in 543 Dutch adolescents. Importantly, they examined whether ADHD symptoms at baseline predicted increased PSMU and found no relationship, highlighting reverse causation can be ruled out as an explanation of the results.

249. In the only study to directly examine the degree to which neuropsychological behaviours mediate the relationship between PSMU and mental health, Soares et al. (2023) found among 995 youth (Mage=25), that higher scores on PSMU was associated with marked decrement in almost all areas of executive functioning (measured by questionnaire), including working memory difficulties (r=0.36 for males, r=0.31 females, Odds ratio 7.9, 95% CI, 4.41, 16.72, p<0.001), inhibition deficits (r=0.40 for males, r=0.39 for females, odds ratio 5.92 (3.08-11.36), p<0.001), delay aversion (inability to delay gratification; r=0.25 for males, r=0.32 for females, odds ratio 3.33 (1.57, 7.03), p<0.01), emotion regulation challenges (r=0.39 for males, r=0.39 for females, odds ratio 6.25 (3.21, 12.20), p<.001). In a model of cumulative risk, those with higher PSMU were almost at 10-times risk of exhibiting multiple executive functioning deficits relative to controls. In the mediation model, all domains of executive functioning were shown to significantly mediate the relationship between PSMU and multiple domains of mental health, such as psychosomatic problems, low self-concept and social problems. In the multiple mediation model that simultaneous tests the independent strength of each executive functioning mediator, all mediators remained significant except inhibition.

250. In summary, there is converging evidence from both cross-sectional and rigorous longitudinal studies that SMU, especially problematic SMU, is causally connected to neurocognitive deficits, such as attention fragmentation, impulsivity, and poorer self-regulation. The longitudinal findings provide solid evidence that SMU and PSMU lead to reduced executive function and thus cannot be attributed to reverse causality, or obvious confounding. These findings align well with the neurobiological research presented above and suggest that the adverse changes in brain structures and function that govern these self-regulatory and executive functions appear

to translate to neurocognitive/behavioural deficits in these areas, as measured by questionnaires and performance tasks. The significance of these findings is that neurobiological and behavioural deficits in socio-emotional regulation and cognitive control are known to play a mechanistic role in heightening vulnerability to mental health challenges, engaging in risky behaviour and developing behavioural addictions (Viera et al. 2023; Crone & Konjin, 2018). These executive functioning deficits have also been shown in meta-analyses to be strong antecedents to suicidality in vulnerable populations (Le et al. 2024), highlighting another potential mechanism of the adverse impacts of SMU and PSMU. Moreover, these executive functioning domains are integral for high academic achievement (Anderson, 2002; Langberg et al. 2013).

5.4.7. SOCIAL MEDIA USE AND DIGITAL STRESS

251. Digital stress is defined as a mild adverse effect resulting from negative experiences of digital technology use or constant access to social information online (Winstone et al. 2022). This can include feeling overwhelmed by notifications, peer expectations and approval, online judgment, and online availability (Nick et al. 2022). Research indicates that this is an emerging issue for young adults and adolescents and is associated with overall anxiety and depression (Nick et al. 2022). Nick and colleagues' (2022) research on adolescent digital stress indicated that higher levels of digital stress were correlated with higher levels of social media use, which in turn were correlated with greater mental health difficulties and higher levels of depressive symptoms over time.

252. However, most research suggests that the particular attitudes, behaviours, or motives for using social media have a greater influence on digital stress than time spent on social media (Keles et al. 2020). Winstone and colleagues (2022) interviewed 13-14-year-olds about their social media experiences, finding that participants' definition of social media use as a "good use of time" or a "waste of time" depended on the specific activity or context. They noted that online passive scrolling was perceived as a waste of time and led to guilt and feelings of anxiety, while the use of social media to communicate with peers was perceived as beneficial. However, communication with peers also led to digital stress relating to expectations of being available online and receiving unsolicited and often sexual messages from strangers. Yang & Smith, 2024 found that using a digital device during social interactions contributed to increased digital stress among adolescents, with perceived peer engagement and negative peer perception being the most highly correlated to digital stress.

253. A systematic review of 41 empirical studies (Naga & Ebardo, 2025) assessed the relationship between social media and technostress, a type of digital stress that includes the complexity of technology, invasion of personal life, pressure to conform to social norms, and information overload. Naga and colleagues found that the interplay of these factors exacerbated social stressors like FoMO and social overload, which led to increased psychological (anxiety, depression), behavioural (reduced engagement), and physical stress (sleep disruptions). These effects were significantly stronger among younger users.

254. In summary, the growing literature on digital stress among adolescents and young adults indicates a relationship with poorer mental health. This highlights the importance of tailored intervention strategies such as moderate digital detoxing, mindfulness techniques, user-centered design modifications on social media applications (Naga & Ebardo, 2025), and social media literacy programs (Tao et al. 2023; Metheekul et al. 2024; Gordon et al. 2021).

5.4.8. MECHANISMS AND PATHWAYS: CONCLUSIONS

255. Child and adolescent use of Defendants' social media platforms cause or contribute to mental health harms via numerous pathways and mechanisms, including but not limited to negative social comparisons, displacement of behaviours that are protective of mental health, exposure to harmful experiences, risky behaviour, neurobiological and cognitive deficits, and digital stress.

5.5. DEVELOPMENTAL VULNERABILITY: CHILDREN & YOUTH ARE AT GREATER RISK OF SOCIAL MEDIA HARMS

5.5.1. DEVELOPMENTAL FACTORS

256. As discussed above, adolescence is a period of profound physical, social, behavioural, and neurobiological (i.e., brain development) change that can heighten sensitivity to mental health disorders, such as anxiety, depression and eating disorders (Paus et al. 2008; Solmi et al. 2022; Rapee et al. 2019). Adolescence is also a critical period in which identity formation, perspective taking abilities and self-evaluation processes are still developing (Orben et al. 2024). Moreover, this developmental period is characterized by a heightened interest in peer interactions, heightened need for social acceptance and approval, and heightened sensitivity to peer exclusion or rejection compared to adulthood (Sebastian et al. 2010). Because social media is designed to be inherently social and relational, its use interacts in complex ways with these developmental

characteristics to form a figurative "window of developmental sensitivity" that accentuates adolescent risks of developing mental health disorders with social media engagement (Orben et al. 2022). For example, research suggests that the impact of social media on well-being indicators such as life satisfaction may not be uniform across ages; instead, there appear to be "windows" of heightened vulnerability during certain developmental stages (Orben et al. 2022). More specifically, a longitudinal study of over 17,000 UK individuals aged 10-80 years found that increases in social media use predicted drops in life satisfaction one year later, but only at specific ages – notably around early adolescence for girls (ages ~11-13 years) and boys (14-15 years), coinciding with puberty onset. Interestingly, this trend re-occurred again around age 19 (a time of social transition to independence) that is known to be a high-risk developmental transition period for illbeing (Orben et al. 2022).

257. Similarly, the umbrella review by Sala et al. (2024), which included 24 reviews on over 600,000 youth reported a moderating impact of age, where younger youth (10-15 years), especially heavier users, were more vulnerable to developing depressive and anxiety symptoms (Sala et al. 2024). Neither the Valkenburg et al. (2020) nor the Orben et al. (2020) umbrella review reported on whether developmental stage exerts an impact of social media use on mental health.

258. Sensitivity analysis reported by the meta-analyses summarised above revealed that age moderated the association between SMU and various health outcomes, with younger individuals typically showing stronger associations with negative effects. According to Ahmed et al. (2024), the link between SMU and depressive symptoms was weaker among older participants, as evidenced by a significant negative moderation effect (b=-0.10), suggesting that younger individuals may be more susceptible to depressive outcomes associated with SMU. Similarly, the Saiphoo and Vahedi (2019) identified that the strength of the association between SMU and body image disturbance decreased with age (b=-0.013), indicating that younger users are more negatively affected by social media in relation to body dissatisfaction. Age-related differences are also prominent in the context of self-injurious thoughts and behaviours. Nesi et al. (2021) found that adolescents who used social media were more likely to report suicidal ideation (OR=3.54) compared to adults (OR=1.69), suggesting that developmental vulnerabilities in adolescence may amplify the psychological risks associated with SMU. Finally, Chen et al. (2024) reported that the negative association between PSMU and sleep quality was less pronounced in older populations

(β=-0.005), reinforcing that youth may experience greater sleep disruptions related to social media use compared to older users.

259. In summary, these findings demonstrate that high use of social media tends to confer greater risk of psychological harm and reduced well-being in early adolescence coinciding around puberty, described as a window of developmental sensitivity (Orben et al. 2022).

5.5.2. SOCIAL AND CONTEXTUAL VULNERABILITY FACTORS

260. As discussed above, adolescence is a period in development with a marked shift of influence from parent to peers. Empirical research has shown that strong peer relations and social support are protective factors against addiction and mental health problems in youth (Acoba, 2024; Butler et al. 2022; Mason et al. 2019). Meta-analytic research suggests that moderate use of social media is associated with greater perceived social support, especially with those with greater numbers of friends/followers. However, there is contrasting research to show that the impact of SMU on mental health may be influenced as much or more by offline social friendships than online interaction.

261. For example, in a large epidemiological study in American adolescents, Twenge et al. (2019) found that the relationship between high digital media use and depression was much stronger in youth with less in-person social contact with peers compared to high users who spent more time in-person with friends. Few differences emerged between low users who had high or low in-person contact. This finding aligns with others that show seeking social support in-person is more effective than seeking support online, despite being less convenient, but the relationships with SMU, social support and mental health may be more nuanced and context-dependent (Vidal et al. 2020). For example, Frison & Eggermont (2015) found that adolescents seeking social support through Facebook had reduced depressive symptoms if support was received, but worsened symptoms if support was not received. However, this pattern was not found in non-virtual social support contexts, suggesting lack of support online leads to more negative emotional responses than lack of support from traditional social support contexts, an ominous finding given online social support networks are larger than in-person and adolescents tend to seek support online more readily (Frison & Eggermont, 2015).

262. Interestingly, although social media provides a comfortable forum for youth with social anxiety to interact, a decline in in-person interactions from displacement may also reinforce avoidance behaviours in socially anxious individuals, leading to greater withdrawal from offline

engagements (Zhou & Shen, 2024). Adolescents who primarily communicate through digital platforms may struggle with direct conversation, reducing their willingness to participate in real-world social interactions. Furthermore, the curated nature of online communication fosters performative interactions rather than authentic dialogue, limiting opportunities for spontaneous, meaningful exchanges (Cover, 2012). The absence of facial expression and social cues inherent to in-person interaction is missing from online interaction, a nuance shown to be associated with greater misinterpretation of messages that leads to distress (Valkenberg & Peter, 2009; Sagliano et al. 2022). The displacement of in-person interactions is particularly concerning among adolescents exhibiting problematic social media use, as these individuals may retreat further into online spaces, exacerbating social isolation, which has been shown to exacerbate addiction (Gong et al. 2024). This highlights the need for Defendants to add digital features and tools that will promote more balanced social engagement through repeated reminders to take a break, prompts for self-reflection, and/or engaging in other responsibilities or recreational or school-related activities.

263. Although some studies suggest that social media can promote social support and social connectedness which may lead to enhanced well-being in youth, the majority of evidence from meta-analytic studies suggest that high SMU or PSMU is associated with greater loneliness and social isolation through displaced in-person interaction in a bidirectional manner, leading to a reinforcing cycle. Moreover, there is evidence from population-based studies that those with less frequent in-person social contact experience greater depressive symptoms from high SMU compared with youth with high SMU and high engagement with in-person peers. Additionally, in-person social support has been found to be more effective in buffering stress and distress compared to online support that shows that when online levels of support do not meet expectations, negative affect may be heightened. This highlights that youth who invest more time in online friendships and rely on seeking emotional support via SMU, which represents a sizable portion of American youth (especially those from marginalized or minoritized communities) appear to be more vulnerable to feeling greater loneliness, social isolation and depression from increasing social media use.

5.5.3. SOCIAL COMPARISON PROCESSES

264. As described above, there is evidence that social comparison, either positive (downward) or negative (upward), represents a mechanistic pathway linking social media with psychological benefits/harms. However, it can also be conceptualized as a vulnerability factor.

SMU provides almost countless opportunities for social comparison since the number of online friends and followers vastly exceeds in-person friends (Reich et al. 2012). Given the tendency for people to curate their online profiles by over-representing positive experiences via posts and photo-shopped pictures (Richey et al. 2018), combined with public displays of likes that serve to reinforce and quantify social rank or status, many youths, particularly those distressed, will undoubtedly engage in upward (unfavourable) social comparisons (Carraturo et al. 2023). Social comparisons have been implicated in the development and maintenance of affective disorders (Pera, 2020). Indeed, unfavourable social comparison processes play an integral role in the psychological harms of SMU, whereby higher SMU is associated with more frequent social comparisons (Kim et al. 2021), and those with more frequent social comparisons report stronger associations between SMU and negative affect (Kim et al. 2021). In a seminal study, Nesi and Prinstein (2015) found that technology-based social comparison and feedback seeking were associated with greater depressive symptoms, even when controlling for the effects of overall frequency of technology use, offline excessive reassurance seeking, and prior depressive symptoms. Moreover, the strong threat of social evaluation in social media has been shown to lead to decreased mood and cognition in the laboratory and in the real world (Grunewald et al. 2022), and those who are sensitive to social rejection are more negatively affected. A recent systematic review showed that higher SMU was associated with higher social comparison which led to depression through envy (Caraturo et al. 2023). However, these relationships were influenced social comparison orientation, whereby those with more opinion-based social comparison traits showing more positive associations with wellbeing, whereas those who engage in more ability-based social comparisons showing stronger relationships between SMU, depression and lower wellbeing (Carraturo et al. 2023). These studies highlight that adolescents who engage in frequent social comparisons, especially appearance-related and abilities-based, and who are sensitive to social rejection, are at increased vulnerability to the harms (i.e., depression) from SMU. Moreover, the harms of high SMU appear to be influenced by the time spent and frequency of offline comparisons.

5.5.4. BEHAVIOURAL VULNERABILITIES

265. Adolescence represents a critical developmental stage marked by heightened sensation-seeking tendencies, which contributes to a greater propensity for risk-taking behaviours compared to both childhood and adulthood (Steinberg et al. 2018; Blakemore & Robbins, 2012). This inclination toward risk is particularly pronounced in social contexts involving peers.

Compounding this behavioural profile, adolescents exhibit underdeveloped self-regulatory capacities and heightened impulsivity due to the ongoing maturation of prefrontal brain regions responsible for executive control (Orben et al. 2024). Although engagement in risky behaviour during adolescence is often developmentally normative—and in some contexts, adaptive—longitudinal evidence indicates that such behaviours are associated with increased susceptibility to later psychopathology, including anxiety, depression, and substance use disorders (Campbell et al. 2020).

266. Importantly, adolescents interact with social media in ways that differ substantially from adults, often engaging with distinct platforms and features (Nesi et al. 2021). The unique affordances of social media—such as constant connectivity, public visibility, and algorithmic reinforcement—interact with developmental vulnerabilities to potentially exacerbate exposure to harm (Orben et al. 2024). Empirical studies underscore this interaction. For instance, posts referencing alcohol consumption tend to garner more positive engagement (e.g., likes) than those that do not, and liking such posts predicts increased alcohol use over time (Kurten et al. 2022). Parallel findings have emerged in relation to vaping and drug-related materials among adolescents and young adults (Donaldson et al. 2022). These forms of social reinforcement incentivize adolescents to engage in riskier online self-disclosures, potentially leading to increased offline engagement in substance use (Orben et al. 2024). A meta-analysis further substantiates this relationship, demonstrating that adolescent social media use is significantly associated with real-world engagement in behaviours posing harm or risk—such as substance use and risky sexual activity (Vannucci et al. 2020).

267. In addition to reinforcing risk behaviour, the affordances of social media platforms—such as persistence and public visibility—contribute to the long-term social consequences of adolescents' online actions (Orben et al. 2024). The semi-public nature of social media, combined with expansive and often poorly delineated networks of followers, results in adolescents addressing an "imagined audience." This phenomenon, known as "context collapse," arises from the convergence of diverse social spheres, increasing the difficulty of tailoring material appropriately for all viewers (Orben et al. 2024). Given their limited risk appraisal capacities, adolescents are more likely to disclose sensitive personal information or engage in behaviours such as sexting, which, once shared, can be captured and redistributed without consent. These behaviours are linked to an increased risk of cyberbullying, sextortion, and other forms of online

victimization (Livingstone, 2008; Mori et al. 2019). Experimental data further indicate that the perceived anonymity afforded by social media can facilitate antisocial behaviours, such as trolling, particularly in group settings (Nitschinsk et al. 2022).

268. Adolescence is also a period marked by intensified self-presentation activities, reflective of the broader developmental process of identity formation and exploration. Social media serves as a salient context for this process, with adolescents frequently engaging in strategic self-disclosure or modification of personal attributes to portray an idealized version of themselves—commonly referred to as the "positivity bias" (Orben et al. 2024). Such inauthentic self-presentation, including the use of edited images, selective sharing of positive experiences, and curated profiles, has been linked to decreased psychological well-being (Bij de Vaate, 2020; Twomey & O'Reilly, 2017). Conversely, authentic self-representation is associated with enhanced well-being. The affordances of social media—including constant availability and immediate, quantifiable peer feedback—facilitate frequent profile curation and reinforce inauthentic presentations, creating a feedback loop that may heighten psychological vulnerability (Kraus et al. 2021; Orben et al. 2024).

269. This feedback loop has measurable consequences for identity development. A systematic review and meta-analysis found that greater intensity of Facebook use predicts a longitudinal decline in self-concept clarity, while the reverse relationship was not observed—indicating a unidirectional influence of social media on identity stability (Gonzales & Hancock, 2008). Diminished self-concept clarity is a well-established risk factor for the emergence of mental health difficulties and substance use problems during adolescence (Kraus et al. 2021). Together, these findings illustrate how the intersection of adolescent developmental characteristics with the structural features of social media platforms can compound risks to psychological well-being and developmental outcomes.

5.5.5. DEVELOPMENTAL VULNERABILITY: CONCLUSIONS

270. Children and youth are especially vulnerable to the mental health risks presented by Defendants' social media platforms due to the profound physical, social, behavioural, and neurobiological changes that occur during this critical developmental phase. Given the severe mental health risks described herein, it is my opinion that Defendants' social media platforms are not reasonably safe for children and youth. Defendants should have mitigated these dangers and

should have fully informed parents, children and youth about the risks and dangers of their platforms.

271. Nevertheless, Defendants allow children and youth as young as age 13 to join their social media platforms. Based on the scientific literature discussed above, Defendants' policies allowing all children and youth to join their social media platforms at age 13 are developmentally inappropriate and unsupported by the science. Further, as described in more detail below, social media companies inadequately enforce age restrictions, knowingly permitting millions of vulnerable children and youth under age 13 onto their platforms (Bejar Dep. at 187) (Federal Trade Commission, 2024). Allowing children and youth—the most developmentally vulnerable group--to engage on their social media platforms *en masse* shows that Defendants value user growth and corporate revenues over child safety. As a result, millions of vulnerable children and youths have been exposed to unreasonable risks of harm by Facebook, Instagram, Snapchat, TikTok, and YouTube.

5.6. <u>INDIVIDUAL VULNERABILITY: CHILDREN AND YOUTH AT GREATEST RISK</u>

272. This section reviews individual differences in sociodemographic, familial, psychosocial, neurobiological, and genetic vulnerabilities that, in addition to age/developmental vulnerability, have been shown to heighten susceptibility of psychological harm from social media. Although most of these characteristics are examined in isolation, as described by Mougharbel & Goldfield (2023), there are individual differences in susceptibility to harm from screen exposure (including social media). In this context, the application of the Differential Susceptibility Theory is a strong model to conceptualize factors that predispose or buffer harm. This theory posits that the effects of environmental exposures (i.e., SMU) is influenced by a complex combination of social, psychological, behavioural, sociodemographic, physiological and genetic characteristics.

273. Moreover, in a recent conceptually elegant review on the mechanisms linking social media use to adolescent mental health vulnerability, Orben et al. 2024 describe how these developmental, cognitive, behavioural and neurobiological vulnerabilities interact with "affordances" inherent in SMU to amplify psychological harms. Affordances are the perceived and flexible action possibilities of digital environments that are jointly shaped by the features of technology and the individual's perception of those features (Orben et al. 2024). These SMU affordances and descriptions of how they interact with individual vulnerabilities to impact mental health are depicted in Figure 4.

274. An example of an affordance is anonymity achieved through fake a fake account can lead to risky posting behaviour and can disinhibit interactions leading to more extreme behaviours or reactions. Another example includes quantifiability – social popularity via "likes" and comments represent quantifiable feedback (or lack thereof) – which can lead to feeling rejected or unpopular if not many likes are received. Many of the examples cited in Orben's review regarding how these affordances interact with vulnerabilities to accentuate harm are detailed below.

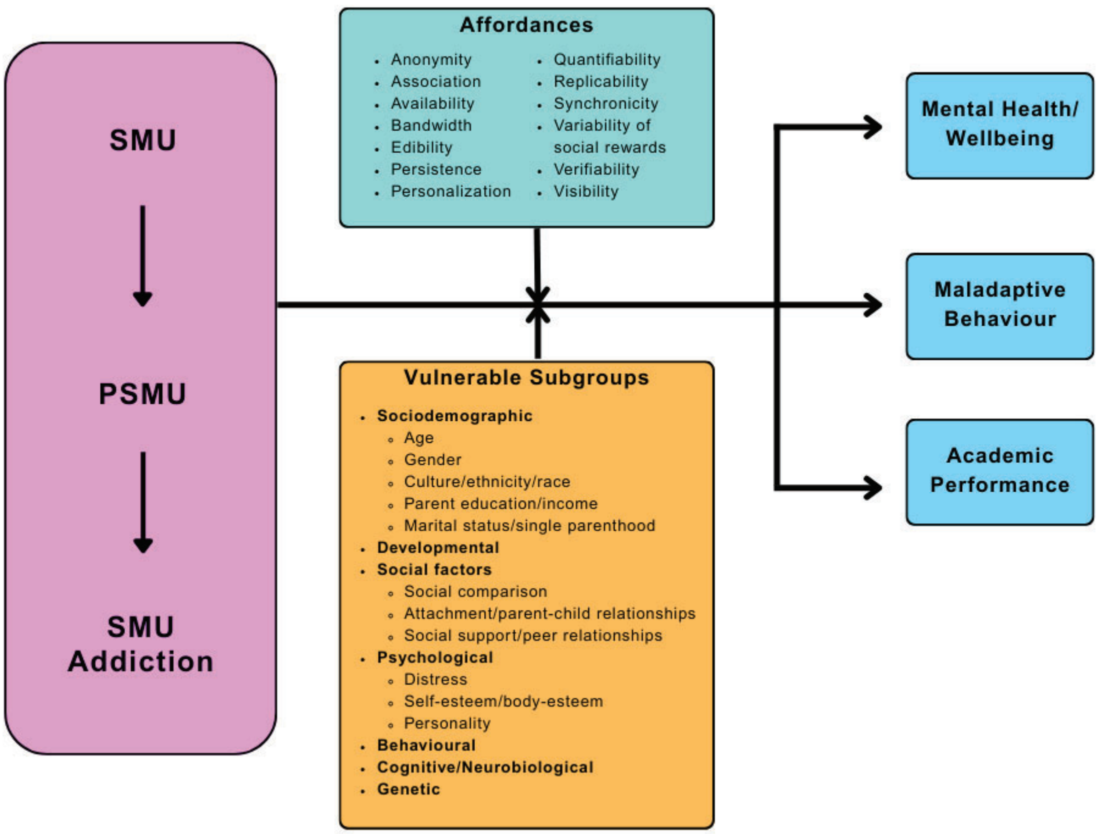


Figure 4. How SMU and SMU affordances independently and interactively amplify vulnerability to harms.

5.6.1. SOCIO-DEMOGRAPHIC CHARACTERISTICS

5.6.1.1. <u>Gender</u>

275. One of the more consistent findings in the literature from systematic reviews and meta-analyses is the stronger relationship between time spent in SMU and symptoms of depression and anxiety in adolescent girls compared to boys. (Ivie et al. 2020; Liu et al. 2022; McCrae et al. 2017), with empirical evidence suggesting that girls are more susceptible to adverse outcomes

across several domains. Meta-regression analyses performed by the studies summarised in section 5.3, above, revealed heterogeneous effects by gender/sex. Liu et al. (2022) found that the association between SMU and depression was considerably stronger for girls (OR=1.72) than for boys (OR=1.20), indicating a higher vulnerability among female adolescents. Bonfanti et al. (2025) provided further support in the context of social comparison in social media and body image concerns, identifying that the association was stronger in studies with higher proportions of female participants, possibly reflecting gendered pressures around physical appearance and social evaluation. Similarly, Ahmed et al. (2024) observed that the association between PSMU and both higher anxiety and lower wellbeing was more pronounced among females than males, with gender differences. Du et al. (2024) highlighted that the link between PSMU and social anxiety was also moderated by gender, with a stronger effect observed in samples with more females (β=0.601), a finding attributed to greater emotional engagement and potential dependency among females in digital social environments. Ferguson et al. (2025), while downplaying strong causal effects of SMU on mental health problems, noted that the effects tend to be slightly larger for girls (r=.075) than for boys (r=.044), aligning with broader evidence of heightened female sensitivity to social and emotional stimuli involved with SMU. Interestingly, some domains show stronger associations for males. Wu et al. (2024) found that the association between problematic PSMU and social anxiety was stronger in samples with a higher proportion of male participants, consistent with Huang's (2022) observation that the impact of PSMU on self-esteem was attenuated in female-dominant samples (β=0.36).

276. This vulnerability may be due, in part, to girls spending more time in SMU, thus having greater exposure to its harms. However, studies have documented that the reasons for using SM differ by gender, and these gender differences in motivation increase girls' vulnerability. More specifically, girls tend to use SM for relational purposes whereas boys tend to use it for entertainment (Manago et al. 2023), and these differences expose girls to more adverse social consequences, including relational aggression via social exclusion, which is more common among girls, and harmful online experiences (Hamm et al. 2015; Kim et al. 2018), increasing their risk of anxiety/depression (Liu et al. 2022). Moreover, girls engage in more social comparison, in-person and online, a known risk factor in the development and maintenance of depression, body image disturbances and eating disorders (Pera, 2020). Additionally, girls tend to use more visual-based platforms (e.g., Instagram, Snapchat and TikTok) (Anderson et al. 2023) and engage in more social

comparisons to the images, which are often enhanced with beautification filters, resulting in more negative comparisons and lower body-esteem and self-esteem (Bonfanti et al. 2025; Jarman et al. 2021).

277. Girls' vulnerability to the harms of SMU is exacerbated by the well documented and longstanding finding that there is stronger pressure on girls to conform to often unattainable beauty standards (Senekal et al. 2023), which increases the risk of body dissatisfaction, disordered eating, and lower self-esteem (Course-Choi & Hammond, 2021). These vulnerabilities likely explain findings that social comparison of physical attractiveness (Cataldo et al. 2021; McCrae, 2017), repeated exposure to and internalization of unrealistic beauty images of influencers and celebrities on social media, and the use of beautification filters are more strongly associated with body dissatisfaction in girls compared to boys (Bozzolo et al. 2022).

278. Interestingly, a study examining psychological impacts of posting pictures among teen girls who used beautifier filters showed no improvements in self-esteem even in response to positive reinforcement in the form of many "likes", indicating presenting an idealized version of oneself feels hollow, while perpetuating/projecting unrealistic beauty standards and negative social comparisons onto other vulnerable teenage girls. (Sala et al. 2024).

279. Regarding gender differences in the relationship between problematic social media use and mental health and well-being, the patterns are more inconsistent with regards to anxiety outcomes. For example, three meta-analytic reviews with over 133 studies found that gender did not moderate the impact of problematic use on a broad range of mental health and well-being outcomes (Shannon et al. 2022; Huang et al. 2022; Cunningham et al. 2021). However, one meta-analytic review found the relationship between problematic social media use and anxiety was stronger in females (Ahmed et al. 2024); while another review found stronger negative impacts on social anxiety in males (Wu et al. 2024).

280. In summary, there is considerable evidence to suggest that girls are generally more vulnerable to psychological harms than boys with higher SMU, but once use becomes problematic or addictive, the psychological harms that ensue are generally comparable across genders.

5.6.1.2. <u>Socioeconomic Status, Race, Ethnicity</u>

281. Although much of the literature removes the influence of well-documented social determinants of health by experimentally or statistically controlling for these sociodemographic

characteristics, there is emerging research to show that marginalized youth may be among the most vulnerable youth populations to social media harms through a variety of processes.

282. An emerging trend in the literature is greater use of digital media and social media among youth from lower socioeconomic status (SES) compared to youth from higher SES (Walsh et al. 2018). Almost 25% of youth feel lonely, and the prevalence of loneliness is higher among equity deserving youth (Statistics Canada, 2021), and higher loneliness has been shown to predict greater social media use, presumably motivated by a desire for connection, increasing vulnerability to harm. Limited access to stable internet or adequate devices may result in lower-quality online experiences, while economic constraints requiring parents to work multiple jobs reduces parental supervision and support, lower digital literacy, thus increasing adolescents' vulnerability to harmful social media experiences (Orben et al. 2024).

283. Marginalized youth, including racial, ethnic, and gender minorities, are disproportionately targeted by online harassment and discriminatory materials, exacerbating preexisting stressors (Sala et al. 2024, Abreu & Kenny, 2018) and increasing risk of psychiatric disorders and even suicide (Clements-Nolle et al. 2006). For example, in a recent study (N=407) of underserved youth (Black, Indigenous, Asian and Latino), Tao & Fisher (2022) found that an alarming 79% and 94% reported individual and vicarious racial discrimination on SMU, compared to 23% reported in youth who are not equity-denied. Structural equation modelling (SEM) showed SMU duration was associated with greater racial cyber discrimination, which in turn, was associated with more distress, with strongest associations among black youth. Further, black youth who reported having more inter-racial social interactions on SMU experienced the most race-related harmful experiences and its untoward impact on well-being. It is well known that relational aggression, victimization, and discrimination is more prevalently expressed against minorities online than in-person, as perpetrators feel empowered by the perceived anonymity (fake SMU accounts) or feeling of emotional distance and safety (Kim et al. 2023).

284. Moreover, as will be shown below, passive scrolling of social media is generally associated with greater psychological harm (Thorisdottir et al. 2019). It is important to note that the number one reason reported for youth actively posting is to share (and brag about) their accomplishments with friends/follower (Anderson et al. 2022). Youth from lower SES families report greater passive use (Skogen et al. 2022), perhaps due to a perception that their lives do not

compare favourably or for fear of negative online reactions to posts which discourages active posting (or fearing negative reactions to posts), creating a vicious cycle.

285. Taken together, these studies provide compelling evidence that youth from marginalized, economically disadvantaged, or underserved communities face a significantly elevated risk of psychological harm from social media use. These risks are further intensified by overlapping social determinants of health, including limited access to mental health care, reduced parental supervision, and chronic economic hardship, creating a compounding and disproportionate burden on the most vulnerable populations (Sala et al. 2024).

5.6.2. PSYCHOLOGICAL DISPOSITION AND MENTAL HEALTH HISTORY

286. Mental health challenges such as emotion dysregulation, anxiety, and depression are known risk factors in the development of addictive behaviours, both substance-related and behavioural addictions (Vieira et al. 2023). As discussed elsewhere in this report, mental health struggles (e.g., anxiety, depression, loneliness, low self-esteem) heighten vulnerability to developing problematic social media use as a means of affect regulation (i.e., self-medication). Evidence from meta-analyses of longitudinal studies demonstrate that once SMU transitions to PSMU, it leads to greater depression and anxiety over time (Ahmed et al. 2024), likely driven by short-term pleasure via dopamine and FoMO, as well as social isolation, social comparison, and displacement of healthier alternatives, creating a vicious cycle. These complex and dynamic bidirectional processes involved in the development and maintenance of problematic social media use are hallmark characteristics of the addiction cycle, and evident in virtually all addiction, both behavioural and substance-related (Vieira et al. 2023). This is clearly illustrated by the stark finding that 40% of youth with depression were classified as having social media addiction, a prevalence rate markedly higher than the 15-25% found in community samples, and even the 17.4% found globally based on a systematic review and meta-analysis (Cheng et al. 2021).

287. Importantly, the psychological mechanisms implicated in PSMU are not limited to clinical cases; they are also observable in non-pathological patterns of everyday SMU, particularly among vulnerable adolescents. Individuals experiencing depression, anxiety, or loneliness may initially turn to social media as a means of coping, only to encounter interactions that intensify their emotional distress. For example, a recent systematic review identified depressive symptoms as both a predictor and consequence of SMU, mediated by maladaptive cognitive processes such as social comparison and envy (Carraturo, 2023). These dynamics are further linked to heightened

emotional reactivity and increased sensitivity to social stimuli, contributing to worsening self-perceptions and emotional instability. Longitudinal evidence further supports a bidirectional relationship: reduced life satisfaction and mood disturbances predict increased SMU and exposure to unfavourable social comparisons over time, which in turn exacerbate psychological distress (Sala et al. 2024). This recursive loop illustrates how vulnerable adolescents may become trapped in a pattern of seeking distraction or validation online, ultimately reinforcing and intensifying their mental health challenges.

288. Low self-esteem emerges as a particularly salient dispositional risk factor within this context. Adolescents with low self-regard are more inclined toward upward social comparisons and are more susceptible to experiencing envy during SMU (Carraturo et al. 2023). Furthermore, such individuals exhibit stronger negative emotional responses to idealized, highly curated images posted by peers, which may reinforce feelings of inadequacy (Li, 2018). Orben et al. (2024) emphasize that adolescents with low self-esteem may be especially reliant on external validation—such as social media "likes"—thereby increasing their susceptibility to compulsive or addictive use patterns (Jo & Baek, 2023). This vulnerability may be further amplified in those with personality traits such as neuroticism, characterized by heightened emotional instability. Such individuals tend to be more reactive to social rejection or the absence of positive feedback and are more likely to ruminate on perceived online slights, increasing their risk for emotional dysregulation and harm (Chow & Wan, 2017).

289. Additionally, adolescents with prior experiences of trauma or offline bullying are particularly vulnerable to the psychological consequences of online victimization. Online environments often facilitate disinhibited and aggressive behaviours, including public shaming, due to the perceived anonymity afforded by pseudonymous or fake accounts. This digital disinhibition effect increases the likelihood of peer aggression and magnifies the impact of cyberbullying, reinforcing pre-existing feelings of rejection, worthlessness, or hopelessness among vulnerable youth. Conversely, adolescents with robust coping skills, higher self-esteem, and no significant mental health concerns tend to exhibit greater resilience in the face of adverse online experiences (Orben et al. 2024).

5.6.3. PERSONALITY TRAITS

290. Personality traits are enduring patterns of perceiving, relating to, and thinking about the environment and oneself. The most investigated models of personality applied to social media

include the Five-Factor Model and the dark triad model. The five-factor model includes 5 dimensions of traits associated with user behaviour; neuroticism (emotional instability/reactivity), extraversion (outgoing and drawing energy from others), agreeableness (cooperative and friendly), openness to experience (curiosity and open to new ideas), and conscientiousness (responsibility and diligence). A recent systematic and meta-analytic review (Akbari et al. 2023) found that extraversion (more social/outgoing) and neuroticism were significantly associated with higher daily and weekly hours spent in Facebook, while conscientiousness was associated with lower time spent daily in Facebook, and openness and agreeableness showing null associations with time in Facebook. However, the pattern of results changes somewhat depending on type of SMU measure used. That said, in all models, neuroticism showed the strongest associations; those higher in neuroticism were 1.35-2.32 at increased odds of spending high amounts of time per day and per week in Facebook. Regarding associations with PSMU, extraversion was no longer predictive, and openness, agreeableness and conscientiousness were negatively associated with PSMU, and neuroticism again emerged as the strongest predictor, with these individuals being 1.89 times the increased odds of PSMU. A recent meta-analysis on 27 studies and almost 32,000 individuals showed a very similar pattern of results for the big five personality traits and how SMU is used, such as sharing information on social media, including sharing entertainment information, health information, emergency information, even rumors or fake news (Lin et al. 2024). Specifically, extraversion showed a positive relationship with sharing information on SMU, neuroticism and agreeableness showed negative associations with sharing (Lin et al. 2024), and openness showed no clear association with information sharing, surprisingly. As one might expect, narcissism is associated with particular behaviours on social media, such as number of selfies, and posting pictures to enhance self-presentation among youth (Weiser, 2015). Prospective research is needed to confirm the hypothesis that selfies may lead to greater narcissism.

291. A growing body of research has examined a personality cluster known as the "dark triad" in relation to SMU and PSMU. The dark triad encompasses three related constructs associated with maladaptive behaviours. They include narcissism (i.e., egocentrism, self-importance and grandiosity), Machiavellianism (characterized by deception, lack of ethics, self-interest) and psychopathy (marked by impulsivity, aggression and lack of empathy, guilt, or remorse) (Paulhus & Williams, 2002). A significant portion of the recent literature, as high as 94% of studies, found a positive association between Dark Triad traits and PSMU, believed to be driven

by a high need to seek feedback to enhance low self-esteem (vulnerable narcissism) or validate and affirm their already positive self-worth (Ahmed & Ahmed, 2025). Similar to results for neuroticism, a prospective study found those with borderline personality traits (a personality disorder characterized by abandonment fears, impulsivity, and emotion dysregulation) are at increased risk of developing PSMU, a relationship believed to be driven by a combination of impulsivity leading to self-regulation challenges and the need to use SMU to cope with negative affect (Gratz et al. 2023). As discussed above, impulsivity is an important personality trait that plays a major part in the occurrence, development, and maintenance of addiction (Cerniglia et al. 2019).

5.6.4. NEUROBIOLOGICAL VULNERABILITY TO SOCIAL REWARD

292. Early adolescence is a particularly vulnerable period because of brain maturation imbalances: reward and emotion-processing regions (e.g., the limbic system) develop sooner than cognitive control regions (prefrontal cortex). This can leave teens biologically predisposed to seek novel social rewards online while lacking full capacity for impulse control and risk evaluation (Orben et al. 2024). Indeed, teens' brains show heightened reactivity to social rewards on social media. In experimental neuroimaging studies, receiving many "likes" on one's posts activates the same reward circuitry (e.g., the nucleus accumbens in the ventral striatum) that responds to tangible rewards like chocolate or money, and in some cases, the neural response was stronger (Meshi et al. 2016). This hyper-responsiveness to peer approval and social reputation are a normal aspect of adolescent neurodevelopment, but it may render youth, especially those sensitive to social rewards to be more vulnerable to psychological harms.

293. For example, in a landmark study, Meshi et al. (2013) investigated the relationship between the way brain processes specific self-relevant gains in reputation and intensity of Facebook use using the Facebook Intensity Scale. Results showed that when responding to gains in reputation for the self, relative to observing gains for others, reward related activity in the left nucleus accumbens predicts Facebook use. However, nucleus accumbens activity in response to monetary reward did not predict Facebook use. Finally, a control step wise regression analysis showed that Facebook use primarily explains the results in the nucleus accumbens. Overall, Meshi et al. 2013 concludes: "results demonstrate how individual sensitivity of the nucleus accumbens to the receipt of self-relevant social information leads to differences in real world behaviour (i.e., greater Facebook use).

294. In an fMRI study on 40 adolescents aged 10-17 years, Dziuria et al. (2023) found that higher neural reward sensitivity showed a negative association between a frequency of interactive connections with friends and a combined loneliness and social dissatisfaction component (LSDC) score, whereas those with lower reward sensitivity showed the opposite effect. Furthermore, results showed that high reward sensitivity was associated with greater LSDC as passive social media use increased, whereas low reward sensitivity showed the opposite. This indicates that youth with greater sensitivity to social-interactive reward may be more susceptible to negative effects of infrequent contact than their low reward-sensitive counterparts.

295. Interestingly, there is also evidence of neural sensitivity to more implicit peer influences, which involve more subtle cues that shape behaviour and preferences. Specifically, Venticinque et al. (2021) experimentally examined, among 43 adolescents (Mean age=19.2, 24 males), neural responses to implicitly "socially tagged" symbols (previously judged by peers as liked vs. not liked, thus differing in apparent popularity) vs. novel symbols that carried no social meaning (not judged by peers). Results indicated greater activity in brain regions involved in salience detection (e.g., anterior cingulate cortex) and reward processing (e.g., caudate) to socially tagged vs. novel symbols, and particularly to unpopular symbols. Greater self-reported susceptibility to peer influence was related to more activity in the insula and caudate when viewing socially tagged vs. novel symbols. Venticinque et al. concluded that "these results suggest that the brain is sensitive to even subtle cues varying in level of peer endorsement and neural sensitivity differed by the tendency to conform to peers' behaviours particularly in regions implicated in social motivation." Relatedly, Meshi found individuals who shared personal information on Facebook showed significantly greater alterations in brain connectivity in social-emotional and reward processing centres of the brain compared to those who do not share personal information, heightening sensitivity to social reward and punishment that may occur in SMU.

296. In summary, there appear to be individual differences in neural reward sensitivity that are activated by common social media contexts and messaging relating to social acceptance and reputation management that are associated with higher usage, and possibly to greater emotional harm due to heightened sensitivity in the face of negative social feedback. More specifically, SMU has negative impacts on brain regions that govern social and emotional reward and punishment that heighten children and youth's vulnerability to psychological harm, and this risk is amplified in those with higher neural sensitivity in these brain centres.

5.6.5. GENETIC INFLUENCES

297. Decades of behavioural-genetic research has shown genetic influences play an etiological role in most psychological traits and psychiatric disorders, including engaging in addictive or compulsive behaviour (Knopik et al. 2017), a concept known as gene-environment correlation. Similarly, it is well documented that the impact of environmental exposures on health is also influenced by genetic variations, a concept known as gene-environment interactions, thus explaining wide individual variability in health in response to the same environmental exposure. Initially, genetic studies showed genetic factors influenced engagement in traditional media use such as TV viewing, as well as its long-term impact on pathological behaviours (i.e., criminal or antisocial behaviour in adulthood (Ferguson et al. 2013; Schwartz & Beaver, 2015). However, the ubiquitous use of smartphones and digital media has sparked several behavioural-genetic investigations.

298. Ayorech et al. (2017) employed a co-twin design comparing monozygotic (identical) vs. dizygotic (fraternal) influence on various online media activities in more than 2500 twin pairs from a UK representative sample of 16-year-old twins who participated in the Twins Early Development Study (TEDS). Results showed that heritability was substantial for all forms of media ranging from 34%-39% for educational, entertainment and gaming, with genetic factors accounting for 24% of the variability in Facebook use. In a larger follow-up study that included 4,000 twin pairs (mean age=22 years) and polygenic scores from 6,000 unrelated individuals, Ayorech extended this finding to both general and problematic internet use. Specifically, results showed that the heritability of these forms of digital media accounted for 20-49% of the variance, and their associations with mental health were primarily due to genetic influences (44-88%). These findings are consistent with previous investigations establishing genetic variations explained a substantial proportion of variance between traumatic online experiences and problematic internet use, and their associations with psychopathology, effortful control and self-directedness (Li et al. 2014; Long et al. 2015; Hahn et al. 2017; Vink et al. 2015). These initial studies indicate that genetics likely play a strong role in being susceptible to engaging in high or problematic social media use (gene-environment correlations), as well as influence the susceptibility to psychological harm from social media exposure (i.e., gene-environment interactions).

5.6.6. QUALITY OF SOCIAL MEDIA USE

299. A growing body of literature distinguishes between passive and active social media use, with implications for adolescent well-being (Orben, 2020; Sala et al. 2024). Passive engagement—characterized by consumption without interaction, such as browsing feeds or viewing posts—has been linked to negative psychological outcomes, including heightened social comparison and diminished self-esteem (Orben et al. 2024). This phenomenon is particularly pronounced among adolescents, whose developmental stage is marked by heightened sensitivity to peer acceptance and identity formation. Exposure to idealized representations of peers' lives can exacerbate feelings of inadequacy, while passive engagement fosters FoMO and perceived social exclusion, contributing to anxiety and depressive symptoms (Orben et al. 2024).

300. Conversely, active social media use—defined by behaviours such as posting, commenting, and direct messaging—can provide social validation and emotional support (Valkenburg et al. 2022). Two meta-analyses have examined the impact of passive vs. active use on youth mental health, with the earlier and smaller one by Thorisdottir (n=10,000 Icelandic youth) showing passive use was associated with greater anxiety and depression, and active use was associated with lower distress (Thorisdottir et al. 2019). However, in the more recent and larger meta-analysis (n=150,000), Godard & Holzman (2024) found negligible differences between active vs. passive use on mental health indicators. Many adolescents alternate between active and passive engagement, with the net impact on mental health contingent on individual coping mechanisms and platform design.

301. It is important to note that even with active use showing less harmful associations with mental health, virtually all studies are cross-sectional, limiting causal inferences. Epidemiological research shows that the number one reason for youth posting on social media is to share their accomplishments or positive experiences (Anderson et al. 2022). Thus, reverse causation can be in effect whereby youth with good mental health who are achieving their academic and life goals, have membership in popular social groups at schools and attending the parties, dining in nice restaurants, travelling to exotic destinations, are more likely to actively post pictures and share these positive experiences.

302. Time spent invested in cleaning and curation of online profiles and presentation is significantly correlated with more severe mental distress, including depression, anxiety, body image dissatisfaction in cisgendered youth (Coyne et al. 2023). Other epidemiological research

showed that how social media is used, especially closed-group vs. open groups had differential relationships with mental health, with open-group SMU associated with more harm (Kingsbury et al. 2021).

5.6.7. DIGITAL LITERACY

303. Digital literacy encompasses not only technical proficiency but also critical thinking, media discernment, and online safety awareness (Sala et al. 2024). Adolescents with limited digital literacy are at greater risk of misinterpreting online information, falling victim to manipulation, and harmful experiences, all of which can contribute to psychological distress. These individuals may struggle to identify unreliable sources, recognize predatory material, or manage online interactions effectively, increasing their exposure to harmful material. Orben et al. (2024) emphasize that adolescents lacking digital literacy skills are particularly vulnerable to algorithm-driven material, which may normalize maladaptive behaviours related to body image, relationships, or mental health.

304. Social media literacy is defined by Ziapour (2024) as "the capacity to critically assess the information that audiences consume or produce, thereby safeguarding them against the dissemination of false information, or filtered images." Research suggests that low digital literacy among adolescents leads to poorer mental health, as teens and young adults find it difficult to navigate the addictive and potentially harmful algorithm-generated material that pervades social media. A study by Tao et al. (2023) examined the relationship between internet addiction and digital competence in adolescent mental health before and during the COVID-19 pandemic. They found that although young people spent more time on social media and reported more mental health problems during the pandemic, digital competence (digital literacy) was a protective factor that alleviated mental health problems. A systematic review (McLean et al. 2016) of the relationship between levels of media literacy and body dissatisfaction and disordered eating found a significant correlation. Tamplin et al. (2018) found similar results, as high levels of social media literacy showed less body dissatisfaction after exposure to social media among young adult women, but not men.

5.6.8. CUMULATIVE AND MULTIPLICATIVE RISK FACTORS

305. As previously discussed, the majority of studies investigated these risk/vulnerability factors in isolation, but in reality, many adolescents will possess multiple risk

factors that would result in additive or even multiplicative effects on mental health and well-being from increasing social media exposure, consistent with decades of epidemiological and genetic research on the concept of cumulative risk in health research (Atkinson et al. 2015; Evans et al. 2013). As an intuitive example based on the above literature review, it can be confidently stated that if users are teenage girls, coming from economically disadvantaged background, have little parental supervision, have high social sensitivity, have been victimized online, and are struggling with their mental health, the risk of psychological harm from SMU resulting from these cumulative vulnerabilities will be markedly nigher than for users who possess fewer vulnerabilities.

306. To my knowledge, only one study has rigorously examined the concept of cumulative risk in the context of social media and mental health. Specifically, in a sample of 10,147 American youth (mean age=12 years) from the NIH-funded Adolescent Brain Cognitive Development study, Pagliaccio et al. (2024) applied a data-driven digital exposome-wide association model to generate a composite digital exposomic risk score that aggregates the cumulative burden on mental health on 41 facets of social media. These risk factors were categorized into 5 main categories: 1) duration (min/hours/day in weekdays and weekends), 2) parental monitoring (parents thinking their children have fake accounts that they can't monitor), 3) apps used (yes/no to using Instagram), 4) overuse or addictive use (i.e., using SMU so much it has a negative effect on schoolwork); 5) peer connection (i.e., feeling connecting to friends using SMU). Results showed that higher SMU digital exposome risk scores were associated with 1.76 (95% CI: 1.39,2.33) higher odds of reporting a previous suicide attempt, and this association remained significant after controlling for sociodemographic characteristics, time in screen time for non-social purposes (e.g., schoolwork, TV, etc.), and non-digital childhood adversity. More strikingly, higher scores on the SMU digital exposome risk composite was associated with Z=1.76, or odds ratio of 5.81 and a composite measure of psychopathology (internalizing, externalizing, and attentional problems) measured by the Brief Problems Monitor Questionnaire, after controlling for age, sex, race, ethnicity, parent education, non-social screen time, and childhood adversity, thus isolating the effect of this SMU cumulative risk. This independent contribution is reflected by the digital exposome variable accounting for 15.61% of the unique variance in the psychopathology composite, which by all benchmarks is clinically significant.

307. It is important to note that other studies published using the ABCD study on social media show low SMU in this wave of data (mean age=12 years), so it is reasonable to conclude

this cumulative risk of psychological harm will increase with increasing social media exposure that typically occurs throughout adolescence. This level of risk will be compounded by the presence of additional adolescent vulnerabilities described above. Also of considerable importance, this study statistically controlled for sociodemographic variables and previous non-digital trauma, so it is likely that the mental health harms among these youth would be even greater if these factors were added to the model.

5.6.9. INDIVIDUAL VULNERABILITY: CONCLUSIONS

308. The cumulative evidence demonstrates that individual characteristics, including but not limited to socio-demographic characteristics, psychological/mental health history, personality traits, neurobiological factors, genetic influences, quality of social media use, and digital literacy make some children and youth especially vulnerable to the mental health harms presented by Defendants' social media platforms. These risks among youth are not evenly distributed but are shaped by a complex interplay of socio-demographic, psychological, neurobiological, and contextual factors. Adolescent girls, marginalized and low-SES youth, and those with preexisting mental health vulnerabilities are disproportionately affected, with heightened exposure to harmful experiences, greater susceptibility to social comparison, and reduced protective factors such as parental supervision and mental health access. Experimental, epidemiological, and neurobiological research converges to show that SMU—especially when excessive, passive, or centered on social comparisons to appearance ideals can exacerbate depressive symptoms, anxiety, low self-esteem, and disordered eating. Genetic and personality traits such as neuroticism further compound this risk, consistent with established individual differential susceptibility risk models (Mougharbel & Goldfield, 2020). Even after controlling for multiple confounding variables, large-scale studies show that cumulative digital exposure significantly predicts broad psychopathology, with clinically meaningful effect sizes. Taken together, this body of research underscores that SMU is a potent risk factor for child and youth mental health problems, particularly when vulnerabilities intersect.

5.7. BRADFORD HILL ANALYSIS

309. Summaries of evidence on each factor follows:

5.7.1. STRENGTH OF ASSOCIATION

310. The strength of association factor refers to the magnitude of association, which is typically measured by statistics like correlation coefficients or relative risk/odds ratios. Bradford Hill posited that if an exposure has a strong association with an outcome (e.g., smokers having a much higher prevalence of lung cancer risk of non-smokers), it is more likely to reflect a causal relationship. However, weaker associations (e.g., a 10% increase in risk) do not preclude causality.

311. As explained above, and detailed in Tables 1-8, the meta-analyses of observational and experimental studies have consistently found a statistically significant association between SMU and poorer mental health, characterized by more severe symptoms of depression, anxiety, FoMO, loneliness and body image disturbances, and lower well-being indicators (happiness, life satisfaction, subjective well-being, etc.) in children and youth. These relationships are more consistent and robust in the context of PSMU on virtually all mental health and well-being indicators, including suicide outcomes. Although there is "no general rule for how large an association needs to be to meet this consideration," (Lash et al. 2020), in many of the studies, the magnitude of the association was generally small for SMU and mental health outcomes, and almost 50% were moderate to large (depending on outcome) for PSMU and mental health outcomes, based on criteria established by Funder & Ozer (2019). These authors argue that small effects accumulate over time, and when considered at the population level, the exposure variable can have meaningful public health impact on mental health outcomes. However, it is important to note that meta-analysis pools all participants from all studies to estimate an average effect size, thus does not account for individual differences in vulnerability. There is evidence the risk of harm is greater in some youth compared to others, evidenced by the cumulative digital exposome study described above (Pagliaccio et al. 2024).

312. Moreover, as described above, many methodological limitations in the research likely attenuate effect sizes and bias results towards the null. This includes the preponderance of self-reported SMU that is known to be unreliable (Parry et al. 2021), over reliance of SMU duration as the exposure variable, high heterogeneity in measures of mental health, and truncated ranges of both exposure (social media use) and outcomes (mental health). For example, it is noteworthy that because almost all US adolescents use social media now (Vogels et al. 2022), the contrast between "users" and "non-users" is narrow – which inherently limits measurable strength. With nearly universal exposure, we are often comparing high vs. moderate use, which will naturally yield

smaller risk ratios and correlations than comparing exposed vs. unexposed in classical epidemiology (Lash et al. 2020). This functionally underestimates the true effect of social media and mental health. Regarding self-reported SMU, Steele et al. (2023) showed that when behavioural data from objective measurement of social media were examined (i.e., pick-ups and notifications), this data significantly predicted depression scores above and beyond self-reported SMU data. This indicates that stronger relationships between SMU and mental health may be observed when objective measures are used. Regarding the experimental studies, when analyses were stratified based on emotional distress, intervention effects from reducing SMU on anxiety and depression symptoms went from small to either moderate (Goldfield, 2024) or very large (Hunt et al. 2018, 2021), easily surpassing clinical significance thresholds for symptom reduction on these well validated inventories. Yet, there were no differences between intervention and controls in those with normal levels of distress as a function of SMU reduction, likely due to the discussed "floor effect" (i.e., little room for improvement).

313. Nevertheless, although the associations in the meta-analytic studies are typically small-to-moderate, they are significantly stronger than other known causal associations. The associations reported in the tables are comparable, and in some cases, stronger than for other exposures "generally agreed to reflect causal effects," including the link between "air pollution and mortality," "smoking and heart disease," and "environmental tobacco smoke [i.e., second hand smoke] and lung cancer" (Lash et al. 2020). For example, well controlled longitudinal studies on air pollution indicates a relative risk of 1.06 (RR=1.06, 95% Cl=1.05-1.07) for an increase of 100 μg/m3 increase in total particle concentrations in ambient air. The magnitude of the risks in these studies reviewed, are comparable for those reported above for SMU and mental health challenges, with some effects of these causal factors being smaller than that reported above for PSMU and mental health harms. For instance, most of the effects for general SMU and mental health outcomes were small, ranging from r=0.010-.20. If we assume the average effect in this range was r=0.15 (the lower end of small effects), this correlation translates to an odds ratio of 1.73, reflecting that youth with higher SMU are 73% more likely to have poorer mental health. For PSMU, correlations mostly ranged from small to large (r=0.10 to 0.50), so if we assume an average effect size pooled across outcomes is, say, r=0.25, this translates to an odds ratio of 2.5, reflecting higher scores on PSMU is associated with a 150% increased risk of symptoms of psychopathology. For this reason, Bradford Hill cautioned against "dismiss[ing]" a potentially causal association on the "grounds

that the observed association appears to be slight" because "there are many occasions in medicine when this is in truth so." (Hill, 1965).

314. It is important to note that more modern applications argue for the importance of not only considering strength of association in this evaluation, but also statistical significance when evaluating strength. As one set of researchers recently put it, "[t]oday, statistical significance-not the magnitude of association-is the accepted benchmark for judging the strength of an observed association, and thus its potential causality" (Fedak et al. 2015, p. 2). And the strength of statistical significance is very high in these meta-analytic studies. For instance, based on effects reported in Table 2, at least 10-meta-analytic review studies reported highly significant effects of SMU and poorer mental health outcomes at $p<0.001$, reflecting the probability that these effects occurred by chance is 1 in 1,000, which of course is highly improbable. Many more achieved this level of significance in the tables on body image and suicide outcomes. It is recognized that in studies with large sample sizes, such as meta-analytic studies, statistical power is very high in detecting significant effects. For this reason, I have not weighed "statistical significance" heavily in my evaluation, but it simply represents another piece of information 'that I considered as it reflects the academic standard benchmark. It is acknowledged that statistical significance does not always mean clinically significant or meaningful; hence my application of Funder & Ozer's (2019) model of effect sizes in population-based mental health research.

315. Taken together, I opine that the strength factor is satisfied here by the meta-analytic reviews of both observational and experimental studies for SMU and fully met for associations between PSMU and poorer mental health.

5.7.2. CONSISTENCY

316. Consistency refers to an association reported across multiple populations, over time, and using different study designs (Lash et al. 2020. p. 20). It is evident that consistency applies here. As described in detail above, the association between SMU, and especially PSMU, and worsening mental health has been consistently demonstrated in over 36 meta-analyses including extremely large cohort studies, cross-sectional and longitudinal observational and experimental studies, in different populations around the world, across numerous positive and negative indicators of mental health, positive indicators of wellbeing, neurobiological outcomes measured by fMRI and MRI, cognitive functioning, and even across a 15-year time period (pre-COVID-19 pandemic, during pandemic, and post-pandemic). As described above for each of the

tables, the vast majority of the meta-analyses report that high SMU and PSMU is statistically significantly associated with more psychological harm, while virtually none of the meta-analyses reported that SMU was associated with benefits.

317. Regarding experimental outcomes (Table 8), less consistency was apparent on mental health outcomes of both positive and negative effects. As previously discussed, however, all meta-analyses possess methodological limitations that artificially supress intervention effects (i.e., floor effects), exacerbated by very high heterogeneity (inappropriate pooling of outcomes and designs). In more homogeneous, low risk of bias experimental studies examining only SMU reduction, with intervention adherence verified objectively (not based on self-report), virtually all studies showed significant effects on most mental health outcomes (Hunt et al. 2018; Hunt et al. 2021; Davis & Goldfield, 2024; Thai et al. 2023; Thrul et al. 2025). The inherent limitations in existing meta-analyses, although not well represented in quality and risk of bias evaluations, have nevertheless been well recognized to be inconsistent with best practices in conducting rigorous, high quality meta-analyses (Vetter, 2019; Walker et al. 2008). This is also evident in a sizable minority that did not even systematically evaluate or report on the quality of studies included in the reviews.

318. Despite most studies achieving statistical significance, as reported above a minority of studies failed to show that SMU was significantly associated with poorer mental health, and this proportion was higher for positive well-being indicators. However, it is important to note that it is "completely fallacious" to deem a set of studies "inconsistent simply because some results are 'statistically significant' and some or not." (Lash et al. 2020, p. 20). This mistaken conclusion is, unfortunately, common in the field. Admittedly, the consistency around general SMU and relations to positive indicators of emotional well-being is less consistent than for negative indicators (ill being).

319. Based on my review, it is my opinion that the consistency factor is met. Considering adverse associations between SMU, and especially PSMU, are stronger for psychopathology, including suicide and self-harm, which are far more serious and distinct from simply having lower happiness or life satisfaction, this strengthens my belief that the consistency factor is met.

5.7.3. SPECIFICITY

320. Specificity, within the Bradford Hill framework, pertains to the extent to which an exposure is uniquely associated with a particular outcome. A highly specific relationship

strengthens causal inference, as it reduces the likelihood of confounding factors. Classic examples include the link between asbestos exposure and mesothelioma, where the disease is attributed to a single exposure. Conversely, when an exposure is associated with multiple disparate outcomes, or when an outcome has multiple etiologies (i.e., mental health) without a predominant cause, specificity is naturally lower, complicating causal interpretation. High specificity would be indicated if, for example, SMU was exclusively associated with depression and if depression in children and youth was predominantly attributable to SMU. However, empirical evidence suggests that social media use correlates with a broad spectrum of negative mental health outcomes as reported in the outcome tables and discussed above.

321. Even though social media exposure does not exhibit high specificity, the absence of specificity does not preclude causation but suggests that social media's influence is likely mediated through multiple pathways and has different impacts on different youth populations. This finding is consistent with the differential susceptibility hypothesis which posits that impact of social media (like other environmental exposures) will be influenced by a combination of sociodemographic, psychosocial, developmental, behavioural and biological factors (Mougharbel & Goldfield, 2020), as discussed above.

322. This Specificity element in causality assessment is "widely considered weak or irrelevant from an epidemiologic standpoint" (Fedak et al. 2015, p. 3) because there are numerous well-known causal relationships that do not satisfy this factor. As Bradford Hill pointed out, tobacco smoking does not exhibit "specificity" with respect to lung cancer, since smoking causes more diseases than just lung cancer, and lung cancer can occur in non-smokers too. Yet, tobacco smoking is nevertheless universally recognized as being causally associated with lung cancer. It is for these reasons why Bradford Hill himself cautioned that "we must not, however, over-emphasize the importance of [specificity]." (Hill, 1965, p. 297). In this case, it is clear that not every adolescent who develops a mental health disorder will have been exposed to heavy or problematic social media use because the etiology of these disorders is a complex and multifactorial, but as Bradford Hill noted, this is often true of causal associations. "Indeed, many health outcomes have been linked to various behavioural, environmental, social, and genetic risk factors," meaning that even in situations of known causality, specificity is not satisfied (Lash et al. 2020). Thus, in my opinion, the specificity criterion is not satisfied here. However, it is generally considered by

modern epidemiologists to be all but irrelevant for the aforementioned reasons, and even Hill himself stated it very rarely applies (Hill et al. 1965).

5.7.4. TEMPORALITY

323. Temporality, the principle that a cause must precede its effect, is a fundamental factor for establishing causality (Hill, 1965). In the context of social media use and mental health, determining whether social media exposure precedes changes in mental health status or whether there is any possibility of reverse causation, whereby the outcome (mental health) leads to the exposure (social media), is critical for evaluating temporality. Longitudinal studies, which assess social media usage at baseline and track subsequent mental health outcomes, are the primary methodological approach for evaluating temporality. In contrast, cross-sectional studies are inherently limited, as they cannot disentangle whether anxiety/depressive or other mental health symptoms lead to increased social media use or vice versa. Given the bidirectional plausibility - whereby social media use may contribute to mental health problems, such as depression, while depression may also drive increased SMU engagement - longitudinal, prospective studies and natural experiments are essential for establishing temporal precedence.

324. This factor is largely satisfied in the relationship between social media use and adverse mental health outcomes. Longitudinal and experimental studies consistently demonstrate that increased social media exposure precedes and predicts worsening mental health indicators, including depression, anxiety, body image disturbances, suicide and self-harm, detrimental changes to brain structure and function, and corollary neuropsychological deficits. While bidirectional influences exist, as discussed above, evidence from multiple meta-analytic reviews (Ahmed et al. 2024; Chen et al. 2024; de Valle et al. 2021) suggests that the primary temporal pathway involves social media use contributing to mental health deterioration, and greater deterioration is seen with PSMU (Chen et al. 2024). Although temporality alone does not establish causation - since a third variable could account for the observed relationship - it is a necessary condition for causal inference. Conversely, many experimental studies that reduced SMU showed subsequent mental health benefits at follow-up, providing experimental evidence of temporality. Given the accumulating prospective and experimental evidence, it is my opinion that the temporality factor is satisfied and provides strong support for the hypothesis that social media use plays a causal role in youth mental health decline.

5.7.5. BIOLOGICAL GRADIENT

325. The biological gradient, or dose-response relationship, refers to whether an increase in exposure levels leads to an increase (or decrease) in the outcome of interest. Hill notes that if a dose-response pattern of results is observed, it is more likely that the association is causal (Hill, 1965). Given virtually all of the meta-analyses were designed and had excellent power to detect if higher SMU (duration, frequency, intensity) had dose-response relationships with worsening mental health outcomes, all results in tables and the summarised discussion above can be applied to evaluate dose-response relationships. A linear gradient (more exposure=more effect) is easiest to interpret, but even a non-linear (e.g., J-shaped or threshold) relationship can indicate a gradient as long as there is a systematic pattern (Lash et al. 2020).

326. The available evidence supports a dose-response relationship between social media use and adverse mental health outcomes, though the association is not always linear. A critical threshold may exist beyond which risk increases disproportionately. Nevertheless, higher levels of social media engagement—whether measured by duration, frequency of check-ins, number of platforms used, or severity of compulsive use—generally correlate with an elevated likelihood of negative psychological effects. Experimental data addressing widespread methodological limitations further suggest that reducing social media exposure mitigates risk, reinforcing the plausibility of a dose-response causal relationship. If social media use was not a causal factor, a consistent gradient of increased use leading to greater harm would be unlikely to be observed repeatedly given the obvious confounders have been controlled for, either statistically or experimentally, in virtually all meta-analyses. The fulfillment of the dose-response factor strengthens the argument for a causal link between social media use and adverse mental health outcomes. The observation that risk increases with exposure supports the inference that this relationship is not incidental but instead indicative of an underlying causal mechanism. As such, it is my opinion that the biological gradient factor is satisfied.

5.7.6. BIOLOGIC PLAUSIBILITY

327. This factor examines whether there is a biologically plausible mechanism by which the exposure can cause the outcome of interest. Although "[w]hat is biologically plausible depends on the biological knowledge of the day." Thus, this factor cannot always be "demanded" in determining causality (Hill, 1965). Social media is a social construct, and I devoted a much of this

report describing the psychological, social, and behavioural mechanisms through which it impacts mental health in the sections above.

328. Multiple studies have documented that several user design features of social media use elicit psychological processes that are analogous to processes implicated in both behavioural and substance addictions. This includes easy access via mobile technology, algorithm-generated personalized experience, auto-scroll that undermines self-regulation of use, notifications that entice engagement, and positively reinforcing features such as gamification and social feedback via likes and comments. Collectively, these factors were empirically demonstrated above to drive excessive or problematic usage. Experimental human neuroimaging studies have shown many of these features, such as social reinforcement in the form of likes, positive comments, stimulate the dopamine reward centers of the brain, a neural pattern of response that is also associated with higher or more intense SMU (Maza et al. 2023; Meshi et al. 2013; Mesh et al. 2015). These brain-behavioural responses are well established biological reinforcement mechanisms that drive addictive behaviour (Maza et al. 2023). Dopamine is also implicated in emotional and behavioural regulation (Salagado-Pineda et al. 2005). Moreover, there is longitudinal evidence of dose-response biological relations, whereby youth who checked their social media accounts more frequently (SMU intensity) later showed greater activation in dopamine reward and emotional regulation during a social a social anticipation task on social media ("likes"/positive comments). However, those who were not habitual SMU checkers showed the opposite pattern (Maza et al. 2023). Importantly, Maza et al. (2023) also showed that frequent SMU checking predicted greater activation in the dorsolateral prefrontal cortex, which is the area of the brain governing self-regulation and executive control (attention, impulsivity, organization, decision making), brain functions well documented to be essential for effective functioning at school, work, and life in general. Other studies reviewed above also indicate that the brain reward responses derived from aspects of social media is even stronger than neural responses registered for other rewarding stimuli such as money or palatable food (Meshi et al. 2013), highlighting the strong addictive properties of SMU. Additional research has shown longitudinal dose-response relationships between high and low social media use and detrimental anatomical (structural) changes (less gray matter), cortical thinning, and less white matter (integral for brain connectivity) in the brain in areas that govern reward and executive functions (Achterberg et al. 2022). These findings are consistent with the fMRI studies showing adverse functional brain responses to SMU exposure to

positive social reinforcement (i.e. likes) which produced brain reward responses that was stronger than for potent reinforcers such as palatable food or money (Meshi et al. 2013). Although this research is still in its infancy, I have not seen a neuroimaging study on social media that has shown benign associations, although they could be present, or perhaps not as evident in the published literature due a publication bias against null findings. Nevertheless, the existing evidence converges to show that there is a neurobiological underpinning to explain why excessive and problematic SMU occurs, and these neural mechanisms likely interact with social, physical, developmental and neurobiological vulnerabilities inherent during adolescence. This potentiates the risk of harm when the brain and behavioural habits are still developing. Additional research may reveal other biological mechanisms. For example, I have shown that higher screen time is associated with lower brain derived neurotrophic factor (Goldfield et al. 2021a), which is a growth factor involved in regulating cognitive processes (Walsh e al., 2020), food intake (Goldfield et al. 2021b), metabolic regulation (Krabbe et al. 2007), and implicated in many psychiatric conditions and quality of life (Goldfield et al. 2024). Thus, this could be an area of future investigation of a biological mechanism linking SMU and mental health.

329. In my opinion, the biological plausibility factor is satisfied here.

5.7.7. COHERENCE

330. This factor looks at whether a "cause-and-effect interpretation" of the data "seriously conflict[s] with the generally known facts of the natural history and biology of the disease." (Hill, 1965). In other words, coherence asks whether the causal interpretation of an association is consistent with what is already known about the natural history and biology of the disease or outcome, and with other observations (like population-level trends, laboratory research, etc.). If a cause-and-effect relationship is true, it should generally cohere with things like time trends in the population, analogous situations, and the absence of contradictory evidence from other domains. In the case of association between social media and psychological harms, the evidence in adolescents is coherent with existing knowledge and understanding of the causes of disorders such as depression, anxiety, body image disturbances, eating disorders, as well as suicidality and self-harm. Specifically, social and environmental factors are known to play an etiological (causal) role in the development of these psychological conditions, and their sub-clinical forms, as discussed above. Moreover, adolescence is a developmental period with heightened need for social connection, and sensitivity to social approval, and is widely considered

a high-risk period for developing mental health problems due to rapid changes in social, physical, and neurobiological changes (Jaworska & McQueen, 2015), as discussed in more detail above.

5.7.7.1. Coherence with Time Trends

331. One strong coherence point is the temporal correlation discussed earlier: The deterioration in teen mental health indicators after 2012 coheres with the widespread adoption of smartphones and social media around that time (Twenge, 2020). This synchronicity across multiple countries (e.g., U.S. (Wilson & Dumornay, 2022), Canada (Statistics Canada, 2023), UK (Cybulski et al. 2021), Australia (Australian Government, 2021) provides a coherent narrative that something changed in youths' lived experience during that period. Social media is a prime candidate as it was indeed a major change in adolescent life. For instance, global surveys showed increased feelings of loneliness among school-aged youth after 2012, in all world regions, which coheres with the idea that even though the world became more digitally connected, face-to-face interaction or genuine connection might have declined (Twenge et al. 2021). If social media was harming social connection, we would expect a rise in loneliness - which is exactly what is seen internationally. In Canada, nearly 25% of youth report feeling lonely some or all of the time (Statistics Canada, 2023), and meta-analytic reviews presented above show bidirectional associations, indicating greater social media use increases loneliness and social isolation, likely due to displaced in-person interactions, and greater loneliness predicts greater social media use, ostensibly to feel more connected (Zhang et al. 2022). This consistency between macro-level data and the proposed causal effect adds coherence.

332. It is also coherent that the increases in depression and self-harm have been especially pronounced among *girls* (Twenge, 2020), since as noted, girls use social media more intensively (especially visually oriented platforms that might affect self-esteem). The fact that girls' mental health worsened more than boys' in the past decade (Slomski, 2023) is what one would predict if social media were a significant factor (because girls on average got a higher "dose" of the suspected cause). That sex difference in trends of social media and depression aligns with the causal hypothesis, enhancing coherence.

333. The social media-psychological harm causation idea is also coherent with research on other digital media. For example, a recent narrative review that I conducted found that all recreational screen behaviours were associated with a higher risk of many mental health problems, with the most consistent and robust associations found for social media use (Mougharbel &

Goldfield, 2020). Similar patterns of findings have been found in meta-analytic reviews on duration of screen exposure. More recently, coherence is seen with studies on smartphone use in general: heavy smartphone use is linked to depression, anxiety, disordered eating, as well as poor sleep and functional brain changes in many studies (e.g., Adams et al. 2013; Garett et al. 2023; Sampasa-Kaningya et al. 2018), which is in turn linked to more severe symptoms of anxiety and depression (Chaput et al. 2016). Social media is one of the primary uses of smartphones for teens, so a lot of that negative impact of "smartphone addiction" has been shown to be driven mostly by social media activities (Noe et al. 2019). Relatedly, results from meta-analytic reviews on Internet addiction or gaming disorder (recognized by World Health Organization, and under consideration as behavioural addiction in the DSM-5), on a wide range of mental health outcomes in adolescents, reveals patterns and magnitudes of association that are remarkably similar to those reported above for SMU addiction (Soares et al. 2023; Mohammad et al. 2023). These findings on other screen addictions cohere with social media causing similar mental health problems, since these are parallel phenomena (i.e., excessive engagement with digital experiences). Thus, there is no conflict here; rather, social media fits into a broader pattern of interactive media that can be harmful when excessively used.

5.7.7.2. <u>Coherence with SMU and Social Attachment Research</u>

334. Systematic reviews consistently report that higher social media use is associated with poorer quality attachments and social relations to family and friends (D'Arienzo et al. 2019; Stöven & Herzberg, 2020). This is coherent with observations that teens today spend less time in in-person social activities (e.g., hanging out with friends, dating, going to parties) than previous generations did, as shown in time-use surveys (Twenge, 2020). If social media partly replaced those interactions, it is coherent that loneliness and depression rose, because digital interactions do not provide the same emotional nourishment. This narrative aligns with sociological data and does not contradict any known social science principle; it is in fact an application of known principles on attachment theory, both to parents and peers. Disorders like anxiety and depression are multi-factorial and known to be influenced by social context during adolescence, evidenced by a relatively new therapy called interpersonal psychotherapy (Markowitz & Weissman, 2004). This evidenced-based psychotherapy is predicated on the evidence that the quality of social relationships with significant others underlie depression and anxiety, and improving these relational dynamics improves symptoms and well-being (Lipsitz & Markowitz, 2013).

335. Coherence also means there is no strong evidence that contradicts the proposed cause-effect. So far, no meta-analysis has found evidence that increased social media use improves youth mental health, which would be a contradiction. While there are positive facets at lower levels (i.e., feeling socially connected), on balance we do not see an inverse relationship (like more social media leading to *less* depression and loneliness at the population level). If that were observed, it would break coherence. Instead, almost all meta-analytic findings (reported in Tables above), based on hundreds of studies on more than 2 million adolescents, in multiple countries, pre- and post- pandemic point to some level of harm, not benefit. Coherence in this context is maintained.

336. In summary, there is strong evidence for the coherence factor. The introduction and explosive growth of social media changed adolescent social environments and interaction patterns; this coincided with a temporal rise in mental health problems, particularly in girls who also use SMU more; known psychological and biological processes explain how SMU leads to psychological harm and align with known vulnerabilities in adolescence. To my knowledge, no or little-known data flatly contradict the notion that social media and psychological harm are causally linked. In other words, no alternative hypothesis explains the full array of findings as coherently.

337. In my opinion, the coherence factor is satisfied.

5.7.8. EXPERIMENT

338. The experiment factor refers to evidence from experiments or analogous interventions where the exposure is manipulated, and outcomes are observed. In epidemiology, this often means randomized controlled trials or natural experiments. If deliberately reducing or removing social media use leads to improved mental health outcomes (or increasing use leads to worse outcomes) under controlled conditions, that provides powerful evidence of causality (Hill, 1965). Here, ethical considerations preclude conducting experimental studies in humans because there is enough evidence that increasing social media exposure increases the risk of psychological harm. Similar constraints exist in human clinical trials research in smoking, substances and other toxins. This explains why most of the interventions designed to assess causality reduce or eliminate social media. However, as reported above, there have been laboratory studies conducted that expose adolescents to unattainable ideal images to examine acute (brief) effects on social comparisons and body image. These meta-analyses of experimental studies found that exposure to the societal ideal on social media leads to increased upward (negative) social comparison and greater body dissatisfaction compared to images that are not reflective of the appearance-ideal, or

control images (McComb et al. 2023; de Valle et al. 2021). Moreover, these studies also found that just allowing youth to use SMU on their personal accounts in the lab (with no contrived experimental manipulation of images) led to greater distress, body dissatisfaction and social comparison, highlighting causal relationships due to the high degree of experimental control in these studies.

339. Several meta-analyses on the effects of SMU reduction or abstinence on a wide range of negative and positive mental health and well-being outcomes have been reviewed in detail above and presented in Table 8. Almost 60% of the intervention effects reported in these meta-analyses were significant, ranging from small to moderate effect sizes. However, as discussed above, many methodological limitations involved in the conduct of these meta-analyses have been known to lead to misleading or non-meaningful conclusions (Vetter, 2019). These include inappropriate pooling of outcomes that contribute to high statistical and clinical heterogeneity, pooling of abstinence with reduction studies, pooling short-term abstinence studies with longer term reduction studies. Perhaps most importantly, the populations studied were exclusively healthy youth, who on average, report very few symptoms of anxiety, depression. As discussed above, in the studies that addressed these limitations, all showed that reducing social media to 30 or 60 minutes/per day for 3 weeks led to moderate to very large effect-sized reflecting reductions in depression (Hunt et al. 2018, 2021) and generalized anxiety (Goldfield, 2024). There is evidence of a dose-response relationship in that the SMU restriction by Hunt et al. 2021 produced stronger intervention effects than my study that used a more liberal restriction of 1 hr/day. The magnitude of symptom reduction reported in these studies easily surpassed clinical thresholds indicating they are clinically meaningful, as reported above. Moreover, these intervention effects are comparable in magnitude to those observed from meta-analyses of clinical trials using cognitive behaviour therapy (the most evidenced-based approach) and even pharmacotherapy for depression in adolescents (Cuijpers et al. 2023). These high quality, low risk of bias studies (as reported in multiple meta-analytic reviews above) provide evidence for a clear causal relationship between SMU and mental health, at least in the context of youth with symptom manifestation.

340. Taken together, there is mixed evidence from the meta-analyses that the criterion of experiment is satisfied, but this is largely due to severe methodological limitations obscuring interpretation. When these limitations are addressed in the 3 experimental trials, causal

relationships become consistent, robust, and clinically meaningful. Based on these high-quality studies, it is my opinion that the experiment factor is satisfied.

5.7.9. ANALOGY

341. Analogy involves using comparisons to similar known causal relationships to support the likelihood of the association being causal. If an exposure is analogous to another exposure that is known to cause a similar effect, then by analogy, it is plausible that this exposure causes the effect too. In Bradford Hill's context, analogy is a weaker factor, but it can be illustrative. There are multiple examples supported by evidence to support the analogy factor, some of them are described under coherence due to conceptual overlap in Bradford Hill factors.

5.7.9.1. Analogous to Other Screen Time

342. As described under coherence, my published research, supported by systematic review of meta-analyses indicate remarkably similar patterns of results and effect sizes on mental health outcomes from other recreational screen behaviours such as TV viewing, video games, internet use, and addictive use of these digital media (Twenge, 2018). This highlights that *excessive screen time* in general can be detrimental (something pediatricians and public health policy have warned about for years), and social media would logically be included in that, with multiple reviews showing it has even stronger effects on mental health for the reasons discussed above. The analogous findings reinforce the notion social media and other media technology cause harm.

5.7.9.2. Analogous to Internet/Gaming Addiction

343. The World Health Organization has recognized Gaming Disorder (excessive video gaming causing impairment) as a diagnosable condition. This recognition came after evidence that a minority of gamers exhibit addiction-like behaviour leading to negative life outcomes. Social media addiction (or "Social Media Disorder" as some researchers call it) shows very similar behavioural patterns – craving, neglect of other activities, inability to cut down, mood effects, withdrawal, etc. (Lei, 2022). It stands to reason that if gaming can become addictive and harm mental health, social media, which elicits similar reward mechanisms (points, likes, endless progression like a digital slot machine, dopamine), could do the same. Indeed, meta-analytic reviews establish that gaming addiction correlates with depression (Ostinelli et al. 2021), as does internet addiction and smartphone addiction with depression and anxiety (Pham et al. 2025); analogously, social media addiction correlates with the same outcomes with comparable effect

sizes (Shannon et al. 2022). Thus, the analogy strengthens belief in causality because it is not an outlier – results form a pattern of behavioural addictions causing harm (like gambling, gaming, etc.).

5.7.9.3. Substance Use Analogy

344. We might even draw analogy to substance abuse. As discussed above in Biological Plausibility, substance-related and behavioural addictions such as problematic social media use share psychological and neurobiological underpinnings. For example, both stimulate the brain reward system which compel further use, both can cause a cycle of craving and temporary relief leading to long-term negative mood (Volkow et al. 2016). Teens using social media to self-medicate loneliness or depression is analogous to those using alcohol to self-medicate stress – in both cases, reliance on an external habit undermines developing healthy coping mechanisms (Vieira et al. (2023). Also, just as frequent alcohol or drug use is known to precipitate depression in teens (via neurochemical changes and life disruptions), excessive or problematic social media is causally associated with depression, as shown above, with evidence that both lead to impairments via neurological reward pathway changes and behavioural health (Crone & Konijin, 208). Although social media does not intoxicate, the analogy is that an external habit hijacks the brain's reward system resulting in classic symptoms of addiction that lead to impairment in psychological, interpersonal, emotional, and academic functioning.

5.7.9.4. Analogy to Rapidly-Changing Environments

345. Historically, when aspects of adolescents' environments drastically changed (e.g., during urbanization or introduction of mass media), there were observable shifts in youth behaviour and health. Social media is such a drastic environmental change (a new social context). By analogy with other historical shifts (like the sudden availability of fast food leading to obesity rise), one can conceptualize social media as a "fast food of social interaction" – highly palatable, easy, but not very nutritious, leading to health issues. This analogy is sometimes drawn by researchers (Twenge et al. 2020) who compared smartphones to a possible cause of a public health crisis, akin to how sudden diet changes caused obesity problems (Twenge, 2020). While analogies like "junk food" are simplistic, they highlight the notion there that we are observing parallels whereby sudden introduction of a new stimulus population-wide often has broad reaching effects.

346. The analogies applicable to social media overwhelmingly align with the idea that it can cause harm. Social media use is analogous to other screen exposures when used excessively

that are well-documented to adversely affect mental health, as demonstrated above. Therefore, by analogy, it is quite reasonable to infer a causal effect. This factor does not add entirely new evidence; rather, it is meant to highlight that observed phenomenon is not unprecedented or inexplicable in light of other knowledge.

347. Taken together, the analogy factor is satisfied in that multiple parallels from different domains support the plausibility and reality of the causal link between social media and mental health harm among children and youth.

5.7.10. BRADFORD HILL CONCLUSION

348. Taken together, the totality of evidence across epidemiological, experimental, psychological, neurobiological, and sociocultural domains demonstrates a causal association between social media use—particularly problematic use—and mental health harm in children and youth. The relationship is statistically significant, consistent across studies and populations, temporally ordered, shows a dose-response gradient, is biologically plausible, coherent with broader scientific understanding and time trends, and supported by high-quality experimental evidence and analogical comparisons. While the strength of association for general SMU is often small, the effect sizes for problematic use are frequently moderate to large and clinically meaningful—comparable to, or greater than, other widely accepted causal risk factors. These small population-level effects for general SMU can translate to significant public health consequences over time (Funder & Ozer, 2019). The harms are disproportionately concentrated among vulnerable subgroups—such as girls, youth with pre-existing mental health concerns, marginalized communities, and those with high digital risk profiles. The scientific data considered in this Bradford Hill analysis further establishes that Defendants' social media platforms cause and contribute to cause mental health harms to children and youth.

6. DEFENDANTS' INTERNAL KNOWLEDGE

6.1. META

6.1.1. OVERVIEW

349. Meta owns Facebook (founded in 2004) and Instagram (acquired by Meta in 2012), two major social media platforms. Meta's platforms have numerous features that drive social media use and addiction in children and youth. One of Meta's very first executives, former President of Facebook Sean Parker, described the thought process going into building the social

media applications as wanting to consume users' time and attention by using dopamine hits to create social validation feedback loops. He identified this as exploiting a vulnerability in human psychology and said that he and Mark Zuckerberg and others did it consciously. (Zuckerberg Ex. 2; Dep. at 53-54). Despite the effects of its features being well-documented in Meta's own internal materials, Meta has continued to use them in ways that harm children and youth.

350. Children and youth are prolific users of Meta's platforms. Meta's own 2021 study found that there were between 450 and 585 million teens on Instagram (META3047MDL-031-00131639; Rothschild Dep. at 85-86). Meta's research shows a substantial volume of Meta pre-teen users as well. Meta notes, for example, that "Teens typically join Instagram when they are in middle school at age 11-12" (META3047MDL-031-00086272). Children and youth are also more likely than adults to report excessive platform use. A study by Meta of U.S. Instagram users, for example, found that "Teens make up 15% of [daily active persons] in the US, but they make up 63% of people who spend more than 28 hours a week on [Instagram]" (the highest category of use in the survey) (META3047MDL-020-00342286).

351. Further, Meta documents show targeting pre-teens through strategies intended to downplay the risks of the platform to parents. One document proposes that Meta "Unlock parents as a barrier: Tweens are sensitive to the notion that they're a generation addicted to all things digital. Parents feel like they're constantly fighting tech's magnetic pull on their kids. This makes parents feel uneasy about their tweens' use of apps. We want to help parents feel comfortable allowing pre-teens to access the platform by providing tools to help them control their pre-teen's experience and app usage. Through unlocking parents as a barrier we hope to acquire new users" (META3047MDL-019-00017593). However, as explained herein, parents have every reason to be worried about their children's use of these products.

6.1.2. META FEATURES INCREASE ENGAGEMENT AND LEAD TO HARMS

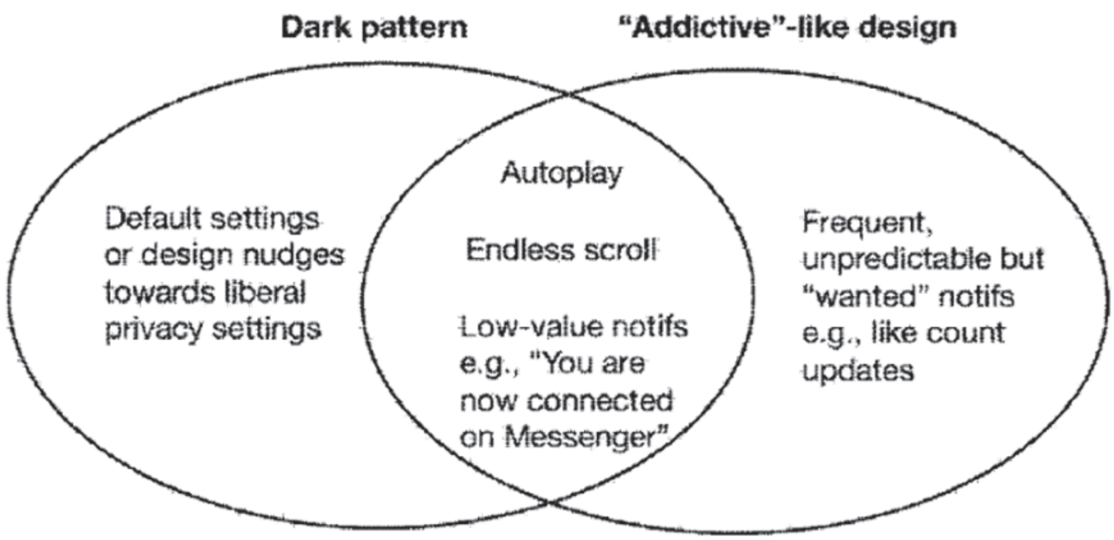
352. Meta targets children and youth with features that draw them to the platform and keep them there. One Meta document, for example, is titled "Laughing, Stalking and Fandoms – How to make IG an urgent app for US (Girl) Teens again" (META3047MDL-019-00104380). The document proposes (among other things) "generat[ing] 'urgency to check' by encouraging the teens we do have in the app today to re-share material with their friends. . . . Re-shares generate push notifications and bring people into the app" (META3047MDL-019-00104380). Push notifications are one of several features that drive compulsive use by children and adolescents.

353. Meta's platforms generate push notifications to bring people into the app (META3047MDL-019-00104380; Kilstein Dep. at 488-89). Meta can control the timing of notifications to increase the time people spend on the platforms and send them at hours when people are otherwise less likely to be using the applications (Andrews Dep. at 80 (proposal to send notifications at night to increase use of platform); META3047MDL-031-00266889 (discussing proposal)). Notifications take advantage of adolescents' emotional regulation and cognitive control deficits, driving them to use the platform more than they would like. This feature also takes advantage of adolescents' dopamine reward pathways, leveraging variable timing of rewards and cues to reinforce compulsive checking behaviors.

354. Meta acknowledges these effects internally. For example, an "IG Mental Health Wellbeing" presentation from 2022 describes how "Notifications make it difficult to manage time spent" on the platform (META3047MDL-136-00013164). Specifically, it notes that "Getting too many minor/irrelevant notifications is a trigger for those with PU [problematic use]," and that "people with PU [problematic use] found it 'incredibly difficult to avoid notifications" (META3047MDL-136-00013164). A survey of Instagram users found that "21% of US teen [weekly active users] say notifications make it harder for them to manage the amount of time they spend on the app, and 31% say the number of notifications they receive can be overwhelming" (META3047MDL-136-00013164). A similar survey of Facebook users found that "Notifications can [] impact feelings of control," and that 29% reported that notifications lead them to use [Facebook] more often than they want" (META3047MDL-044-00171345).

355. Meta witnesses acknowledged during deposition that push notifications contribute to problematic use. Vishnavi Jayakumar, the former Head of Youth Policy at Meta, testified that for teenagers, "we generally acknowledge that we – that notifications tend to draw them into the app repeatedly, and for more sessions and for longer time in session than we would otherwise want for young people of that age. And so notifications have been seen as a form of increasing the dependency of somebody on the app" (Jayakumar Dep. at 141-142). Meta nonetheless targeted teens with notifications. For example, a May 2023 presentation on Instagram Youth: Tween Needs noted that a majority of 13-14-year-old Instagram Direct messaging sessions were driven by notifications, highlighting the importance of notifications in driving sessions. (META3047MDL-004-00003522).

356. Meta in both Facebook and Instagram incorporates infinite scrolling and autoplay features that create seamless consumption experiences, take advantage of dopamine reward pathways, emotional and cognitive control deficits and reduce the natural stopping points and prolong use (Zenone et al. 2022). Meta's internal documents acknowledge the addictive nature of these features. For example, a document titled "'Addiction'/Problematic Use Design Audit Plan" identifies "Autoplay" and Endless Scroll" as part of the platforms' "'Addictive'-like design." The document also identifies these as "dark pattern" features—that is, features that manipulate users into making choices unconsciously:



(META3047MDL-044-00108564). Another Meta document notes that endless scroll "enable[s] mindless usage" of the platform, leading to compulsive use: "People are aware they want to stop but don't have the self-control to help themselves do that" (Guadagno Dep. at 188-92, META3047MDL-020-00251106).

357. Meta documents note that these effects are the strongest among adolescents. For example, in "What Makes Teens Tick?", a Meta researcher explains that "Teen brains are much more sensitive to dopamine, one of the reasons that the risk of drug addiction is higher for adolescents and it's the same thing that keeps them scrolling and scrolling. Due to the immature brain, they have a much harder time stopping even though they want to" (META3047MDL-003-00191207). The document discusses how Meta can take advantage of adolescents' unique traits to drive use: "Approval and acceptance are huge rewards for teens and interactions are the currency

on [Instagram]. DMs, notifications, comments, follows, likes, etc. encourage teens to continue engaging and keep coming back to the app" (META3047MDL-003-00191207). Another Meta presentation regarding "Teen Mental Health" notes that "Teens talk of Instagram in terms of an 'addicts narrative' spending too much time indulging in a compulsive behavior that they know is negative but feel powerless to resist" (META3047MDL-003-00091414).

358. Instagram introduced stories in 2016 and Facebook in 2017. These are ephemeral posts that disappeared after 24 hours. Stories were launched in response to competition for teen users on Snapchat whose ephemeral posts allowed teens to share away from the prying eyes of parents and teachers (META3047MDL-014-00017094). Stories were a key part of teen retention and growth strategy, allowing teens to share more spontaneous moments as feed sharing formalized (META3047MDL-003-00023877).

359. Meta knew that ephemeral materials were a trigger for problematic use as the 24-hour clock induced FoMO (META3047MDL-020-00005380). If a user did not sign on every day, they risked missing posts on stories. Social norms grew around the advent of stories, and Meta found that 40% of teens were concerned about offending friends if they didn't respond to their post or stories right away (META3047MDL-136-00013164). Ephemeral posts drove teens onto the app at regular intervals to ensure they saw relevant posts and responded to friends. Push notifications, infinite scroll, autoplay and stories remain a core part of both Instagram and Facebook.

360. Meta documents seem to acknowledge that these features were designed to encourage addictive behavior. For example, Meta notes that "likes," "notifications" and "infinite scroll" are "**features that are designed to exploit insecurity, or provide a dopamine rush . . . to increase time spent**" among youth users, which is "inherently at odds with well-being and take away from people's ability to consciously focus[] on activities that add value to their lives" (META3047MDL-044-00026817 (emphasis added)). The document goes on to state: "our product exploits weaknesses in the human psychology to promote product engagement and time spent" and "because of our reliance on AI, we cannot currently control for when content is being strategically leveraged to manipulate the opinions and moods of individual people" (META3047MDL-044-00026817). Many considered Meta's features to be addictive going back to at least 2009, when the New York Times published an article on the distracting and addictive toll Facebook was taking on America's teens (Kate Hafner, To Deal With Obsession, Some Defriend Facebook, New York Times (December 20, 2009)

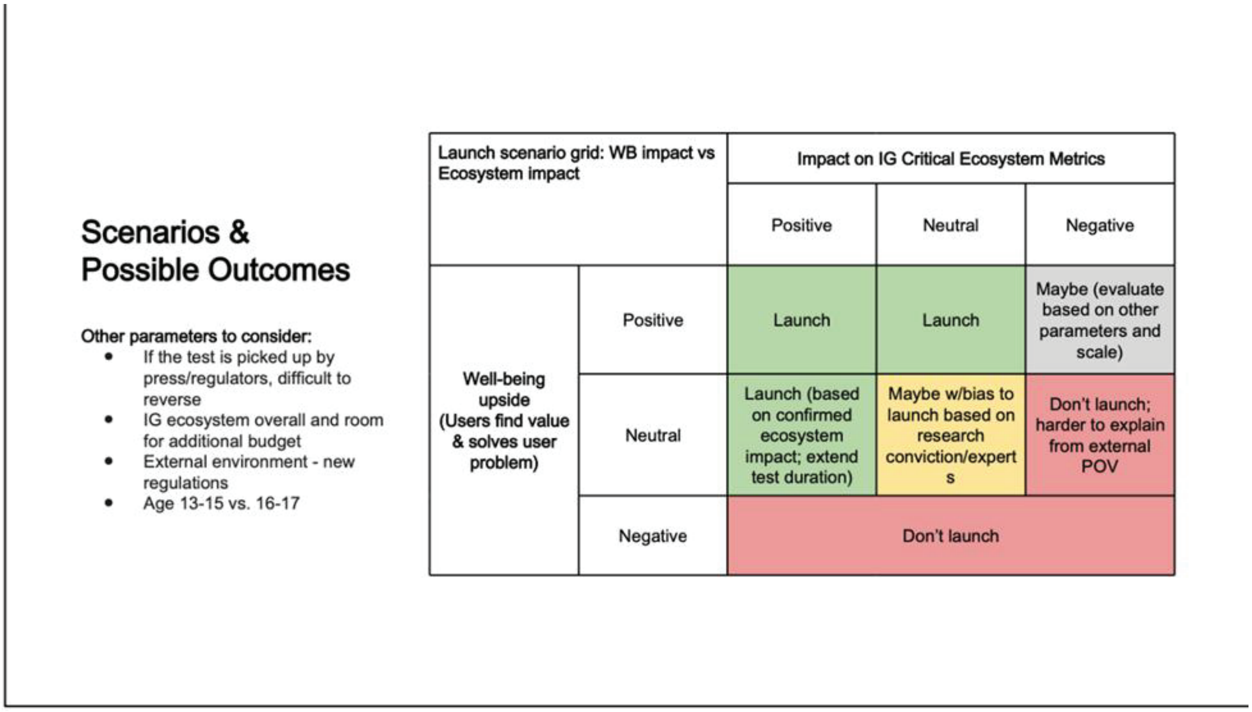
https://www.nytimes.com/2009/12/21/technology/internet/21facebook.html). In fact, a Facebook internal Market Research report dated September 2008 noted:

(META3047MDL-111-00427927).

361. This is not surprising, given that Meta sets goals based on users', including teen users', time spent on the platform. An internal email from a Meta employee in November 2016 indicates Zuckerberg decided that the top priority for the company in 2017 was going to be teens. Discussing that priority, the email specified: "Our overall company goal is total teen time spent . . ." (META3047MDL-003-00172008). A 2021 email from a Meta employee to Adam Mosseri (the Head of Instagram) indicates that the product teams continued to try to increase how often users' get on the app (reflected below):

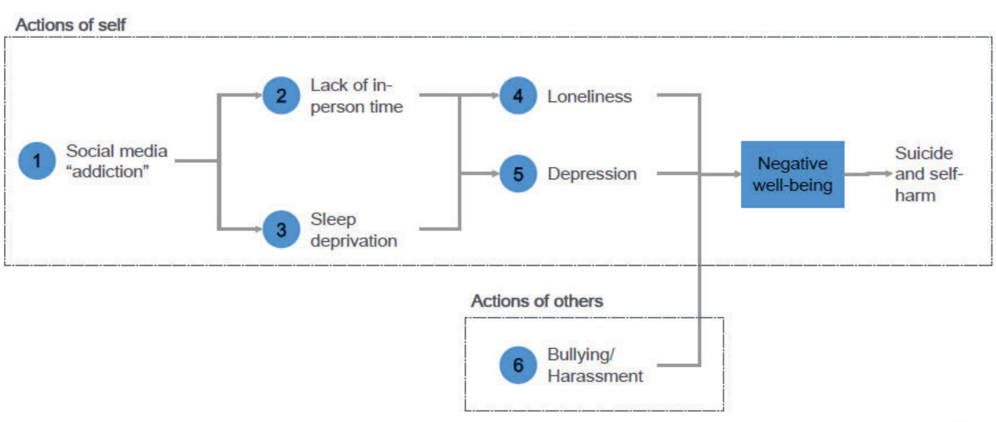
Strategy	To promote well-being, align our metric goals with people's goals	Metrics like "well-being sessions" could align our goals with our customers' goals. No one wakes up thinking they want to maximize the number of times they open Instagram that day. But that's exactly what our product teams are trying to do.	High

(META3047MDL-003-00161686). According to a Well-Being team document, research showed that "problematic use is correlated with increased time spent, sessions and night time usage" (META3047MDL-020-00263115). Meta documents discuss how "Late Night Use"—defined as use between midnight and 4 a.m.—is common among teens, with nearly half of teens reporting late night use at least once a week (Volichenko Dep. at 127, Volichenko Ex. 6 at 10). As Meta documents acknowledge, this "[n]ighttime social media use is associated with poorer mental health in teens due to displacing sleep," which is a "direct relationship between social media use and teen well-being (META3047MDL-003-00089142). The following shows a decision grid for balancing safety measures and ecosystem metrics:



Launch scenario grid: WB impact vs Ecosystem impact		Impact on IG Critical Ecosystem Metrics		
		Positive	Neutral	Negative
Well-being upside (Users find value & solves user problem)	Positive	Launch	Launch	Maybe (evaluate based on other parameters and scale)
	Neutral	Launch (based on confirmed ecosystem impact; extend test duration)	Maybe w/bias to launch based on research conviction/expert s	Don't launch; harder to explain from external POV
	Negative	Don't launch		

(META3047MDL-035-00001018). It shows that even if a proposed product solution had a positive effect on well-being, if there was a negative effect on ecosystem metrics, Meta would not necessarily implement it. This is especially concerning given an Instagram Well-Being Strategy document from 2018 showed their "model for how social media usage may be linked to suicide/self-harm":



HIGHLY CONFIDENTIAL

(META3047MDL-037-00068917).

362. Additionally, Facebook and Instagram allows users to interact with others' posts through "likes" and "comments" and by following other users. The number of interactions a post receives (e.g., "like counts") and the number of followers an account has, are all available to the public. This gamification of the platform can, and does, lead children and youth to obsess over their like counts, followers' counts and other figures' and can lead to social anxiety loops when they do not receive the validation they are hoping for.

363. Again, Meta refers to this phenomenon driving use by children and youth. For example, the "What Makes Teens Tick?" document referenced above states: "[a]pproval and acceptance are huge rewards for teens and interactions are the currency on IG. DMs, notifications, comments, follows, likes etc. encourage teens to continue engaging and keep coming back to the app" (META3047MDL-003-00191207).

364. Meta documents that these features cause mental health issues, particularly among adolescents. In a document titled "Likes and Social Comparison on Instagram," Meta researchers discuss how "seeing more posts with high like counts . . . is associated with feeling worse" (META3047MDL-038-00000234). Meta notes that Instagram's "News Feed ranking may also make this worse by prioritizing high-feedback posts" (META3047MDL-020-00588060). According to Meta, "On average, a person will receive about 5% as many Likes on their own posts as they see in their feeds" (META3047MDL-038-00000234). This leads to "more negative and less positive social comparison" (META3047MDL-038-00000234). Meta describes negative social comparison as a "significant problem" on Instagram, with the highest level of impact on teen girls (META3047MDL-020-00693093). As Alex Dow, Meta's Research Scientist Director, stated: "I think that negative social comparison is endemic to our products. . . . [I]t is a specific and concrete way in which our products are negative for their lives" (META3047MDL-020-00216374).

365. A number of Meta executives, including Dow (META3047MDL-003-00117852), recommended internally that like counts be hidden from the public to reduce these negative effects. Vishnavi Jayakumar, Instagram's former Head of Safety & Wellbeing, testified that Meta researchers "put together a really compelling package of information based on their interviews and user research suggesting that -- I'm sorry -- suggesting that likes might be one way in which we could target the issue of negative social comparison" (Jayakumar Dep. at 166). Similarly, Jennifer

Guadagno, Meta's Director of UX Research, told colleagues that "[r]emoving like counts is one of, if the [sic] THE, most significant levers FB has to reduce social comparison" (META3047MDL-003-00154846). Despite these recommendations, Meta continues to make like counts publicly available.

366. Since 2019, Instagram has allowed people to alter photos using third-party augmented reality effects, which include so-called "cosmetic surgery filters" intended to improve the person's appearance (META3047MDL-050-00003832; *see also* Guadagno Dep. at 93-94). From the start, experts—including "psychologists, researchers, body image activists, and AR professionals"—were highly critical of these features (META3047MDL-040-00337135). According to Meta's internal documents, a "large majority" of experts "recommended prohibiting these filters," explaining that "[t]hese extreme beauty effects can have severe impacts on both the individuals using the effects and those viewing the image (META3047MDL-040-00337135). The experts noted that "Children are particularly vulnerable," though "many others are vulnerable as well: those with a history of mental health challenges, eating disorders, etc." (META3047MDL-040-00337135; *see also* Stewart Dep at 46-47).

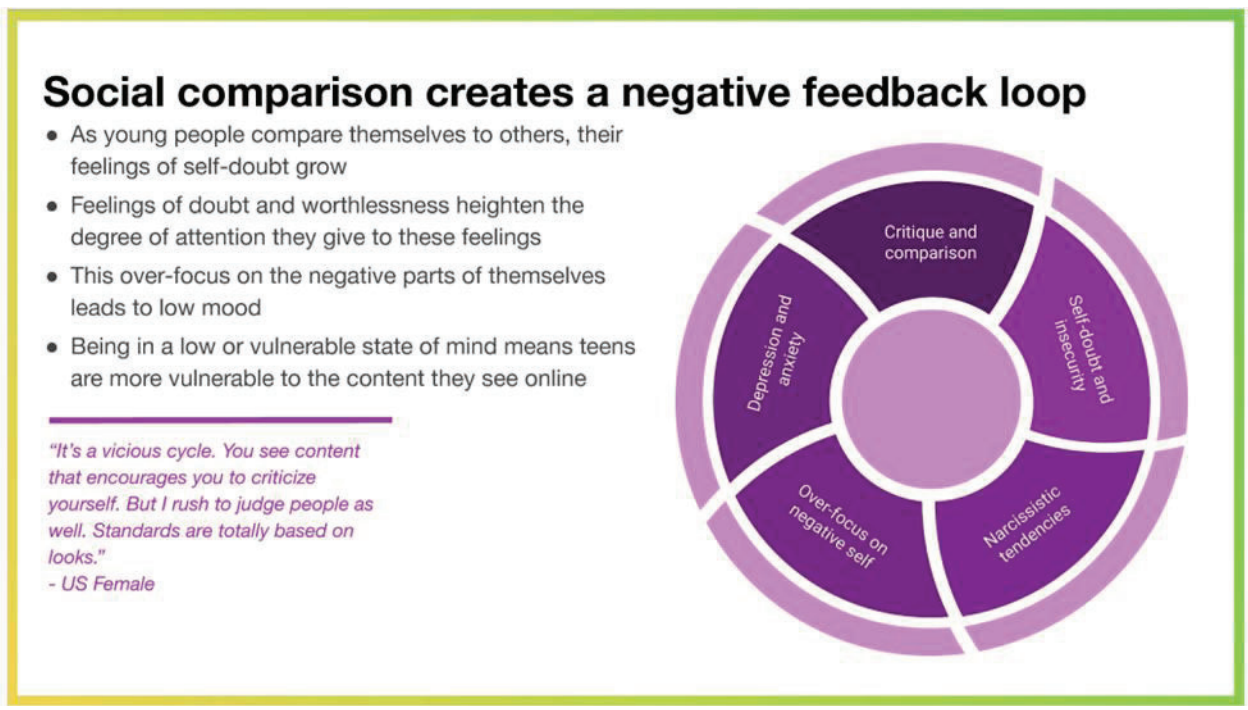
367. Meta later conducted its own studies and concluded: "The altering of selfies appears to be connected with negative impacts on both the person posting it, and those viewing it in terms of mental health, body dissatisfaction, and eating disorder behaviors" (META3047MDL-020-00609932). Notably, Meta found that "younger users . . . are the biggest demographic using our Spark effects" (META3047MDL-020-00609932). Meta's former head of policy, Karina Newton, explained: "As you know, these Spark filters primarily live on IG [Instagram] right now and are overwhelmingly used by teen girls" (META3047MDL-003-00178117). She goes on to say "[W]e're talking about actively encouraging young girls into body dysmorphia and enabling self-view of an idealized face (and very western definition of that face by the way) that can result in serious issues" (META3047MDL-003-00178117).

368. In response to public outcry, Meta temporarily banned cosmetic surgery filters in October of 2019, but the ban was short-lived; in May of 2020, Meta lifted the ban, citing concerns about potential "negative growth impact" (META3047MDL-050-00003832; *see also* META3047MDL-003-00179247; META3047MDL-003-00179481).

369. In addition to the effects described above, Meta's own research documents how these and other features of its platforms can contribute to anxiety, depression, sleep deprivation

and eating disorders among teens. For example, a document titled "Teen Mental Health Deep Dive" describes the results of surveys conducted by Meta on Instagram users. The document notes that Teens consistently "openly attribute their increased level of anxiety and depression to Instagram," a reaction that was "unprompted and consistent across all groups" (META3047MDL-003-00109173). It further explains that "The proliferation of new and different ways to compare themselves to others, combined with constant access [] means that there is no way to escape social comparison on IG [Instagram]," which is "the number one reason why IG [Instagram] is worse than other platforms for mental health" (META3047MDL-003-00109173). "Teens who struggle with mental health" said that "Instagram makes it worse" (META3047MDL-003-00109173).

370. This survey highlights the insidious cycle of SMU and PSMU, which can create a social comparison negative feedback loop. When young people use Instagram, they compare themselves to others, growing their self-doubt, in return this doubt increases the attention teens give to comparison, leading to an over focus on the negative parts of their lives, and ultimately leading to a "low or vulnerable state" (META3047MDL-003-00109173). This social comparison spiral can lead to negative downstream effects like insecurities around body image or weight, increased pressure on perfection, and anxiety (META3047MDL-003-00109173).



(META3047MDL-003-00109173).

371. Meta's documents also note that "there is substantial evidence to suggest that Instagram and Facebook use can increase body dissatisfaction" (META3047MDL-037-00007066) and that "downward spiral[s] [] exacerbated by our platform" can lead to eating disorders, body dysmorphia and body dissatisfaction (META3047MDL-003-00001846).

372. Meta also studied addiction and mental health topics internally. In 2018, Facebook conducted a survey of 20,000 US Facebook users to measure perceptions of problematic use. (META3047MDL-039-00000058). In this study Meta defined problematic social media use as having both "serious problems with sleep, work or relationships that they attribute to Facebook AND concerns or preoccupations about how they use Facebook" (META3047MDL-039-00000058). Under this PSMU definition, in this self-reported survey, Meta found 3.1% of Facebook users in the US experience PSMU (META3047MDL-039-00000058). When Meta proposed an alternative definition for PSMU, "Spending a lot more time on Facebook than they want to," 14% of users reported being affected by PSMU (META3047MDL-039-00000058). 11% of Facebook users self-reported negative life impacts from platform use including serious problems with sleep, work performance, and relationships (META3047MDL-039-00000058). This 2018 study also shows that PSMU was highest in teens and young adults (META3047MDL-039-00000058). Meta would later describe the 3.1% of Facebook users who experience problematic use to be severe cases, and that 55% of Facebook users experience mild problematic use (META3047MDL-003-00086233).

373. Meta's 2018 review of suicide and self-injury (SSI) data on Instagram demonstrated over five million daily active users were exposed to SSI admission or promotion materials on Instagram in October 2018 (META3047MDL-143-00000002). Teens were disproportionately exposed to SSI content (META3047MDL-143-00000002). Teens were 18% of the Instagram daily active user (DAU) population but made up the vast majority (45-60%) of those who admitted and promoted self-harm and suicide videos (META3047MDL-143-00000002). Increased use of the platform was also associated with producing SSI material, with those who posted SSI promotion or admission material using the platform three times more than the average user (META3047MDL-143-00000002).

374. In 2019, Meta conducted a deprivation study on Facebook and found that stopping Facebook use for even a week led to increased wellbeing amongst those surveyed. Individuals in

the experiment group who stopped using Facebook reported lower feelings of depression, anxiety and social comparison when compared to the control group (META3047MDL-047-00058006).

375. The findings from the Facebook deprivation study track other internal Meta literature reviewed by the foundational wellbeing research team in the Well-being Research 10,000 Foot View (META3047MDL-003-00144417). While positive impact was noted, this report showed that Facebook had an overall negative effect on wellbeing (META3047MDL-003-00144417). Negative impact on wellbeing is especially prevalent where Facebook displaces sleep, in person interaction, and other activities associated with positive wellbeing (META3047MDL-003-00144417). Wellbeing was found to be lower while using Facebook when compared to other digital activities like watching TV (META3047MDL-003-00144417). Facebook use also had a negative effect on the wellbeing of teens (META3047MDL-003-00144417). Meta stated that "[n]ighttime social media use is associated with poorer mental health in teens due to displacing sleep; this is the most direct relationship between social media use and teen well-being" (META3047MDL-003-00144417, internal citation omitted)

376. Meta studied the negative experiences that users encountered on Instagram in 2019. The goal of this survey was to "get a current snapshot of people's perception of negative experiences on Instagram and identify top problem areas" (META3047MDL-059-00000216). NETS surveyed active Instagram users about whether they had experienced certain harms within the last 7 days. 23% of Instagram users had seen nudity or sexual content they felt did not belong on Instagram, 21% of Instagram users saw violent content they felt did not belong on Instagram, 19% of users saw something on Instagram that made them feel a child was unsafe, 18% saw someone on Instagram promoting eating disorders or unhealthy weight loss, and 12% of users saw someone who they worried might hurt themselves or commit suicide (META3047MDL-059-00000216). For every category except eating disorder, material which remained stable between age groups, children and adolescents had these negative experiences more often than adults.

377. In 2021, Meta conducted the Bad Experiences and Encounters Framework Survey (BEEF). This largescale survey showed the expansive reach of platform harm. For example, in the seven days before the survey measure was taken, 19% of all users and 21% of users aged 13-15 reported experiencing negative social comparison (META3047MDL-004-00015029). 16.3% of users saw nudity or sexual material on Instagram, and that number increased among the youngest users aged 13-15 among whom 19.2% saw nudity (META3047MDL-004-00015029). 12.8 percent

of Instagram users saw violent content, but among 16–17-year-old users that number jumps to 14.3% (META3047MDL-004-00015029). 11.9% of Instagram users experienced unwanted advances in the last 7 days, which are defined as "unwanted sexual advances," among teens ages 13-15 this number rose to 13%, and among teens ages 16-17 14.1% experienced an unwanted sexual advance (META3047MDL-004-00015029).

378. The Beef Survey also found that younger users experienced harm at a higher rate than older Instagram users across the majority of the issues studied, including the serious issue of self-harm; 6.7% of Instagram users saw suicide or self-harm material compared to 8.4% of users ages 13-15 (META3047MDL-004-00015029). These harms occurred as many as ten times a week in a significant portion of the population studied (META3047MDL-004-00015029). Additionally, the survey results found that the vast majority of these bad experiences involved interactions with strangers that the teen did not know in real life (META3047MDL-004-00015029). When this data is extrapolated to the entirety of the Instagram population it shows that millions of users are having harmful experiences that will negatively affect their mental health.

Issues by all age groups

Younger people report higher rates of every issue, with some issues felt more universally than others

In general, the older the respondent, the less likely they are to report experiencing any of the 22 issues measured. All red cells (the age group with the highest rate of experiencing an issue) are within the four youngest age groups.

The gap between the lowest and highest issue rates vary by issue. Bullying witness, for instance, has the widest delta: 31.1% of the 22-26 age group report experiencing it, compared to only 10.6% of the 45+ group, a delta of 20.5 percentage points. Other large deltas include usability passive (delta = 20 points), hate witness (19.5), and misinfo (17.5).

By contrast, certain issues are experienced at similar rates regardless of age. For example, drug sales (delta = 2.1), account security (3.9), and usability action (4.6).

	Overall %	13-15	16-17	18-21	22-26	27-34	35-44	45+	Delta
		Column N %	Column N %	Column N %	Column N %	Column N %	Column N %	Column N %	Highest-lowest
commerciality	48.2%	37.7%a	42.5%b,f,g	47.6%c	51.2%d	50.5%d	44.8%b,e	39.6%a,f	13.50%
misinfo	30.3%	24.4%a	29.2%b	30.0%b,d	33.6%c	31.2%d	24.4%a	16.1%e	17.50%
bully witness	28.3%	27.2%a	29.4%b	29.9%b,c	31.1%c	27.4%a	19.8%d	10.6%e	20.50%
audience limitation	26.8%	28.2%a,b	29.3%a	28.1%a	26.7%b	24.9%c	20.3%d	15.9%e	13.40%
usability passive	25.5%	30.1%a	30.0%a	29.5%a	25.9%b	21.6%c	17.1%d	10.1%e	20.00%
hate witness	25.3%	26.0%a	28.5%b	27.9%b	27.9%b	22.5%c	15.7%d	9.0%e	19.50%
data privacy	24.4%	17.9%a	21.4%b	23.0%c	25.9%d	24.8%d,f	20.2%b	14.3%e	11.60%
perceived control	23.9%	18.4%a	20.0%a	24.8%b	26.7%c	24.7%b,c	20.9%a	14.2%d	12.50%
fake acct 1st	21.8%	15.8%a	21.2%b	24.8%c	23.4%c,d	22.9%b,d	17.4%a	13.2%e	11.60%
negative comparison	19.2%	21.4%a	19.5%b	20.1%a,b	19.4%b	17.5%c	13.4%d	6.8%e	14.60%
transparency	17.5%	14.9%a	19.1%b,f	19.0%b	17.1%c	15.1%a	12.0%d	8.4%e	10.70%
political posts	17.0%	14.3%a,d	16.3%a,b	17.3%b	18.0%b,c	15.2%a,f	12.4%d	8.7%e	9.30%
nudity	16.3%	19.2%a	18.4%a	18.2%a	16.7%b	13.6%c	11.3%d	6.2%e	13.00%
over enforcement	14.8%	14.1%a,c	16.8%b	16.3%b	14.8%a,f	12.9%c	9.1%d	5.9%e	10.90%
violence	12.8%	12.8%a,b	14.3%a	13.2%a	13.1%a	11.5%b	8.2%c	5.0%d	9.30%
unwanted advances	11.9%	13.0%a	14.1%a	14.2%a	11.0%b	8.0%c	7.7%c,d	6.9%d	7.30%
usability action	10.7%	11.2%a,e	11.1%a,e	11.1%a	10.3%a,b	9.6%b	8.5%c	6.6%d	4.60%
bully target	8.1%	10.8%a	9.7%a	8.1%b	7.1%b,c	6.5%c	4.9%d	3.4%e	7.40%
self harm	6.7%	8.4%a	7.2%a,b	7.5%a	5.8%b	3.5%c	2.5%c,d	1.9%d	6.50%
acct security	3.9%	5.2%a	3.2%b,c	4.2%a,b	3.2%c	2.1%d	1.6%d	1.3%d	3.90%
drugs	3.9%	3.7%a,b	3.5%a,b	3.8%a	2.7%a,b,c	3.6%a,b	2.3%b,c	1.7%c	2.10%
impersonation 1st	3.7%	5.5%a	3.5%a	5.0%a	3.1%a	1.2%b	0.7%b	0.3%b	5.20%

An expanded table with confidence intervals can be found here.

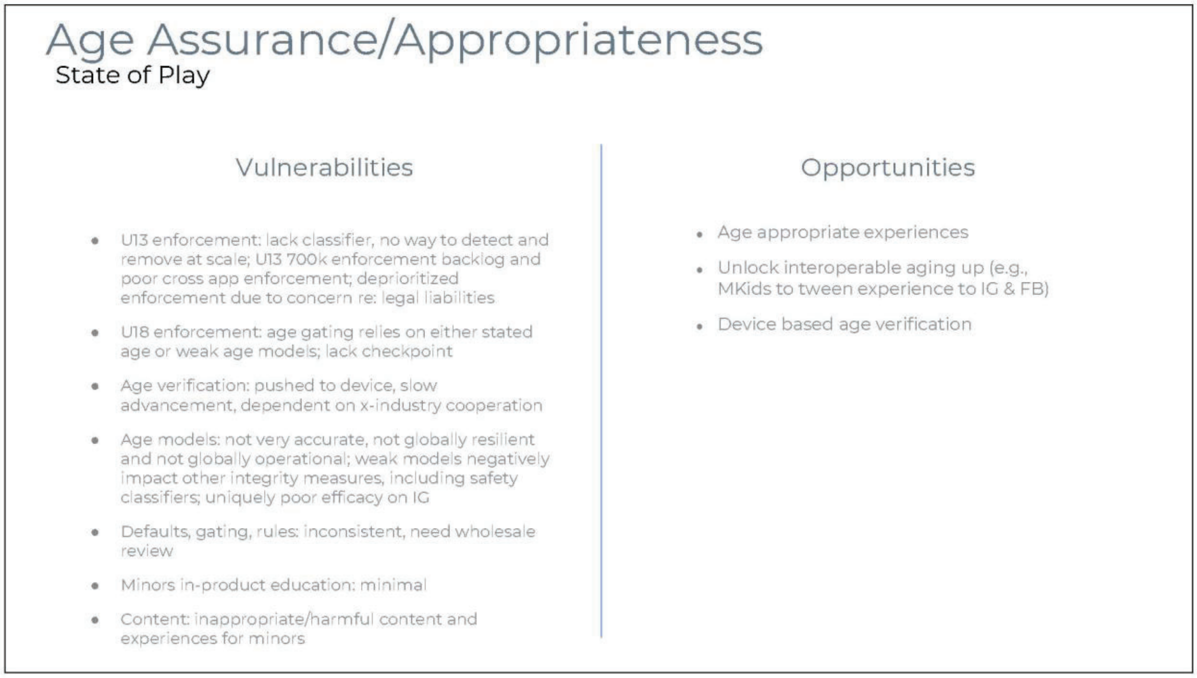
21

(META3047MDL-004-00015029).

6.1.3. AGE VERIFICATION

379. Meta does not have an effective age gating system. At founding, Facebook was designed for and used by college students, and a college or university .edu address was required for sign up (Associated Press, Timeline: key dates in Facebook's 10-year history (February 4, 2014) https://phys.org/news/2014-02-timeline-key-dates-facebook-year.html). In 2006, almost two years after the app's launch Facebook allowed any self-proclaimed 13-year-old with a valid email address to join (Jon Loomer, Detailed History of Facebook Changes 2004-12 (May 6, 2012) https://www.jonloomer.com/history-of-facebook-changes/). From launch, Facebook required users to enter their age to join, but this version of age verification was fairly easy to trick (Bejar Dep. at 187). While Facebook asked for a user's age from its launch in 2004, Instagram did not ask users for their age until December 4, 2019, 7 years after the app was acquired by Meta (Rothschild Ex. 4; Rothschild Dep. at 76-77). In 2019 Meta executives testified in front of the UK Digital, Culture, Media and Sport committee that they did not know the age of their users on Instagram (META3047MDL-003-00176638). Despite this, Meta documents show that not only were some under 13-year-olds using their platform but that "[t]eens typically join Instagram when they are in middle school at age 11-12…" (META3047MDL-031-00086272).

380. Even when users' age was requested, no proof was required, so users could misrepresent their age (Rothschild Dep. at 80-81). The same was true for Facebook (META3047MDL-031-00004338). Meta's internal documents show that its efforts to detect and remove users under 13 were inadequate. As of July 2020, Meta documents revealed that they lacked a classifier thus there was in no way to detect and remove under 13 users "at scale" and that its age gating relied on "stated age or weak age models" (MT-IG-NM-000180934 – also shown in the PowerPoint slide from that exhibit below).



Stated age means the age a user reports and is only as good as the veracity of the user. Documents show as many as half of teens misrepresent their age a fact well known to the Defendants (META3047MDL-014-00335618; META3047MDL-014-00291926).

381. Not only was the age verification system weak (META3047MDL-034-00137594), but internal documents show that even for those identified as being under 13, Meta was not removing them. A 2020 document shows that Meta "deprioritized enforcing against U13s" (META3047MDL-034-00027362). Meta acknowledged as much admitting to an enforcement backlog of 700 thousand under 13 users (MT-IG-AG-NM-000180934). A recommendation was made at this time for "leadership support to push product to act on knowledge we already have, i.e. clear our backlogs, disable verified u13s, build an u18 checkpoint to review minors who have been reported on 18+ products like FB Dating" (META3047MDL-014-00055179). However, as of March 2021, Meta had not started work on creating an under 18+ checkpoint (META3047MDL-031-00004338) and as of June 2021, the backlog of under 13 users was up to 2 million (META3047MDL-034-00056779; Rothschild Dep. at 138-42).

382. Around the same time, Meta proposed the launch of "Instagram Kids" (or Instagram Youth), a platform aimed at tweens (defined by Meta as age 10-12) (see META3047MDL-014-

00291926), further underscoring Meta's efforts to cultivate user dependency from an early age. As of December 17, 2024, Instagram was still working through teen modeling (Kilstein Dep. at 301).

6.2. SNAPCHAT

6.2.1. OVERVIEW

383. Snapchat started as a photo sharing application. It became popular in part because of its novel "ephermerality" feature - photos disappeared from the recipient's phone after a few seconds (SNAP2097141; SNAP0758611). Later Snap introduced several additional features, such as picture and video broadcasts ("Stories"), ephemeral text-based messaging, and its infinite feed ("Discover" and "Spotlight"). The product went from a simple messaging and photo-sharing application to a paradigmatic social media platform (SNAP3748749).

384. Snapchat's mass appeal to adolescents and teenagers fueled its meteoric success. Snapchat users skew younger – middle school to college students (SNAP2097141). Snapchat has long acknowledged the impact of younger users, proclaiming that it was "thrilled to hear that most of" its users "were high school students who were using Snapchat as a new way to pass notes in class" (Snap, Inc., Let's chat., Snap Newsroom (May 10, 2012), https://newsroom.snap.com/lets-chat). Snap's server data at the time indicated that the app was most used during the school day and less on the weekend (Snap, Inc., Let's chat., Snap Newsroom (May 10, 2012), https://newsroom.snap.com/lets-chat). By 2014, Snap "absolutely own[ed]" the youth demographic – with internal estimates indicating it had achieved 84% market penetration among users aged 10 to 24 (SNAP2324207). Snap's early dominance of the youth market caused investors to value the company at $10 billion that same year, just three years after the platform had launched. (SNAP0865799). Snap's overwhelming popularity among teens helped propel the company to a $25 billion valuation at the time of its IPO in 2017 (SNAP0865799). Snapchat has consistently attracted a larger percentage of teen users than its competitors, with tens of millions of daily active teen users today (SNAP0849935; SNAP1269797).

385. Snapchat attracts younger users with its bright and cartoonish design. Users present themselves on the platform by Bitmojis, which are cartoon avatars (Snap, What is a Bitmoji, https://help.snapchat.com/hc/en-us/articles/7012342198676-What-is-a-Bitmoji). You can share your Bitmoji in Chat through stickers, it represents you on Snap Map, and as their icon within

Snapchat. Snap describes Bitmoji as one of Snapchat's biggest differentiators, and a feature that is much harder to copy than others (SNAP2104677).

386. Bitmoji users build a bond through configuring and using their avatar which increases the switching cost to other Avatars (SNAP2104677). Bitmoji enhances messaging beyond ways that emojis, stickers and gifs are capable (SNAP2104677). By using a unique Bitmoji, "communication becomes truly personal" (SNAP2104677). This bond drives sustained engagement and growth (SNAP2104677). Snap acknowledges that Bitmoji uniquely resonates with teens (SNAP0215278). Bitmoji partners with fashion and other brands to create skins for your Bitmoji that a user can purchase in-app (SNAP0665001). A user can create a Bitmoji that looks like them or not.

6.2.2. SNAPCHAT FEATURES INCREASE ENGAGEMENT AND LEAD TO HARMS

387. Snapchat has five tabs or surfaces on its platform: Camera, Chat, Snap Map, Stories/Discover, and Spotlight. Each tab is designed to maximize user engagement and retention.

388. Users are initially taken to the Camera. Photos or videos can share with others with other Snap users. This section of the app also contains a lens carousel, an endless array of lenses (also referred to as filters), which a user can apply to a photo to create augmented reality effects (SNAP2812798). These lenses are algorithmically ranked to provide contextualized and personalized recommendations to users (SNAP0464752; SNAP0506749). Certain lenses appear only for a limited time, driving engagement and a sense of urgency (SNAP1018774; Brody Dep. Ex. 5).

389. Lenses drive Snapchat engagement and are a key feature to its platform (SNAP0506749). Lenses are also known to cause negative impacts on users, including teenagers, especially the beautification Lenses (Brody Dep. at 187, 194, 219 (rough); SNAP0525938; SNAP0933724). Users have reported mental health harms and developed "Snapchat dysmorphia" (Brody Dep. at 187, 194, 219 (rough); SNAP0078233; SNAP0525938; SNAP0933724; SNAP0525939). Top Snap personnel approved of beauty lenses that would amplify big lips and change nose size and other facial features and allowed lenses that would "sexualize" the user (SNAP2157395).

390. Once a Snap is taken, a user is able to save the photo or video in their Memories (SNAP1847822). There is also a private, password-protected feature called "My Eyes Only" (SNAP0029949). Although Snap is aware its "My Eyes Only" feature is used to share and save

inappropriate images, including nude images, Snap has not restricted the feature by age or provided parental controls (Oshuntula Dep. Ex. 8; Oshuntula Dep. at 136 & 139).

391. After receiving a Snap, users are prompted to send the Snap to another user or post it to "My Story". If a user sends the Snap to a specific friend, they are transferred to the Chat portion of the app. Within the Chat tab, users can share Snaps or Chats that disappear after a certain period of time or upon viewing (Snapchat.com, https://help.snapchat.com/hc/en-us/articles/7012334940948-When-does-Snapchat-delete-Snaps-andChats#:~:text=Chats%20With%20Friends%20%F0%9F%92%AC&text=Chats%20in%20Group%20Chats%20are,everyone%20has%20viewed%20the%20Chat). Chats disappear either immediately after being viewed or after a pre-set amount of time unless the user proactively saves it. This creates an urgency to quickly view, respond, and/or save communication (whether chats or Snaps) (Snapchat.com, https://help.snapchat.com/hc/en-us/articles/7012334940948-When-does-Snapchat-delete-Snaps-and-Chats#:~:text=Chats%20With%20Friends%20%F0%9F%92%AC&text=Chats%20in%20Group%20Chats%20are,everyone%20has%20viewed%20the%20Chat).

392. If a user decides to send their Snap to the Stories feature, they can choose between a Private group story and Main stories. Snap recognizes users report that they treat these two categories of stories differently (SNAP3117707). Posting to Main story is where users are "posting things they wouldn't mind their parents or strangers to see" (SNAP3117707). It is where a user "captures that signal prestige or status, social affiliation, etc." (SNAP3117707). On the other hand, posting to Private group story is generally used to connect with others in precise but indirect ways. Snap reports Private stories are used for flirting, ice "cracking", and exclusivity (SNAP3117707). Being added to a Private group story is like being "selected" (SNAP3117707). The Story feature is ephemeral and Stories expire after 24 hours. This ephemeral nature requires users to develop a daily habit of checking their Snap app (SNAP1342034). Given the ephemeral nature of Snaps, Stories, and other experiences on Snapchat, users are at constant risk of missing moments they would have otherwise enjoyed. Pivoting off this "FOMO," Snap crafts notification campaigns and features to encourage engagement (SNAP0886473).

393. According to Snap, "push notifications are a powerful lever for growth and engagement on Snapchat" (SNAP5147058). In 2022, 28 billion notifications drove about 1.6 billion Snapchat opens each day (SNAP5147058). About 26 million incremental daily active users

are driven to open the app via growth notification pushes (SNAP5147058). Snap claims notifications provide an opportunity to reach users when they are outside the app (SNAP5147058). It is a feature that beckons a user back to the app (Osborne Dep. at 136-138). Snap is aware that notifications can affect mental health and cause addictive behavior (SNAP4723815; Osborne Dep. at 136-138). Snapchat sends users notifications all day. Notifications are pushed to users while at school (Sellis Dep. at 226-231). Snapchat implemented quiet hours for notifications but rolled them back from 12-7am to 3-6am to increase daily active user growth (SNAP4712437).

394. Snapchat measures the success of a notification by tracking the "notification open rate" (Tran Dep. at 26-31). When a user opens Snapchat due to a notification signal, it is seen as a positive incremental daily active user metric (Tran Dep. at 23-31). Users are sent notifications when they receive a Snap, when they have been added as a "friend", if they subscribe to certain stories or opt in to "friend" story notifications (Sellis Dep. at 226-231). A user can also receive community notifications, notifications about how a Snap or Story is doing, if a contact joins Snap, and more (Sellis Dep. 226-231). There is no maximum cap on the amount of notifications Snapchat will send a user in a given day (Tran. Dep. at 39-46).

395. After a user views all their personal Stories from the Chat tab feed and reaches the end of the available Main and Private stories, instead of exiting playback, they continue to auto-advance into Discover (SNAP2266855; SNAP5066299). Discover is Snapchat's general content section (SNAP4222809; https://newsroom.snap.com/introducing-discover). It is comprised of user generated material and partnership creators, including media partners, influencers, advertisers, entertainment companies and news outlets (SNAP4222809; https://newsroom.snap.com/introducing-discover). This auto-advance from Friends' stories to user generated materials occurs even though numerous users report that they wish to opt out of it. They report it to be irritating, feeling like they're "getting sucked into discover" and describe it as "mentally destroying" (SNAP0307144).

396. In addition to auto-advancing users from Stories to Discover, Snapchat implements an endless scrolling design which Snap employees have called addictive (SNAP1393050). Content is ranked using an algorithmic sampling model that provides the most relevant content and reduces barriers to consumption (SNAP6116693). The goal is to provide "the right content to the right people at the right time, leveraging as many signals as we can from users and internal curators"

(SNAP6116693). This auto-advance feature and the algorithm curation encourages users to spend as much time as possible on the platform.

397. Spotlight was introduced in 2020 by Snap. The most notable feedback after its launch was its similarity to other popular social media sites with vertical short video feeds, notably TikTok and Instagram Reels (SNAP0188592). Similar to Discover, Spotlight offers an endless scroll that is algorithmically curated for each user (SNAP1393050).

398. Spotlight acts as a popularity contest, where content is selected from submitted user generated content to be featured now or in the future (https://help.snapchat.com/hc/en-us/articles/7012288096532-How-do-I-submit-Snaps-to-Spotlight). Snapchat states that Spotlight contains elements of other social media and states that public comments are "very harmful to Snapchatters" (SNAP0735040). When launched, Spotlight did not contain "likes" and "comments" features, claiming they corresponded with toxicity and bullying (SNAP3203243). However, since 2021, Spotlight has permitted public comments, thus causing it to resemble Tik Tok even more (SNAP1560315; SNAP4681508; https://help.snapchat.com/hc/en-us/articles/7012352337428-What-happens-when-I-comment-on-a-Spotlight-Snap). From its launch, Spotlight comments were designed to increase engagement and act as a way to give additional signals that would be helpful for user-level recommendations (SNAP1561260). Moreover, Spotlight contains a visible number of views, comments, shares, and reposts, which can effectively act as a similar metric, meaning that Spotlight embodies many of the social comparison metrics of other major social media platforms.

399. To increase traffic and engagement with Spotlight, Snap designed the "Always On Badge" in 2023 (SNAP4227244). This visual signal is a red icon over the Spotlight icon to flag a user to that portion of the platform (SNAP4227244). The red icon only clears once the feature is selected by the user. The visual signal acts as a reminder to a Snapchat user every sixty minutes (SNAP4227244). This strategic change raised the daily active use of Spotlight from 53 million to 71 million, a lift that was the single biggest lift of daily active use ever seen in an A/B test (SNAP4227244).

400. The final tab of the Snapchat app is the Snap Map. Launched in 2017, Snap Map immediately raised concerns with parents (SNAP3764816). It allowed all users to upload publicly posted images on its searchable Snap Map (SNAP3764816). Location sharing on Snap Map is an opt-in feature. When a user opts-in, they share their exact location with the anyone they've added

as "Friends" (SNAP3764816). A 2024 user engagement survey of 13-17-year-olds showed that "Find My Friends" was one of the top used features in the Maps tab (SNAP3721368 at 53).

401. When Snap Maps was first envisioned, "living vicariously" was embedded in its design (SNAP5468295). This living vicariously can lead some of Snapchat's young users to feel anxiety over social comparison, and fear of missing out (SNAP1941838; SNAP0031906). Many teens state that location sharing via Snap Map can make them self-conscious and fear being stalked (SNAP1941838). It also raises concerns related to the safety of minors. Snapchat can show a user at their school, home, work, or any other location, unless they choose to opt out in "ghost mode" (SNAP0052732). Other teens report opening Snap Maps over twenty times a day and sharing their location to everyone, irrespective of concerns about the privacy implications (SNAP4836937; SNAP3800937).

402. Snap's features increase user engagement and time spent on Snapchat. To that end, Snap's "North Star Metric" is a daily bi-directional communication. Over "85% of Snapchatters who talked to a friend today on Snapchat will open the app 7 out of the next 7 days" (SNAP4300951).

403. Accordingly, Snap has gamified the Snapchat platform to reward users, especially teens, for opening Snapchat more often and engaging in more frequent bi-directional communication (Voss Dep. Rough Tr. at 253-254). Every Snap user is assigned a Snapscore, which increases as a user sends or receives Snaps. Teen Snapchat users often attempt to drive their score as high as possible because, as Snap understood, the Snapscore served as a "status symbol" (SNAP3386748). To that end, a "main driver" of "app engagement," and the "primary driver" of teen Snapchat usage is a feature called Streaks. Snap's own research found they were used to drive up Snapscores (SNAP3151495; SNAP1806711; SNAP2345620; SNAP7148843). Streaks act as a reward for users who have exchanged Snaps, back and forth, for at least three consecutive days with a unique emoji that includes the number of days that they have kept the streak alive (SNAP6118582; SNAP2889335; SNAP4951751).

404. Snap understands the Streaks feature is primarily used by teen users, and that "unlike older demos whose main motivation is staying connected with people they might not talk to everyday," teens are motivated to maintain Streaks "by seeing the number go up" (SNAP3151495; SNAP6759368; SNAP6759344; SNAP3808780). Snap refers to this use of

Streaks as "unhealthy" and approximates that between 10-30% of users—approximately "60-200M" users—fall into the "unhealthy streaks" category (SNAP3156939; SNAP3808780).

405. Snap further understands that this type of "[g]amification has driven engagement and retention" because users with Streaks "[k]eep[] them coming back daily to Snapchat, even if they are not using it for keeping in touch with friends" (SNAP3386748). While users report that "Streaks make[] it impossible to unplug for even a day," Snap regards this "Daily Habit Training" as one of the "Key Positive[s]" of the feature (SNAP6906160).

406. According to Snap, Streak usage can be explained, in part, by the "Social Ping Theory," by which children engage with Snapchat and maintain streaks for "network acceptance" and "internal proof" that they have friends who keep in touch with them each day (SNAP2894057). In this way, "users mainly use[] Streaks as a social status measure to increase" their "Snap Scores," and therefore seek "as many Streaks as possible" (SNAP7148847).

407. However, while Streaks are "so core to communication engagement" on Snapchat, Snap acknowledges that the feature—and especially the "Streak icon"— incentivizes "shallow gamified communication," reinforces "toxic behavior," and represents a "self-perpetuating, anxiety driven system" in which users engage in "compulsive behavioral pattern[s]" to maintain their Streaks (SNAP6110233; SNAP0892766; SNAP6145093). Through research, Snap has learned that "[m]any users feel they are 'in too deep' to get out of a Streak," feel "social pressure" to maintain them, and personal relationships can be negatively affected by breaking streaks (SNAP0640337; SNAP0029949). For teens specifically, Streaks are used to "maintain social status," and the bigger the streak becomes, the more stress it causes (SNAP2425355; SNAP3151495). The "hard dopamine loop" produced by Streaks coupled with a users' fear of losing a Snapstreak can create a multitude of mental health harms including anxiety and thoughts of self-harm (SNAP0857671).

408. Snap's founder and CEO, Evan Spiegel, has acknowledged the harms that Streaks can cause, calling Streaks a "toxic behavior" and recommending at one point that the company should "kill streaks" because "it's the right thing to do" (SNAP6110229; SNAP6110234; SNAP0886013; SNAP0884986). However, at present, the Streaks feature—and the numerical Streaks icon—still exist on Snapchat platform.

409. Like Streaks, Snap Score is another numerical point system generated by Snapchat, which serves to "reward and incentivize users" who send or open Snaps, add friends, post a Story,

or maintain a Streak (SNAP5154720). Similar to Streaks, Snap Scores are commonly viewed as a form of social "validation," with higher scores regarded as a "status symbol" (SNAP3386751). However, unlike the Streaks icon, which is typically only viewable by the users involved in the Streak, a users' Snap Score is public. Thus, Snap acknowledges how "[e]ducating users" about Snap Score can have an "addictive" effect on that user that "encourage[s] them to produce and consume more snaps," causing them to "ultimately become high-quality users" (SNAP6118652).

410. Snapchat encourages users to add friends, which will provide more opportunities to send and receive Snaps and thus increase a user's Snapscore. During the sign-up process, Snapchat encourages users to add others as "Friends" on the platform. Once called "Quick Add", this feature, now rebranded as "Find Friends," suggests users to follow as "friends" (https://help.snapchat.com/hc/en-us/articles/34691800487316-What-happened-to-Quick-Add). Suggesting "friends" is vital to Snapchat, due in part to retention rates (SNAP6650275). New users with bi-directional communication have 35% higher retention in week two and new users with friend story view have 30% higher retention rates in week two (SNAP6650275). Snapchat feeds users "friend" suggestions during sign-up, and while using multiple parts of its platform (SNAP7302141). Friends are suggested to users through friend-of-friend or contact-of-contact algorithms that frequently connect users to strangers (SNAP5471363; SNAP6650275). As the feature evolved, underage users were given additional restrictions, increasing a mutual "friend" count from two to three before Snapchat suggests them a user (SNAP6496157).

411. Another way that Snap has gamified its platform is through the use of Trophies, which served as rewards for users' "engagement" with the Snapchat platform" (SNAP4954018). For example, Snap provided trophies when users engaged with certain filters, reached Snap Score milestones, sent certain amounts of chats, or watched defined amounts of videos on Discover or Spotlight (SNAP4954018). The condition for unlocking each Trophy is not public knowledge, but they are meant to "provide positive feedback for using the app and finding new ways to use features" (SNAP4954018). Although Snapchat no longer provides trophies, trophies served a significant role until they were deprecated in approximately 2020.

6.2.3. AGE VERIFICATION

412. Snap has no age verification and does not verify users' ages (SNAP0316064; SNAP6114428). Instead, Snap has "age gating" which requires users to enter their birthday when creating an account (Chan Dep. at 82). Snap does not take any action to verify or confirm the

accuracy of its users' self-reported ages at account signup (Boyle 30(b)(6) Dep. at 86). And Snap did not require users to enter age when creating account prior to June 2013 (SNAP1234598; Boyle 30(b)(6) Dep. at 144).

413. Like other social media platforms, Snap is aware that users lie about their age when creating accounts (SNAP6114428; SNAP1234598; Boyle 30(b)(6) Dep. at 116). Snap does not ask for parental consent (Boyle 30(b)(6) Dep. at 104). The team responsible for account creation and age gating—Snap's Activation team—describes its mission as helping "Snapchatters get into [the] app as seamlessly and as quickly as possible" (SNAP3242221). Snap' prioritizes "reducing as much friction as possible for Snapchatters to create an account" (SNAP2247951).

414. When a user signs up for Snapchat in the United States, they are provided a sign-up page with information that defaults the user's age to 18 (Boyle 30(b)(6) Dep. at 107; SNAP2268193). Snap knows that the default age makes it easier for minors to lie about their age (SNAP6398196; SNAP4571055). In February 2023, Ofcom, a British regulatory agency, expressed concern over Snap's default age in account creation (Chan Dep. at 153). Ofcom's research found that "one of the key risk factors was that children were bypassing age assurance measures in social media apps or sites" (Chan Dep. at 155, Chan Dep. Ex. 12). It also showed that "[f]or children aged 8 to 12 who used social media the proportions with their own profile were; eight in ten among Snapchat users" (Chan Dep. at 156). When users lie about their age when creating accounts, some of Snap's safety features would not apply to those users (Boyle 30(b)(6) Dep. at 113).

415. If a user initially enters a birthday under the age of 13, Snap allows the user to immediately re-enter a different birthday indicating they are over 13 (Chan Dep. at 216–223; Boyle 30(b)(6) Dep. at 162). Snap knows this allows underage users to create accounts (Boyle 30(b)(6) Dep. Ex. 6; Boyle 30(b)(6) Dep. at 165). Although Snap considered implementing a cooldown period to limit this practice in 2018 and 2021, it ultimately chose not to do so (SNAP5708527; SNAP5490201; Boyle 30(b)(6) Dep. at 179; Chan Dep. at 215-224).

416. Snap has never conducted an audit on whether the account creation process allows underage users to access the platform (Chan Dep. at 95). Snap does not track, audit or otherwise monitor whether reported ages on its platform are accurate (Chan Dep. at 251; Boyle 30(b)(6) at 117).

417. In 2016, Snap developed an age model for ad targeting in the Age Inference Model, which buckets users in 13-17, 18-20, 21-24, 25-24, and 35 plus (Boyle 30(b)(6) Dep. at 278; SNAP4648461; SNAP6892817). For ad targeting purposes, Snap will override a user's reported age if it is highly confident that the reported age is incorrect (SNAP4648461). Forty percent of users have untrusted dates of birth (SNAP4648461). Until November 2024, Snap's age inference model was owned by the monetization team (SNAP6892817).

418. In November 2023 Snap developed an age estimation model to predict whether a user is under 18 using High School community data (SNAP6058205; SNAP3086647; SNAP7125560). It has 97% accuracy and was able to predict 78% of highschoolers who represented they were over the age of 18 (SNAP6058205; SNAP3086647; SNAP7125560). Snap uses the model for analytics only and does not use it for safety purposes or to proactively remove underage accounts (SNAP6058205; SNAP3086647; SNAP7125560).

419. Snap recognizes there are likely millions of users under the age of 13 on Snapchat (SNAP0227658; SNAP1270459). Prior to April 2023, when Snap's content moderator detected content featuring a self-recorded minor declaring themselves to be under the age of 13 on Spotlight, Snap did not investigate the account but labeled the content as Invasion of Privacy and only downranked the content to not be visible on Spotlight (SNAP1047045; SNAP6114487; SNAP2822901; SNAP1942575; SNAP3664412). Snap's machine learning content moderation model for Spotlight can infer when a user is under 13 (SNAP5350932; SNAP5919460; Lue Dep. at 120). This model filters the content from being shown in Spotlight but does not investigate the account (SNAP5350932; SNAP5919460; SNAP0788746). In December 2021, Snap had roughly 43,275,166 users listed as under 13 (SNAP7292616).

420. In November 2024, Snap developed text matching for public profiles' bios if a user self-declares themselves to be under 13 (Boyle 30(b)(6) Dep. at 78 & 85). Prior to the public profile text scan, Snap's only method of investigating users who are under 13 is by user reports (Boyle 30(b)(6) Dep. at 85 & 88). Snap does not allow users to report under-13 accounts in-app; this reporting reason is only available on Snap's support website (Boyle 30(b)(6) Dep. at 249-261).

6.3. TIKTOK

6.3.1. OVERVIEW

421. TikTok has millions of young users, and these children and teens spend far more time on the platform than adults. According to internal research using TikTok's self-reported ages, TikTok's 69.5 million daily active users under 18 spend an average of 106 minutes a day on TikTok, and users in the 90th percentile spend an average of 242 minutes a day on TikTok (TIKTOK3047MDL-002-00098058). On average, teens spend 25% more time on TikTok than adults, and teens under 15 consume more Tiktok videos per day and are far more likely to like and share videos than adults. (TIKTOK3047MDL-002-00098058; TIKTOK3047MDL-047-LARK-00510814; TIKTOK3047MDL-004-00290586).

422. TikTok's young userbase is not surprising. In 2017, TikTok purchased a social media app known as Musical.ly. Musical.ly was designed for users to post short videos and was especially popular with pre-teen girls. Online marketing expert Gary Vaynerchuck described Musical.ly as the "youngest social network ever seen," with users in the first, second and third grades (Chris Stokel-Walker, *TikTok Boom: China's Dynamite App and the Superpower Race for Social Media* (p. 160), Canbury Press (2021)). In 2018, TikTok merged its own app with Musical.ly, resulting in all of Musical.ly's young users automatically becoming TikTok users when they updated the Musical.ly app on their phone. This included sixth and seventh graders (Kirchhoff Dep. at 73-75). According to a Product Manager at TikTok, the user base TikTok purchased when it bought Musical.ly was mostly young girls, aged 7 to 12 (Kirchhoff Dep. at 65-66, 106-107; *see also* TIKTOK3047MDL-111-LARK-05914410 ("Over half of the interviewees mentioned that their younger sisters or brothers or cousins used Musical.ly. Those users were all under 13")).

423. In 2020, TikTok reported internally that L2 users (TikTok's moniker for users 15-17) were "growing strongly" and "the high school clusters are getting more and more mainstream" (TIKTOK3047MDL-236-04863474). At this point, TikTok documents indicate it was getting "saturated" with "L12 females" (TikTok's moniker for girls 14 and under and 15 to 17), and it started also trying to attract more male and older users (TIKTOK3047MDL-236-04863474). By 2022, TikTok reported internally that it had achieved market penetration of 70% among U.S. 16- to 17-year-olds and 91% among all users under 18 (TIKTOK3047MDL-115-04478441). While the percentage of young users that made up TikTok's userbase fluctuated, millions of children and teenagers used the app, many of whom were under 13 (TIKTOK3047MDL-042-LARK-00237491

(reporting that approximately 4.76 million TikTok users in the United States were under 13/14 years old); TIKTOK3047MDL-038-LARK-00192063 ("10% of users are underage")).

6.3.2. TIKTOK FEATURES INCREASE ENGAGEMENT AND LEAD TO HARMS

424. TikTok's platform was designed to captivate users and keep their attention for as long as possible (TIKTOK3047MDL-024-LARK-00040453) ("The main goal of tiktok rec-sys is to improve user's retention and stayduration"). TikTok designed its platform to facilitate habitual or excessive use. TikTok's features had the "ability to get people into flow – the psychological state of extreme engagement, loss of sense of time and even loss of self" and users' "anticipation of reward" and "the variability of rewards" (**which is what makes the app so addictive**)" (TIKTOK3047MDL-080-LARK-02692385 (emphasis added)). TikTok's addictive properties were viewed as a business advantage; in communicating with its advertisers, TikTok stressed that people typically spent longer on TikTok per session than its competitors (TIKTOK3047MDL-004-00314472).

425. TikTok introduced the most powerful social media algorithm to date, optimized for engagement (TIKTOK3047MDL-002-00119724). TikTok focuses its algorithm "mostly on user interactions," so the algorithm usually "has no idea what type of content it is recommending to users" (TIKTOK3047MDL-004-00310982). This content-agnostic algorithm driven only by engagement is harmful to children. For example, Tik-Tok's Minor Safety team noted in 2020 that "Social Media is inherently dangerous and *all* minors are at risk when they engage on the platform" (TIKTOK3047MDL-004-00144753). The algorithm is so powerful that, for a time, its known addictive nature became a problem for TikTok engagement as people were afraid to join the platform fearing addiction (TIKTOK3047MDL-002-00091634).

426. Like the other platforms discussed in this report, TikTok sends push notifications to its users. Push notifications go directly to the phone of a user even when they are not using, or seeking to use, the app. TikTok has several types of notifications (TIKTOK3047MDL-004-00291835). TikTok admits the purpose of these notifications is to "activate users to return to the app," "encourage video view and creation," and "encourage users to keep posting" (TIKTOK3047MDL-004-00291835).

427. TikTok documents acknowledge significant evidence of harms resulting from its app. For example, one document provides, "Studies suggest that use of TikTok may cause mental health issues for minors, including addiction, depression, and body image issues"

(TIKTOK3047MDL-120-LARK-06165590). According to another, harms resulting from TikTok's algorithm or product design include addiction, reduced attention span, and exacerbation of pre-existing mental health conditions "such as depression, anxiety or body dysmorphia" (TIKTOK3047MDL-080-LARK-02552741). "Passive social media usage poses risks of addiction, emotional disturbance, and other negative consequences for all ages. While the risk is obviously higher when done in [ex]cess, even the 'average' amount can cause harm. Youth (U18s) users are particularly at risk because of their neurodevelopment" (TIKTOK3047MDL-087-LARK-03239203). TikTok's minor safety policy annual review stated, "Social Media is inherently dangerous and all minors are at risk when they engage on the platform" (TIKTOK3047MDL-004-00144753).

428. TikTok documents acknowledge that PSMU could interfere with children's sleep and school, as well as "lead to mental health risks" and "loss of analytical skills, memory formation, contextual thinking, conversational depth, empathy, and increased anxiety" (TIKTOK3047MDL-014-00330672; TIKTOK3047MDL-004-00137151; TIKTOK3047MDL-004-00144498) (prolonged time on social media poses as "inherent risk" of concentration issues)). According to one TikTok document, both "[s]creen time and social media use at night are associated with delayed and inadequate sleep," which is associated with other mental health harms and that almost 1 in 5 teens 13-15 and 1 in 4 teens 15-17 used TikTok between midnight and 5am (TIKTOK3047MDL-002-00091798).

429. Users told TikTok its app was addictive. In 2020, a high school student journalist wrote about her experience in an article circulated at TikTok and referred to internally as "Pretty spot on" (https:// nileswestnews.org/78920/west-word/what-my-rules-for-social-media-would-be-if-i-was-a-gen-z-parent/; TIKTOK3047MDL-079-LARK-02076026). The teen described "how addictive the app tends to be" and how she "noticed the other day sitting at a stoplight, that I had a physical urge to scroll through TikTok, not just a mental one. I thought about the app, and my hand actually reached towards my phone, like a magnet" (https://nileswestnews.org/78920/west-word/what-my-rules-for-social-media-would-be-if-i-was-a-gen-z-parent/). She continued "I've stopped to scroll through my For You page twice just while writing this article, and I can't tell you the last time I fell asleep to something other than a video of some teens dancing on my For You Page. I know how addictive the app is, and I know that it decreases my productivity" (https://nileswestnews.org/78920/west-word/what-my-rules-for-social-media-would-be-if-i-was-

a-gen-z-parent/). A Common Sense report circulated at TikTok stated "adolescent girls spend over two hours per day on TikTok and nearly half (45%) say they feel 'addicted' to the platform" (TIKTOK3047MDL-038-LARK-00191976).

430. TikTok also collected significant amounts of external research on the connection between use of social media and mental health harms. For example, according to an annotated bibliography of research TikTok maintained, "[a]fter adjustment for confounders, a greater amount of time spent on social media was associated with an increased risk of self-harm and depression and lower levels of self-esteem" (TIKTOK3047MDL-062-01189492). Other studies in TikTok's possession reported similar mental health risks (TIKTOK3047MDL-014-00330672 ("studies demonstrated a significant relationship between social media use and body image concerns and eating disorders, with social comparison as a potential contributing factor"); TIKTOK3047MDL-060-01128772 (research linking social media use and ADHD); TIKTOK3047MDL-014-00330672 (social media makes almost half of 13-17 year olds feel worse about their bodies); TIKTOK3047MDL-014-00330672 ("adolescents who spent more than 3 hours per day on social media faced double the risk of experiencing poor mental health outcomes including symptoms of depression and anxiety"); TIKTOK3047MDL-014-00330672 ("studies on the effects of excessive social media use found a consistent relationship between social media use and poor sleep quality, reduced sleep duration, sleep difficulties, and depression among youth. Poor sleep has been linked to altered neurological development in adolescent brains, depressive symptoms, and suicidal thoughts and behaviors")). And despite knowing that social media use is associated with sleep and concentration problems, TikTok sent "notifications to users during the school day and in some cases, up until midnight, which could interfere with sleep" (TIKTOK3047MDL-002-00101574 (while TikTok ultimately stopped sending notifications at night to children who reported their age as under 18, it continued to send notifications during the school day)).

431. Ultimately, TikTok's Youth Safety and Wellbeing team was "able to ascertain that harm for teens is most likely to begin after 60 minutes to total daily screen time" and "that extremely high usage, and subsequently extremely high risk of harm, can be identified when users are using the app consecutively for 90 minutes or more" (TIKTOK3047MDL-087-LARK-03239203 (evaluating a new proposed version of TikTok that would be "similar to the main TikTok app in many ways, especially in looks and functionality"; TIKTOK3047MDL-054-LARK-00552347; TIKTOK3047MDL-197-04799946 (referring to 3.5 hours during the day or 2 hours at

night as "unbalanced engagement"); TIKTOK3047MDL-002-00101525 (referring to more than 6 hours a day as "objective[ly] harmful")). Children and teens frequently used TikTok for much longer than 60 minutes (TIKTOK3047MDL-002-00091798 (~13% or almost 9 million minors used the app for more than 3.5 hours a day); TIKTOK3047MDL-002-00091798 (10% of minors used TikTok for more than 4 hours a day); TIKTOK3047MDL-002-00091634 ("compulsive usage on TikTok is rampant")).

432. This high usage is consistent with TikTok's "advertising-based business model" which employees recognized internally "encourages optimization for time spent in the app" (TIKTOK3047MDL-004-00137151; TIKTOK3047MDL-004-00141938 (employees noting "We want people to spend as much time as possible on TikTok, which can be in contrast to mental health" and "The sales team is revenue driven, and they're the ones that will kill me if they hear me saying people shouldn't be spending two hours on TikTok."); TIKTOK3047-MDL-079-LARK-02142329 (noting the sales team believed "ads targeted to the youth are also very meaningful revenue")). Even for "screentime management" tools, a TikTok employee admitted that the goal was "not to reduce the time spent" but to "contribute to DAU and retention" (TIKTOK3047MDL-047-LARK-00510814). Accordingly, the goal of TikTok features like notifications was to get "users to open the app more and stay longer" (TIKTOK3047MDL-099-LARK-04599758; *see also* TIKTOK3047MDL-024-LARK-00040453 ("The main goal of tiktok rec-sys is to improve user's retention and stayduration"); TIKTOK3047MDL-090-LARK-03555314 (TikTok's algorithm product team and algorithm itself seeks to increase "stay duration")). And TikTok used tools like variable rewards to make its app "addictive" (TIKTOK3047MDL-080-LARK-02692385).

433. In 2020 TikTok conducted market research among 18–24-year-olds first in a survey of 1,006 respondents, and then in follow up interviews with 24 participants (TIKTOK3047MDL-004-00323234). TikTok found that even these users who are less vulnerable than their younger counterparts are likely to admit that TikTok drains too much of their time and attention (TIKTOK3047MDL-004-00323234). Multiple users described PSMU saying their experience with TikTok was addicting (TIKTOK3047MDL-004-00323234).

434. In Trust and Safety Digital wellbeing product strategy, TikTok reviewed some of the tools they implemented to combat PSMU and found low adoption rates among their users. For example, only 9.4% of TikTok's users visited the revamped screen time page in 2022, showing

very low awareness of wellbeing features (TIKTOK3047MDL-006-00327425). In this same update, TikTok set a goal for the acceptable range of extreme use among minors, finding that 5% or less of minor users experiencing PSMU was an acceptable range. This could amount to millions of people (TIKTOK3047MDL-006-00327425). The paper also quotes an internal TikTok study that found that 50% of users who deactivated the product did so because they were worried about losing control of their time or the platforms addictive qualities (TIKTOK3047MDL-006-00327425). TikTok acknowledges this compulsive usage "correlates with a slew of negative mental effects like loss of analytical skills, memory formation, contextual thinking, conversational depth, empathy, and increased anxiety" like loss of analytical skills, memory" (TIKTOK3047MDL-006-00327425). TikTok's Protect and Care team put together a paper on the balanced engagement index, which was meant to help with wellbeing of those under 18. The goal of the digital wellbeing pillar is to promote balanced engagement among teen users they studied teen behavior in order to get a baseline (TIKTOK3047MDL-197-04799946). They found that, on average, minors spend 1.8 hours a day on the platform, and 3% of minors categorized as heavy users spent more than 6 hours a day on the platform (TIKTOK3047MDL-197-04799946). But even with all this excessive use, TikTok's safety features are not well known and not working well with only .62% of minor users having turned on the take a break feature (TIKTOK3047MDL-197-04799946). TikTok found that 19 percent of users 13-15 and 25% of users 16-17 were active on the platform from 12 a.m. to 5 a.m. As detailed above this nighttime use can have serious effects on user wellbeing (TIKTOK3047MDL-197-04799946).

6.3.3. AGE VERIFICATION

435. TikTok has long been labeled as the youngest social media app. (Chris Stokel-Walker, TikTok Boom: China's Dynamite App and the Superpower Race for social media (p. 19), Canbury Press (2021)). The platform verification system made it easy for under 13 users to sign up for an account, having no age gate the first year of launch (TikTok's Objections & Responses to Plaintiffs' Interrogatory Set 3 at *18 (while TikTok launched in August 2018, there was no age gate until February 2019). TikTok acknowledges that once they did implement age verification it was easy for a child to lie about their age and join the platform (TIKTOK3047MDL-004-00306371).

436. In fact, in April of 2023 the Information Commissioner's Office fined TikTok 12,700,000 pounds for breaching the UK General Data Protection Regulation between May 2018 and July 2020. The ICO stated:

> The ICO estimates that TikTok allowed up to 1.4 million UK children under 13 to use its platform in 2020, despite its own rules not allowing children that age to create an account.
>
> UK data protection law says that organisations that use personal data when offering information society services to children under 13 must have consent from their parents or carers.
>
> TikTok failed to do that, even though it ought to have been aware that under 13s were using its platform. TikTok also failed to carry out adequate checks to identify and remove underage children from its platform.
>
> The ICO investigation found that a concern was raised internally with some senior employees about children under 13 using the platform and not being removed. In the ICO's view TikTok did not respond adequately.

(https://ico.org.uk/about-the-ico/media-centre/news-and-blogs/2023/04/ico-fines-tiktok-127-million-for-misusing-children-s-data/).

6.4. YOUTUBE

6.4.1. OVERVIEW

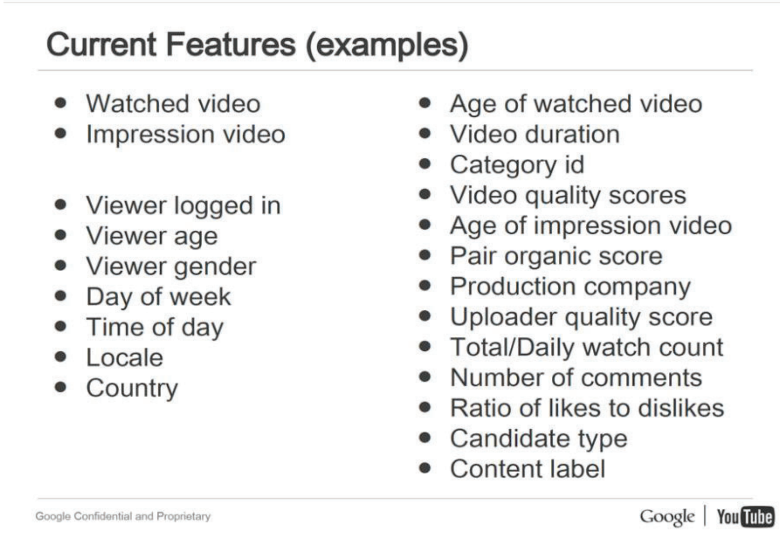
437. Shortly after its launch in February 2005, YouTube was acquired by Google in 2006 and has remained under its ownership ever since. By 2018, according to an internal document that referenced a recent Pew Research study, YouTube was "the most widely used internet platform by US teens" (excluding music watch time) (GOOG-3047MDL-00937887). The YouTube platform consists of two main products: YouTube Main, which is the traditional version available on both app and web, and YouTube Kids, a separate product with its own app and web version. The YouTube Kids app was launched in February 2015, and the web-based version was launched in August 2019. Although it is accessible to anyone, YouTube Kids is targeted at children aged 2-8 years old and serves as an introductory product to YouTube Main (GOOG-3047MDL-0160498; GOOG-3047MDL-01608261).

438. YouTube has focused on attracting younger audiences for growth and engagement. For example, one YouTube document highlighted that investing in youth is a "business opportunity for YouTube" to "retain and grow the next generation of creators, otherwise they could leave for other platforms and never come back" (GOOG-3047MDL-00666027). YouTube also sees itself as a platform for community-building and engagement, which it recognizes as appealing to teen and tween users (*See, e.g.* GOOG-3047MDL-05566104.ECM; GOOG-3047MDL-01738317; GOOG-3047MDL-03547420; GOOG-3047MDL-01725085).

6.4.2. YOUTUBE FEATURES INCREASE ENGAGEMENT AND LEAD TO HARMS

439. YouTube started using algorithms to recommend content in 2008, initially optimizing for clicks and views (YouTube Official Blog, On YouTube's recommendation system, Sep 2021, https://blog.youtube/inside-youtube/on-youtubes-recommendation-system/#:~:text=The%20Up%20Next%20panel%20appears,the%20experience%20was%20entirely%20different). In 2012, YouTube shifted its focus to maximizing Watch Time, aiming to drive long-term engagement with minimal user effort (GOOG-3047MDL-02001809; GOOG-3047MDL-00000064). Over the years, additional goals were incorporated, such as user "satisfaction" measured by in-app surveys in 2015 and "responsibility" (i.e., removing violative content, reducing the spread of borderline content, raising authoritative voices, and rewarding trusted and eligible creators) in 2017 (GOOG-3047MDL-04045797; GOOG-3047MDL-04618585).

440. YouTube's recommender algorithm is a prediction engine that selects candidate videos based on their likelihood to achieve YouTube's goals (e.g., watch time and responsibility). The algorithm predicts what users may want to see based on their search entries and user data. It considers a wide variety of information, including demographics, the user's on and off-platform history, and data about candidate videos.



(GOOG-3047MDL-03305969).

441. The algorithm is continuously being refined and tweaked, primarily to increase watch time (GOOG-3047MDL-03305969). Materials recommended by the YouTube algorithm appears on various surfaces within the platform, including the Home Page and Watch Next page, and drives about 75% of YouTube watch time (GOOG-3047MDL-04479725). YouTube's focus on watch time proved successful - soon after its shift to focus on watch time, YouTube set a goal of reaching 1 billion hours of watch time per day (*see e.g.*, GOOG-3047MDL-00579554). After reaching that goal, it set an even higher goal of achieving 4 billion hours of Watch Time by 2020 (*see, e.g.,* Goodrow Dep. Vol. I at 274-275).

442. Autoplay has been a fixture of the YouTube platform for nearly a decade. When the feature is "on," the YouTube platform will "automatically play a recommended video after your current video finishes" (GOOG-3047MDL-04626757). YouTube launched Autoplay on YouTube Main desktop in 2015 and expanded to YouTube Main mobile apps in 2016 (and, at some point therefore, implemented on YouTube Kids as well) (GOOG-3047MDL-04626757). On YouTube Main, Autoplay was launched with all users automatically opt-ed into the feature, i.e., the default setting was turned "on" for Autoplay (GOOG-3047MDL-04626757; GOOG-3047MDL-04652560).

443. According to a dual-branded Google/YouTube slide deck, dated June 12, 2015, titled "Notifications," YouTube was a comparatively "quiet app" with less than 0.5% of session starts from email or push notifications (GOOG-3047MDL-00767071; GOOG-3047MDL-05263731). However, the Boomerang team aimed to change this by using notifications to "[b]ring

users back to YouTube every day" to serve the "team's core mission of growth" by targeting users with appealing content (GOOG-3047MDL-05263731). However, some employees worried about the approach, commenting "I don't see the set of user problems we are trying to solve by these notifications" (GOOG-3047MDL-05263731). YouTube's 2015 metrics goal included an increase from 2 million to 20 million visits from notifications per day (GOOG-3047MDL-05263731). YouTube's "Notifications Platform" not only pushed out notifications related to Music and Gaming but also to Reactr, the in-app video sharing project, the nascent Kids app, and other areas of YouTube (GOOG-3047MDL-05263731; Yair Dep. at 181-184). Once on the app, users encounter a range of notifications and prompts—such as "Watch More" notifications—designed to reinforce viewing habits and boost YouTube's overall daily active viewer metrics (GOOG-3047-MDL-02009802).

444. In the summer of 2024, YouTube introduced Appearance Effects, focusing mainly on facial enhancements. There are filters and affects to change the video background and the users' features, including placing "fun" masks on the user, adjusting eye color, brightening teeth (Google/YouTube 30(b)(6) (Niedermeyer) Dep. at 73).

445. YouTube's design features, such as likes, comments, notifications, autoplay, and endless scrolling, encourage addictive screen time. YouTube Kids was developed with many of these same features, including autoplay and endless scrolling. YouTube documents discuss how its "vision" was to create an addictive app, (*see, e.g.,* GOOG-3047MDL-00767071), and increased 'rabbit hole' watch time, keeping users engaged (*see, e.g.,* GOOG-3047MDL-04683418).

446. One of the reasons Autoplay was on by default was to generate more watch time (GOOG-3047MDL-04652560; *see also* GOOG-3047MDL-04613300 (2015 email noting that autoplay's desktop launch "impact has been huge. Autoplay now generates 16% of YouTube's desktop watch time")). On YouTube Kids, Autoplay was initially implemented for all users, without the ability to turn it on or off, *i.e.,* there was no user control and thus no "default" setting – it was always on (Google/YouTube 30(b)(6) (Beser) Dep. at 38-39). Despite research as early as 2018 suggesting that Autoplay may contribute to overuse and sleep disruption (*see, e.g.,* GOOG-3047MDL-04683418), YouTube did not turn it off by default until 2021, and then only applied that setting to self-declared teens (despite announcing that it would be applied to "all users ages 13-17") (GOOG-3047MDL-05713254; GOOG-3047MDL-00000252). For YouTube Kids, YouTube

did not implement a user control to turn off autoplay (a "toggle") until 2021, and did not enable parents to "lock" that toggle off until 2022 (Google 30(b)(6) (Beser) Ex. 1 at 38-39).

447. YouTube has acknowledged that consuming a high volume of content with "potential negative impact (PNI)" can have an adverse effect on teens (GOOG-3047MDL-01372617). Nevertheless, watching just one of these videos will trigger the algorithm to aggregate and continue recommending similarly harmful material. In fact, approximately 66% of the watch time for suicide self-harm (SSH) material and approximately 62% of the watch time for eating disorder (ED) material is driven by YouTube's algorithm (GOOG-3047MDL-00798577). Despite these statistics, YouTube did not inform parents or young users that viewing a single potentially negative impact (PNI) video would prompt the algorithm to aggregate and recommend similar material, and the company did not take steps to mitigate these risks until 2023 (Stovezky Dep. at 156:10-19.).

448. In April 2018, YouTube's User Reach team reviewed available literature on the negative effects of watching digital videos on overall viewer well-being (GOOG-3047MDL-00874191). YouTube found that several aspects of viewer well-being (i.e. "wellness factors") are affected by watching digital videos.

449. Around this time (mid-2018), YouTube saw a need to "[s]howcase that we take our responsibility seriously and are balancing growth with responsibility (GOOG-3047MDL-05275966). As a result, it announced a series of updates to the YouTube mobile app to "help users develop their own sense of digital wellbeing" including the options to receive a scheduled notification digest combining all daily push notifications into a single notification and disabling notification sounds and vibrations. (GOOG-3047MDL-05275966). The internal overview of these updates recognized that "[n]otification can be distracting and overwhelming, especially close to bedtime" and consequently, YouTube disabled sounds and vibrations from notifications by default from 10pm to 8am (GOOG-3047MDL-05275966). Shimrit Ben Yair, a Google employee who worked on Reactr, disfavored the imposition of these quiet hours, stating that, "Quiet Hours has a big impact on Reactr users, and violates sender expectation. It also puts Reactr at a disadvantage compared to other messaging apps (Yair Dep. at 182, 206, GOOG-3047MDL-05446752). Brian Marquardt, a Project Manager working on YouTube Main, responded on the same thread, "[Another Google employee's] point that sender expects recipient's phone to buzz for a specific chat app (all except Snapchat at this point, it seems) 24 hours a day, doesn't convince me that's

best for the wellbeing of those recipients. Let alone billons of YT users who downloaded a video app, not a chat app, or had YouTube preloaded on their Android phone" (GOOG-3047MDL-05446752). Another employee responded to Marquardt, telling him that handicapping features on YouTube would drive users to achieve their messaging needs elsewhere and "hurts our ability to compete" (GOOG-3047MDL-05446752). In other words, Google employees were internally debating the tradeoff between user wellbeing and app competitiveness.

450. Under "Key Messages" in its internal materials related to the May 2018 launch of digital wellbeing features, YouTube defined the problem as the amount of time people were spending on devices, with surfing, scrolling, gaming, and watching videos adding up to, on average, 86 hours a month (GOOG-3047MDL-05275966). It went on to say that such statistics gave rise to concerns of tech addiction and cited studies tying "extended screen time to distractions, sleep deprivation and depression" (GOOG-3047MDL-05275966). Furthermore, in a January 27, 2020, presentation to the Executive Steering Committee on mental health, a product opportunity identified as "better sleep" was discussed, including that "37% of 18–24-year-olds report YouTube cut into their sleep" (GOOG-3047MDL-01523782).

451. Despite this knowledge, YouTube's notification team continued to dissect the relationship between notifications and mental health, in some instances attempting to dismiss it entirely (*See, generally,* GOOG-3047MDL-03704131). In 2021, Google's Growth and Notification Team (GaNT) hosted a Notification Summit showcasing research findings concluding that interruptions and late-night use were the behaviors that people worried about the most (GOOG-3047MDL-03928001). Notifications and social media apps were seen as the culprits but, in understanding the help people want for this issue, Google recognized that the "appetite for constraining future self is low" (GOOG-3047MDL-03928001). This is likely because those surveyed ranked limiting screen time usage for specific apps as the worst among tools for alleviating the problems associated with notifications (GOOG-3047MDL-03928001). Google recognizes that although users know they need fewer interruptions and desire to avoid late-night use, they are unwilling to place a constraint on their future selves to achieve it.

6.4.3. AGE VERIFICATION

452. As with the other Defendants, YouTube has a stated age limit of thirteen for a user to create a Google account and access YouTube main. It offers a YouTube Kids application for even younger children. The You Tube Kids application was apparently not engaging enough for

tweens. YouTube therefore allows parents to consent to their younger children accessing YouTube Main governed by what YouTube calls a Supervised Experience (i.e. SupeX) (See, e.g. GOOG-3047MDL-02946487).

453. The stated age limit is effectively meaningless as users of any age are able to access the YouTube Main platform without logging in (Google/YouTube 30(b)(6) Jain Dep. at 96-98). Additionally, YouTube's age verification relies only on the self-declared age of the user at the time of account creation, which YouTube documents show is unreliable (GOOG-3047MDL-04585554; GOOG-3047MDL-04703742; GOOG-3047MDL-04683365; GOOG-3047MDL-03385518; GOOG-3047MDL-01339056; GOOG-3047MDL-04585554; GOOG-3047MDL-05665186.ECM; GOOG-3047MDL-01988369; (Google/YouTube 30(b)(6) (Beser) at 20:3-4). This is its sole method of assuring the age of users for application of age-appropriate features and tools (*See, e.g.,* Kim Dep. at 214-215; Google/YouTube 30(b)(6) (Saffel) Dep. at 25). This age verification is easy to circumvent by lying or simply not logging in, meaning there is no age assurance as to which of these users are minors (Google/YouTube 30(b)(6) (Saffel) Dep. at 22).

454. Despite having the technology to implement age inference models – and, in fact, having done just that in other contexts and other jurisdictions – YouTube has not introduced age inference models in the U.S. for the purpose of ensuring that minors receive age-appropriate features and access. Notably, YouTube has for many years used age inference models for purposes of advertising (*See, e.g.,* Hebda Dep. at 48-59; Saphir Dep. at 34-36). And, since at least 2020, YouTube has implemented age inference models for the purpose of ensuring that minors benefit from age-appropriate design and features but only in Europe, in order to comply with laws and regulations in that jurisdiction (Google/YouTube 30(b)(6) (Saffel) Ex. 1; Google/YouTube 30(b)(6) (Beser) at 20. YouTube has not implemented those models in the U.S. (Google/YouTube 30(b)(6) (Saffel) Dep. at 42; Google/YouTube 30(b)(6) (Beser) Dep. at 27). In February 2025, YouTube announced that it planned to use machine learning in 2025 to "help us estimate a user's age – distinguishing between younger viewers and adults – to help provide the best and most age-appropriate experiences and protections" (Google/YouTube 30(b)(6) (Saffel) Ex. 1).

6.5. <u>DEFENDANTS' INTERNAL KNOWLEDGE: CONCLUSIONS</u>

455. Based on my review of Defendants' internal documents, as well as my in-depth analysis of the relevant scientific literature, it is my opinion that Defendants knew or should have known that children and youth are more vulnerable to the mental health risks presented by their

social media platforms. Strategic planning documents, internal communications, and research findings demonstrate Defendants' understanding that their platforms pose a profound risk to the mental health of children and youth. Nevertheless, Defendants did not implement adequate safeguards and did not fully inform parents and children about the risks of their platforms. This opinion is grounded in established psychological and behavioral science and corroborated by the Defendants' own internal documents.

7. CONCLUSION

456. In conclusion, the totality and weight of the evidence, based on my synthesis of the evidence from meta-analytic reviews of large observational studies and high-quality experiments that address notable methodological limitations indicates a coherent, consistent causal relationship between social media use and mental health harms to children and youth. Similarly, results from the application of the Bradford Hill analysis indicate that all factors are met, except for specificity which Hill himself acknowledged rarely applies and is not necessary for a determination of causality. In my opinion, based on the totality and weight of evidence, and my clinical training and experience, that social media use, especially problematic social media use causes and contributes to cause mental health harms in children and youth.

The undersigned hereby certifies their understanding that they owe a primary and overriding duty of candor and professional integrity to help the Court on matters within their expertise and in all submissions to, or testimony before, the Court. The undersigned further certifies that their report and opinions are not being presented for any improper purpose, such as to harass, cause unnecessary delay, or needlessly increase the cost of litigation.

Dated: May 16, 2025

Gary Goldfield

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8. REFERENCES

Abma, J. C., & Martinez, G. M. (2017). Sexual Activity and Contraceptive Use Among Teenagers in the United States, 2011-2015. *National Health Statistics Reports*, *104*, 1–23.

Abreu, R. L., & Kenny, M. C. (2018). Cyberbullying and LGBTQ Youth: A Systematic Literature Review and Recommendations for Prevention and Intervention. *Journal of Child & Adolescent Trauma*, *11*(1), 81–97. https://doi.org/10.1007/s40653-017-0175-7

Achterberg, M., Becht, A., Van Der Cruijsen, R., Van De Groep, I. H., Spaans, J. P., Klapwijk, E., & Crone, E. A. (2022). Longitudinal associations between social media use, mental well-being and structural brain development across adolescence. *Developmental Cognitive Neuroscience*, *54*, 101088. https://doi.org/10.1016/j.dcn.2022.101088

Acoba, E. F. (2024). Social support and mental health: The mediating role of perceived stress. *Frontiers in Psychology*, *15*, 1330720. https://doi.org/10.3389/fpsyg.2024.1330720

Adams, S. K., Daly, J. F., & Williford, D. N. (2013). Article Commentary: Adolescent Sleep and Cellular Phone Use: Recent Trends and Implications for Research. *Health Services Insights*, *6*, HSI.S11083. https://doi.org/10.4137/HSI.S11083

Ademiluyi, A., Li, C., & Park, A. (2022). Implications and Preventions of Cyberbullying and Social Exclusion in Social Media: Systematic Review. *JMIR Formative Research*, *6*(1), e30286. https://doi.org/10.2196/30286

Agüera, Z., Lozano-Madrid, M., Mallorquí-Bagué, N., Jiménez-Murcia, S., Menchón, J. M., & Fernández-Aranda, F. (2021). A review of binge eating disorder and obesity. *Neuropsychiatrie*, *35*(2), 57–67. https://doi.org/10.1007/s40211-020-00346-w

Ahmed, E., & Ahmed, S. (2025). Social media addiction, personality traits, and disorders: An overview of recent literature. *Current Opinion in Psychiatry*, *38*(1), 72–77. https://doi.org/10.1097/YCO.0000000000000969

Ahmed O, Walsh EI, Dawel A, Alateeq K, Espinoza Oyarce DA, & Cherbuin N. (2024). Social media use, mental health and sleep: A systematic review with meta-analyses. *J Affect Disord*, *367*, 701–712. https://doi.org/10.1016/j.jad.2024.08.193

Aichner, T., Grünfelder, M., Maurer, O., & Jegeni, D. (2021). Twenty-Five Years of Social Media: A Review of Social Media Applications and Definitions from 1994 to 2019. *Cyberpsychology, Behavior, and Social Networking*, *24*(4), 215–222. https://doi.org/10.1089/cyber.2020.0134

Akbari, M., Seydavi, M., Jamshidi, S., Marino, C., & Spada, M. M. (2023). The Big-five personality traits and their link to problematic and compensatory Facebook use: A systematic review and meta-analysis. *Addictive Behaviors*, *139*, 107603. https://doi.org/10.1016/j.addbeh.2022.107603

Akbari M, Seydavi M, Palmieri S, Mansueto G, Caselli G, & Spada MM. (2021). Fear of missing out (FoMO) and internet use: A comprehensive systematic review and meta-analysis. *J Behav Addict*, *10*(4), 879–900. https://doi.org/10.1556/2006.2021.00083

Alexander-Bloch, A., Raznahan, A., Bullmore, E., & Giedd, J. (2013). The Convergence of Maturational Change and Structural Covariance in Human Cortical Networks. *The Journal of Neuroscience*, *33*(7), 2889–2899. https://doi.org/10.1523/JNEUROSCI.3554-12.2013

Allcott, H., Braghieri, L., Eichmeyer, S., & Gentzkow, M. (2020). The Welfare Effects of Social Media. *American Economic Review*, *110*(3), 629–676. https://doi.org/10.1257/aer.20190658

Al-Menayes, J. J. (2015). Social Media Use, Engagement and Addiction as Predictors of Academic Performance. *International Journal of Psychological Studies*, *7*(4), 86. https://doi.org/10.5539/ijps.v7n4p86

Alonzo, R., Hussain, J., Stranges, S., & Anderson, K. K. (2021). Interplay between social media use, sleep quality, and mental health in youth: A systematic review. *Sleep Medicine Reviews*, *56*, 101414. https://doi.org/10.1016/j.smrv.2020.101414

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition). American Psychiatric Association. https://doi.org/10.1176/appi.books.9780890425596

American Psychological Association. (2018, April 19). *APA Dictionary of Psychology*. https://dictionary.apa.org/

American Psychological Association. (2024). Teens are spending nearly 5 hours daily on social media. Here are the mental health outcomes. *Monitor on Psychology*, *55*(3). https://www.apa.org/monitor/2024/04/teen-social-use-mental-health

Anderson, D. R., Huston, A. C., Schmitt, K. L., Linebarger, D. L., & Wright, J. C. (2001). Early childhood television viewing and adolescent behavior: The recontact study. *Monographs of the Society for Research in Child Development*, *66*(1), I–VIII, 1–147.

Anderson, M., Faverio, M., & Gottfried, J. (2023, December 11). Teens, Social Media and Technology 2023. *Pew Research Center*. https://www.pewresearch.org/internet/2023/12/11/teens-social-media-and-technology-2023/

Anderson, M., Vogels, E., Perrin, A., & Rainie, L. (2022, November 16). Teens' views about social media. *Pew Research Center*. https://www.pewresearch.org/internet/2022/11/16/2-teens-views-about-social-media/

Anderson, P. (2002). Assessment and Development of Executive Function (EF) During Childhood. *Child Neuropsychology*, *8*(2), 71–82. https://doi.org/10.1076/chin.8.2.71.8724

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, *30*(2), 252–262. https://doi.org/10.1037/adb0000160

Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction—An overview. *Current Pharmaceutical Design*, *20*(25), 4053–4061. https://doi.org/10.2174/13816128113199990616

Andrianie, P. S., Japar, M., Pratisti, W. D., Kasturi, T., & Purwandari, E. (2024). The Role of Peer Relationships in Problematic Internet Use among Adolescents: A Scoping Review and Meta-analysis. *The Open Psychology Journal*, *17*(1), e18743501333973. https://doi.org/10.2174/0118743501333973241113061357

Ansari S, Iqbal N, Asif R, Hashim M, Farooqi SR, & Alimoradi Z. (2024). Social Media Use and Well-Being: A Systematic Review and Meta-Analysis. *Cyberpsychol Behav Soc Netw*, *27*(10), 704–719. https://doi.org/10.1089/cyber.2024.0001

Aragon-Guevara, D., Castle, G., Sheridan, E., & Vivanti, G. (2023). The Reach and Accuracy of Information on Autism on TikTok. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-023-06084-6

Arendt, F., Scherr, S., & Romer, D. (2019). Effects of exposure to self-harm on social media: Evidence from a two-wave panel study among young adults. *New Media & Society*, *21*(11–12), 2422–2442. https://doi.org/10.1177/1461444819850106

Armstrong, P. W., & Westerhout, C. M. (2017). Composite End Points in Clinical Research: A Time for Reappraisal. *Circulation*, *135*(23), 2299–2307. https://doi.org/10.1161/CIRCULATIONAHA.117.026229

Atkinson, L., Beitchman, J., Gonzalez, A., Young, A., Wilson, B., Escobar, M., Chisholm, V., Brownlie, E., Khoury, J. E., Ludmer, J., & Villani, V. (2015). Cumulative Risk, Cumulative Outcome: A 20-Year Longitudinal Study. *PLOS ONE*, *10*(6), e0127650. https://doi.org/10.1371/journal.pone.0127650

Australian Government. (2021, June 25). *Australia's youth: Mental illness*. Australian Institute of Health and Welfare. https://www.aihw.gov.au/reports/children-youth/mental-illness

Aydın, O., Obuća, F., Boz, C., & Ünal-Aydın, P. (2020). Associations between executive functions and problematic social networking sites use. *Journal of Clinical and Experimental Neuropsychology*, *42*(6), 634–645. https://doi.org/10.1080/13803395.2020.1798358

Ayorech, Z., Krapohl, E., Plomin, R., & Von Stumm, S. (2017). Genetic Influence on Intergenerational Educational Attainment. *Psychological Science*, *28*(9), 1302–1310. https://doi.org/10.1177/0956797617707270

Baldwin, J. R., Wang, B., Karwatowska, L., Schoeler, T., Tsaligopoulou, A., Munafò, M. R., & Pingault, J.-B. (2023). Childhood Maltreatment and Mental Health Problems: A Systematic Review and Meta-Analysis of Quasi-Experimental Studies. *The American Journal of Psychiatry*, *180*(2), 117–126. https://doi.org/10.1176/appi.ajp.20220174

Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., Andreassen, C. S., & Demetrovics, Z. (2017). Problematic Social Media Use: Results from a Large-Scale Nationally Representative Adolescent Sample. *PLOS ONE*, *12*(1), e0169839. https://doi.org/10.1371/journal.pone.0169839

Bapaye, J. A., & Bapaye, H. A. (2021). Demographic Factors Influencing the Impact of Coronavirus-Related Misinformation on WhatsApp: Cross-sectional Questionnaire Study. *JMIR Public Health and Surveillance*, *7*(1), e19858. https://doi.org/10.2196/19858

Barlow, J., Wright, C., Sheasby, J., Turner, A., & Hainsworth, J. (2002). Self-management approaches for people with chronic conditions: A review. *Patient Education and Counseling*, *48*(2), 177–187. https://doi.org/10.1016/S0738-3991(02)00032-0

Baumgartner, S. E., Van Der Schuur, W. A., Lemmens, J. S., & Te Poel, F. (2018). The Relationship Between Media Multitasking and Attention Problems in Adolescents: Results of Two Longitudinal Studies. *Human Communication Research*, *44*(1), 3–30. https://doi.org/10.1093/hcre.12111

Beaver, K. M., Schwartz, J. A., Connolly, E. J., Al-Ghamdi, M. S., & Kobeisy, A. N. (2015). The role of parenting in the prediction of criminal involvement: Findings from a nationally representative sample of youth and a sample of adopted youth. *Developmental Psychology*, *51*(3), 301–308. https://doi.org/10.1037/a0038672

Beck, A. T., Rush, A. J., Shaw, B. F., Emery, G. W., DeRubeis, R. J., Hollon, S. D., & Clark, D. M. (2024). *Cognitive therapy of depression* (Second edition). The Guilford Press.

Berridge, K. C. (2012). From prediction error to incentive salience: Mesolimbic computation of reward motivation. *European Journal of Neuroscience*, *35*(7), 1124–1143. https://doi.org/10.1111/j.1460-9568.2012.07990.x

Betz, D. E., Sabik, N. J., & Ramsey, L. R. (2019). Ideal comparisons: Body ideals harm women's body image through social comparison. *Body Image*, *29*, 100–109. https://doi.org/10.1016/j.bodyim.2019.03.004

Bhandari, A., & Bimo, S. (2022). Why's Everyone on TikTok Now? The Algorithmized Self and the Future of Self-Making on Social Media. *Social Media + Society*, *8*(1), 20563051221086241. https://doi.org/10.1177/20563051221086241

Bij De Vaate, N. A. J. D., Veldhuis, J., & Konijn, E. A. (2020). How online self-presentation affects well-being and body image: A systematic review. *Telematics and Informatics*, *47*, 101316. https://doi.org/10.1016/j.tele.2019.101316

Blakemore, S.-J., & Robbins, T. W. (2012). Decision-making in the adolescent brain. *Nature Neuroscience*, *15*(9), 1184–1191. https://doi.org/10.1038/nn.3177

Boer, M., Stevens, G., Finkenauer, C., & Van Den Eijnden, R. (2020). Attention Deficit Hyperactivity Disorder-Symptoms, Social Media Use Intensity, and Social Media Use Problems in Adolescents: Investigating Directionality. *Child Development*, *91*(4). https://doi.org/10.1111/cdev.13334

Boer, M., Stevens, G. W. J. M., Finkenauer, C., De Looze, M. E., & Van Den Eijnden, R. J. J. M. (2021). Social media use intensity, social media use problems, and mental health among adolescents: Investigating directionality and mediating processes. *Computers in Human Behavior*, *116*, 106645. https://doi.org/10.1016/j.chb.2020.106645

Bond, R., Fariss, C., Jones, J. *et al.* A 61-million-person experiment in social influence and political mobilization. *Nature* **489**, 295–298 (2012). https://doi.org/10.1038/nature11421

Bonfanti RC, Melchiori F, Teti A, Albano G, Raffard S, Rodgers R, & Lo Coco G. (2025). The association between social comparison in social media, body image concerns and eating disorder symptoms: A systematic review and meta-analysis. *Body Image*, *52*, 101841. https://doi.org/10.1016/j.bodyim.2024.101841

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2021). *Introduction to Meta-Analysis* (1st ed.). Wiley. https://doi.org/10.1002/9781119558378

Borges Do Nascimento, I. J., Beatriz Pizarro, A., Almeida, J., Azzopardi-Muscat, N., André Gonçalves, M., Björklund, M., & Novillo-Ortiz, D. (2022). Infodemics and health misinformation: A systematic review of reviews. *Bulletin of the World Health Organization*, *100*(9), 544–561. https://doi.org/10.2471/BLT.21.287654

Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R., Scarpato, E., Di Mauro, A., Di Stefano, A. V., Caruso, C., Corsello, G., & Staiano, A. (2022). The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks. *International Journal of Environmental Research and Public Health*, *19*(16), 9960. https://doi.org/10.3390/ijerph19169960

Bradley, S. W., Roberts, J. A., & Bradley, P. W. (2019). Experimental evidence of observed social media status cues on perceived likability. *Psychology of Popular Media Culture*, *8*(1), 41–51. https://doi.org/10.1037/ppm0000164

Brailovskaia, J., Cosci, F., Mansueto, G., & Margraf, J. (2021). The relationship between social media use, stress symptoms and burden caused by coronavirus (Covid-19) in Germany and Italy: A cross-sectional and longitudinal investigation. *Journal of Affective Disorders Reports*, *3*, 100067. https://doi.org/10.1016/j.jadr.2020.100067

Brand, M., Rumpf, H.-Jü., Demetrovics, Z., MÜller, A., Stark, R., King, D. L., Goudriaan, A. E., Mann, K., Trotzke, P., Fineberg, N. A., Chamberlain, S. R., Kraus, S. W., Wegmann, E., Billieux, J., & Potenza, M. N. (2020). Which conditions should be considered as disorders in the International Classification of Diseases (ICD-11) designation of "other specified disorders due to addictive behaviors"? *Journal of Behavioral Addictions*. https://doi.org/10.1556/2006.2020.00035

Brandes, S. B., & Levin, D. (2014). "Like My Status": Israeli teenage girls constructing their social connections on the Facebook social network. *Feminist Media Studies*, *14*(5), 743–758. https://doi.org/10.1080/14680777.2013.833533

Branje, S., De Moor, E. L., Spitzer, J., & Becht, A. I. (2021). Dynamics of Identity Development in Adolescence: A Decade in Review. *Journal of Research on Adolescence*, *31*(4), 908–927. https://doi.org/10.1111/jora.12678

Brasil, K. M., Mims, C. E., Pritchard, M. E., & McDermott, R. C. (2024). Social media and body image: Relationships between social media appearance preoccupation, self-objectification, and body image. *Body Image*, *51*, 101767. https://doi.org/10.1016/j.bodyim.2024.101767

Brautsch LA, Lund L, Andersen MM, Jennum PJ, Folker AP, & Andersen S. (2023). Digital media use and sleep in late adolescence and young adulthood: A systematic review. *Sleep Med Rev*, *68*, 101742. https://doi.org/10.1016/j.smrv.2022.101742

Brown, A., & Dittmar, H. (2005). Think "Thin" and Feel Bad: The Role of Appearance Schema Activation, Attention Level, and Thin–Ideal Internalization for Young Women's Responses to Ultra–Thin Media Ideals. *Journal of Social and Clinical Psychology*, *24*(8), 1088–1113. https://doi.org/10.1521/jscp.2005.24.8.1088

Brown, L., & Kuss, D. J. (2020). Fear of Missing Out, Mental Wellbeing, and Social Connectedness: A Seven-Day Social Media Abstinence Trial. *International Journal of Environmental Research and Public Health*, *17*(12), 4566. https://doi.org/10.3390/ijerph17124566

Buchanan, T. (2003). Internet-based Questionnaire Assessment: Appropriate Use in Clinical Contexts. *Cognitive Behaviour Therapy*, *32*(3), 100–109. https://doi.org/10.1080/16506070310000957

Burnell, K., Meter, D. J., Andrade, F. C., Slocum, A., & George, M. J. (2025). The Effects of Social Media Restriction: Meta-Analytic Evidence from Randomized Controlled Trials. *SSM - Mental Health*, 100459. https://doi.org/10.1016/j.ssmmh.2025.100459

Butler, N., Quigg, Z., Bates, R., Jones, L., Ashworth, E., Gowland, S., & Jones, M. (2022). The Contributing Role of Family, School, and Peer Supportive Relationships in Protecting the Mental Wellbeing of Children and Adolescents. *School Mental Health*, *14*(3), 776–788. https://doi.org/10.1007/s12310-022-09502-9

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Callan, M. J., Kim, H., & Matthews, W. J. (2015). Age differences in social comparison tendency and personal relative deprivation. *Personality and Individual Differences*, *87*, 196–199. https://doi.org/10.1016/j.paid.2015.08.003

Cameron, J. D., Chaput, J.-P., Sjödin, A. M., & Goldfield, G. S. (2017). Brain on Fire: Incentive Salience, Hedonic Hot Spots, Dopamine, Obesity, and Other Hunger Games. *Annual Review of Nutrition*, *37*(1), 183–205. https://doi.org/10.1146/annurev-nutr-071816-064855

Campbell, R., Wright, C., Hickman, M., Kipping, R. R., Smith, M., Pouliou, T., & Heron, J. (2020). Multiple risk behaviour in adolescence is associated with substantial adverse health and social outcomes in early adulthood: Findings from a prospective birth cohort study. *Preventive Medicine*, *138*, 106157. https://doi.org/10.1016/j.ypmed.2020.106157

Canady, V. A. (2021). CDC data finds sharp rise in suicide attempts among teen girls amid COVID-19. *Mental Health Weekly*, *31*(24), 1–3. https://doi.org/10.1002/mhw.32836

Carr, C. T., & Hayes, R. A. (2015). Social Media: Defining, Developing, and Divining. *Atlantic Journal of Communication*, *23*(1), 46–65. https://doi.org/10.1080/15456870.2015.972282

Carraturo, F., Di Perna, T., Giannicola, V., Nacchia, M. A., Pepe, M., Muzii, B., Bottone, M., Sperandeo, R., Bochicchio, V., Maldonato, N. M., & Scandurra, C. (2023). Envy, Social Comparison, and Depression on Social Networking Sites: A Systematic Review. *European Journal of Investigation in Health, Psychology and Education*, *13*(2), 364–376. https://doi.org/10.3390/ejihpe13020027

Caruana, E. J., Roman, M., Hernández-Sánchez, J., & Solli, P. (2015). Longitudinal studies. *Journal of Thoracic Disease*, *7*(11), E537-540. https://doi.org/10.3978/j.issn.2072-1439.2015.10.63

Casale, S., Musicò, A., & Spada, M. M. (2021). A systematic review of metacognitions in Internet Gaming Disorder and problematic Internet, smartphone and social networking sites use. *Clinical Psychology & Psychotherapy*, *28*(6), 1494–1508. https://doi.org/10.1002/cpp.2588

Casale, S., Rugai, L., & Fioravanti, G. (2018). Exploring the role of positive metacognitions in explaining the association between the fear of missing out and social media addiction. *Addictive Behaviors*, *85*, 83–87. https://doi.org/10.1016/j.addbeh.2018.05.020

Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, *28*(1), 62–77. https://doi.org/10.1016/j.dr.2007.08.003

Caspi, A., Houts, R. M., Ambler, A., Danese, A., Elliott, M. L., Hariri, A., Harrington, H., Hogan, S., Poulton, R., Ramrakha, S., Rasmussen, L. J. H., Reuben, A., Richmond-Rakerd, L., Sugden, K., Wertz, J., Williams, B. S., & Moffitt, T. E. (2020). Longitudinal Assessment of Mental Health Disorders and Comorbidities Across 4 Decades Among Participants in the Dunedin Birth Cohort Study. *JAMA Network Open*, *3*(4), e203221. https://doi.org/10.1001/jamanetworkopen.2020.3221

Cataldo, I., De Luca, I., Giorgetti, V., Cicconcelli, D., Bersani, F. S., Imperatori, C., Abdi, S., Negri, A., Esposito, G., & Corazza, O. (2021). Fitspiration on social media: Body-image and other psychopathological risks among young adults. A narrative review. *Emerging Trends in Drugs, Addictions, and Health*, *1*, 100010. https://doi.org/10.1016/j.etdah.2021.100010

CDC. (2025, March 7). *About Prescription Opioids*. Overdose Prevention. https://www.cdc.gov/overdose-prevention/about/prescription-opioids.html

Cénat, J. M., Hébert, M., Blais, M., Lavoie, F., Guerrier, M., & Derivois, D. (2014). Cyberbullying, psychological distress and self-esteem among youth in Quebec schools. *Journal of Affective Disorders*, *169*, 7–9. https://doi.org/10.1016/j.jad.2014.07.019

Center for Coutnering Digital Hate. (2022). *Deadly by Design: TikTok pushes harmful content promoting eating disorders and self-harm into users' feeds.* https://counterhate.com/wp-content/uploads/2022/12/CCDH-Deadly-by-Design_120922.pdf

Center for Disease Control (CDC) (2024). About Youth Violence. https://www.cdc.gov/youth-violence/about/index.html

Cerniglia, L., Griffiths, M. D., Cimino, S., Palo, V. D., Monacis, L., Sinatra, M., & Tambelli, R. (2019). A latent profile approach for the study of internet gaming disorder, social media addiction, and psychopathology in a normative sample of adolescents. *Psychology Research and Behavior Management*, *12*, 651–659. https://doi.org/10.2147/PRBM.S211873

Chaput, J.-P., Gray, C. E., Poitras, V. J., Carson, V., Gruber, R., Olds, T., Weiss, S. K., Connor Gorber, S., Kho, M. E., Sampson, M., Belanger, K., Eryuzlu, S., Callender, L., & Tremblay, M. S. (2016). Systematic review of the relationships between sleep duration and health indicators in school-aged children and youth. *Applied Physiology, Nutrition, and Metabolism*, *41*(6 (Suppl. 3)), S266–S282. https://doi.org/10.1139/apnm-2015-0627

Chen, I.-H., Pakpour, A. H., Leung, H., Potenza, M. N., Su, J.-A., Lin, C.-Y., & Griffiths, M. D. (2020). Comparing generalized and specific problematic smartphone/internet use: Longitudinal relationships between smartphone application-based addiction and social media addiction and psychological distress. *Journal of Behavioral Addictions*, *9*(2), 410–419. https://doi.org/10.1556/2006.2020.00023

Chen, S., Xiao, L., & Kumar, A. (2023). Spread of misinformation on social media: What contributes to it and how to combat it. *Computers in Human Behavior*, *141*, 107643. https://doi.org/10.1016/j.chb.2022.107643

Chen, Y., Li, S., Tian, Y., Li, D., & Yin, H. (2024). Problematic social media use may be ruining our sleep: A meta-analysis on the relationship between problematic social media use and sleep quality. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-024-01407-9

Chen Z, Liao X, Yang J, Tian Y, Peng K, Liu X, & Li Y. (2024). Association of screen-based activities and risk of self-harm and suicidal behaviors among young people: A systematic review and meta-analysis of longitudinal studies. *Psychiatry Res*, *338*, 115991. https://doi.org/10.1016/j.psychres.2024.115991

Cheng, C., Lau, Y., Chan, L., & Luk, J. W. (2021). Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. *Addictive Behaviors*, *117*, 106845. https://doi.org/10.1016/j.addbeh.2021.106845

Cheng, Q., Li, H., Silenzio, V., & Caine, E. D. (2014). Suicide Contagion: A Systematic Review of Definitions and Research Utility. *PLoS ONE*, *9*(9), e108724. https://doi.org/10.1371/journal.pone.0108724

Chow, T. S., & Wan, H. Y. (2017). Is there any 'Facebook Depression'? Exploring the moderating roles of neuroticism, Facebook social comparison and envy. *Personality and Individual Differences*, *119*, 277–282. https://doi.org/10.1016/j.paid.2017.07.032

Clark, D. A., & Beck, A. T. (2010). Cognitive theory and therapy of anxiety and depression: Convergence with neurobiological findings. *Trends in Cognitive Sciences*, *14*(9), 418–424. https://doi.org/10.1016/j.tics.2010.06.007

Clements-Nolle, K., Marx, R., & Katz, M. (2006). Attempted Suicide Among Transgender Persons: The Influence of Gender-Based Discrimination and Victimization. *Journal of Homosexuality*, *51*(3), 53–69. https://doi.org/10.1300/J082v51n03_04

Sterne, J. A. C., Savović J, Page M.J, et al. (2019) RoB 2: A revised tool for assessing risk of bias in randomised trials. British Medical Journal, 366:l4898; doi: 10.1136/BMJ.L4898

Colten, H. R., Altevogt, B. M., & Research, I. of M. (US) C. on S. M. and. (2006). Extent and Health Consequences of Chronic Sleep Loss and Sleep Disorders. In *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*. National Academies Press (US). https://www.ncbi.nlm.nih.gov/books/NBK19961/

Costello, N., Sutton, R., Jones, M., Almassian, M., Raffoul, A., Ojumu, O., Salvia, M., Santoso, M., Kavanaugh, J. R., & Austin, S. B. (2023). ALGORITHMS, ADDICTION, AND

ADOLESCENT MENTAL HEALTH: An Interdisciplinary Study to Inform State-level Policy Action to Protect Youth from the Dangers of Social Media. *American Journal of Law & Medicine*, *49*(2–3), 135–172. https://doi.org/10.1017/amj.2023.25

Course-Choi, J., & Hammond, L. (2021). Social Media Use and Adolescent Well-Being: A Narrative Review of Longitudinal Studies. *Cyberpsychology, Behavior, and Social Networking*, *24*(4), 223–236. https://doi.org/10.1089/cyber.2020.0020

Cover, R. (2012). Performing and undoing identity online: Social networking, identity theories and the incompatibility of online profiles and friendship regimes. *Convergence: The International Journal of Research into New Media Technologies*, *18*(2), 177–193. https://doi.org/10.1177/1354856511433684

Coyne, S. M., Padilla-Walker, L. M., Day, R. D., Harper, J., & Stockdale, L. (2014). A Friend Request from Dear Old Dad: Associations Between Parent–Child Social Networking and Adolescent Outcomes. *Cyberpsychology, Behavior, and Social Networking*, *17*(1), 8–13. https://doi.org/10.1089/cyber.2012.0623

Coyne, S. M., Radesky, J., Collier, K. M., Gentile, D. A., Linder, J. R., Nathanson, A. I., Rasmussen, E. E., Reich, S. M., & Rogers, J. (2017). Parenting and Digital Media. *Pediatrics*, *140*(Supplement_2), S112–S116. https://doi.org/10.1542/peds.2016-1758N

Coyne, S. M., Weinstein, E., Sheppard, J. A., James, S., Gale, M., Van Alfen, M., Ririe, N., Monson, C., Ashby, S., Weston, A., & Banks, K. (2023). Analysis of Social Media Use, Mental Health, and Gender Identity Among US Youths. *JAMA Network Open*, *6*(7), e2324389. https://doi.org/10.1001/jamanetworkopen.2023.24389

Craig, W., Boniel-Nissim, M., King, N., Walsh, S. D., Boer, M., Donnelly, P. D., Harel-Fisch, Y., Malinowska-Cieślik, M., Gaspar De Matos, M., Cosma, A., Van Den Eijnden, R., Vieno, A., Elgar, F. J., Molcho, M., Bjereld, Y., & Pickett, W. (2020). Social Media Use and Cyber-Bullying: A Cross-National Analysis of Young People in 42 Countries. *Journal of Adolescent Health*, *66*(6), S100–S108. https://doi.org/10.1016/j.jadohealth.2020.03.006

Crone, E. A., & Konijn, E. A. (2018). Media use and brain development during adolescence. *Nature Communications*, *9*(1), 588. https://doi.org/10.1038/s41467-018-03126-x

Crow, S., Eisenberg, M. E., Story, M., & Neumark-Sztainer, D. (2008). Are body dissatisfaction, eating disturbance, and body mass index predictors of suicidal behavior in adolescents? A longitudinal study. *Journal of Consulting and Clinical Psychology*, *76*(5), 887–892. https://doi.org/10.1037/a0012783

Cugelman, B., Thelwall, M., & Dawes, P. (2011). Online Interventions for Social Marketing Health Behavior Change Campaigns: A Meta-Analysis of Psychological Architectures and Adherence Factors. *Journal of Medical Internet Research*, *13*(1), e17. https://doi.org/10.2196/jmir.1367

Cuijpers, P., Miguel, C., Harrer, M., Plessen, C. Y., Ciharova, M., Ebert, D., & Karyotaki, E. (2023). Cognitive behavior therapy vs. control conditions, other psychotherapies, pharmacotherapies and combined treatment for depression: A comprehensive meta-analysis including 409 trials with 52,702 patients. *World Psychiatry*, *22*(1), 105–115. https://doi.org/10.1002/wps.21069

Cunningham S, Hudson CC, & Harkness K. (2021). Social Media and Depression Symptoms: A Meta-Analysis. *Res Child Adolesc Psychopathol*, *49*(2), 241–253. https://doi.org/10.1007/s10802-020-00715-7

Cuthbert, B. N., & Insel, T. R. (2013). Toward the future of psychiatric diagnosis: The seven pillars of RDoC. *BMC Medicine*, *11*, 126. https://doi.org/10.1186/1741-7015-11-126

Cybulski, L., Ashcroft, D. M., Carr, M. J., Garg, S., Chew-Graham, C. A., Kapur, N., & Webb, R. T. (2021). Temporal trends in annual incidence rates for psychiatric disorders and self-harm among children and adolescents in the UK, 2003–2018. *BMC Psychiatry*, *21*(1), 229. https://doi.org/10.1186/s12888-021-03235-w

Dane, A., & Bhatia, K. (2023). The social media diet: A scoping review to investigate the association between social media, body image and eating disorders amongst young people. *PLOS Global Public Health*, *3*(3), e0001091. https://doi.org/10.1371/journal.pgph.0001091

Danthinne, E. S., Giorgianni, F. E., & Rodgers, R. F. (2020). Labels to prevent the detrimental effects of media on body image: A systematic review and meta-analysis. *International Journal of Eating Disorders*, *53*(5), 647–661. https://doi.org/10.1002/eat.23242

D'Arienzo, M. C., Boursier, V., & Griffiths, M. D. (2019). Addiction to Social Media and Attachment Styles: A Systematic Literature Review. *International Journal of Mental Health and Addiction*, *17*(4), 1094–1118. https://doi.org/10.1007/s11469-019-00082-5

Davis, C. G., & Goldfield, G. S. (2024). Limiting social media use decreases depression, anxiety, and fear of missing out in youth with emotional distress: A randomized controlled trial. *Psychology of Popular Media*, *14*(1), 1–11. https://doi.org/10.1037/ppm0000536

Dayan, J., Bernard, A., Olliac, B., Mailhes, A.-S., & Kermarrec, S. (2010). Adolescent brain development, risk-taking and vulnerability to addiction. *Journal of Physiology-Paris*, *104*(5), 279–286. https://doi.org/10.1016/j.jphysparis.2010.08.007

De Hesselle, L. C., & Montag, C. (2024). Effects of a 14-day social media abstinence on mental health and well-being: Results from an experimental study. *BMC Psychology*, *12*(1), 141. https://doi.org/10.1186/s40359-024-01611-1

De Lenne, O., Vandenbosch, L., Eggermont, S., Karsay, K., & Trekels, J. (2020). Picture-perfect lives on social media: A cross-national study on the role of media ideals in adolescent well-being. *Media Psychology*, *23*(1), 52–78. https://doi.org/10.1080/15213269.2018.1554494

de Valle MK, Gallego-García M, Williamson P, & Wade TD. (2021). Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. *Body Image*, *39*, 276–292. https://doi.org/10.1016/j.bodyim.2021.10.001

Dean, B. (2021). *Social Network Usage & Growth Statistics (2022)*. Backlinko. https://backlinko.com/social-media-users

Denniss, E., Lindberg, R., Marchese, L. E., & McNaughton, S. A. (2024). #Fail: The quality and accuracy of nutrition-related information by influential Australian Instagram accounts. *International Journal of Behavioral Nutrition and Physical Activity*, *21*(1), 16. https://doi.org/10.1186/s12966-024-01565-y

Denniss, E., Lindberg, R., & McNaughton, S. A. (2023). Quality and accuracy of online nutrition-related information: A systematic review of content analysis studies. *Public Health Nutrition*, *26*(7), 1345–1357. https://doi.org/10.1017/S1368980023000873

Dignard, N.A.L., & Jarry, J.L. (2021). The "Little Red Riding Hood Effect:" Fitspiration is just as bad as thinspiration for women's body dissatisfaction. Body Image, 36:201-213. https://doi.org/10.1016/j.bodyim.2020.11.012 i.org/

Dixon, S. (2024, December 5). *U.S. teens social media engagement frequency 2023*. Statista. https://www.statista.com/statistics/1327670/us-teens-social-media-sites-app-used-by-frequency/

Dohnt, H. K., & Tiggemann, M. (2006). Body Image Concerns in Young Girls: The Role of Peers and Media Prior to Adolescence. *Journal of Youth and Adolescence*, *35*(2), 135–145. https://doi.org/10.1007/s10964-005-9020-7

Donaldson SI, Dormanesh A, Perez C, Majmundar A, & Allem JP. (2022). Association Between Exposure to Tobacco Content on Social Media and Tobacco Use: A Systematic Review and Meta-analysis. *JAMA Pediatr*, *176*(9), 878–885. https://doi.org/10.1001/jamapediatrics.2022.2223

Dondzilo, L., Mahalingham, T., & Clarke, P. J. F. (2024). A preliminary investigation of the causal role of social media use in eating disorder symptoms. *Journal of Behavior Therapy and Experimental Psychiatry*, *82*, 101923. https://doi.org/10.1016/j.jbtep.2023.101923

Doron, J., Trouillet, R., Maneveau, A., Neveu, D., & Ninot, G. (2015). Coping profiles, perceived stress and health-related behaviors: A cluster analysis approach. *Health Promotion International*, *30*(1), 88–100. https://doi.org/10.1093/heapro/dau090

Downs, S., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomized and non-randomized studies of health care interventions. Journal of Epidemiology & Community Health, 52(6), 377–384. https://doi.org/10.1136/jech.52.6.377

Du M, Zhao C, Hu H, Ding N, He J, Tian W, Zhao W, Lin X, Liu G, Chen W, Wang S, Wang P, Xu D, Shen X, & Zhang G. (2024). Association between problematic social networking use and anxiety symptoms: A systematic review and meta-analysis. *BMC Psychol*, *12*(1), 263. https://doi.org/10.1186/s40359-024-01705-w

Dyson, M. P., Hartling, L., Shulhan, J., Chisholm, A., Milne, A., Sundar, P., Scott, S. D., & Newton, A. S. (2016). A Systematic Review of Social Media Use to Discuss and View Deliberate

Self-Harm Acts. *PLOS ONE*, *11*(5), e0155813. https://doi.org/10.1371/journal.pone.0155813

Dziura, S. L., McNaughton, K. A., Giacobbe, E., Yarger, H. A., Hickey, A. C., Shariq, D., & Redcay, E. (2023). Neural sensitivity to social reward predicts links between social behavior and loneliness in youth during the COVID-19 pandemic. *Developmental Psychobiology*, *65*(6), e22413. https://doi.org/10.1002/dev.22413

Edgcomb, J. B., & Zima, B. (2018). Medication Adherence Among Children and Adolescents with Severe Mental Illness: A Systematic Review and Meta-Analysis. *Journal of Child and Adolescent Psychopharmacology*, *28*(8), 508–520. https://doi.org/10.1089/cap.2018.0040

Eden, A., Ellithorpe, M. E., Meshi, D., Ulusoy, E., & Grady, S. M. (2021). All night long: Problematic media use is differentially associated with sleep quality and depression by medium. *Communication Research Reports*, *38*(3), 143–149. https://doi.org/10.1080/08824096.2021.1902798

Eide, T. A., Aarestad, S. H., Andreassen, C. S., Bilder, R. M., & Pallesen, S. (2018). Smartphone Restriction and Its Effect on Subjective Withdrawal Related Scores. *Frontiers in Psychology*, *9*, 1444. https://doi.org/10.3389/fpsyg.2018.01444

Elkin, N., Mohammed Ashraf, A. K., Kılınçel, O., KılınçeL, Ş., Ranganathan, M., Sakarya, A. K., & Soydan, A. M. (2025). Screens and scars: SEM analysis of the relationship between childhood trauma, emotion regulation, and social media addiction. *Frontiers in Psychology*, *16*, 1502968. https://doi.org/10.3389/fpsyg.2025.1502968

Erikson, E. H. (1950). *Childhood and society*. W W Norton & Co.

Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological Bulletin*, *139*(6), 1342–1396. https://doi.org/10.1037/a0031808

Fam, J. Y., Männikkö, N., Juhari, R., & Kääriäinen, M. (2023). Is parental mediation negatively associated with problematic media use among children and adolescents? A systematic review and meta-analysis. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement*, *55*(2), 89–99. https://doi.org/10.1037/cbs0000320

Fardouly, J., Magson, N. R., Johnco, C. J., Oar, E. L., & Rapee, R. M. (2018). Parental Control of the Time Preadolescents Spend on Social Media: Links with Preadolescents' Social Media Appearance Comparisons and Mental Health. *Journal of Youth and Adolescence*, *47*(7), 1456–1468. https://doi.org/10.1007/s10964-018-0870-1

Fassi L., Ferguson, A.M., Przybylski, A.K., Ford, T.J., & Orben A. (2025). Social media use in adolescents with and without mental health conditions. *Nature Human Behaviour, doi: 10.1038/s41562-025-02134-4. Online ahead of print*

Fassi, L., Thomas K, Parry DA, Leyland-Craggs A, Ford TJ, & Orben A. (2024). Social Media Use and Internalizing Symptoms in Clinical and Community Adolescent Samples: A Systematic Review and Meta-Analysis. *Journal of the American Medical Association-Pediatrics (JAMA Peds)*, *178*(8), 814–822. https://doi.org/10.1001/jamapediatrics.2024.2078

Faverio, M., & Sidoti, O. (2024, December 12). Teens, Social Media and Technology 2024. *Pew Research Center*. https://www.pewresearch.org/internet/2024/12/12/teens-social-media-and-technology-2024/

Fedak, K. M., Bernal, A., Capshaw, Z. A., & Gross, S. (2015). Applying the Bradford Hill criteria in the 21st century: How data integration has changed causal inference in molecular epidemiology. *Emerging Themes in Epidemiology*, *12*(1), 14. https://doi.org/10.1186/s12982-015-0037-4

Federal Trade Commission. (2024, August 2). *FTC Investigation Leads to Lawsuit Against TikTok and ByteDance for Flagrantly Violating Children's Privacy Law*. Federal Trade Commission. https://www.ftc.gov/news-events/news/press-releases/2024/08/ftc-investigation-leads-lawsuit-against-tiktok-bytedance-flagrantly-violating-childrens-privacy-law

Ferguson, C. J., Kaye, L. K., Branley-Bell, D., & Markey, P. (2025). There is no evidence that time spent on social media is correlated with adolescent mental health problems: Findings from a meta-analysis. *Professional Psychology: Research and Practice*, *56*(1), 73–83. https://doi.org/10.1037/pro0000589

Ferguson, C. J., Kaye, L. K., Branley-Bell, D., Markey, P., Ivory, J. D., Klisanin, D., Elson, M., Smyth, M., Hogg, J. L., McDonnell, D., Nichols, D., Siddiqui, S., Gregerson, M., & Wilson, J. (2022). Like this meta-analysis: Screen media and mental health. *Professional Psychology: Research and Practice*, *53*(2), 205–214. https://doi.org/10.1037/pro0000426

Ferguson, C. J., Muñoz, M. E., Garza, A., & Galindo, M. (2014). Concurrent and Prospective Analyses of Peer, Television and Social Media Influences on Body Dissatisfaction, Eating Disorder Symptoms and Life Satisfaction in Adolescent Girls. *Journal of Youth and Adolescence*, *43*(1), 1–14. https://doi.org/10.1007/s10964-012-9898-9

Fergusson, D. M., Horwood, L. J., Ridder, E. M., & Beautrais, A. L. (2005). Subthreshold Depression in Adolescence and Mental Health Outcomes in Adulthood. *Archives of General Psychiatry*, *62*(1), 66. https://doi.org/10.1001/archpsyc.62.1.66

Ferguson, K. T., Cassells, R. C., MacAllister, J. W., & Evans, G. W. (2013). The physical environment and child development: An international review. *International Journal of Psychology*, *48*(4), 437–468. https://doi.org/10.1080/00207594.2013.804190

Fernandez, D. P., Kuss, D. J., & Griffiths, M. D. (2020). Short-term abstinence effects across potential behavioral addictions: A systematic review. *Clinical Psychology Review*, *76*, 101828. https://doi.org/10.1016/j.cpr.2020.101828

Festinger, L. (1954). A Theory of Social Comparison Processes. *Human Relations*, *7*(2), 117–140. https://doi.org/10.1177/001872675400700202

Finkle, E. (2022, December 5). Bringing Age Verification to Facebook Dating. *Meta*. https://about.fb.com/news/2022/12/facebook-dating-age-verification/

Fioravanti, G., Bocci Benucci, S., Ceragioli, G., & Casale, S. (2022). How the Exposure to Beauty Ideals on Social Networking Sites Influences Body Image: A Systematic Review of Experimental Studies. *Adolescent Research Review*, *7*(3), 419–458. https://doi.org/10.1007/s40894-022-00179-4

Fioravanti, G., Casale, S., Benucci, S. B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. *Computers in Human Behavior*, *122*, 106839. https://doi.org/10.1016/j.chb.2021.106839

Firth, J., Torous, J., Stubbs, B., Firth, J. A., Steiner, G. Z., Smith, L., Alvarez-Jimenez, M., Gleeson, J., Vancampfort, D., Armitage, C. J., & Sarris, J. (2019). The "online brain": How the Internet may be changing our cognition. *World Psychiatry*, *18*(2), 119–129. https://doi.org/10.1002/wps.20617

Flayelle, M., Brevers, D., King, D. L., Maurage, P., Perales, J. C., & Billieux, J. (2023). A taxonomy of technology design features that promote potentially addictive online behaviours. *Nature Reviews Psychology*, *2*(3), 136–150. https://doi.org/10.1038/s44159-023-00153-4

Fournier, L., Schimmenti, A., Musetti, A., Boursier, V., Flayelle, M., Cataldo, I., Starcevic, V., & Billieux, J. (2023). Deconstructing the components model of addiction: An illustration through "addictive" use of social media. *Addictive Behaviors*, *143*, 107694. https://doi.org/10.1016/j.addbeh.2023.107694

Franchina, V., Vanden Abeele, M., Van Rooij, A. J., Lo Coco, G., & De Marez, L. (2018). Fear of Missing Out as a Predictor of Problematic Social Media Use and Phubbing Behavior among Flemish Adolescents. *International Journal of Environmental Research and Public Health*, *15*(10), 2319. https://doi.org/10.3390/ijerph15102319

Frison, E., & Eggermont, S. (2015). The impact of daily stress on adolescents' depressed mood: The role of social support seeking through Facebook. *Computers in Human Behavior*, *44*, 315–325. https://doi.org/10.1016/j.chb.2014.11.070

Frison, E., & Eggermont, S. (2016). Exploring the Relationships Between Different Types of Facebook Use, Perceived Online Social Support, and Adolescents' Depressed Mood. *Social Science Computer Review*, *34*(2), 153–171. https://doi.org/10.1177/0894439314567449

Frison, E., & Eggermont, S. (2017). Browsing, Posting, and Liking on Instagram: The Reciprocal Relationships Between Different Types of Instagram Use and Adolescents' Depressed Mood. *Cyberpsychology, Behavior, and Social Networking*, *20*(10), 603–609. https://doi.org/10.1089/cyber.2017.0156

Funder, D. C., & Ozer, D. J. (2019). Evaluating Effect Size in Psychological Research: Sense and Nonsense. *Advances in Methods and Practices in Psychological Science*, *2*(2), 156–168. https://doi.org/10.1177/2515245919847202

Galica, V. L., Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Social Media Use and Conduct Problems in Emerging Adults. *Cyberpsychology, Behavior, and Social Networking*, *20*(7), 448–452. https://doi.org/10.1089/cyber.2017.0068

Gallivan, H. (2014, May 18). *Teens, Social Media and Body Image*. https://lynnemaureenhurdle.com/wp-content/uploads/2017/01/18_Gallivan_Teens-social-media-body-image-presentation-H-Gallivan-Spring-2014.pdf

Gambo, S., & Özad, B. O. (2020). The demographics of computer-mediated communication: A review of social media demographic trends among social networking site giants. *Computers in Human Behavior Reports*, *2*, 100016. https://doi.org/10.1016/j.chbr.2020.100016

Garrett, S. L., Burnell, K., Armstrong-Carter, E. L., Nelson, B. W., Prinstein, M. J., & Telzer, E. H. (2023). Links Between Objectively-Measured Hourly Smartphone Use and Adolescent Wake Events Across Two Weeks. *Journal of Clinical Child & Adolescent Psychology*, 1–11. https://doi.org/10.1080/15374416.2023.2286595

Gaysynsky, A., Senft Everson, N., Heley, K., & Chou, W.-Y. S. (2024). Perceptions of Health Misinformation on Social Media: Cross-Sectional Survey Study. *JMIR Infodemiology*, *4*, e51127. https://doi.org/10.2196/51127

George, A. S., George, A. S. H., Baskar, T., & Karthikeyan, M. M. (2024). *Reclaiming Our Minds: Mitigating the Negative Impacts of Excessive Doomscrolling*. https://doi.org/10.5281/ZENODO.13737987

Georgiades, K., Duncan, L., Wang, L., Comeau, J., Boyle, M. H., & 2014 Ontario Child Health Study Team. (2019). Six-Month Prevalence of Mental Disorders and Service Contacts among Children and Youth in Ontario: Evidence from the 2014 Ontario Child Health Study.

The Canadian Journal of Psychiatry, *64*(4), 246–255. https://doi.org/10.1177/0706743719830024

Ghaznavi, J., & Taylor, L. D. (2015). Bones, body parts, and sex appeal: An analysis of #thinspiration images on popular social media. *Body Image*, *14*, 54–61. https://doi.org/10.1016/j.bodyim.2015.03.006

Godard, R., & Holtzman, S. (2024). Are active and passive social media use related to mental health, wellbeing, and social support outcomes? A meta-analysis of 141 studies. *Journal of Computer-Mediated Communication*, *29*(1), zmad055. https://doi.org/10.1093/jcmc/zmad055

Goldfield, G.S. (2024, June 23). *Limiting Social Media Use Decreases Depression, Anxiety and FoMO in Youth with Emotional Distress: A Randomized Controlled Trial*. Canadian Psychological Association Conference 2024, Ottawa, ON, Canada.

Goldfield, G. S., Cameron, J. D., Sigal, R. J., Kenny, G. P., Holcik, M., Prud'homme, D., Guerin, E., Alberga, A. S., D'Angiulli, A., Tremblay, M. S., Mougharbel, F., & Walsh, J. (2021). Screen time is independently associated with serum brain-derived neurotrophic factor (BDNF) in youth with obesity. *Applied Physiology, Nutrition, and Metabolism*, *46*(9), 1083–1090. https://doi.org/10.1139/apnm-2020-0756

Goldfield, G. S., Walsh, J., Sigal, R. J., Kenny, G. P., Hadjiyannakis, S., De Lisio, M., Ngu, M., Prud'homme, D., Alberga, A. S., Doucette, S., Goldfield, D. B., & Cameron, J. D. (2021). Associations of the BDNF Val66Met Polymorphism With Body Composition, Cardiometabolic Risk Factors, and Energy Intake in Youth With Obesity: Findings From the HEARTY Study. *Frontiers in Neuroscience*, *15*, 715330. https://doi.org/10.3389/fnins.2021.715330

Gong, F., Gong, Z., Liu, H., Yi, P., Jia, Y., Zhuang, J., Shu, J., Huang, X., & Wu, Y. (2024). The Impact of Problematic Internet Use on Adolescent Loneliness-Chain Mediation Effects of Social Support and Family Communication. *Psychology Research and Behavior Management*, *17*, 1903–1916. https://doi.org/10.2147/PRBM.S443349

Gonzales, A. L., & Hancock, J. T. (2008). Identity Shift in Computer-Mediated Environments. *Media Psychology*, *11*(2), 167–185. https://doi.org/10.1080/15213260802023433

Gordon, C. S., Jarman, H. K., Rodgers, R. F., McLean, S. A., Slater, A., Fuller-Tyszkiewicz, M., & Paxton, S. J. (2021). Outcomes of a Cluster Randomized Controlled Trial of the SoMe Social Media Literacy Program for Improving Body Image-Related Outcomes in Adolescent Boys and Girls. *Nutrients*, *13*(11), 3825. https://doi.org/10.3390/nu13113825

Gratz, K. L., Richmond, J. R., Scamaldo, K. M., Edmonds, K. A., Rose, J. P., & Tull, M. T. (2023). Prospective Impact of Borderline Personality Disorder Symptoms and Social Media Addiction on Coping and Health Related Outcomes During a Global Pandemic. *International Journal of Cognitive Therapy*, *16*(4), 571–593. https://doi.org/10.1007/s41811-023-00183-z

Griffiths, M. (2005). A ‘components’ model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*(4), 191–197. https://doi.org/10.1080/14659890500114359

Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders*, *31*(1), 1–16. https://doi.org/10.1002/eat.10005

Grunewald, K., Deng, J., Wertz, J., & Schweizer, S. (2022). The effect of online social evaluation on mood and cognition in young people. *Scientific Reports*, *12*(1), 20999. https://doi.org/10.1038/s41598-022-24932-w

Gupta, R., & Ariefdjohan, M. (2021). Mental illness on Instagram: A mixed method study to characterize public content, sentiments, and trends of antidepressant use. *Journal of Mental Health*, *30*(4), 518–525. https://doi.org/10.1080/09638237.2020.1755021

Hahn, E., Reuter, M., Spinath, F. M., & Montag, C. (2017). Internet addiction and its facets: The role of genetics and the relation to self-directedness. *Addictive Behaviors*, *65*, 137–146. https://doi.org/10.1016/j.addbeh.2016.10.018

Haidt, J. (2024). *The anxious generation: How the great rewiring of childhood is causing an epidemic of mental illness*. Penguin Press.

Hall, J. A., Johnson, R. M., & Ross, E. M. (2019). Where does the time go? An experimental test of what social media displaces and displaced activities' associations with affective well-being and quality of day. *New Media & Society*, *21*(3), 674–692. https://doi.org/10.1177/1461444818804775

Han X, Zhou E, & Liu D. (2024). Electronic Media Use and Sleep Quality: Updated Systematic Review and Meta-Analysis. *J Med Internet Res*, *26*, e48356. https://doi.org/10.2196/48356

Harris, J. L., Swanson, B., & Petersen, I. T. (2024). A Developmentally Informed Systematic Review and Meta-Analysis of the Strength of General Psychopathology in Childhood and Adolescence. *Clinical Child and Family Psychology Review*, *27*(1), 130–164. https://doi.org/10.1007/s10567-023-00464-1

Haslam, N., McGrath, M. J., Viechtbauer, W., & Kuppens, P. (2020). Dimensions over categories: A meta-analysis of taxometric research. *Psychological Medicine*, *50*(9), 1418–1432. https://doi.org/10.1017/S003329172000183X

Hay, C., Meldrum, R., & Mann, K. (2010). Traditional Bullying, Cyber Bullying, and Deviance: A General Strain Theory Approach. *Journal of Contemporary Criminal Justice*, *26*(2), 130–147. https://doi.org/10.1177/1043986209359557

Hazen, E., Schlozman, S., & Beresin, E. (2008). Adolescent Psychological Development. *Pediatrics In Review*, *29*(5), 161–168. https://doi.org/10.1542/pir.29.5.161

Hellman, M., Schoenmakers, T. M., Nordstrom, B. R., & Van Holst, R. J. (2013). Is there such a thing as online video game addiction? A cross-disciplinary review. *Addiction Research & Theory*, *21*(2), 102–112. https://doi.org/10.3109/16066359.2012.693222

Herrero, J., & Meneses, J. (2006). Short Web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: A comparison to pencil and paper responses among Internet users. *Computers in Human Behavior*, *22*(5), 830–846. https://doi.org/10.1016/j.chb.2004.03.007

Hill, A. B. (1965). The Environment and Disease: Association or Causation? *Proceedings of the Royal Society of Medicine*, *58*(5), 295–300. https://doi.org/10.1177/003591576505800503

Hill, K. (2011, May 20). *Mark Zuckerberg Is Wrong About Kids Under 13 Not Being Allowed on Facebook*. Forbes. https://www.forbes.com/sites/kashmirhill/2011/05/20/mark-zuckerberg-is-wrong-about-kids-under-13-not-being-allowed-on-facebook/

Hofstede, G. (1980). Culture and Organizations. *International Studies of Management & Organization*, *10*(4), 15–41. https://doi.org/10.1080/00208825.1980.11656300

Hofstede, G. (1983). National Cultures in Four Dimensions: A Research-Based Theory of Cultural Differences among Nations. *International Studies of Management & Organization*, *13*(1–2), 46–74. https://doi.org/10.1080/00208825.1983.11656358

Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations* (2nd ed.). Sage Publications.

Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image*, *17*, 100–110. https://doi.org/10.1016/j.bodyim.2016.02.008

Hood, R., Zabatiero, J., Zubrick, S. R., Silva, D., & Straker, L. (2021). The association of mobile touch screen device use with parent-child attachment: A systematic review. *Ergonomics*, *64*(12), 1606–1622. https://doi.org/10.1080/00140139.2021.1948617

Houghton, S., Lawrence, D., Hunter, S. C., Rosenberg, M., Zadow, C., Wood, L., & Shilton, T. (2018). Reciprocal Relationships between Trajectories of Depressive Symptoms and Screen Media Use during Adolescence. *Journal of Youth and Adolescence*, *47*(11), 2453–2467. https://doi.org/10.1007/s10964-018-0901-y

Hristova, D., Jovicic, S., Göbl, B., De Freitas, S., & Slunecko, T. (2022). "Why did we lose our snapchat streak?". Social media gamification and metacommunication. *Computers in Human Behavior Reports*, *5*, 100172. https://doi.org/10.1016/j.chbr.2022.100172

Hu, B., Yu, Y., Yan, L., Qi, G., Wu, D., Li, Y., Shi, A., Liu, C., Shang, Y., Li, Z., Cui, G., & Wang, W. (2022). Intersubject correlation analysis reveals the plasticity of cerebral functional connectivity in the long-term use of social media. *Human Brain Mapping*, *43*(7), 2262–2275. https://doi.org/10.1002/hbm.25786

Hu, W., Li, B., Li, X., Luo, S., Xu, Z., Li, J., Chen, W., & Guo, V. Y. (2025). The distribution of frequent perceived loneliness and its association with suicidal behaviors in adolescents: A school-based study across 93 countries/territories. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-025-02698-6

Huang, C. (2022). A meta-analysis of the problematic social media use and mental health. *International Journal of Social Psychiatry*, *68*(1), 12–33. https://doi.org/10.1177/0020764020978434

Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: A meta-analysis on media and body image. *Media Psychology*, *24*(4), 437–489. https://doi.org/10.1080/15213269.2020.1737545

Hunt, M., All, K., Burns, B., & Li, K. (2021). Too Much of a Good Thing: Who We Follow, What We Do, And How Much Time We Spend on Social Media Affects Well-Being. *Journal of Social and Clinical Psychology*, *40*(1), 46–68. https://doi.org/10.1521/jscp.2021.40.1.46

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No More FOMO: Limiting Social Media Decreases Loneliness and Depression. *Journal of Social and Clinical Psychology*, *37*(10), 751–768. https://doi.org/10.1521/jscp.2018.37.10.751

Hysing, M., Pallesen, S., Stormark, K. M., Jakobsen, R., Lundervold, A. J., & Sivertsen, B. (2015). Sleep and use of electronic devices in adolescence: Results from a large population-based study. *BMJ Open*, *5*(1), e006748. https://doi.org/10.1136/bmjopen-2014-006748

Isarabhakdi, P., & Pewnil, T. (2016). Engagement with family, peers, and Internet use and its effect on mental well-being among high school students in Kanchanaburi Province, Thailand. *International Journal of Adolescence and Youth*, *21*(1), 15–26. https://doi.org/10.1080/02673843.2015.1024698

Ivie EJ, Pettitt A, Moses LJ, & Allen NB. (2020). A meta-analysis of the association between adolescent social media use and depressive symptoms. *J Affect Disord*, *275*, 165–174. https://doi.org/10.1016/j.jad.2020.06.014

Jaeschke, R., Singer, J., & Guyatt, G. H. (1989). Measurement of health status. *Controlled Clinical Trials*, *10*(4), 407–415. https://doi.org/10.1016/0197-2456(89)90005-6

Jami, E. S., Hammerschlag, A. R., Ip, H. F., Allegrini, A. G., Benyamin, B., Border, R., Diemer, E. W., Jiang, C., Karhunen, V., Lu, Y., Lu, Q., Mallard, T. T., Mishra, P. P., Nolte, I. M., Palviainen, T., Peterson, R. E., Sallis, H. M., Shabalin, A. A., Tate, A. E., … Middeldorp, C. M. (2022). Genome-wide Association Meta-analysis of Childhood and Adolescent Internalizing Symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry*, *61*(7), 934–945. https://doi.org/10.1016/j.jaac.2021.11.035

Jarman, H. K., Fuller-Tyszkiewicz, M., McLean, S. A., Rodgers, R. F., Slater, A., Gordon, C. S., & Paxton, S. J. (2023). Who's most at risk of poor body image? Identifying subgroups of adolescent social media users over the course of a year. *Computers in Human Behavior*, *147*, 107823. https://doi.org/10.1016/j.chb.2023.107823

Jarman, H. K., Marques, M. D., McLean, S. A., Slater, A., & Paxton, S. J. (2021). Social media, body satisfaction and well-being among adolescents: A mediation model of appearance-ideal internalization and comparison. *Body Image*, *36*, 139–148. https://doi.org/10.1016/j.bodyim.2020.11.005

Jaworska, N., & MacQueen, G. (2015). Adolescence as a unique developmental period. *Journal of Psychiatry and Neuroscience*, *40*(5), 291–293. https://doi.org/10.1503/jpn.150268

Jerónimo F & Carraça EV. (2022). Effects of fitspiration content on body image: A systematic review. *Eat Weight Disord*, *27*(8), 3017–3035. https://doi.org/10.1007/s40519-022-01505-4

Jo, H., & Baek, E.-M. (2023). Predictors of social networking service addiction. *Scientific Reports*, *13*(1), 16705. https://doi.org/10.1038/s41598-023-43796-2

Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2018). *Monitoring the Future National Survey Results on Drug Use, 1975-2017: Overview, Key Findings on Adolescent Drug Use*. Institute for Social Research. https://eric.ed.gov/?id=ED589762

Jong, S. T., & Drummond, M. J. N. (2016). Hurry up and 'like' me: Immediate feedback on social networking sites and the impact on adolescent girls. *Asia-Pacific Journal of Health, Sport and Physical Education*, *7*(3), 251–267. https://doi.org/10.1080/18377122.2016.1222647

Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., Lowry, R., Chyen, D., Whittle, L., Thornton, J., Lim, C., Bradford, D., Yamakawa, Y., Leon, M., Brener, N., & Ethier, K. A. (2018). Youth Risk Behavior Surveillance—United States, 2017. *MMWR. Surveillance Summaries*, *67*(8), 1–114. https://doi.org/10.15585/mmwr.ss6708a1

Karazsia, B. T., Murnen, S. K., & Tylka, T. L. (2017). Is body dissatisfaction changing across time? A cross-temporal meta-analysis. *Psychological Bulletin*, *143*(3), 293–320. https://doi.org/10.1037/bul0000081

Kbaier, D., Kane, A., McJury, M., & Kenny, I. (2022). *Prevalence of Health Misinformation on Social Media—Challenges and Mitigation Before, During, and Beyond the COVID-19 Pandemic: Scoping Literature Review (Preprint)*. https://doi.org/10.2196/preprints.38786

Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth*, *25*(1), 79–93. https://doi.org/10.1080/02673843.2019.1590851

Kerr B, Garimella A, Pillarisetti L, Charlly N, Sullivan K, & Moreno MA. (2025). Associations Between Social Media Use and Anxiety Among Adolescents: A Systematic Review Study. *J Adolesc Health*, *76*(1), 18–28. https://doi.org/10.1016/j.jadohealth.2024.09.003

Keyes, C. L. M. (2005). Mental Illness and/or Mental Health? Investigating Axioms of the Complete State Model of Health. *Journal of Consulting and Clinical Psychology*, *73*(3), 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Keyes, C. L. M. (2006). Subjective Well-Being in Mental Health and Human Development Research Worldwide: An Introduction. *Social Indicators Research*, *77*(1), 1–10. https://doi.org/10.1007/s11205-005-5550-3

Kim, H. M. (2021). What do others' reactions to body posting on Instagram tell us? The effects of social media comments on viewers' body image perception. *New Media & Society*, *23*(12), 3448–3465. https://doi.org/10.1177/1461444820956368

Kim, H., Schlicht, R., Schardt, M., & Florack, A. (2021). The contributions of social comparison to social network site addiction. *PLOS ONE*, *16*(10), e0257795. https://doi.org/10.1371/journal.pone.0257795

Kim, Y. K., Kim, Y. J., Maleku, A., & Moon, S. S. (2019). Typologies of Peer Victimization, Depression, and Alcohol Use among High School Youth in the United States: Measuring Gender Differences. *Social Work in Public Health*, *34*(4), 293–306. https://doi.org/10.1080/19371918.2019.1606750

Kingsbury, M., Reme, B.-A., Skogen, J. C., Sivertsen, B., Øverland, S., Cantor, N., Hysing, M., Petrie, K., & Colman, I. (2021). Differential associations between types of social media use and university students' non-suicidal self-injury and suicidal behavior. *Computers in Human Behavior*, *115*, 106614. https://doi.org/10.1016/j.chb.2020.106614

Kirlic, N., Colaizzi, J. M., Cosgrove, K. T., Cohen, Z. P., Yeh, H., Breslin, F., Morris, A. S., Aupperle, R. L., Singh, M. K., & Paulus, M. P. (2021). Extracurricular Activities, Screen Media Activity, and Sleep May Be Modifiable Factors Related to Children's Cognitive

Functioning: Evidence From the ABCD Study®. *Child Development*, *92*(5), 2035–2052. https://doi.org/10.1111/cdev.13578

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook® and academic performance. *Computers in Human Behavior*, *26*(6), 1237–1245. https://doi.org/10.1016/j.chb.2010.03.024

Kitchenham, B., & Charters, S. (2007). *Guidelines for performing Systematic Literature Reviews in Software Engineering* (No. EBSE-2007-01).

Kleemans, M., Daalmans, S., Carbaat, I., & Anschütz, D. (2018). Picture Perfect: The Direct Effect of Manipulated Instagram Photos on Body Image in Adolescent Girls. *Media Psychology*, *21*(1), 93–110. https://doi.org/10.1080/15213269.2016.1257392

Knopik, V. S., Neiderhiser, J. M., DeFries, J. C., & Plomin, R. (2017). *Behavioral genetics* (seventh edition). Worth Publishers Macmillan Learning.

Konijn, E. A., Nije Bijvank, M., & Bushman, B. J. (2007). I wish I were a warrior: The role of wishful identification in the effects of violent video games on aggression in adolescent boys. *Developmental Psychology*, *43*(4), 1038–1044. https://doi.org/10.1037/0012-1649.43.4.1038

Krabbe, K. S., Nielsen, A. R., Krogh-Madsen, R., Plomgaard, P., Rasmussen, P., Erikstrup, C., Fischer, C. P., Lindegaard, B., Petersen, A. M. W., Taudorf, S., Secher, N. H., Pilegaard, H., Bruunsgaard, H., & Pedersen, B. K. (2007). Brain-derived neurotrophic factor (BDNF) and type 2 diabetes. *Diabetologia*, *50*(2), 431–438. https://doi.org/10.1007/s00125-006-0537-4

Krach, S. (2010). The rewarding nature of social interactions. *Frontiers in Behavioral Neuroscience*. https://doi.org/10.3389/fnbeh.2010.00022

Kramer, A. D. I., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences*, *111*(24), 8788–8790. https://doi.org/10.1073/pnas.1320040111

Krause, H.-V., Baum, K., Baumann, A., & Krasnova, H. (2021). Unifying the detrimental and beneficial effects of social network site use on self-esteem: A systematic literature review. *Media Psychology*, *24*(1), 10–47. https://doi.org/10.1080/15213269.2019.1656646

Krause, H.-V., große Deters, F., Baumann, A., & Krasnova, H. (2023). Active social media use and its impact on well-being—An experimental study on the effects of posting pictures on instagram. *Journal of Computer-Mediated Communication*, *28*(1), zmac037. https://doi.org/10.1093/jcmc/zmac037

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, *53*(9), 1017–1031. https://doi.org/10.1037/0003-066X.53.9.1017

Kross, E., Verduyn, P., Sheppes, G., Costello, C. K., Jonides, J., & Ybarra, O. (2021). Social Media and Well-Being: Pitfalls, Progress, and Next Steps. *Trends in Cognitive Sciences*, *25*(1), 55–66. https://doi.org/10.1016/j.tics.2020.10.005

Kumar, N. (2025, March 18). How Many People Use Instagram 2025 (New Statistics). *DemandSage*. https://www.demandsage.com/instagram-statistics/

Kurten, S., Vanherle, R., Beullens, K., Gebhardt, W. A., Van Den Putte, B., & Hendriks, H. (2022). Like to drink: Dynamics of liking alcohol posts and effects on alcohol use. *Computers in Human Behavior*, *129*, 107145. https://doi.org/10.1016/j.chb.2021.107145

Kuş M. (2025). A meta-analysis of the impact of technology related factors on students' academic performance. *Front Psychol*, *16*, 1524645. https://doi.org/10.3389/fpsyg.2025.1524645

Kuss, D. J., & Griffiths, M. D. (2012). Internet Gaming Addiction: A Systematic Review of Empirical Research. *International Journal of Mental Health and Addiction*, *10*(2), 278–296. https://doi.org/10.1007/s11469-011-9318-5

Langberg, J. M., Dvorsky, M. R., & Evans, S. W. (2013). What Specific Facets of Executive Function are Associated with Academic Functioning in Youth with Attention-Deficit/Hyperactivity Disorder? *Journal of Abnormal Child Psychology*, *41*(7), 1145–1159. https://doi.org/10.1007/s10802-013-9750-z

Lash, T. L., VanderWeele, T. J., Haneuse, S., & Rothman, K. J. (2020). *Modern epidemiology* (Fourth edition). Wolters Kluwer / Lippincott Williams & Wilkins.

Lauer, D. (2021). You cannot have AI ethics without ethics. *AI and Ethics*, *1*(1), 21–25. https://doi.org/10.1007/s43681-020-00013-4

Le, G. H., Wong, S., Haikazian, S., Johnson, D. E., Badulescu, S., Kwan, A. T. H., Gill, H., Di Vincenzo, J. D., Rosenblat, J. D., Mansur, R., Teopiz, K. M., Rhee, T. G., Ho, R., Liao, S., Cao, B., Schweinfurth-Keck, N., Vinberg, M., Grande, I., Phan, L., … McIntyre, R. S. (2024). Association between cognitive functioning, suicidal ideation and suicide attempts in major depressive disorder, bipolar disorder, schizophrenia and related disorders: A systematic review and meta-analysis. *Journal of Affective Disorders*, *365*, 381–399.

Lee, D., Lee, J., Namkoong, K., & Jung, Y.-C. (2021). Altered functional connectivity of the dorsal attention network among problematic social network users. *Addictive Behaviors*, *116*, 106823. https://doi.org/10.1016/j.addbeh.2021.106823

Lee, T. A., & Pickard, A. S. (2013). Exposure Definition and Measurement. In *Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide*. Agency for Healthcare Research and Quality (US). https://www.ncbi.nlm.nih.gov/books/NBK126191/

Lei, H., Huang, Y., Chai, Y., & Zhang, X. (2022). Social Media Disorder, Mental Health, and Validation of the Chinese Version of 27-Item Social Media Disorder Scale in Chinese College Students. *Frontiers in Public Health*, *10*, 942720. https://doi.org/10.3389/fpubh.2022.942720

Lemahieu L, Vander Zwalmen Y, Mennes M, Koster EHW, Vanden Abeele MMP, & Poels K. (2025). The effects of social media abstinence on affective well-being and life satisfaction: A systematic review and meta-analysis. *Sci Rep*, *15*(1), 7581. https://doi.org/10.1038/s41598-025-90984-3

Lembke, A. (2021). *Dopamine Nation: Finding Balance in the Age of Indulgence*. Penguin Publishing Group.

Levine, L. E., Waite, B. M., & Bowman, L. L. (2007). Electronic Media Use, Reading, and Academic Distractibility in College Youth. *CyberPsychology & Behavior*, *10*(4), 560–566. https://doi.org/10.1089/cpb.2007.9990

Lewis, S. P., Heath, N. L., Sornberger, M. J., & Arbuthnott, A. E. (2012). Helpful or Harmful? An Examination of Viewers' Responses to Nonsuicidal Self-Injury Videos on YouTube. *Journal of Adolescent Health*, *51*(4), 380–385. https://doi.org/10.1016/j.jadohealth.2012.01.013

Li, M., Chen, J., Li, N., & Li, X. (2014). A Twin Study of Problematic Internet Use: Its Heritability and Genetic Association With Effortful Control. *Twin Research and Human Genetics*, *17*(4), 279–287. https://doi.org/10.1017/thg.2014.32

Li, M., Zhang, X., Chen, K., Miao, Y., Xu, Y., Sun, Y., Jiang, M., Liu, M., Gao, Y., Xue, X., & Li, X. (2024). Alcohol Exposure and Disease Associations: A Mendelian Randomization and Meta-Analysis on Weekly Consumption and Problematic Drinking. *Nutrients*, *16*(10), 1517. https://doi.org/10.3390/nu16101517

Li, Y.-Y., Koning, I. M., Finkenauer, C., Boer, M., & Van Den Eijnden, R. J. J. M. (2024). The bidirectional relationships between fear of missing out, problematic social media use and adolescents' well-being: A random intercept cross-lagged panel model. *Computers in Human Behavior*, *154*, 108160. https://doi.org/10.1016/j.chb.2024.108160

Lieberman, D. Z., & Long, M. E. (2018). *The molecule of more: How a single chemical in your brain drives love, sex, and creativity-and will determine the fate of the human race*. BenBella Books, Inc.

Lim, K.-S., Wong, C. H., McIntyre, R. S., Wang, J., Zhang, Z., Tran, B. X., Tan, W., Ho, C. S., & Ho, R. C. (2019). Global Lifetime and 12-Month Prevalence of Suicidal Behavior, Deliberate Self-Harm and Non-Suicidal Self-Injury in Children and Adolescents between 1989 and 2018: A Meta-Analysis. *International Journal of Environmental Research and Public Health*, *16*(22), 4581. https://doi.org/10.3390/ijerph16224581

Lin, H., Wang, C., & Sun, Y. (2024). How big five personality traits influence information sharing on social media: A meta analysis. *PLOS ONE*, *19*(6), e0303770. https://doi.org/10.1371/journal.pone.0303770

Lindström, B., Bellander, M., Schultner, D. T., Chang, A., Tobler, P. N., & Amodio, D. M. (2021). A computational reward learning account of social media engagement. *Nature Communications*, *12*(1), 1311. https://doi.org/10.1038/s41467-020-19607-x

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. Journal of Health and Social Behavior, Spec No, 80–94.

Lipsitz, J. D., & Markowitz, J. C. (2013). Mechanisms of change in interpersonal therapy (IPT). *Clinical Psychology Review*, *33*(8), 1134–1147. https://doi.org/10.1016/j.cpr.2013.09.002

Liu M, Kamper-DeMarco KE, Zhang J, Xiao J, Dong D, & Xue P. (2022). Time Spent on Social Media and Risk of Depression in Adolescents: A Dose-Response Meta-Analysis. *Int J Environ Res Public Health*, *19*(9). https://doi.org/10.3390/ijerph19095164

Liu, R. T., Steele, S. J., Hamilton, J. L., Do, Q. B. P., Furbish, K., Burke, T. A., Martinez, A. P., & Gerlus, N. (2020). Sleep and suicide: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review*, *81*, 101895. https://doi.org/10.1016/j.cpr.2020.101895

Liu, R. T., Walsh, R. F. L., Sheehan, A. E., Cheek, S. M., & Sanzari, C. M. (2022). Prevalence and Correlates of Suicide and Nonsuicidal Self-injury in Children: A Systematic Review and Meta-analysis. *JAMA Psychiatry*, *79*(7), 718. https://doi.org/10.1001/jamapsychiatry.2022.1256

Liu, Y., Mohamad, E. M. W., Azlan, A. A., & Tan, Y. (2025). Am I Happier Without You? Social Media Detox and Well-Being: A Meta-Analysis of Randomized Controlled Trials. *Behavioral Sciences*, *15*(3), 290. https://doi.org/10.3390/bs15030290

Livingstone, S. (2008). Taking risky opportunities in youthful content creation: Teenagers' use of social networking sites for intimacy, privacy and self-expression. *New Media & Society*, *10*(3), 393–411. https://doi.org/10.1177/1461444808089415

Long, E. C., Verhulst, B., Neale, M. C., Lind, P. A., Hickie, I. B., Martin, N. G., & Gillespie, N. A. (2016). The Genetic and Environmental Contributions to Internet Use and Associations With Psychopathology: A Twin Study. *Twin Research and Human Genetics: The Official Journal of the International Society for Twin Studies*, *19*(1), 1–9. https://doi.org/10.1017/thg.2015.91

Lorenzo-Luaces, L., Dierckman, C., & Adams, S. (2023). *Attitudes and (mis)information about cognitive-behavioral therapy (CBT) on TikTok: An analysis of video content*. https://doi.org/10.31234/osf.io/87n2q

Lotter, L. D., Saberi, A., Hansen, J. Y., Misic, B., Paquola, C., Barker, G. J., Bokde, A. L. W., Desrivières, S., Flor, H., Grigis, A., Garavan, H., Gowland, P., Heinz, A., Brühl, R., Martinot, J.-L., Paillère, M.-L., Artiges, E., Papadopoulos Orfanos, D., Paus, T., … Dukart, J. (2024). Regional patterns of human cortex development correlate with underlying neurobiology. *Nature Communications*, *15*(1), 7987. https://doi.org/10.1038/s41467-024-52366-7

Lozano-Blasco, R., Barreiro-Collazo, A., Romero-Gonzalez, B., & Soto-Sanchez, A. (2024). The Family Context in Cybervictimization: A Systematic Review and Meta-Analysis. *Trauma, Violence, & Abuse*, *25*(3), 2143–2157. https://doi.org/10.1177/15248380231207894

Madge, C., Meek, J., Wellens, J., & Hooley, T. (2009). *Facebook* , social integration and informal learning at university: 'It is more for socialising and talking to friends about work than for actually doing work.' *Learning, Media and Technology*, *34*(2), 141–155. https://doi.org/10.1080/17439880902923606

Mahler, M. S. (1974). Symbiosis and individuation: The psychological birth of the human infant. *The Psychoanalytic Study of the Child*, *29*, 89–106. https://doi.org/10.1080/00797308.1974.11822615

Manago, A. M., Walsh, A. S., & Barsigian, L. L. (2023). The contributions of gender identification and gender ideologies to the purposes of social media use in adolescence. *Frontiers in Psychology*, *13*, 1011951. https://doi.org/10.3389/fpsyg.2022.1011951

Mangunkusumo, R. T., Moorman, P. W., Van Den Berg-de Ruiter, A. E., Van Der Lei, J., De Koning, H. J., & Raat, H. (2005). Internet-administered adolescent health questionnaires compared with a paper version in a randomized study. *Journal of Adolescent Health*, *36*(1), 70.e1-70.e6. https://doi.org/10.1016/j.jadohealth.2004.02.020

Marciano, L., Camerini, A.-L., & Morese, R. (2021). The Developing Brain in the Digital Era: A Scoping Review of Structural and Functional Correlates of Screen Time in Adolescence. *Frontiers in Psychology*, *12*, 671817. https://doi.org/10.3389/fpsyg.2021.671817

Marciano, L., Lin, J., Sato, T., Saboor, S., & Viswanath, K. (2024). Does social media use make us happy? A meta-analysis on social media and positive well-being outcomes. *SSM Mental Health*, *6*. https://doi.org/10.1016/j.ssmmh.2024.100331

Marciano L, Ostroumova M, Schulz PJ, & Camerini AL. (2021). Digital Media Use and Adolescents' Mental Health During the Covid-19 Pandemic: A Systematic Review and Meta-Analysis. *Front Public Health*, *9*, 793868. https://doi.org/10.3389/fpubh.2021.793868

Markon, K. E., Chmielewski, M., & Miller, C. J. (2011). The reliability and validity of discrete and continuous measures of psychopathology: A quantitative review. *Psychological Bulletin*, *137*(5), 856–879. https://doi.org/10.1037/a0023678

Markowitz, J. C., & Weissman, M. M. (2004). Interpersonal psychotherapy: Principles and applications. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, *3*(3), 136–139.

Martínez, V., Jiménez-Molina, Á., & Gerber, M. M. (2023). Social contagion, violence, and suicide among adolescents. *Current Opinion in Psychiatry*, *36*(3), 237–242. https://doi.org/10.1097/YCO.0000000000000858

Marttila, E., Koivula, A., & Räsänen, P. (2021). Does excessive social media use decrease subjective well-being? A longitudinal analysis of the relationship between problematic use, loneliness and life satisfaction. *Telematics and Informatics*, *59*, 101556. https://doi.org/10.1016/j.tele.2020.101556

Mason, M., Mennis, J., Russell, M., Moore, M., & Brown, A. (2019). Adolescent Depression and Substance Use: The Protective Role of Prosocial Peer Behavior. *Journal of Abnormal Child Psychology*, *47*(6), 1065–1074. https://doi.org/10.1007/s10802-018-0501-z

Maurya, C., Muhammad, T., Dhillon, P., & Maurya, P. (2022). The effects of cyberbullying victimization on depression and suicidal ideation among adolescents and young adults: A three year cohort study from India. *BMC Psychiatry*, *22*(1), 599. https://doi.org/10.1186/s12888-022-04238-x

Maza, M. T., Fox, K. A., Kwon, S.-J., Flannery, J. E., Lindquist, K. A., Prinstein, M. J., & Telzer, E. H. (2023). Association of Habitual Checking Behaviors on Social Media With

Longitudinal Functional Brain Development. *JAMA Pediatrics*, *177*(2), 160. https://doi.org/10.1001/jamapediatrics.2022.4924

McComb, C. A., Vanman, E. J., & Tobin, S. J. (2023). A meta-analysis of the effects of social media exposure to upward comparison targets on self-evaluations and emotions. *Media Psychology*, *26*(5), 612–635. https://doi.org/10.1080/15213269.2023.2180647

McComb, S. E., & Mills, J. S. (2022). The effect of physical appearance perfectionism and social comparison to thin-, slim-thick-, and fit-ideal Instagram imagery on young women's body image. *Body Image*, *40*, 165–175. https://doi.org/10.1016/j.bodyim.2021.12.003

McCrae, N., Gettings, S., & Purssell, E. (2017). Social Media and Depressive Symptoms in Childhood and Adolescence: A Systematic Review. *Adolescent Research Review*, *2*(4), 315–330. https://doi.org/10.1007/s40894-017-0053-4

McLean, S. A., Paxton, S. J., & Wertheim, E. H. (2016). The role of media literacy in body dissatisfaction and disordered eating: A systematic review. *Body Image*, *19*, 9–23. https://doi.org/10.1016/j.bodyim.2016.08.002

McMahon, L., Singleton, T., & Hayes, G. (2024, November 28). *Do "much, much more" on age verification, social media apps told*. BBC. https://www.bbc.com/news/articles/cn4v52ezx17o

McNamee, P., Mendolia, S., & Yerokhin, O. (2021). Social media use and emotional and behavioural outcomes in adolescence: Evidence from British longitudinal data. *Economics & Human Biology*, *41*, 100992. https://doi.org/10.1016/j.ehb.2021.100992

Meier, A., & Krause, H.-V. (2022). Does passive social media use harm well-being? *Journal of Media Psychology*. https://econtent.hogrefe.com/doi/10.1027/1864-1105/a000358

Meier, A., & Reinecke, L. (2021). Computer-Mediated Communication, Social Media, and Mental Health: A Conceptual and Empirical Meta-Review. *Communication Research*, *48*(8), 1182–1209. https://doi.org/10.1177/0093650220958224

Meng, S.-Q., Cheng, J.-L., Li, Y.-Y., Yang, X.-Q., Zheng, J.-W., Chang, X.-W., Shi, Y., Chen, Y., Lu, L., Sun, Y., Bao, Y.-P., & Shi, J. (2022). Global prevalence of digital addiction in general population: A systematic review and meta-analysis. *Clinical Psychology Review*, *92*, 102128. https://doi.org/10.1016/j.cpr.2022.102128

Mérelle, S. Y. M., Kleiboer, A. M., Schotanus, M., Cluitmans, T. L. M., Waardenburg, C. M., Kramer, D., van de Mheen, D., & van Rooij, A. J. (2017). Which health-related problems are associated with problematic video-gaming or social media use in adolescents? A large-scale cross-sectional study. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, *14*(1), 11–19.

Meshi, D., Mamerow, L., Kirilina, E., Morawetz, C., Margulies, D. S., & Heekeren, H. R. (2016). Sharing self-related information is associated with intrinsic functional connectivity of cortical midline brain regions. *Scientific Reports*, *6*(1), 22491. https://doi.org/10.1038/srep22491

Meshi, D., Morawetz, C., & Heekeren, H. R. (2013). Nucleus accumbens response to gains in reputation for the self relative to gains for others predicts social media use. *Frontiers in Human Neuroscience*, *7*, 439. https://doi.org/10.3389/fnhum.2013.00439

Meshi, D., Tamir, D. I., & Heekeren, H. R. (2015). The Emerging Neuroscience of Social Media. *Trends in Cognitive Sciences*, *19*(12), 771–782. https://doi.org/10.1016/j.tics.2015.09.004

Metheekul, P. (2024). The Development and Effectiveness of Digital Well-being Intervention on Enhancing Digital Literacy and Psychological Well-Being of Thai Adolescents. *The Journal of Behavioral Science*, *19*(2), 89–102.

Micali, N., Ploubidis, G., De Stavola, B., Simonoff, E., & Treasure, J. (2014). Frequency and Patterns of Eating Disorder Symptoms in Early Adolescence. *Journal of Adolescent Health*, *54*(5), 574–581. https://doi.org/10.1016/j.jadohealth.2013.10.200

Midgley, C., Thai, S., Lockwood, P., Kovacheff, C., & Page-Gould, E. (2021). When every day is a high school reunion: Social media comparisons and self-esteem. *Journal of Personality and Social Psychology*, *121*(2), 285–307. https://doi.org/10.1037/pspi0000336

Mikami, A. Y., Khalis, A., & Karasavva, V. (2025). Logging out or leaning in? Social media strategies for enhancing well-being. *Journal of Experimental Psychology: General*, *154*(1), 171–189. https://doi.org/10.1037/xge0001668

Mohammad, S., Jan, R. A., & Alsaedi, S. L. (2023). Symptoms, Mechanisms, and Treatments of Video Game Addiction. *Cureus*. https://doi.org/10.7759/cureus.36957

Montag, C., Lachmann, B., Herrlich, M., & Zweig, K. (2019). Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories. *International Journal of Environmental Research and Public Health*, *16*(14), 2612. https://doi.org/10.3390/ijerph16142612

Moreno, M. A., & Whitehill, J. M. (2014). Influence of Social Media on Alcohol Use in Adolescents and Young Adults. *Alcohol Research: Current Reviews*, *36*(1), 91–100.

Moretta, T., Buodo, G., Demetrovics, Z., & Potenza, M. N. (2022). Tracing 20 years of research on problematic use of the internet and social media: Theoretical models, assessment tools, and an agenda for future work. *Comprehensive Psychiatry*, *112*, 152286. https://doi.org/10.1016/j.comppsych.2021.152286

Mori, C., Temple, J. R., Browne, D., & Madigan, S. (2019). Association of Sexting With Sexual Behaviors and Mental Health Among Adolescents: A Systematic Review and Meta-analysis. *JAMA Pediatrics*, *173*(8), 770. https://doi.org/10.1001/jamapediatrics.2019.1658

Morningstar, B., Clayborne, Z., Wong, S. L., Roberts, K. C., Prince, S. A., Gariépy, G., Goldfield, G. S., Janssen, I., & Lang, J. J. (2023). The association between social media use and physical activity among Canadian adolescents: A Health Behaviour in School-aged Children (HBSC) study. *Canadian Journal of Public Health*, *114*(4), 642–650. https://doi.org/10.17269/s41997-023-00754-9

Moshel, M. L., Warburton, W. A., Batchelor, J., Bennett, J. M., & Ko, K. Y. (2024). Neuropsychological deficits in disordered screen use behaviours: A systematic review and meta-analysis. *Neuropsychology Review*, *34*(3), 791–822. https://doi.org/10.1007/s11065-023-09612-4

Mougharbel, F., Chaput, J.-P., Sampasa-Kanyinga, H., Hamilton, H. A., Colman, I., Leatherdale, S. T., & Goldfield, G. S. (2023). Heavy social media use and psychological distress among adolescents: The moderating role of sex, age, and parental support. *Frontiers in Public Health*, *11*, 1190390. https://doi.org/10.3389/fpubh.2023.1190390

Mougharbel, F., & Goldfield, G. S. (2020). Psychological Correlates of Sedentary Screen Time Behaviour Among Children and Adolescents: A Narrative Review. *Current Obesity Reports*, *9*(4), 493–511. https://doi.org/10.1007/s13679-020-00401-1

Mu, W., Zhu, D., Wang, Y., Li, F., Ye, L., Wang, K., & Zhou, M. (2020). Three-Wave Longitudinal Survey on the Relationship between Neuroticism and Depressive Symptoms of First-Year

College Students: Addictive Use of Social Media as a Moderated Mediator. *International Journal of Environmental Research and Public Health*, *17*(17), 6074. https://doi.org/10.3390/ijerph17176074

Murcia, J. V., & de Asis, A. (2016). Influence of Facebook addiction on study habits of college students. *SSRN*. https://scholar.google.com/scholar?cluster=14486697813687323057&hl=en&oi=scholarr

Murray, L., Creswell, C., & Cooper, P. J. (2009). The development of anxiety disorders in childhood: An integrative review. *Psychological Medicine*, *39*(9), 1413–1423. https://doi.org/10.1017/S0033291709005157

Naga, J. F., & Ebardo, R. A. (2025). Social network sites (SNS) an archetype of techno-social stress: A systematic review. *Heliyon*, *11*(1), e41119. https://doi.org/10.1016/j.heliyon.2024.e41119

Nan, Y., Qin, J., Li, Z., Kim, N. G., Kim, S. S. Y., & Miller, L. C. (2024). Is social media use related to social anxiety? A meta-analysis. *Mass Communication & Society*, *27*(3), 441–474. https://doi.org/10.1080/15205436.2024.2321533

Narrow, W. E., & Kuhl, E. A. (2011). Dimensional approaches to psychiatric diagnosis in DSM-5. *The Journal of Mental Health Policy and Economics*, *14*(4), 197–200.

National Center for Drug Abuse Statistics. (n.d.). *Teenage Drug Use Statistics [2023]: Data & Trends on Abuse*. NCDAS. Retrieved April 10, 2025, from https://drugabusestatistics.org/teen-drug-use/

Nereim, C., Bickham, D., & Rich, M. (2022). Exploring use patterns and racial and ethnic differences in real time affective states during social media use among a clinical sample of adolescents with depression: Prospective cohort study. *JMIR Formative Research*, *6*(5), e30900. https://doi.org/10.2196/30900

Nesi J, Burke TA, Bettis AH, Kudinova AY, Thompson EC, MacPherson HA, Fox KA, Lawrence HR, Thomas SA, Wolff JC, Altemus MK, Soriano S, & Liu RT. (2021). Social media use and self-injurious thoughts and behaviors: A systematic review and meta-analysis. *Clin Psychol Rev*, *87*, 102038. https://doi.org/10.1016/j.cpr.2021.102038

Nesi, J., & Prinstein, M. J. (2015). Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms. *Journal of Abnormal Child Psychology*, *43*(8), 1427–1438. https://doi.org/10.1007/s10802-015-0020-0

Nesi, J., Rothenberg, W. A., Bettis, A. H., Massing-Schaffer, M., Fox, K. A., Telzer, E. H., Lindquist, K. A., & Prinstein, M. J. (2022). Emotional Responses to Social Media Experiences Among Adolescents: Longitudinal Associations with Depressive Symptoms. *Journal of Clinical Child & Adolescent Psychology*, *51*(6), 907–922. https://doi.org/10.1080/15374416.2021.1955370

Neuman, S. B. (1988). The Displacement Effect: Assessing the Relation between Television Viewing and Reading Performance. *Reading Research Quarterly*, *23*(4), 414. https://doi.org/10.2307/747641

Nick, E. A., Kilic, Z., Nesi, J., Telzer, E. H., Lindquist, K. A., & Prinstein, M. J. (2022). Adolescent Digital Stress: Frequencies, Correlates, and Longitudinal Association With Depressive Symptoms. *Journal of Adolescent Health*, *70*(2), 336–339. https://doi.org/10.1016/j.jadohealth.2021.08.025

Niederkrotenthaler, T., Till, B., Kirchner, S., Sinyor, M., Braun, M., Pirkis, J., Tran, U. S., Voracek, M., Arendt, F., Ftanou, M., Kovacs, R., King, K., Schlichthorst, M., Stack, S., & Spittal, M. J. (2022). Effects of media stories of hope and recovery on suicidal ideation and help-seeking attitudes and intentions: Systematic review and meta-analysis. *The Lancet Public Health*, *7*(2), e156–e168. https://doi.org/10.1016/S2468-2667(21)00274-7

Nitschinsk, L., Tobin, S. J., & Vanman, E. J. (2022). The Disinhibiting Effects of Anonymity Increase Online Trolling. *Cyberpsychology, Behavior, and Social Networking*, *25*(6), 377–383. https://doi.org/10.1089/cyber.2022.0005

Nixon, C. L. (2014). Current perspectives: The impact of cyberbullying on adolescent health. *Adolescent Health, Medicine and Therapeutics*, *5*, 143–158. https://doi.org/10.2147/AHMT.S36456

Noë, B., Turner, L. D., Linden, D. E. J., Allen, S. M., Winkens, B., & Whitaker, R. M. (2019). Identifying Indicators of Smartphone Addiction Through User-App Interaction. *Computers in Human Behavior*, *99*, 56–65. https://doi.org/10.1016/j.chb.2019.04.023

Noe, R. A., Tews, M. J., & Marand, A. D. (2013). Individual differences and informal learning in the workplace. *Journal of Vocational Behavior*, *83*(3), 327–335. https://doi.org/10.1016/j.jvb.2013.06.009

Nuss, K., Coulter, R., & Liu, S. (2024). Content of social media fitspiration and its effect on physical activity-related behavior: A systematic review. *Psychology of Popular Media*, *13*(3), 353–362. https://doi.org/10.1037/ppm0000489

O'Day, E. B., & Heimberg, R. G. (2021). Social media use, social anxiety, and loneliness: A systematic review. *Computers in Human Behavior Reports*, *3*, 100070. https://doi.org/10.1016/j.chbr.2021.100070

O'Donnell, S., & Epstein, L. H. (2019). Smartphones are more reinforcing than food for students. *Addictive Behaviors*, *90*, 124–133. https://doi.org/10.1016/j.addbeh.2018.10.018

Office of the Surgeon General (OSG). (2023). *Social Media and Youth Mental Health: The U.S. Surgeon General's Advisory*. US Department of Health and Human Services. http://www.ncbi.nlm.nih.gov/books/NBK594761/

Orben, A. (2020). Teenagers, screens and social media: A narrative review of reviews and key studies. *Social Psychiatry and Psychiatric Epidemiology*, *55*(4), 407–414. https://doi.org/10.1007/s00127-019-01825-4

Orben, A., & Blakemore, S.-J. (2023). How social media affects teen mental health: A missing link. *Nature*, *614*(7948), 410–412. https://doi.org/10.1038/d41586-023-00402-9

Orben, A., Meier, A., Dalgleish, T., & Blakemore, S.-J. (2024). Mechanisms linking social media use to adolescent mental health vulnerability. *Nature Reviews Psychology*, *3*(6), 407–423. https://doi.org/10.1038/s44159-024-00307-y

Orben, A., Przybylski, A. K., Blakemore, S.-J., & Kievit, R. A. (2022). Windows of developmental sensitivity to social media. *Nature Communications*, *13*(1), 1649. https://doi.org/10.1038/s41467-022-29296-3

Ozimek, P., Lainas, S., Bierhoff, H.-W., & Rohmann, E. (2023). How photo editing in social media shapes self-perceived attractiveness and self-esteem via self-objectification and physical appearance comparisons. *BMC Psychology*, *11*(1), 99. https://doi.org/10.1186/s40359-023-01143-0

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S.,

… Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, n71. https://doi.org/10.1136/bmj.n71

Pagliaccio, D., Tran, K. T., Visoki, E., DiDomenico, G. E., Auerbach, R. P., & Barzilay, R. (2024). Probing the digital exposome: Associations of social media use patterns with youth mental health. *NPP—Digital Psychiatry and Neuroscience*, *2*(1), 5. https://doi.org/10.1038/s44277-024-00006-9

Pan, W., Liu, D., & Fang, J. (2021). An Examination of Factors Contributing to the Acceptance of Online Health Misinformation. *Frontiers in Psychology*, *12*, 630268. https://doi.org/10.3389/fpsyg.2021.630268

Pancani, L., Petilli, M. A., Riva, P., & Rusconi, P. (2023). *I can't live without you:* delay discounting in smartphone usage. *Journal of Cognitive Psychology*, *35*(4), 441–455. https://doi.org/10.1080/20445911.2023.2195031

Parry, D. A., Davidson, B. I., Sewall, C. J. R., Fisher, J. T., Mieczkowski, H., & Quintana, D. S. (2021). A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use. *Nature Human Behaviour*, *5*(11), 1535–1547. https://doi.org/10.1038/s41562-021-01117-5

Paterna, A., Alcaraz-Ibáñez, M., Aguilar-Parra, J. M., Salavera, C., Demetrovics, Z., & Griffiths, M. D. (2024). Problematic smartphone use and academic achievement: A systematic review and meta-analysis. *Journal of Behavioral Addictions*, *13*(2), 313–326. https://doi.org/10.1556/2006.2024.00014

Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, *36*(6), 556–563. https://doi.org/10.1016/S0092-6566(02)00505-6

Paulus, M. P., Squeglia, L. M., Bagot, K., Jacobus, J., Kuplicki, R., Breslin, F. J., Bodurka, J., Morris, A. S., Thompson, W. K., Bartsch, H., & Tapert, S. F. (2019). Screen media activity and brain structure in youth: Evidence for diverse structural correlation networks from the ABCD study. *NeuroImage*, *185*, 140–153. https://doi.org/10.1016/j.neuroimage.2018.10.040

Paulus, M. P., Zhao, Y., Potenza, M. N., Aupperle, R. L., Bagot, K. S., & Tapert, S. F. (2023). Screen media activity in youth: A critical review of mental health and neuroscience findings. *Journal of Mood & Anxiety Disorders*, *3*, 100018. https://doi.org/10.1016/j.xjmad.2023.100018

Paus, T., Keshavan, M., & Giedd, J. N. (2008). Why do many psychiatric disorders emerge during adolescence? *Nature Reviews Neuroscience*, *9*(12), 947–957. https://doi.org/10.1038/nrn2513

Pedrouzo, S., & Krynski, L. (2023). Hyperconnected: Children and adolescents on social media. The TikTok phenomenon. *Archivos Argentinos de Pediatria*, *121*(4). https://doi.org/10.5546/aap.2022-02674.eng

Peng, P., & Liao, Y. (2023). Six addiction components of problematic social media use in relation to depression, anxiety, and stress symptoms: A latent profile analysis and network analysis. *BMC Psychiatry*, *23*(1), 321. https://doi.org/10.1186/s12888-023-04837-2

Pera, A. (2020). The Psychology of Addictive Smartphone Behavior in Young Adults: Problematic Use, Social Anxiety, and Depressive Stress. *Frontiers in Psychiatry*, *11*, 573473. https://doi.org/10.3389/fpsyt.2020.573473

Pickles, A., & Angold, A. (2003). Natural categories or fundamental dimensions: On carving nature at the joints and the rearticulation of psychopathology. *Development and Psychopathology*, *15*(3), 529–551. https://doi.org/10.1017/S0954579403000282

Pike, G. R., & Saupe, J. L. (2002). Does High School Matter? An Analysis of Three Methods of Predicting First-Year Grades. *Research in Higher Education*, *43*(2), 187–207. https://doi.org/10.1023/A:1014419724092

Pires, R., Henriques-Calado, J., Sousa Ferreira, A., Bach, B., Paulino, M., Gama Marques, J., Ribeiro Moreira, A., Grácio, J., & Gonçalves, B. (2021). The Utility of ICD-11 and DSM-5 Traits for Differentiating Patients With Personality Disorders From Other Clinical Groups. *Frontiers in Psychiatry*, *12*, 633882. https://doi.org/10.3389/fpsyt.2021.633882

Plaisier, X. S., & Konijn, E. A. (2013). Rejected by peers—Attracted to antisocial media content: Rejection-based anger impairs moral judgment among adolescents. *Developmental Psychology*, *49*(6), 1165–1173. https://doi.org/10.1037/a0029399

Plummer, F., Manea, L., Trepel, D., & McMillan, D. (2016). Screening for anxiety disorders with the GAD-7 and GAD-2: A systematic review and diagnostic metaanalysis. *General Hospital Psychiatry*, *39*, 24–31. https://doi.org/10.1016/j.genhosppsych.2015.11.005

PlushCare. (2025, August 1). *How Accurate is Mental Health Advice on TikTok?* https://plushcare.com/blog/tiktok-mental-health/

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin*, *112*(1), 160–164. https://doi.org/10.1037/0033-2909.112.1.160

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, *29*(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Qi, C. (2019). A double-edged sword? Exploring the impact of students' academic usage of mobile devices on technostress and academic performance. *Behaviour & Information Technology*, *38*(12), 1337–1354. https://doi.org/10.1080/0144929X.2019.1585476

Rajesh T & Rangaiah B. (2022). Relationship between personality traits and facebook addiction: A meta-analysis. *Heliyon*, *8*(8), e10315. https://doi.org/10.1016/j.heliyon.2022.e10315

Ramadhan RN, Rampengan DD, Yumnanisha DA, Setiono SB, Tjandra KC, Ariyanto MV, Idrisov B, & Empitu MA. (2024). Impacts of digital social media detox for mental health: A systematic review and meta-analysis. *Narra J*, *4*(2), e786. https://doi.org/10.52225/narra.v4i2.786

Rapee, R. M., Oar, E. L., Johnco, C. J., Forbes, M. K., Fardouly, J., Magson, N. R., & Richardson, C. E. (2019). Adolescent development and risk for the onset of social-emotional disorders: A review and conceptual model. *Behaviour Research and Therapy*, *123*, 103501. https://doi.org/10.1016/j.brat.2019.103501

Rehm, J., Gmel, G. E., Gmel, G., Hasan, O. S. M., Imtiaz, S., Popova, S., Probst, C., Roerecke, M., Room, R., Samokhvalov, A. V., Shield, K. D., & Shuper, P. A. (2017). The relationship between different dimensions of alcohol use and the burden of disease—An update. *Addiction*, *112*(6), 968–1001. https://doi.org/10.1111/add.13757

Reich, S. M., Subrahmanyam, K., & Espinoza, G. (2012). Friending, IMing, and hanging out face-to-face: Overlap in adolescents' online and offline social networks. *Developmental Psychology*, *48*(2), 356–368. https://doi.org/10.1037/a0026980

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, *90*, 24–31. https://doi.org/10.1016/j.socscimed.2013.04.026

Richey, M., Gonibeed, A., & Ravishankar, M. N. (2018). The Perils and Promises of Self-Disclosure on Social Media. *Information Systems Frontiers*, *20*(3), 425–437. https://doi.org/10.1007/s10796-017-9806-7

Ridley, B. J., Cornelissen, P. L., Maalin, N., Mohamed, S., Kramer, R. S. S., McCarty, K., & Tovée, M. J. (2022). The degree to which the cultural ideal is internalized predicts judgments of male and female physical attractiveness. *Frontiers in Psychology*, *13*, 980277. https://doi.org/10.3389/fpsyg.2022.980277

Ringwald, W. R., Forbes, M. K., & Wright, A. G. C. (2021). Meta-analysis of structural evidence for the Hierarchical Taxonomy of Psychopathology (HiTOP) model. *Psychological Medicine*, 1–14. https://doi.org/10.1017/S0033291721001902

Rodríguez, M. R., Nuevo, R., Chatterji, S., & Ayuso-Mateos, J. L. (2012). Definitions and factors associated with subthreshold depressive conditions: A systematic review. *BMC Psychiatry*, *12*(1), 181. https://doi.org/10.1186/1471-244X-12-181

Rothenberg, E. (2023, November 26). *Meta collected children's data from Instagram accounts, unsealed court document alleges | CNN Business*. CNN. https://www.cnn.com/2023/11/26/business/meta-collecting-data-children-facebook/index.html

Rounsefell K, Gibson S, McLean S, Blair M, Molenaar A, Brennan L, Truby H, & McCaffrey TA. (2020). Social media, body image and food choices in healthy young adults: A mixed methods systematic review. *Nutr Diet*, *77*(1), 19–40. https://doi.org/10.1111/1747-0080.12581

Rozgonjuk, D., Sindermann, C., Elhai, J. D., & Montag, C. (2020). Fear of Missing Out (FoMO) and social media's impact on daily-life and productivity at work: Do WhatsApp, Facebook, Instagram, and Snapchat Use Disorders mediate that association? *Addictive Behaviors*, *110*, 106487. https://doi.org/10.1016/j.addbeh.2020.106487

Ruan, C., Lu, Z., Li, H., Lin, W., Li, D., & Yuan, J. (2023). More friends on SNS, more materialism? The moderating roles of self-esteem and social comparison orientation. *PLOS ONE*, *18*(5), e0283723. https://doi.org/10.1371/journal.pone.0283723

Sagliano, L., Ponari, M., Conson, M., & Trojano, L. (2022). Editorial: The interpersonal effects of emotions: The influence of facial expressions on social interactions. *Frontiers in Psychology*, *13*, 1074216. https://doi.org/10.3389/fpsyg.2022.1074216

Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers in Human Behavior*, *101*, 259–275. https://doi.org/10.1016/j.chb.2019.07.028

Sala, A., Porcaro, L., & Gómez, E. (2024). Social Media Use and adolescents' mental health and well-being: An umbrella review. *Computers in Human Behavior Reports*, *14*, 100404. https://doi.org/10.1016/j.chbr.2024.100404

Salamone, J. D., & Correa, M. (2012). The Mysterious Motivational Functions of Mesolimbic Dopamine. *Neuron*, *76*(3), 470–485. https://doi.org/10.1016/j.neuron.2012.10.021

Salari, N., Zarei, H., Rasoulpoor, S., Ghasemi, H., Hosseinian-Far, A., & Mohammadi, M. (2025). The impact of social networking addiction on the academic achievement of university students globally: A meta-analysis. *Public Health in Practice*, *9*, 100584. https://doi.org/10.1016/j.puhip.2025.100584

Salgado-Pineda, P., Delaveau, P., Blin, O., & Nieoullon, A. (2005). Dopaminergic Contribution to the Regulation of Emotional Perception: *Clinical Neuropharmacology*, *28*(5), 228–237. https://doi.org/10.1097/01.wnf.0000185824.57690.f0

Sampasa-Kanyinga, H., Chaput, J.-P., & Hamilton, H. A. (2019). Social Media Use, School Connectedness, and Academic Performance Among Adolescents. *The Journal of Primary Prevention*, *40*(2), 189–211. https://doi.org/10.1007/s10935-019-00543-6

Sampasa-Kanyinga, H., Colman, I., Goldfield, G. S., Hamilton, H. A., & Chaput, J.-P. (2020). Sex differences in the relationship between social media use, short sleep duration, and body mass index among adolescents. *Sleep Health*, *6*(5), 601–608. https://doi.org/10.1016/j.sleh.2020.01.017

Sampasa-Kanyinga, H., Goldfield, G. S., Kingsbury, M., Clayborne, Z., & Colman, I. (2020). Social media use and parent–child relationship: A cross-sectional study of adolescents. *Journal of Community Psychology*, *48*(3), 793–803. https://doi.org/10.1002/jcop.22293

Sampasa-Kanyinga, H., & Hamilton, H. A. (2015). Social networking sites and mental health problems in adolescents: The mediating role of cyberbullying victimization. *European Psychiatry*, *30*(8), 1021–1027. https://doi.org/10.1016/j.eurpsy.2015.09.011

Sampasa-Kanyinga, H., Hamilton, H. A., & Chaput, J. (2018). Use of social media is associated with short sleep duration in a dose–response manner in students aged 11 to 20 years. *Acta Paediatrica*, *107*(4), 694–700. https://doi.org/10.1111/apa.14210

Sarmiento, I. G., Olson, C., Yeo, G., Chen, Y. A., Toma, C. L., Brown, B. B., Bellmore, A., & Mares, M.-L. (2020). How does social media use relate to adolescents' internalizing symptoms? Conclusions from a systematic narrative review. *Adolescent Research Review*, *5*(4), 381–404. https://doi.org/10.1007/s40894-018-0095-2

Schag, K., Schönleber, J., Teufel, M., Zipfel, S., & Giel, K. E. (2013). Food-related impulsivity in obesity and Binge Eating Disorder – a systematic review. *Obesity Reviews*, *14*(6), 477–495. https://doi.org/10.1111/obr.12017

Schwartz, J. A., & Beaver, K. M. (2015). A Partial Test of Moffitt's Developmental Taxonomy: Examining the Role of Genetic Risk. *Justice Quarterly*, *32*(5), 768–791. https://doi.org/10.1080/07418825.2013.805798

Scott, H., & Woods, H. C. (2018). Fear of missing out and sleep: Cognitive behavioural factors in adolescents' nighttime social media use. *Journal of Adolescence*, *68*(1), 61–65. https://doi.org/10.1016/j.adolescence.2018.07.009

Scully, M., Swords, L., & Nixon, E. (2023). Social comparisons on social media: Online appearance-related activity and body dissatisfaction in adolescent girls. *Irish Journal of Psychological Medicine*, *40*(1), 31–42. https://doi.org/10.1017/ipm.2020.93

Sebastian, C., Viding, E., Williams, K. D., & Blakemore, S.-J. (2010). Social brain development and the affective consequences of ostracism in adolescence. *Brain and Cognition*, *72*(1), 134–145. https://doi.org/10.1016/j.bandc.2009.06.008

Senekal, J. S., Ruth Groenewald, G., Wolfaardt, L., Jansen, C., & Williams, K. (2023). Social media and adolescent psychosocial development: A systematic review. *South African Journal of Psychology*, *53*(2), 157–171. https://doi.org/10.1177/00812463221119302

Seong, E., Noh, G., Lee, K. H., Lee, J.-S., Kim, S., Seo, D. G., Yoo, J. H., Hwang, H., Choi, C.-H., Han, D. H., Hong, S.-B., & Kim, J.-W. (2021). Relationship of Social and Behavioral Characteristics to Suicidality in Community Adolescents With Self-Harm: Considering Contagion and Connection on Social Media. *Frontiers in Psychology*, *12*, 691438. https://doi.org/10.3389/fpsyg.2021.691438

Sepas A, Bangash AH, Nielsen RE, Yang W, & El-Hussuna A. (2024). The Association between Problematic Instagram Use, Psychological Distress, and Well-Being: A Systematic Review and Meta-Analysis. *Cyberpsychol Behav Soc Netw*, *27*(9), 641–650. https://doi.org/10.1089/cyber.2023.0222

Shabahang, R., Shim, H., Aruguete, M. S., & Zsila, Á. (2022). Oversharing on Social Media: Anxiety, Attention-Seeking, and Social Media Addiction Predict the Breadth and Depth of Sharing. *Psychological Reports*, *127*(2), 513–530. https://doi.org/10.1177/00332941221122861

Shankman, S. A., Funkhouser, C. J., Klein, D. N., Davila, J., Lerner, D., & Hee, D. (2018). Reliability and validity of severity dimensions of psychopathology assessed using the STRUCTURED CLINICAL INTERVIEW for DSM-5 (SCID). *International Journal of Methods in Psychiatric Research*, *27*(1), e1590. https://doi.org/10.1002/mpr.1590

Shannon H, Bush K, Villeneuve PJ, Hellemans KG, & Guimond S. (2022). Problematic Social Media Use in Adolescents and Young Adults: Systematic Review and Meta-analysis. *JMIR Ment Health*, *9*(4), e33450. https://doi.org/10.2196/33450

Sharif, I., Wills, T. A., & Sargent, J. D. (2010). Effect of Visual Media Use on School Performance: A Prospective Study. *Journal of Adolescent Health*, *46*(1), 52–61. https://doi.org/10.1016/j.jadohealth.2009.05.012

Sherman, L. E., Payton, A. A., Hernandez, L. M., Greenfield, P. M., & Dapretto, M. (2016). The Power of the *Like* in Adolescence: Effects of Peer Influence on Neural and Behavioral Responses to Social Media. *Psychological Science*, *27*(7), 1027–1035. https://doi.org/10.1177/0956797616645673

Shimkhada, R., & Ponce, N. A. (2024). Social Media Use and Serious Psychological Distress Among Adolescents. *JMIR Pediatrics and Parenting*, *7*, e57041–e57041. https://doi.org/10.2196/57041

Shimoga, S. V., Erlyana, E., & Rebello, V. (2019). Associations of Social Media Use With Physical Activity and Sleep Adequacy Among Adolescents: Cross-Sectional Survey. *Journal of Medical Internet Research*, *21*(6), e14290. https://doi.org/10.2196/14290

Shulman, E. P., Smith, A. R., Silva, K., Icenogle, G., Duell, N., Chein, J., & Steinberg, L. (2016). The dual systems model: Review, reappraisal, and reaffirmation. *Developmental Cognitive Neuroscience*, *17*, 103–117. https://doi.org/10.1016/j.dcn.2015.12.010

Skogen, J. C., Bøe, T., Finserås, T. R., Sivertsen, B., Hella, R. T., & Hjetland, G. J. (2022). Lower Subjective Socioeconomic Status Is Associated With Increased Risk of Reporting Negative Experiences on Social Media. Findings From the “LifeOnSoMe”-Study. *Frontiers in Public Health*, *10*, 873463. https://doi.org/10.3389/fpubh.2022.873463

Slomski, A. (2023). Teen Girls Are Faring Worse Than Boys on Nearly All Mental Health Measures—Here’s Why. *JAMA*, *329*(15), 1243. https://doi.org/10.1001/jama.2023.3402

Soares, F. B., Gruzd, A., Jacobson, J., & Hodson, J. (2023). To troll or not to troll: Young adults’ anti-social behaviour on social media. *PLOS ONE*, *18*(5), e0284374. https://doi.org/10.1371/journal.pone.0284374

Sobkin, V. S., & Fedotova, A. V. (2019). Adolescent Aggression in Social Media: Perception and Personal Experience. *Psychological Science and Education*, *24*(2), 5–18. https://doi.org/10.17759/pse.2019240201

Sobkin, V. S., & Fedotova, A. V. (2021). Adolescents on Social Media: Aggression and Cyberbullying. *Psychology in Russia: State of the Art*, *14*(4), 186–201. https://doi.org/10.11621/pir.2021.0412

Social media use, connections and relationships in Canadian adolescents: Findings from the 2018 Health Behaviour in School-aged Children (HBSC) Study. (with Public Health Agency of Canada). (2021). Public Health Agency of Canada = Agence de santé publique du Canada.

Solinas, M., Belujon, P., Fernagut, P. O., Jaber, M., & Thiriet, N. (2019). Dopamine and addiction: What have we learned from 40 years of research. *Journal of Neural Transmission*, *126*(4), 481–516. https://doi.org/10.1007/s00702-018-1957-2

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, *27*(1), 281–295. https://doi.org/10.1038/s41380-021-01161-7

Sowell, E. R., Peterson, B. S., Thompson, P. M., Welcome, S. E., Henkenius, A. L., & Toga, A. W. (2003). Mapping cortical change across the human life span. *Nature Neuroscience*, *6*(3), 309–315. https://doi.org/10.1038/nn1008

Spínola, L. G., Calaboiça, C., & Carvalho, I. P. (2024). The use of social networking sites and its association with non-suicidal self-injury among children and adolescents: A systematic review. *Journal of Affective Disorders Reports*, *16*, 100781. https://doi.org/10.1016/j.jadr.2024.100781

Starvaggi, I., Dierckman, C., & Lorenzo-Luaces, L. (2023). *Mental health misinformation on social media: Review and future directions*. https://doi.org/10.31234/osf.io/nt85m

Statistics Canada. (2021, November 24). *The Daily — Canadian Social Survey: Loneliness in Canada*. Government of Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/211124/dq211124e-eng.htm

Statistics Canada. (2023). *Online digital media use and adolescent mental health*. https://doi.org/10.25318/82-003-X202300200002-ENG

Statistics Canada. (2025, January 16). *Rising mental health concerns among youth*. Government of Canada. https://www.statcan.gc.ca/o1/en/plus/7642-rising-mental-health-concerns-among-youth

Steele, R. G., Khetawat, D., Christofferson, J. L., & Hall, J. A. (2023). Concurrent Validity of Self-Reported Social Media Use in Adolescents and Young Adults: Associations with Objective Data and Psychosocial Functioning. *Journal of Psychopathology and Behavioral Assessment*, *45*(1), 97–108. https://doi.org/10.1007/s10862-022-10013-9

Steinberg, L. (2010). A dual systems model of adolescent risk-taking. *Developmental Psychobiology*, *52*(3), 216–224. https://doi.org/10.1002/dev.20445

Steinberg, L., Icenogle, G., Shulman, E. P., Breiner, K., Chein, J., Bacchini, D., Chang, L., Chaudhary, N., Giunta, L. D., Dodge, K. A., Fanti, K. A., Lansford, J. E., Malone, P. S., Oburu, P., Pastorelli, C., Skinner, A. T., Sorbring, E., Tapanya, S., Tirado, L. M. U., … Takash, H. M. S. (2018). Around the world, adolescence is a time of heightened sensation seeking and immature self-regulation. *Developmental Science*, *21*(2), e12532. https://doi.org/10.1111/desc.12532

Stieger, S., & Lewetz, D. (2018). A Week Without Using Social Media: Results from an Ecological Momentary Intervention Study Using Smartphones. *Cyberpsychology, Behavior, and Social Networking*, *21*(10), 618–624. https://doi.org/10.1089/cyber.2018.0070

Stöven, L. M., & Herzberg, P. Y. (2020). Relationship 2.0: A systematic review of associations between the use of social network sites and attachment style. *Journal of Social and Personal Relationships*, *38*(3), 1103–1128. https://doi.org/10.1177/0265407520982671

Su, C., Zhou, H., Gong, L., Teng, B., Geng, F., & Hu, Y. (2021). Viewing personalized video clips recommended by TikTok activates default mode network and ventral tegmental area. *NeuroImage*, *237*, 118136. https://doi.org/10.1016/j.neuroimage.2021.118136

Suarez-Lledo, V., & Alvarez-Galvez, J. (2021). Prevalence of Health Misinformation on Social Media: Systematic Review. *Journal of Medical Internet Research*, *23*(1), e17187. https://doi.org/10.2196/17187

Substance Abuse and Mental Health Services Administration. (2024). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2023 National Survey on Drug Use and Health* (Nos. PEP24-07–021). Department of Health and Human Services. https://www.samhsa.gov/data/report/2023-nsduh-annual-national-report

Sun, Y., & Zhang, Y. (2021). A review of theories and models applied in studies of social media addiction and implications for future research. *Addictive Behaviors*, *114*, 106699. https://doi.org/10.1016/j.addbeh.2020.106699

Swedo, E. A., Beauregard, J. L., De Fijter, S., Werhan, L., Norris, K., Montgomery, M. P., Rose, E. B., David-Ferdon, C., Massetti, G. M., Hillis, S. D., & Sumner, S. A. (2021). Associations Between Social Media and Suicidal Behaviors During a Youth Suicide Cluster in Ohio. *Journal of Adolescent Health*, *68*(2), 308–316. https://doi.org/10.1016/j.jadohealth.2020.05.049

Szwedo, D. E., Mikami, A. Y., & Allen, J. P. (2011). Qualities of Peer Relations on Social Networking Websites: Predictions From Negative Mother-Teen Interactions: QUALITIES

OF PEER RELATIONS ON SOCIAL NETWORKING WEBSITES. *Journal of Research on Adolescence*, *21*(3), 595–607. https://doi.org/10.1111/j.1532-7795.2010.00692.x

Talbot, C. V., Gavin, J., Van Steen, T., & Morey, Y. (2017). A content analysis of thinspiration, fitspiration, and bonespiration imagery on social media. *Journal of Eating Disorders*, *5*(1), 40. https://doi.org/10.1186/s40337-017-0170-2

Tamplin, N. C., McLean, S. A., & Paxton, S. J. (2018). Social media literacy protects against the negative impact of exposure to appearance ideal social media images in young adult women but not men. *Body Image*, *26*, 29–37. https://doi.org/10.1016/j.bodyim.2018.05.003

Tao, S., Reichert, F., Law, N. W. Y., & Rao, N. (2023). Digital Technology Use and Adolescent Mental Health Before and During the COVID-19 Pandemic: The Roles of Internet Addiction and Digital Competence. *Cyberpsychology, Behavior, and Social Networking*, *26*(10), 739–746. https://doi.org/10.1089/cyber.2023.0048

Tao, X., & Fisher, C. B. (2022). Exposure to social media racial discrimination and mental health among adolescents of color. *Journal of Youth and Adolescence*, *51*(1), 30–44. https://doi.org/10.1007/s10964-021-01514-z

Tariq, A., Muñoz Sáez, D., & Khan, S. R. (2022). Social media use and family connectedness: A systematic review of quantitative literature. *New Media & Society*, *24*(3), 815–832. https://doi.org/10.1177/14614448211016885

Tereshchenko, S. Y. (2023). Neurobiological risk factors for problematic social media use as a specific form of Internet addiction: A narrative review. *World Journal of Psychiatry*, *13*(5), 160–173. https://doi.org/10.5498/wjp.v13.i5.160

Terlizzi, E. P., & Zablotsky, B. (2024). Symptoms of Anxiety and Depression Among Adults: United States, 2019 and 2022. *National Health Statistics Reports*, *213*, CS353885. https://doi.org/10.15620/cdc/64018

Thai, H., Davis, C. G., Mahboob, W., Perry, S., Adams, A., & Goldfield, G. S. (2023). Reducing social media use improves appearance and weight esteem in youth with emotional distress. *Psychology of Popular Media*, *13*(1), 162–169. https://doi.org/10.1037/ppm0000460

Thai, H., Davis, C. G., Stewart, N., Gunnell, K. E., & Goldfield, G. S. (2021). The Effects of Reducing Social Media Use on Body Esteem Among Transitional-Aged Youth. *Journal of Social and Clinical Psychology*, *40*(6), 481–507. https://doi.org/10.1521/jscp.2021.40.6.481

Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance.* American Psychological Association. https://doi.org/10.1037/10312-000

Thorell LB, Burén J, Ström Wiman J, Sandberg D, & Nutley SB. (2024). Longitudinal associations between digital media use and ADHD symptoms in children and adolescents: A systematic literature review. *Eur Child Adolesc Psychiatry*, *33*(8), 2503–2526. https://doi.org/10.1007/s00787-022-02130-3

Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and Passive Social Media Use and Symptoms of Anxiety and Depressed Mood Among Icelandic Adolescents. *Cyberpsychology, Behavior, and Social Networking*, *22*(8), 535–542. https://doi.org/10.1089/cyber.2019.0079

Throuvala, M. A., Griffiths, M. D., Rennoldson, M., & Kuss, D. J. (2021). Perceived Challenges and Online Harms from Social Media Use on a Severity Continuum: A Qualitative

Psychological Stakeholder Perspective. *International Journal of Environmental Research and Public Health*, *18*(6), 3227. https://doi.org/10.3390/ijerph18063227

Thrul, J., Devkota, J., Aljuboori, D., Regan, T., Alomairah, S., & Vidal, C. (2025). *Social media reduction or abstinence interventions are providing mental health benefits – reanalysis of a published meta-analysis*. https://doi.org/10.31234/osf.io/degba

Tibbs, M., Deschênes, S., van der Velden, P., & Fitzgerald, A. (2025). An investigation of the longitudinal bidirectional associations between interactive versus passive social media behaviors and youth internalizing difficulties. A within-person approach. *Journal of Youth and Adolescence*, *54*(4), 849–862. https://doi.org/10.1007/s10964-024-02093-5

Tiggemann, M., & Miller, J. (2010). The Internet and Adolescent Girls' Weight Satisfaction and Drive for Thinness. *Sex Roles*, *63*(1–2), 79–90. https://doi.org/10.1007/s11199-010-9789-z

TikTok Transparency Center. (2020, June 18). *How TikTok recommends videos #ForYou*. Newsroom | TikTok. https://newsroom.tiktok.com

Tran, H. G. N., Thai, T. T., Dang, N. T. T., Vo, D. K., & Duong, M. H. T. (2023). Cyber-Victimization and Its Effect on Depression in Adolescents: A Systematic Review and Meta-Analysis. *Trauma, Violence, & Abuse*, *24*(2), 1124–1139. https://doi.org/10.1177/15248380211050597

Tromholt, M. (2016). The Facebook Experiment: Quitting Facebook Leads to Higher Levels of Well-Being. *Cyberpsychology, Behavior, and Social Networking*, *19*(11), 661–666. https://doi.org/10.1089/cyber.2016.0259

Tseng, F., & Yang, H. (2015). Internet Use and Web Communication Networks, Sources of Social Support, and Forms of Suicidal and Nonsuicidal Self-Injury Among Adolescents: Different

Patterns Between Genders. *Suicide and Life-Threatening Behavior*, *45*(2), 178–191. https://doi.org/10.1111/sltb.12124

Tsitsika, A. K., Tzavela, E. C., Janikian, M., Ólafsson, K., Iordache, A., Schoenmakers, T. M., Tzavara, C., & Richardson, C. (2014). Online Social Networking in Adolescence: Patterns of Use in Six European Countries and Links With Psychosocial Functioning. *Journal of Adolescent Health*, *55*(1), 141–147. https://doi.org/10.1016/j.jadohealth.2013.11.010

Turner, G., Ferguson, A. M., Katiyar, T., Palminteri, S., & Orben, A. (2024). Old Strategies, New Environments: Reinforcement Learning on Social Media. *Biological Psychiatry*, S0006322324018201. https://doi.org/10.1016/j.biopsych.2024.12.012

Twenge, J. M. (2020). Increases in Depression, Self-Harm, and Suicide Among U.S. Adolescents After 2012 and Links to Technology Use: Possible Mechanisms. *Psychiatric Research and Clinical Practice*, *2*(1), 19–25. https://doi.org/10.1176/appi.prcp.20190015

Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology*, *128*(3), 185–199. https://doi.org/10.1037/abn0000410

Twenge, J. M., Haidt, J., Blake, A. B., McAllister, C., Lemon, H., & Le Roy, A. (2021). Worldwide increases in adolescent loneliness. *Journal of Adolescence*, *93*(1), 257–269. https://doi.org/10.1016/j.adolescence.2021.06.006

Twivy, E., Freeman, D., Anderson, C., Loe, B. S., & Waite, F. (2025). The social media scale for depression in adolescence. *International Journal of Adolescence and Youth*, *30*(1), 2450425. https://doi.org/10.1080/02673843.2025.2450425

Twomey, C., & O'Reilly, G. (2017). Associations of Self-Presentation on Facebook with Mental Health and Personality Variables: A Systematic Review. *Cyberpsychology, Behavior, and Social Networking*, *20*(10), 587–595. https://doi.org/10.1089/cyber.2017.0247

United Nations. (n.d.). *Youth*. United Nations. Retrieved April 15, 2025, from https://www.un.org/en/global-issues/youth

United States Census Bureau. (n.d.). *QuickFacts United States PST045224*. U.S. Department of Commerce. https://www.census.gov/quickfacts/fact/table/US/PST045224

U.S. Centers for Disease Control and Prevention. (2024, August 8). *About Mental Health*. Mental Health. https://www.cdc.gov/mental-health/about/index.html

U.S. Centers for Disease Control and Prevention. (2025, February 12). *Youth Risk Behavior Surveillance System (YRBSS)*. Youth Risk Behavior Surveillance System (YRBSS). https://www.cdc.gov/yrbs/index.html

US Centers for Disease Control and Prevention. (2025, February 18). *About Mental Health*. CDC. https://www.cdc.gov/mental-health/about/index.html

Vahedi, Z., & Zannella, L. (2021). The association between self-reported depressive symptoms and the use of social networking sites (SNS): A meta-analysis. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*, *40*(5), 2174–2189. https://doi.org/10.1007/s12144-019-0150-6

Valkenburg, P. M., Driel, I. I. van, & Beyens, I. (2021). *The associations of active and passive social media use with well-being: A critical scoping review*. OSF. https://doi.org/10.31234/osf.io/j6xqz

Valkenburg, P. M., & Peter, J. (2009). Social Consequences of the Internet for Adolescents: A Decade of Research. *Current Directions in Psychological Science*, *18*(1), 1–5. https://doi.org/10.1111/j.1467-8721.2009.01595.x

Valkenburg, P. M., Van Driel, I. I., & Beyens, I. (2022). The associations of active and passive social media use with well-being: A critical scoping review. *New Media & Society*, *24*(2), 530–549. https://doi.org/10.1177/14614448211065425

Valkenburg PM. (2022). Social media use and well-being: What we know and what we need to know. *Curr Opin Psychol*, *45*, 101294. https://doi.org/10.1016/j.copsyc.2021.12.006

Vandenbosch, L., Fardouly, J., & Tiggemann, M. (2022). Social media and body image: Recent trends and future directions. *Current Opinion in Psychology*, *45*, 101289. https://doi.org/10.1016/j.copsyc.2021.12.002

Van Den Eijnden, R. J. J. M., Lemmens, J. S., & Valkenburg, P. M. (2016). The Social Media Disorder Scale. *Computers in Human Behavior*, *61*, 478–487. https://doi.org/10.1016/j.chb.2016.03.038

Vannucci A, Simpson EG, Gagnon S, & Ohannessian CM. (2020). Social media use and risky behaviors in adolescents: A meta-analysis. *J Adolesc*, *79*, 258–274. https://doi.org/10.1016/j.adolescence.2020.01.014

Varona, M. N., Muela, A., & Machimbarrena, J. M. (2022). Problematic use or addiction? A scoping review on conceptual and operational definitions of negative social networking sites use in adolescents. *Addictive Behaviors*, *134*, 107400. https://doi.org/10.1016/j.addbeh.2022.107400

Vendemia, M. A., & Fox, J. (2024). How social media images of sexualized young women elicit appearance commentary from their peers and reinforce objectification. *Body Image*, *49*, 101683. https://doi.org/10.1016/j.bodyim.2024.101683

Venticinque, J. S., Chahal, R., Beard, S. J., Schriber, R. A., Hastings, P. D., & Guyer, A. E. (2021). Neural responses to implicit forms of peer influence in young adults. *Social Neuroscience*, *16*(3), 327–340. https://doi.org/10.1080/17470919.2021.1911843

Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do Social Network Sites Enhance or Undermine Subjective Well-Being? A Critical Review. *Social Issues and Policy Review*, *11*(1), 274–302. https://doi.org/10.1111/sipr.12033

Vernon, L., Modecki, K. L., & Barber, B. L. (2017). Tracking Effects of Problematic Social Networking on Adolescent Psychopathology: The Mediating Role of Sleep Disruptions. *Journal of Clinical Child & Adolescent Psychology*, *46*(2), 269–283. https://doi.org/10.1080/15374416.2016.1188702

Vetter, T. R. (2019). Systematic Review and Meta-analysis: Sometimes Bigger Is Indeed Better. *Anesthesia & Analgesia*, *128*(3), 575–583. https://doi.org/10.1213/ANE.0000000000004014

Vidal C, Lhaksampa T, Miller L, & Platt R. (2020). Social media use and depression in adolescents: A scoping review. *Int Rev Psychiatry*, *32*(3), 235–253. https://doi.org/10.1080/09540261.2020.1720623

Vieira, C., Kuss, D. J., & Griffiths, M. D. (2023). Early maladaptive schemas and behavioural addictions: A systematic literature review. *Clinical Psychology Review*, *105*, 102340. https://doi.org/10.1016/j.cpr.2023.102340

Vink, J. M., Van Beijsterveldt, T. C. E. M., Huppertz, C., Bartels, M., & Boomsma, D. I. (2015). Heritability of compulsive I nternet use in adolescents. *Addiction Biology*, *21*(2), 460–468. https://doi.org/10.1111/adb.12218

Vogels, E., Gelles-Watnick, R., & Massarat, N. (2022, August 10). Teens, Social Media and Technology 2022. *Pew Research Center*. https://www.pewresearch.org/internet/2022/08/10/teens-social-media-and-technology-2022/

Volkow, N. D., Koob, G. F., & McLellan, A. T. (2016). Neurobiologic Advances from the Brain Disease Model of Addiction. *New England Journal of Medicine*, *374*(4), 363–371. https://doi.org/10.1056/NEJMra1511480

Vossen, H. G. M., van den Eijnden, R. J. J. M., Visser, I., & Koning, I. M. (2024). Parenting and Problematic Social Media Use: A Systematic Review. *Current Addiction Reports*, *11*(3), 511–527. https://doi.org/10.1007/s40429-024-00559-x

Wadsley M & Ihssen N. (2023). A Systematic Review of Structural and Functional MRI Studies Investigating Social Networking Site Use. *Brain Sci*, *13*(5). https://doi.org/10.3390/brainsci13050787

Walhovd, K. B., Krogsrud, S. K., Amlien, I. K., Bartsch, H., Bjørnerud, A., Due-Tønnessen, P., Grydeland, H., Hagler, D. J., Håberg, A. K., Kremen, W. S., Ferschmann, L., Nyberg, L., Panizzon, M. S., Rohani, D. A., Skranes, J., Storsve, A. B., Sølsnes, A. E., Tamnes, C. K., Thompson, W. K., … Fjell, A. M. (2016). Neurodevelopmental origins of lifespan changes in brain and cognition. *Proceedings of the National Academy of Sciences*, *113*(33), 9357–9362. https://doi.org/10.1073/pnas.1524259113

Walker, E., Hernandez, A. V., & Kattan, M. W. (2008). Meta-analysis: Its strengths and limitations. *Cleveland Clinic Journal of Medicine*, *75*(6), 431–439. https://doi.org/10.3949/ccjm.75.6.431

Walsh, J. J., Barnes, J. D., Cameron, J. D., Goldfield, G. S., Chaput, J.-P., Gunnell, K. E., Ledoux, A.-A., Zemek, R. L., & Tremblay, M. S. (2018). Associations between 24 hour movement behaviours and global cognition in US children: A cross-sectional observational study. *The Lancet Child & Adolescent Health*, *2*(11), 783–791. https://doi.org/10.1016/S2352-4642(18)30278-5

Walsh, J. J., Barnes, J. D., Tremblay, M. S., & Chaput, J.-P. (2020). Associations between duration and type of electronic screen use and cognition in US children. *Computers in Human Behavior*, *108*, 106312. https://doi.org/10.1016/j.chb.2020.106312

Wang, Y.-H., Shi, Z.-T., & Luo, Q.-Y. (2017). Association of depressive symptoms and suicidal ideation among university students in China: A systematic review and meta-analysis. *Medicine*, *96*(13), e6476. https://doi.org/10.1097/MD.0000000000006476

Weinstein, E., & James, C. (2022). *Behind Their Screens: What Teens Are Facing (and Adults Are Missing)*. The MIT Press. https://doi.org/10.7551/mitpress/14088.001.0001

Weiser, E. B. (2015). #Me: Narcissism and its facets as predictors of selfie-posting frequency. *Personality and Individual Differences*, *86*, 477–481. https://doi.org/10.1016/j.paid.2015.07.007

Wells, G., Horwitz, J., & Seetharaman, D. (2021, September 14). Facebook Knows Instagram Is Toxic for Teen Girls, Company Documents Show. *The Wall Street Journal*. https://www.wsj.com/articles/facebook-knows-instagram-is-toxic-for-teen-girls-company-documents-show-11631620739?mod=article_inline

Werling, A. M., Kuzhippallil, S., Emery, S., Walitza, S., & Drechsler, R. (2022). Problematic use of digital media in children and adolescents with a diagnosis of attention-deficit/hyperactivity disorder compared to controls. A meta-analysis. *Journal of Behavioral Addictions*, *11*(2), 305–325. https://doi.org/10.1556/2006.2022.00007

Wesselhoeft, R., Sørensen, M. J., Heiervang, E. R., & Bilenberg, N. (2013). Subthreshold depression in children and adolescents – a systematic review. *Journal of Affective Disorders*, *151*(1), 7–22. https://doi.org/10.1016/j.jad.2013.06.010

Widiger, T. A., & Samuel, D. B. (2005). Diagnostic categories or dimensions? A question for the Diagnostic and statistical manual of mental disorders--fifth edition. *Journal of Abnormal Psychology*, *114*(4), 494–504. https://doi.org/10.1037/0021-843X.114.4.494

Wiecha, J. L., Sobol, A. M., Peterson, K. E., & Gortmaker, S. L. (2001). Household Television Access: Associations With Screen Time, Reading, and Homework Among Youth. *Ambulatory Pediatrics*, *1*(5), 244–251. https://doi.org/10.1367/1539-4409(2001)001<0244:HTAAWS>2.0.CO;2

Wilson, S., & Dumornay, N. M. (2022). Rising Rates of Adolescent Depression in the United States: Challenges and Opportunities in the 2020s. *Journal of Adolescent Health*, *70*(3), 354–355. https://doi.org/10.1016/j.jadohealth.2021.12.003

Winstone, L., Mars, B., Haworth, C., & Kidger, J. (2022). *Types of social media use and digital stress in early adolescence*. https://doi.org/10.31234/osf.io/pbjm4

Wong J, Yi PX, Quek FYX, Lua VYQ, Majeed NM, & Hartanto A. (2024). A four-level meta-analytic review of the relationship between social media and well-being: A fresh perspective in the context of COVID-19. *Curr Psychol*, 1–15. https://doi.org/10.1007/s12144-022-04092-w

World Health Organization (WHO) (2019). International Classification of Diseases, Eleventh Revision (ICD-11). 2021 https://icd.who.int/browse11.

Wu, A. M. S., Cheung, V. I., Ku, L., & Hung, E. P. W. (2013). Psychological risk factors of addiction to social networking sites among Chinese smartphone users. *Journal of Behavioral Addictions*, *2*(3), 160–166. https://doi.org/10.1556/JBA.2.2013.006

Wu, H., Zhou, X., Chen, D., Zheng, Y., & You, J. (2024). Longitudinal association between social media exposure and nonsuicidal self-injury among adolescents: Investigating the directionality by within-person effects. *Current Psychology*, *43*(11), 9744–9754. https://doi.org/10.1007/s12144-023-05128-5

Wu, P., Feng, R., & Zhang, J. (2024). The relationship between loneliness and problematic social media usage in Chinese university students: A longitudinal study. *BMC Psychology*, *12*(1), 13. https://doi.org/10.1186/s40359-023-01498-4

Wu, W., & Weaver, D. (1997). On-Line Democracy or On-Line Demagoguery?: Public Opinion “Polls” on the Internet. *Harvard International Journal of Press/Politics*, *2*(4), 71–86. https://doi.org/10.1177/1081180X97002004006

Xanidis, N., & Brignell, C. M. (2016). The association between the use of social network sites, sleep quality and cognitive function during the day. *Computers in Human Behavior*, *55*, 121–126. https://doi.org/10.1016/j.chb.2015.09.004

Yang, C., & Smith, C. (2024). Digital social multitasking (DSMT) and digital stress among adolescents: A peer norm perspective. *Heliyon*, *10*(10), e31051. https://doi.org/10.1016/j.heliyon.2024.e31051

Yang Q & Feng Y. (2024). Relationships between social networking sites use and subjective well-being—A meta-analysis and meta-analytic structural equation model. *Heliyon*, *10*(12), e32463. https://doi.org/10.1016/j.heliyon.2024.e32463

Yeung, A., Ng, E., & Abi-Jaoude, E. (2022). TikTok and Attention-Deficit/Hyperactivity Disorder: A Cross-Sectional Study of Social Media Content Quality. *The Canadian Journal of Psychiatry*, *67*(12), 899–906. https://doi.org/10.1177/07067437221082854

Yigiter, M. S., Demir, S., & Dogan, N. (2024). The relationship between problematic social media use and depression: A meta-analysis study. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*, *43*(9), 7936–7951. https://doi.org/10.1007/s12144-023-04972-9

Yin, X.-Q., De Vries, D. A., Gentile, D. A., & Wang, J.-L. (2019). Cultural Background and Measurement of Usage Moderate the Association Between Social Networking Sites (SNSs) Usage and Mental Health: A Meta-Analysis. *Social Science Computer Review*, *37*(5), 631–648. https://doi.org/10.1177/0894439318784908

Yoon S, Kleinman M, Mertz J, & Brannick M. (2019). Is social network site usage related to depression? A meta-analysis of Facebook-depression relations. *J Affect Disord*, *248*, 65–72. https://doi.org/10.1016/j.jad.2019.01.026

Young, S. N. (2008). The neurobiology of human social behaviour: An important but neglected topic. *Journal of Psychiatry & Neuroscience: JPN*, *33*(5), 391–392.

Zarate, D., Hobson, B. A., March, E., Griffiths, M. D., & Stavropoulos, V. (2023). Psychometric properties of the Bergen Social Media Addiction Scale: An analysis using item response theory. *Addictive Behaviors Reports*, *17*, 100473. https://doi.org/10.1016/j.abrep.2022.100473

Zenone, M., Kenworthy, N., & Maani, N. (2022). The Social Media Industry as a Commercial Determinant of Health. *International Journal of Health Policy and Management*, 1. https://doi.org/10.34172/ijhpm.2022.6840

Zhang L, Li C, Zhou T, Li Q, & Gu C. (2022). Social Networking Site Use and Loneliness: A Meta-Analysis. *J Psychol*, *156*(7), 492–511. https://doi.org/10.1080/00223980.2022.2101420

Zhang, Y., Li, S., & Yu, G. (2021). The relationship between social media use and fear of missing out: A meta-analysis. *Acta Psychologica Sinica*, *53*(3), 273–290. https://doi.org/10.3724/SP.J.1041.2021.00273

Zhong, R., & Frenkel, S. (2020, August 20). A third of TikTok's US users may be 14 or under, raising safety questions. *The New York Times*. https://www.nytimes.com/2020/08/14/technology/tiktok-underage-users-ftc.html

Zhou, H., Sealock, J. M., Sanchez-Roige, S., Clarke, T.-K., Levey, D. F., Cheng, Z., Li, B., Polimanti, R., Kember, R. L., Smith, R. V., Thygesen, J. H., Morgan, M. Y., Atkinson, S. R., Thursz, M. R., Nyegaard, M., Mattheisen, M., Børglum, A. D., Johnson, E. C., Justice, A. C., … Gelernter, J. (2020). Genome-wide meta-analysis of problematic alcohol use in 435,563 individuals yields insights into biology and relationships with other traits. *Nature Neuroscience*, *23*(7), 809–818. https://doi.org/10.1038/s41593-020-0643-5

Zhou, X., & Shen, X. (2024). Unveiling the relationship between social anxiety, loneliness, motivations, and problematic smartphone use: A network approach. *Comprehensive Psychiatry*, *130*, 152451. https://doi.org/10.1016/j.comppsych.2024.152451

Zhu, Y., Deng, L., & Wan, K. (2022). The association between parent-child relationship and problematic internet use among English- and Chinese-language studies: A meta-analysis. *Frontiers in Psychology*, *13*, 885819. https://doi.org/10.3389/fpsyg.2022.885819

Ziapour, A., Malekzadeh, R., Darabi, F., Yıldırım, M., Montazeri, N., Kianipour, N., & Nejhaddadgar, N. (2024). The role of social media literacy in infodemic management: A systematic review. *Frontiers in Digital Health*, *6*, 1277499. https://doi.org/10.3389/fdgth.2024.1277499

Zhu, J., Racine, N., Devereux, C., Hodgins, D. C., & Madigan, S. (2023). Associations between adverse childhood experiences and substance use: A meta-analysis. *Child Abuse & Neglect*, 106431. https://doi.org/10.1016/j.chiabu.2023.106431

9. APPENDIX A

Affordances of social media that are relevant to the relationship between adolescent development and mental health, as published in Orben et al. 2024, pp. 411-412.

Table 1 | Affordances of social media that are relevant to the relationship between adolescent development and mental health

Affordance	Description	Example of affordance	Example associated mechanism	Example relationship with mental health	Refs.
Anonymity	The difficulty with which other social media agents (users, institutions or companies) can identify the source or sender of a message	Anonymity can easily be achieved in social media through fake accounts or using platforms that do not require sharing of identity	Behaviour: risky posting behaviour	High anonymity can disinhibit interactions and make behaviours or reactions more extreme	79,243
Association	The degree with which links between people, between people and content or between a presenter and their audience can be articulated	Friends lists facilitate the association between people Comments or reposts facilitate the association between a person and content or ideas	Cognitive: social comparison	The ability to understand who is associated with whom can make it easier to judge social status or friendship ties, boosting comparison with others	84
Availability	How easily a user can reach and access the technology as well as how easily the user can be reached through the technology (also termed permanence or perpetual contact)	Mobile use of social media enables high availability	Neurobiological: reward and stress	Heightened availability of peers via mobile media can support increased checking behaviours, which might have long-term consequences for reward processing	244,245
Bandwidth	The breadth of socio-emotional cues that messages transmit; partially determined by the modality of channels (such as video chat or email), but also by users' adaption to channel limitations (for example, different language use, timing or interpunctuation), which can all influence a sense of social presence	Few social cues makes it difficult to judge what people think of a behaviour or posts on social media	Behaviour: risky posting behaviour	Low bandwidth can potentially disinhibit interactions and make behaviours or reactions more extreme	81,246,247
Editability	The degree to which messages can be carefully crafted, refined and edited; also called rehearsability, which emphasizes the ability to not only edit but also consider material before posting	Posts can be drafted and re-drafted many times before sharing on social media	Behaviour: self-presentation and identity	The editability of profiles enables users to curate and present their online identity, potentially facilitating identity development	35,84,248
Persistence	The degree to which messages remain accessible to receivers in the same form as originally crafted and displayed by the sender	Auto-deletion features enable ephemeral messages with low persistence	Behaviour: self-presentation and identity	The persistence of social media posts (for example, after screenshotting) could limit adolescents' ability to freely explore their identity	79,80, 82,84
Personalization	The degree to which messages are tailored (by senders or by recommendation algorithms) to fit the identity, preferences or expectations of the receiver	TikTok algorithms enable users to consume content that is highly relevant to them	Cognitive: self-concept development	The personalization of content can change what young people see on social media feeds, influencing self-concept development	81,143, 249,250
Quantifiability	How countable information is, especially if it formally quantifies aspects of social life that were previously not as clearly labelled with quantitative values	Numbers of friends or followers, and social feedback and content popularity, which are quantified through the 'like' button or similar one-click reactions	Cognitive: social inclusion and exclusion	The quantifiability of social feedback could make it easier to feel excluded or unpopular (for example, when not receiving likes)	35,152,194, 251–253
Replicability	The ease with which messages can be duplicated and shared with others, via the same or other digital channels	Features that enable forwarding content across platforms; if this is not built into the system, users might find other means (for example, through screenshots)	Behaviour: risky posting behaviour	Replicability can amplify the risk of activities such as sexting	254
Synchronicity	The degree to which an interaction is perceived as happening simultaneously, in real time	Feed posts are classically more strongly associated with asynchronous communication, and instant messengers with synchronous communication	Cognitive: social feedback	Asynchronicity of communication makes it more likely that adolescents have time to ruminate about potential social feedback, especially when presumed negative	35,81,255

Affordance	Description	Example of affordance	Example associated mechanism	Example relationship with mental health	Refs.
Variability of social rewards	The degree to which social interaction and feedback occur on variable time schedules	The time lag between sending a message or posting and the responses and reactions to these actions is unknown	Neurobiological: reward	Quantified social feedback from peers can support increased checking behaviours, which might have long-term consequences on reward processing	160,217,256
Verifiability	How easily a message's truthfulness can be cross-examined and authenticated by others	Verifiability is implicated in inauthentic self-presentations (such as using visual filters), scams (such as catfishing) and other forms of deception (such as misinformation or fake news)	Cognitive: social comparison	If the verifiability of individuals or their posts is low, it is difficult to gauge the authenticity of their self-presentations that form the basis for social comparisons	33,143,249, 250,252,257
Visibility	The relative ease with which messages can be located and seen by others; sometimes also termed publicness (or scalability if approached from the sender's perspective)	Visibility enables users to choose the size and nature of their audiences and influences whether information is considered private, semi-public or public	Cognitive: self-presentation and identity	Profile visibility enables users to curate and try out different private and public online identities, potentially facilitating identity development	83,84,255

EXHIBIT A

Curriculum Vitae

a) NAME and ADDRESS

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b) EDUCATION/ DEGREES

Ph.D.	Health Psychology, Carleton University, Ottawa, CAN 1998
M.A.	Health Psychology, Carleton University, Ottawa, Ontario 1993
B. A.	Honours, Psychology, Carleton University, Ottawa, Ontario 1990

c) EMPLOYMENT HISTORY

2019-Present	Professor, Department of Pediatrics, Faculty of Medicine, University of Ottawa
2019-Present	Professor, Cross Appointed to School of Population Health, University of Ottawa
2019-Present	Professor, Cross-appointed to School of Psychology, University of Ottawa
2019-Present	Professor, Cross-appointed to School of Human Kinetics, University of Ottawa
2013-Present	Senior Scientist, CHEO Research Institute, Ottawa, ON
2012-2019	Associate Professor, Department of Pediatrics, University of Ottawa
2012-2019	Associate Professor, Cross-Appointed to School of Human Kinetics, University of Ottawa
2012-2019	Associate Professor, Cross-Appointed, School of Psychology, University of Ottawa
2006-2012	Assistant Professor, Department of Pediatrics, University of Ottawa
2006-2012	Assistant Professor, Cross-Appointed to School of Psychology, University of Ottawa
2006-2012	Assistant Professor, Cross Appointed, School of Human Kinetics, University of Ottawa
2003-Present	Registered Clinical Psychologist, Private Practice, Ottawa, ON
2001-2013	Clinical Scientist, CHEO Research Institute, Ottawa, ON.
2001-2005	Adjunct Professor, School of Human Kinetics, University of Ottawa, Ottawa, ON
2001-Present	Adjunct research professor, Dept. of Psychology, Carleton University, Ottawa, ON
1998-2000	Post-Doctoral Fellow, Behavioral Medicine, University at Buffalo, Dept of Psychology, Buffalo, NY.
1998-2000	Behaviour therapist, Childhood Weight Control Program**,** SUNY at Buffalo,NY
1996-1998	Research Associate, SCO Hospital - Elizabeth Bruyere Pavilion, Ottawa, ON
1991-1995	Research Assistant, Eating Disorders Program, Ottawa Civic Hospital

d) HONOURS/AWARDS

2013-2014	Outstanding Research Mentor, CHEO Research Institute
2008-2012	Endowed Scholar, CHEO Volunteer Association/CHEO-RI
2003-2008	Canadian Institutes of Health Research (CIHR) New Investigator Award
1997-1998	Nominated for Senate Medal-Outstanding Doctoral Dissertation, Carleton University
1988-1990	Dean's Honour Ro

e) SCHOLARLY AND PROFESSIONAL ACTIVITIES:

Scientific Committee Membership

- Instructor-Pediatric Obesity Management course Development, Obesity Canada (2024-present)
- Member - Canadian Pediatrics Society Digital task force committee (2024-Present)
- Member –Journal Editorial Board: Childhood Obesity (2019-present)
- Member –Journal Editorial Board, Mental Health and Physical Activity (2019-present)
- Member, Organizing committee for the development of the Canadian Centre for Mental Health in Sport (2017-present)
- Member, Canadian 24 hour movement guidelines development committee for the early years: An integration of physical activity, sedentary behavior, & Sleep (2015-17)
- Member, International Network on Eating Behaviour in Children (2017-present)
- Member, Organizing Committee on Physical Activity and Mental Health Conference, CHEO/University of Ottawa (2017)
- Member, Organizing committee of the 6th Conference on Recent Advances in the Prevention and Management of Childhood and Adolescent Obesity – Understanding the Interplay between Physical and Mental Health- (2015-2016).
- Member, CIHR Peer reviewer grants committee. Social and Developmental Aspects of Children's and Youth's Health Committee (CHI) (2005, 2013)
- Member, CHEO Research Institute grants committee, (2002-Present)
- Member-CIHR Fellowship Grants Awards Committee (2010-2012)
- Member- Alberta Innovates Health Solutions Fellowship Awards Committee (2011-2013)
- Member- Health Behaviour Change Committee- American Heart Association (2011-2013)
- Member – Child Obesity Prevention Guidelines Committee- Registered Nurses of Ontario (2010-2013)
- Member — CIHR Salary Awards grants committee (2006-2009)
- Member, CIHR Grant review committee – INMD – Healthy Body Weight (2005)

Community Committee Membership

- Chair, Steering Committee of GOALS (Girls, Obesity, and Loving Support) 2002-2004
- Co-Chair – Ottawa Academy of Psychologists Mentorship Group – 2004-2008
- Member-Ministry of Research and Innovation YSTOP- Youth Science and Technology Outreach Program (2005-2008)

Ad Hoc Peer Grant Reviewer

- Heart And Stroke Foundation of Canada – 2005, 2006
- Canadian Diabetes Association, 2004, 2005
- Canadian Institutes of Health Research – 2005-2007, 2010-2013, 2021-24
- Alberta Heritage Foundation for Medical Research, 2005, 2007, 2009
- Social Science and Humanities Research Council of Canada, 2007

Ad Hoc Manuscript Reviewer (Select)

- Canadian Medical Association Journal
- Pediatrics
- Health Psychology
- Journal of Consulting and Clinical Psychology
- Affective Disorders
- JAMA
- JAMA Pediatrics
- Lancet-Child and Adolescent Health
- Appetite
- Obesity Research
- International Journal of Obesity
- American Journal of Psychiatry
- Eating Behaviors
- Personality and Social Psychology Bulletin
- American Journal of Preventive Medicine
- Preventive Medicine
- Applied Physiology, Nutrition and Metabolism
- Journal of Psychosomatic Research
- American Journal of Clinical Nutrition
- International Journal of Behavioral Nutrition and Physical Activity
- International Journal of Pediatric Obesity
- Journal of Pediatric Psychology
- Medicine and Science in Sports & Exercise

Professional associations/memberships

- Canadian Psychological Association
- College of Psychologists of Ontario (Registered Clinical Psychologist)
- Canadian Pediatric Obesity Weight Loss Registry (CAN-POWR)
- Sedentary Behaviour Research Network (SBRN)

f) UNDERGRADUATE/GRADUATE THESIS/RESEARCH SUPERVISION:

Undergraduate Completed – 50 theses/research practica/summer students/volunteers

Graduate Students: Master's Completed: 21; Master's in progress: 0

PhD Completed; 5; PhD students in progress: 0

Postdoc: Completed 3, In progress: 1

Graduate Student thesis committee member/examiner = 31 completed or in progress.

Undergraduate Students/Research Volunteers/Summer Students:

Martin Davidson — Summer research student, Carleton University, May 2002-August 2002.
Title: Validation of a self-report measure of the reinforcing value of food.

Julie Wilson — Summer research student, Carleton University, May 2002-August 2002.
Title: Effects of physical activity on emotional eating in obese adolescents

Christine Legg — Honours thesis Supervisor in Psychology, Carleton University, 2002-2003.
Title: Effects of stress on changes in the reinforcing value of food in restrained and non-restrained eaters.

Andrew Lumb — Honours thesis Supervisor in Psychology, Carleton University, 2003-04.
Title: Determinants of the reinforcing value of food

Terrell Cunningham — Independent study Supervisor – Psychology, Carleton University, 2003-04.
Title: Validation of the Emotional Eating Scale

Ceri Moore — Honours thesis Supervisor in Psychology, Carleton University, 2004-2005
Title: Attachment, Interpersonal and psychosocial Functioning in Obese and non-obese Adolescents.

Lara Paniagua — Research Practicum Student, Psychology, Carleton University, 2004-2005
Title: Effects of School-based Intervention on Physical Activity and Aerobic Fitness

Stephanie Leclair — Research Practicum Student, Psychology, Carleton University, 2005
Title: A Needs Assessment of Potential Consumers for the Treatment of Paediatric Obesity at CHEO

Lauren Dowler — Honours thesis Supervisor in Psychology, Carleton University, 2004-2005
Title: Dopamine Polymorphisms and Rate of Weight Gain in Pregnant Women

Kim Allen — Honours Practicum student in Human Kinetics, University of Ottawa, 2005
Title: Effects of Virtual Reality on Aerobic Fitness in Obese Youth

Adam Bierzynski — Honours Practicum student in Human Kinetics, University of Ottawa, 2005
Title: Effects of Virtual Reality on Body composition in Obese Youth

Natalie Langdon — Research Practicum Student, Psychology, Carleton University, 2006-2007
Title: Use of Internet to deliver family-based behavioural treatment of childhood obesity.

Kim Watkins — Research Practicum Student, Psychology, Carleton University, 2008
Title: Effects of Virtual Reality on Body composition in Obese Youth

Andree-Anne Morrisey Research Practicum Student, Psychology, Carleton University, 2008

	Title: Effects of Virtual Reality on Body composition in Obese Youth
Michael Bourghese	Research Volunteer, Human Kinetics, University of Ottawa, 2008-09 Title: Effects of Active Gaming on Body composition and lipid profile
Laura Peters	Research Volunteer Student, Psychology, Carleton University, 2009 Title: Development, Implementation and Efficacy of a Family-based Treatment of Child Obesity Delivered via Internet:
Danijela Maras	Research Volunteer Student, Psychology, Carleton University, 2010 Title: Qualitative interviews identifying barriers and facilitators of participation in a family-based child obesity intervention via internet
Isaac Davis	Honours Thesis Student, Psychology, Carleton University, 2010-11 Title: Relationship between aerobic fitness and psychosocial factors in obese adolescents: A HEARTY Study
Colleen Burke	Research Volunteer, Dept. of Psychology, University of Ottawa Title: Evaluation of Freggie Friday Fruit and Vegetable Program
Dolapo Disu	Research practicum, Dept. of Psychology, Carleton University (2011) Title: Preschoolers Activity Trial
Jesse Beckstead	Research practicum, Dept. of Psychology, Carleton University (2011) Title: Evaluation of Freggie Friday Fruit and Vegetable Program
Christina Czaban	Research practicum, Dept. of Psychology, Carleton University (2011) Title: Preschoolers Activity Trial
Genevieve Hayden	Research Volunteer, Dept. of Psychology, University of Ottawa (2011) Title: Preschoolers Activity Trial
Alicia Biafore	Research Volunteer, Dept. of psychology, Carleton University (2011) Title: Evaluation of Freggie Friday Fruit and Vegetable Program
Kristi Billard	Research Volunteer, Biomedical Sciences, University of Ottawa (2011) Title: *Prenatal smoking and child obesity grant* preparation
Emily Chan	Research Volunteer, BSc. Psychology, Queen's University (2011) Title: Preschooler's Activity Trial
Thomas Zakharov	Research Volunteer, BSc. Biopharmaceutical Sciences, U of O (2011) Title: Appetite Signalling Proteins in Youth with Binge Eating Disorder
Eva Applebaum	Research Volunteer, Anatomy & Cell Biology, McGill University (2011)

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Jasmine Lim	Research Volunteer, Human Kinetics, University of Ottawa, (2011) Title: Preschoolers Activity Trial
Alicia Biafore	Honors Thesis Supervisor, Dept. Psychology, University of Ottawa (2011-12) Title: Relationship Between Quality of Life and Psychosocial Adjustment in Youth with Severe Obesity.
Sierra Boudreau	Honour's thesis student, Integrated Science, Carleton University (2013-14) Title: The Role of Dopamine in Eating Behaviour
Yannick Plante	Research Volunteer, Human Kinetics, University of Ottawa (2015-16) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Connor O'Reilly	Research Volunteer, Human Kinetics, University of Ottawa (2015-16) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Praneal Merchant	Research Volunteer, Dept of Psychology, University of Ottawa (2015-16) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Jessica Oey	Research Volunteer, Human Kinetics, University of Ottawa (2015-16) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Alex Taranowski	Research Volunteer, Human Kinetics, University of Ottawa (2016-17) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Brian Khoe	Research Volunteer, Human Kinetics, University of Ottawa (2016-17) Title: Effects of Methylphenidate on Food intake in Obese Youth
Emily Lowry	Research Volunteer, Dept. of Neuroscience, Carleton University (2016-17) Title: Ramping up Neurocognition (RUN): Effects of physical activity on cognitive development in Kindergarten children.
Brandon Heidinger	Research Volunteer, Biomedical Sciences, University of Ottawa (2016-2018) Title: Dopamine genes predicting response to binge eating disorder
Corrine Staff	Research Practicum, Dept. of Psychology, Carleton University (2017-18) Title: Effects of Methylphenidate on Energy intake and expenditure in Obese youth.
Mohcene Abdessemed	Honour's Thesis Student, Biomedical Sciences, University of Ottawa (2019)

	Title: The Association between physical activity, sedentary behaviour and socio-emotional development in young children
Helen Thai	Honour's thesis student, Dept. of Psychology, Carleton University (2019-20) Title: Effects of social media use reduction on body image
Alex Adams	Honour's thesis student, Dept. of Psychology, Carleton University (2021-22) Title: Effects of social media use reduction on wellbeing
Sabrina Perry	Honour's thesis student, Dept. of Psychology, Carleton University (2021-22) Title: Effects of social media use reduction on Anxiety
Ankit Sharda	Honour's thesis student, Dept. of Psychology, Carleton University (2022-23) Title: Effects of social media use reduction on reallocating leisure activities
Ashley Bossilkov	Research Volunteer, Dept. of Psychology, University of Ottawa (2022-Current) Title: Research on Eating and Adolescent Lifestyles (REAL 2.0).
Francesca Dela Rosa	Research Volunteer, Dept of Psychology, University of Ottawa (2022-Current) Title: Mindful-Based Eating Awareness Training-MB-EAT Smart Teen Study
Maddie Moskovic	Research Volunteer, Queen's University, Dept. of Life Sciences (2023-Current) Title: Mindful-Based Eating Awareness Training-MB-EAT Smart Teen Study
Paige Kaufman	Honour's Thesis Student, Department of Psychology, McMaster University (2024-25) Title; Systematic review of Social Media and Mental Health
Melina McLellan	Honour's Thesis student, Department of Psychology, Carleton University (2024-25) Title; Moderating role of Social Comparison on the Relationship Between Social Media and Mental health:

Master's Thesis/Research Practicum/Research Volunteer Supervision

Claudio Lorrello	Master's thesis, Human Kinetics University of Ottawa, 2004-2006 Title: Effects of Methylphenidate on Energy Balance
Andrew Lumb	Master's thesis in Psychology, Carleton University, 2004-2006 Title: Effects of Media Literacy on reducing negative effects of media exposure to the aesthetic ideal in females *** Nominated for Senate Medal at Carleton University for outstanding thesis**
Amanda Nolan	Master's practicum student, Psychology, Carleton University, 2005 Title: Effects of Virtual Reality on Psychological Health in Obese Youth
Rachel Vella-Zarb	Master's practicum student, Psychology, Carleton University, 2006

	Title: Comparative evaluation of the effects of interactive video game cycling and cycling to music on enjoyment and perceived exertion
Jameason Cameron	Master's Thesis in Human Kinetics, University of Ottawa, 2005-2008 Title**:** The Effects of Food Deprivation on Food Hedonics and the Relative- Reinforcing Value of Food.
Marisa Murray	Master's practicum student, Psychology, Carleton University, 2010 Title: Family Meals as a protective factor against child obesity
Pierce McKennirey	Masters Research Volunteer, Psychology, Carleton University 2010 Effects of Internet-based Interventions for child obesity: A Systematic Review
Sara Bruce	Research Volunteer, MSc. Human Kinetics, Guelph University, 2011 Title: Prenatal smoking and child obesity.
Jakub Racek	Master's Practicum Student, Psychology, Carleton University 2012 Title: Preschoolers Activity Trial
Genevieve Hayden	Summer Student, Department of Psychology, University of Ottawa, 2012 Title: Preschoolers Activity trial.
Alison Flett	Research practicum student, Dept. Psychology, Carleton University, 2012 Title: Preschoolers Activity trial
Danijela Maras	Master's Thesis in Psychology, Carleton University, 2011-2013 Title: Attachment Style and Obesity: Examination of Eating Behaviours as Mediating Mechanisms in a Community Sample of Ontario Youth
Alessandro Tirelli	Master's Thesis in Human Kinetics, University of Ottawa (2013-2017) Title: Effects of Health Claims on Taste and food Consumption in Children
Ashley Gunter	Research Volunteer, Human Kinetics, University of Ottawa (2015-16) Title: Effects of prenatal cigarette exposure on adiposity and metabolism in young children.
Darcie Valois	Master's Thesis, Department of Psychology, Carleton University, (2015-17). The Mediating role of Attachment and Coping in the Relationship Between Weight Teasing and Body Dissatisfaction in Obese Youth
Shakiba Bani Fatemi	Master's Thesis, School of Human Kinetics, University of Ottawa (2016-18) Title: Effects of methylphenidate on food reward and food-impulsivity
Kaamel Hafizi	Master thesis, School of Human Kinetics, University of Ottawa (2016-18) Title: Effects of physical activity on neurocognition in young children
Kent Bastell	Master's Thesis, School of Human Kinetics, University of Calgary (2016-18)

The effects of aerobic training and resistance training on health-related quality of life (HRQOL) in people with type 1 diabetes

Fatme El Amine — Master's thesis, School of Human Kinetics, University of Ottawa (2016-17)
Title: Effects of methylphenidate on olfaction and energy intake in individuals living with obesity

Mohcene Abdessemed — Master's thesis, Telfer School of Management, University of Ottawa (2020-22)
Title: Effects of reducing social media on mental health in youth.

Wardah Mahboob — Master's Thesis: Department of Psychology, Carleton University, (2020-22)
Title: Longitudinal associations between eating behaviour and change in BMI in youth; Findings from the REAL study.

Doctoral Student Thesis Supervision

Deanna Drahovzal — Doctoral Intern, Mental Health PSU, CHEO, 2004-2005
Title: A Needs Assessment of Potential Consumers for the Treatment of Paediatric Obesity at CHEO

Stephanie Leclair — Dissertation, Dept. of Psychology, University of Ottawa, (2006-2012)
Title: Development, Implementation and Efficacy of a Family-based Treatment of Child Obesity Delivered via Internet:

Angela Wilson — Dissertation, Dept. of Psychology, University of Ottawa – 2011-2018
Title: The relationship between depression and obesity in children and youth: A systematic Review and Meta-analysis

Marisa Murray — Dissertation, Dept. of Psychology, University of Ottawa – 2011-2018)
Title: A longitudinal investigation of the relationship between screen time and anxiety and depression in youth: The moderating effects of social support, attachment and coping.

Luzia Jaeger Hintze — Doctoral Dissertation, School of Human Kinetics, U of Ottawa, 2014-18
Title: Top Down or Bottom Up? A Study of Early Markers of Weight Loss Success.

Fatima Mougharbel — Dissertation, School of Population Health, University of Ottawa, 2017-2023
Title: The longitudinal investigation of Weight Teasing as a predictor of anxiety and depression in youth.

Postdoctoral Supervision

Dr. Ahmed Boachie — Psychiatric Post-Doctoral Fellow: CHEO Research Institute, 2001
Title: Olanzapine as an Adjunctive Treatment for Anorexia Nervosa

Dr. Kristi Adamo Postdoctoral Fellow, CHEO Research Institute 2005-2006
Title: Physiological and Behavioural Predictors of Energy Balance in Obese Youth
*** Awarded CIHR post-doctoral funding (declined)**

Dr. Jameason Cameron-Postdoctoral Fellowship, HALO, CHEO Research Institute
Title: Effects of Methylphenidate on Body Weight, Food Intake, and energy expenditure (2013-2015).

Dr. Marcus Veber Postdoctoral Fellowship, HALO, CHEO Research Institute
Title: Lifestyle behaviours and mental health (2024-2026).

Graduate Thesis Committee Membership/External Examiner

Dana Cross: Masters thesis, Human Kinetics, University of Ottawa, 2004-2005
Title**:** Investigating Male Body Image Within the Goodness-of-Fit Model

Gina Bottamini Doctoral Dissertation, Faculty of Education, University of Ottawa, 2004-06
Title: The Development and Validation of a Male Body Image Questionnaire

Travis Saunders Doctoral Dissertation, Human Kinetics, University of Ottawa, 2009-2013
Title: Effects of Sedentary Behaviour on Cardio-metabolic metabolic health, .

Jessica McNeil Masters Thesis. Human Kinetics, University of Ottawa, 2010-2012
Title: The effects of Menstrual cycle determinants of energy balance in women with different adiposity levels.

Michael Hopkins Master's Thesis, Human Kinetics, University of Ottawa, 2010-2012
Title: Energy expenditure in obese women undergoing a structured exercise or lifestyle embedded activities intervention

Jakub Racek Master's Thesis, Dept. of Psychology, Carleton University, 2011-2012
Healthy Eating Practices: The role of Consideration of Future Consequences and Conscientiousness

Nicole Obeid Doctoral Dissertation, Psychology, University of Ottawa, 2010-2012
Title: Determinants of chronic relapse in hospitalized Anorexia Nervosa patients.

Jameason Cameron Doctoral Dissertation, Human Kinetics, University of Ottawa (2008-2013)
Title: Acute and chronic energy deprivation improves smell performance and heightens the rewarding value of food: How modality of deprivation differently impacts olfaction, food reward, appetite, peptide hormones, and energy intake.

Chantal Gosselin Chair, Master's thesis Defence, Human Kinetics, University of Ottawa (2012)
Title: The Effects of Green Tea Extract on Metabolism

Stephanie Leon	Doctoral Dissertation, Dept. of Psychology, University of Ottawa (2012-18) Title: The Role of Family Functioning in Repeat visits to the Emergency Department in Youth
Michael Borghese	Masters, School of Human Kinetics, University of Ottawa (2012-2014) Title: The Influence of Weight status on the link Between TV and Food Intake in Children
Natasha Schranz	Dissertation/Examiner, University of South Australia, Adelaide, SA (2013) Title: Can resistance training change the strength, body composition and self-concept of overweight and obese adolescent males? A randomized Controlled trial
Aidan Gribbon	Masters, School of Human Kinetics, University of Ottawa (2013-2015) Title: Active Video Games and Energy Balance in Male Adolescents
Holly Ockenden	Masters, School of Human Kinetics, University of Ottawa (2013-2015) Title: Development of Maternal Health Survey
Jennifer Brown	Masters, School of Human Kinetics, University of Ottawa (2013-2015) Title: Relationship of Appetite, Olfaction, and Gut Hormones after Roux –en-Y Gastric Bypass Surgery: Could this explain weight regain.
Genevieve Monaghan	Doctoral Dissertation, Dept. of Psychology, University of Ottawa (2012-18) Title: Measuring and Reducing Distorted Thinking About Food in Adults
Allana LeBlanc	Doctoral Dissertation, Dept. Population Health, University of Ottawa (2015) Title: Why are Children sedentary: An examination using the International Study of Child Obesity, Lifestyle, and the Environment”
Jessica McNeil	Doctoral Dissertation, Dept. Human Kinetics, University of Ottawa (2015). Title: Examining the acute effects of sleep restriction and timing on energy balance, satiety efficiency and food reward in adults
Jaime-Lee Yabsley	Masters, School of Human Kinetics, University of Ottawa (2016-18) Title: Validation of a child version of the Three-factor eating Questionnaire- A Psychometric Tool for the Evaluation of Eating Behaviour
Kathryn E. Rand	External Examiner, MA thesis, Department of Health Promotion, Dalhousie University (2017) Title: Weight-based teasing in recreational sports in nova scotia: An exploratory study
Justin Lang	Examiner, PhD. Thesis, Population Health, University of Ottawa (2017) Exploring the utility of cardiorespiratory fitness as a population health surveillance indicator for children and youth: An international analysis of results from the 20 M shuttle run test.

Ryan Featherstone Masters, School of Human Kinetics, University of Ottawa (2017-19).
Title: Effects of sleep on mental health and cognition in adolescents

Catherine Pouliot Masters, School of Human Kinetics, University of Ottawa (2017-19).
Title: Effect of an 8-week Exercise Program on the Diet of Sedentary Adolescents with a Normal weight and Excess Body Weight.

Salma Mahmoodianfard: Doctoral Dissertation, Human Kinetics, University of Ottawa (2017-21)
Title: The effects of probiotics supplementation on gut bacteria, appetite and weight loss in women with obesity

Hugues Sampasa-Kanyinga, Doctoral Dissertation, School of Epidemiology, U of Ottawa (2017-21)
Title: Association between movement behaviours and mental health in children and youth.

Jane Booth Master's thesis, School of Human Kinetics, University of Calgary (2018-20)
Title: Effects of exercise on metabolic syndrome and quality of life

Derek Buchanan External Examiner, Doctoral Dissertation, Department of Neuroscience, Carleton University (2020)
Title: Transcranial direct current stimulation and the theta beta ratio in the context of attention deficit hyperactivity disorder and pediatric neuropsychiatry.

Olivier Brown Doctoral Thesis Committee Member, Dept of Psychology, UOttawa (2020-24)
Title: Resilience and neurophysiological recovery in Concussion in Youth

Amelia Eaton MSC. Thesis committee, Human Kinetics, University of Ottawa (2021-22).
Title: A case-control study of gamma wave density and impulsivity in youth with and without Type 2 diabetes.

Alicia Ricketts Doctoral thesis, School of Human Kinetics, Uottawa (2021-Current)
Title: Effects of probiotics and energy restriction on microbiota and weight loss in women with obesity

Saniya Tandon MSc. Thesis committee, School of Epidemiology, UOttawa (2022-24)
Title: Association of Physical activity, fruit and vegetable Consumption in youth

Kathryn Walker: Doctoral Thesis, External examiner, School of Epidemiology, UOttawa (2023)
Title: Cycling for Transportation and recreation and cognitive outcomes in middle-aged and older adults

g) GRADUATE COURSES:

N/A

h) EXTERNAL RESEARCH FUNDING ($11 Million as PI/Co-PI and >$15.5 Million as Co-Inv)

UNDER REVIEW

Are psychosocial protective factors in adolescence predictive of mental wellness in adulthood? A 15-year follow-up study. ($97,018) (SSHRC)
Principal Investigators: Drs N. Obeid, **G. Goldfield**
Co-Investigators: I. Colman, T. Vaillancourt, D. Maras, G. Tasca

Digital Platform to Advance Mental Health Research in Children and Youth (Brain Canada)
Principal Investigators. Drs. Louise Gallagher, **G. Goldfield,** M Maslej, ($2,998,995)
Co-Investigators: P. Arnold, M. Aitken, J. Vortsman

Cross-sectional and prospective associations between integrated lifestyle behaviours and psychosocial outcomes among Canadian youth: focusing on socioeconomic disparities for effective behavioural interventions ($75,000) CIHR
Principal Investigators: Drs. J.-P. Chaput, **G. Goldfield**
Co-Investigators: Veber Lopes, M, Lang, J., Janssen, I., Georgiades, K, da Costa, Bruno

AWARDED

Multisite Randomized Clinical Trial: Mindfulness Based Intervention for Mild Traumatic Brain Injury (MBI4mTBI) CIHR
Co-Principal Investigators: Ledoux, A.A., Silverberg, N., Zemek, R. (**$1,308,105; 2025-2029**)
Co-Investigators: Barrowman, NJ; Cairncross, M; Craig, WR; Davis, AL; Doan, QH; Gagnon, I; **Goldfield, GS**; Gray, CE; Jaworska, N; Reed, N; Sicard, V; Smith, AM; Walker, LA

Unintended consequences of participating in pediatric obesity interventions CIHR
Co-Principal Investigators: Albga, A., Ball, G., Jebeile, H., Johnston, B., Côté, M., Sockalingam S. (**$415,000; 2025-2027**)
Co-Investigators: Agostino, H., Booij, L., Carrière, K., Cohen, T., Erdstein, J., Farnesi, BC, **Goldfied, G.,** Hadjiyannakis, S., Kwok, C., Lacaze-Masmonteil, T., Lucibello, K., Morrison, K., Patte, K., Patton, I., Sacco, S., Sesma- Vazquez, M., & Zenlea, I.

Cohort Network for Adolescents and Youth with Mental Health Multimorbidity: A Master Observational Trial (CALM) Ont. Brain Institute
Principal Investigator: Louise Gallagher (**$5,899,000; 2023-2026**)
Co-Directors: **G. Goldfield,** A Voineskos, P. Arnold, S. Ameis, J Vorkman, M Kimber, S. Ameis, S. Monga, E. Dickie

Feasibility of a Mindfulness-Based Eating Awareness Training for Disordered Eating and Mental health in Youth with Obesity: A single Blind RCT study ($99k) (CHAMO)
Principal Investigators: Drs. M. Harrison and G. Goldfield

Evaluating the ongoing impact of COVID-19 on youth substance use and mental health trajectories over time: renewal of the COMPASS prospective cohort — CIHR
Principal Investigator: Scott Leatherdale (**$2,555,100; 2023-2028**)
Co-Investigators: **G. Goldfield**
Biobehavioral Mechanisms of Contrave in adults with Obesity (150K) — Bausch Health
Principal Investigators: **G. Goldfield**, E. Douct, N Jaworska, P. Blier
(2023-25; 148,000)
Co-Investigators: J. Shiau, A-A Ledoux,

Biobehavioral Mechanisms of Contrave in adults with Obesity (50K) — UOttawa BMRI
Principal Investigators: G. Goldfield, Natalia Jaworska (**2023-24; $50,000)**
Co-Investigators:E. Doucet, J. Shiau, A-A Ledoux

Effects of a Social Media Use Reduction Intervention on Neural, Cognitive, and Psychosocial Functioning in Youth with Emotional Distress: A Single-Blind, RCT Feasibility Study (REWIRE trial) — CHAMO
Principal Investigators: G. Goldfield, M. Robb **(2024-2026; 140,000)**
Co-Investigators; Len Epstein, albert Tu, Nagwa Wilson, A. ledoux, N Jaworska

No More FoMO: Effects of a Social Media Use Reduction Intervention on Cognitive, And Psychosocial Functioning in Youth with Emotional Distress: A Single-Blind, RCT Feasibility Study — CHEO-RI
Principal Investigators: G. Goldfield, M. Robb **(2024-2025; 30,000)**
Co-Investigators; Len Epstein, Albert Tu, Nagwa Wilson, A. Ledoux, N Jaworska

Effects of Mindfulness Training on wellbeing in youth with Emotional Distress — Ont. Bio Sci Innovation
Principal Investigator: **Dr. Gary Goldfield** (**$75, 000; 2023-2024**)
Co-Investigators: Dr. AA. Ledoux, B. Saab, M. Robb, K. Pajer, M. Cheng, J. Lang

Teaching Adolescents with type 1 Diabetes Self-compassion (TADS) to reduce diabetes distress: A randomized controlled trial — JDRF and Brain Canada
Principal Investigator: Marie-Eve Robinson; **($250,000, 2022-2024)**
Co-Investigators: G. Goldfield, A. Ahmet, E. Goldbloom,
K. Khatchadourian, S. Lawrence, C. Zuijdwijk, J. Shah, B. Feldman, K. Liu

Effects of Reducing Social Media Use on Emotional Distress in Youth — CIHR
Principal Investigators: Dr. Gary Goldfield; Dr. Chris Davis **($340,424, 2021-2025)**
Co-Investigators: Drs. N. Barrowman; J.P. Chaput; P. Cloutier; C. Gray;
A.A. Ledoux; T. Saunders

Effects of Mindfulness-Based Eating Awareness Training on Disordered Eating in Youth With Obesity: The MB-EAT-SMART study — Ont. Brain Institute
Principal Investigators: Dr. Gary Goldfield;(50,000, 2021-2022).
Co-Investigators: Drs. A Buchholz, C Peters, AA Ledoux, B. Saab, J Kristeller

Mindfulness-Based Intervention for Mild Traumatic Brain Injury+MRI — OBI & MOBIO

Principal Investigator: Andree-Anne Ledoux **($50,000, 2022-23)**
Co-Investigator: Dr. **Gary Goldfield**

Mindfulness-Based Intervention for Mild Traumatic Brain Injury^{+MRI} a Pilot study uOBMRI
Principal Investigator: Andree-Anne Ledoux **($75,000, 2022-23)**
Co-Investigator: Dr. Gary Goldfield

Mindfulness-Based Intervention for Mild Traumatic Brain Injury CHAMO
Principal Investigator: Andree-Anne Ledoux **($91,900, 2022-23)**
Co-Investigator: Dr. Gary Goldfield

Pediatric Concussion Assessment of Rest and Exertion with MRI (PedCARE^{+MRI}) Health Research-PSI
Principal Investigator: Roger Zemek, Andree-Anne Ledoux **($195,500)**
Co-Investigator: Dr. Gary Goldfield

Mindfulness-Based Intervention for Mild Traumatic Brain Injury in youth with MRI (MBI-4-mTBI+MRI) CHEO-RI
Principal Investigator: Andree-Anne Ledoux **($29,995.25, 2019-20)**
CO-Investigators: Zemek, R; Smith, A.; Osmond, M.; Gray, C; Goulet, K.; Reed, N.; Anderson, P.; **Goldfield, G**.; Barrowman, N.; Leeder, K.; Cairncross, M.; Silverberg, N.

Effects of social media reduction on mental health in youth: A randomized controlled pilot trial CHEO-RI
Principal Investigator: Dr. G. Goldfield (30,000, 2019-20)
Co-Investigators: Drs. M Tremblay, JP. Chaput, C. Gray, M Robb, M. Cheng, C. Davis, Frederic Nault-Briere, P. Cloutier

Sleep extension and insulin sensitivity in short-sleeping adolescents having risk factors for type 2 diabetes. CIHR
Principal Investigator: Drs. Jean Philippe Chaput **($229,500, 2020-2022)**
Co-Investigators: G. Goldfield, R Gruber, S. Hadjiyannakis, J Hamid

What are the Effects of Aerobic Exercise on the Brain, Mood & Cognitive Function in Depressed Transitional-Aged Youth? UMRF
Principal Investigator: Dr. N Jaworska, V Knott **($35,000, 2018-19)**
Co-Investigators: Drs **G. Goldfield**, A. Ortiz, I. Manion, J Steffener, J Brunet, T Smita,

The Effects of Dopamine-Related Genes on Binge Eating in Women with Binge-Eating Disorder: Can A Multilocus Dopamine Score Predict Treatment Response Shire Pharma
Principal Investigator: Dr. Gary Goldfield ($30,280; 2017-2018)
Co-Investigators: Drs, D. Bullman, J. Cameron, E. Doucet, P. Robaey, R. Vaillancourt

Ramping up Neurocognition (RUN): A the impact of a teacher-led active play intervention on kindergarten children's cognitive, social and emotional development. Public Health Agency of Canada
Principal Investigator: Dr. Gary Goldfield ($36,000; 2018-2024)
Co-Investigators: Drs A D'Angiulli, K. Adamo, N., K Gunnell, PJ Naylor, V. Temple.

Ramping up Neurocognition (RUN): A the impact of a teacher-led active play intervention on kindergarten children's cognitive, social and emotional development. — SSHRC
Principal Investigator: Dr. Gary Goldfield ($271,280; 2017-2024)
Co-Investigators: Drs A D'Angiulli, K. Adamo, N., K Gunnell, PJ Naylor, V. Temple.

Pediatric Concussion Assessment of Rest and Exertion+MRI — Physician Services Inc. (PSI)
Principal Investigators: Dr. R. Zemek and Dr. AA Ledoux, ($195,000; 2017-19)
Co-Investigators: Drs, A. Smith, A.Nishard, N. Reed, S. Reid, K. Farion. **G. Goldfield**

The prospective contribution of sport and active leisure to student academic and psycho-social success from kindergarten to high school. — SSHRC
Principal Investigator: Dr. Frederic Briere **($144,076; 2017-2019)**
Co-Investigators: Drs. C. Levesque, **G. Goldfield,** T Barnett, K Gunnell, V Dupere, M Janosz, L. Pagani, M. Tremblay

Supporting healthy physical activity and sedentary behaviour habits in Alberta licensed and approved child care settings through updated accreditation standards — CIHR
Principal Investigator: Dr. Valerie Carson **($195,230; 2016-2019)**
Co-Investigators: Drs. **G. Goldfield,** K Adamo, A. Oakley, N Ogden, N Kuzik

Ramping up Neurocognition (RUN): A Randomized Controlled Pilot Trial Examining the Effects of Physical Activity Promotion on Neurocognitive Development in Young Children (September 2016-August 2017) — CHEO-RI
Principal Investigator: **Dr. Gary Goldfield ($29,580)**
Co-Investigators: Drs A D'Angiulli, K. Adamo, N. Barrowman, V Carson, k. Gunnell, P. Longmuir, PJ Naylor, V. Temple, P Anderson, M. Tremblay

Neurocognitive correlates of physical activity promotion in young children from different socioeconomic status: A pilot study **($8,300; 2017-2018)** — Carleton University
Principal Investigator: Dr. Amedeo D'Angiulli
Co-Investigator: Dr. G. Goldfield.

Update of the Canadian Physical Activity Guidelines for the Early Years — CIHR
Principal Investigator: Dr. Mark Tremblay ($**100,000; 2016-2017**)
Co-Investigators: **Goldfield, GS**, Carson, V, Duggan, M, Adamo, KB, Birken, C, Choquette, L, Connor-Gorber, S, LeBlanc A, Faulkner G, Gray C, Jannssen I, Jannssen X,Okely, A, Poitras V, Rayner ME, Reilly, JJ, Rodin R, Sampson M, Spence JC, Timmons BW, Welsh F.

Update of the Canadian Sedentary Behaviour Guidelines for the Early Years — CIHR
Principal Investigator: Dr. Mark Tremblay **($100,000; 2015-16)**
Co-Investigators: **Goldfield, GS,** Carson, V, Duggan, M, Adamo, KB, Birken, C, Choquette, L, Connor-Gorber, S, LeBlanc A, Faulkner G, Gray C, Jannssen I, Jannssen X,Okely, A, Poitras V, Rayner ME, Reilly, JJ, Rodin R, Sampson M,

Spence JC, Timmons BW, Welsh F.

The Pediatric Research on Eating Disorders and Obesity unit (PREDO) — CHEO-RI
Principal Investigator; Dr. Wendy Spettigue **($120,000; 2014-17)**
Co-investigators: K. Baldwin, A Buchholz, Clark, L, Feder S, **Goldfield GS,** Hadjiyyannakis S, Harrison M, Norris M, Obeid N, Perkins J, Roscoe C,

The Ontario Research on Adolescent Lifestyles (REAL) Study: When high School children reach adulthood — U of Ottawa Medical Research Fund
Principal Investigator: Drs. G . Goldfield, Dr. M. Flament (retired) **($35,000**; **2014-2015)**
Co-investigators: I. Manion, A. Buchholz, K. Henderson

Effects of Prenatal Exposure to Cigarettes on Adiposity and Metabolism in Young Children. — Heart & Stroke Foundation
Principal Investigator: Dr. Gary Goldfield ($288, 397; 2013-16)
Co-Investigators: Drs E Doucet, P. Fried, K. Adamo, M. Walker, M. Tremblay N. Barrowman

Prevalence, correlates and course of suicidal ideation in a community sample and a clinical sample of adolescents **(2013-15)** — U of O Medical Research Fund
Principal Investigators: M. Flament; S. Thatte; **($50,000)**
Co- Investigators: G. Tasca, M. Seguin, C. Quiroga, J. Makinen, K. Henderson, A. Buchholz, **G. Goldfield**, S. Walker. Coll: S. Hatcher

Activity Begins in Childhood (2012-14) — CIHR
Principal Investigator: Dr. Kristi Adamo ($307,842)
Co-Investigators; Drs. **G. Goldfield**, P.J. Naylor, V. Temple, N Barrowman

Sedentary time and markers of cardiometabolic risk in children and youth: a randomized crossover study — CHEO-RI
Principal Investigator: Jean-Philippe Chaput **($30,000; 2011-12)**
Co-Investigators: T. Saunders, M. Tremblay, R. Colley, **G. Goldfield**, G. Kenny.

The Ontario Research on Eating and Adolescent Lifestyle (REAL) study: A Validation of a Web-based Survey Questionnaire — CHEO-RI
Principal Investigator: Dr. Katherine Henderson **($26,999; 2011-12)**
Co- Investigators: G. Goldfield, A. Buchholz, M. Flament. N. Barrowman

Effects of Methylphenidate on Energy Balance in Obese Adolescents — CHEO-RI/FHS
Principal Investigators: Drs. Eric Doucet, **Gary Goldfield ($15,000; 2010-present)**
Co-Investigator: Dr. Philippe Robaey

Co-existent Obstructive Sleep Apnea and Obesity: Finding NEAT targets for intervention (**$49,736; 2010-11)** **Principal Investigators:** Drs. Sherri Katz and Rachel Colley **Co-Investigators:** S. Hadjiyannakis, K. Adamo, **G. Goldfield**,	Ontario Thoracic Society
Calibrating Early Lifestyles to Manage Obesity: A Health & Education Practitioner Approach **Principal Investigator:** Dr. Mark Tremblay **($241,620; 2011-12)** **Co-Investigators: Drs. G. Goldfield,** K. Adamo, J. Barnes, J.P Chaput	Public Health Agency Canada
Behavioural Engineering of Physical Activity in Pre-school Children: A Randomized Controlled trial **Principal Investigator: Dr. Gary Goldfield ($140,000; 2010-2012)** **Co-Investigator:** Dr. K. Adamo	Heart & Stroke Foundation
Program Evaluation of "Freggie Friday" in Ottawa Schools (2010-2011) **Principal Investigators:** Drs. K. Adamo & G. Goldfield **($30,000)** **Co-Investigators: G. Goldfield** C. Colapinto, K. Dejesus, J. Rutherford	Canadian Produce Marketing Assoc
The Ontario Prospective Longitudinal Study on Risk Factors for Eating and Weight Disorders in Adolescence (REAL study). From paper and pencil to Web-survey (2010-2011) **Principal Investigator:** Dr. Martine Flament - **$35,000** **Co-Investigators:** Drs. **G. Goldfield**, A. Buchholz, and K. Henderson	UMRF
A Tertiary Care Approach to The Management of Pediatric Obesity And it's Co-Morbidities (2009-2011) - $168, 411 **Principal Investigator:** Dr. Stasia Hadjiyannaki, **Co-investigators: G. Goldfield**, K.Adamo, M. Tremblay, R Colley, et al.	CHAMO
Critical Periods of Body Weight Regulation: A Women's Health Perspective Sherbrooke, Ottawa, Montreal Merging Team – SOMET (2008-2013) Principal Investigator: Denis Prud'homme, **($2,500,000 over 5 yrs)** **CO-Principal Investigators:** R. Rabasa-Lhoret, K. Adamo, E**.** Doucet, M.Brochu **Co-Investigators: G. Goldfield**, S. Hadjiyannakis, N. Edwards, D. Stacey et al.	CIHR
Prevalence of Markers of Insulin Resistance Among Offspring Exposed to Gestational Diabetes: A 13-17 Year Follow Up Study of a RCT Cohort **Principal Investigator:** Dr. **Stasia Hadjiyannakis ($28,912.00,** 2007-2008) **Co-Investigators:** T. Pinto, K. Adamo, J. Rutherford, **G. Goldfield**, I. Gaboury, J. Malcolm, E. Keely, M. Lawson	CHEO RI
Type 1 Diabetes, Aerobic & Resistance Exercise (T1-DARE; 2008-2010) **Principal Investigator:** Dr. R. Sigal **($170,000)** **Co-Investigators: Drs. G. Goldfield**, G. Kenny, S. Hadjiyannakis	Can. Diabetes Association
Establishment of Pediatric Obesity Cohort: Physiological and Psychological	

Determinants of Impaired Glucose Homeostasis (2007-2009) **$50,000** **Principal Investigator:** Dr. K. Adamo **Co-Investigators:** Drs. **G. Goldfield**, S. Hadjiyannakis, S. Dagenais	Canadian Diabetes Association
Appetite Signaling Proteins and Energy Intake in Obese Adolescents with Binge Eating Disorder (2007-2008) **$30,000** **Principal Investigator:** Dr. Kristi Adamo, **Co-Investigators:** Drs. **G. Goldfield**, S. Hadjiyannakis, E. Doucet	CHEO-RI
Y KIDS-FIT – A pilot program for overweight children involving physical Activity, diet, nutrition and lifestyle sessions (2006-2007) **$30,000** **Principal Investigator:** J. Campbell **Co-Investigators**: Drs. **G. Goldfield**, K. Adamo, R. Pozeg	Ont. Ministry Health promotion
Physiological and Behavioural Predictors of Energy Balance in Obese Youth 2006-2008; **$80,000 + $10,000** research allowance **(declined)** **Principal Investigator:** Dr. Kristi Adamo **Mentor/Supervisor: Dr. G. Goldfield** and Dr. E. Doucet	CIHR
Childhood Obesity Research Unit – Infrastructure Grant (2007-2008) **Co-Principal Investigators**: Drs. K. Adamo, **G. Goldfield** **$291,759**	Canadian Foundation for Innovation
How to Research Mental Well-Being (2006-2009) Y-STOP **Co-Investigators:** Drs I. Manion, R. Flewelling, Z. Merali, Y Albert, K. Matheson, M. Cappellii, K. Henderson, A. Buchholz, **G. Goldfield,**	Youth Science Technology & Outreach Program
A National Think Tank for Health Services Delivery and Research in Pediatric Weight Management **Principal Investigator:** Dr. Geoff Ball **($15,000**, 2006-2007) **Co-Investigators: Gary Goldfield**, Amanda Newton, John Spence	CIHR
Sleep Apnea in Obesity in Urban youth and its effects on Respiratory, Cardiovascular and Endocrine Systems (SOURCE) **Principal Investigator:** Sherri Katz (**$30,000** ,2007-2008) **Co-Investigators:** Drs. I. McCluskey, K. Adamo, S. Hadjiyannakis, **G. Goldfield**	CHEO-RI
Feasibility and short-term efficacy of Virtual Reality to Increase Physical Activity in Overweight or Obese Adolescents (2006-2008) **Principal Investigator: Dr. G. Goldfield ($150,000)** **Co-Investigators:** Drs. Kr. Adamo, S. Hadjiyannakis	Canadian Diabetes Association
Examining a biopsychosocial model of the development of body image, eating behaviours and weight in youth: An Ontario prospective longitudinal Study Principal Investigator: Dr. Martine Flament (**$150,000;** 2006-2008**)** Co-Investigators; **Drs. Gary Goldfield**, A. Buchholz, K. Henderson	Provincial Centre of Excellence for Child and Youth Mental Health

Resistance Exercise in Active Adults with Diabetes – Type 1 (READI, 2006-2010) CIHR
Principal Investigators: Drs. R. Sigal, G. Kenny, L. Donovan,
M. Riddell, B. Perkins (**$1,200,000)**
Co-Investigators: **Drs. G. Goldfield**, S. Hadjiyannakis

Canadian Learning to be Active School Study (CLASS, June 2005-May 2006) CIHR
Co-Investigator, **($50,000)**
Principal Investigator: Dr. M. Tremblay
Co-Investigators: Dr. K. Adamo**, G. Goldfield**, C. Leblanc, S. Hadjiyannakis

Family-Based behavioural treatment for childhood Obesity Delivered Via Internet: A Randomized Controlled Trial (July 2005-June 2007) Heart & Stroke Foundation
Principal Investigator: Dr. Gary Goldfield ($99,835)
Co-Investigators: Drs. P. McGrath, C. Watters, D. Prud'homme

Type 1 Diabetes, Aerobic & Resistance Exercise (T1-DARE; 2005-2008) Can. Diabetes Association
Principal Investigator: Dr. Ronald Sigal $225,000
Co-Investigators: Drs. Gary Goldfield, Glen Kenny, Stasia Hadjiyannakis et al.

Feasibility and short-term efficacy of Virtual Reality to Increase Physical Activity in Overweight or Obese Adolescents (2006-2007) CHEO-RI
Principal Investigator: Dr. G. Goldfield ($30,000)
Co-Investigators: K. Adamo, S. Hadjiyannakis, S. Bouchard, J. Lapierre

Healthy Eating Aerobic and Resistance Training in Youth (HEARTY 2004-2009) CIHR
Co-Principal Investigators: Drs. G. Goldfield, R. Sigal, G. Kenny
S. Hadjiyannakis (**$1,620,516)**
Co-Investigators: Drs. D. Prud'homme, R. Gougeon, G. Wells

Correlates of Eating & Weight Disorders in a community-based Adolescent population: Investigating an Integrative Biopsychosocial Model (2004-2005) UMRF
Principal Investigator: Dr. M. Flament (**$34,770)**
Co-Investigators: Drs. G. Goldfield, A. Buchholz, K. Henderson

New Investigator Salary Award (2003 – 2008) CIHR
Increasing Physical Activity in Obese Children
Principal Investigator: **Dr. G. Goldfield**
$250,000 over 5 years ($50,000/year)

Effects of methylphenidate on energy balance in obese men (2003-2004) U of Ottawa
Principal Investigator: **Dr. G. Goldfield, ($20,000)**
Co-Investigators: Drs. E. Doucet, D. Prud'homme, P. Imbeault

Effects of methylphenidate on energy balance in obese men: (2003-2004) CIHR
Principal Investigators: **Drs. G. Goldfield** and E. Doucet **($50,000)**
Co-Investigators: Drs. D. Prud'homme, P. Imbeault

Increasing Physical Activity in Obese Children: 2002-2004 — CIHR
Principal Investigator: **Dr. Gary Goldfield ($167,000)**
Co-Investigator: Dr. Denis Prud'homme

Increasing Physical Activity in Obese Children: 2001-02 — CHEO-RI
Principal Investigator: **Dr. Gary Goldfield ($29,837)**
Co-Investigator: Dr. Denis Prud'homme

Determinants of Delay Discounting in Smokers: 2000-02 — NIH (NCI)
Co-Principal Investigators: Drs. L. Epstein,
G. Goldfield ($200,000 - USD)

Eating Attitudes and Behavior in Bulimics and Bodybuilders: 1995-97 — Sport Canada
Principal Investigators: **Drs G. Goldfield** & A. Blouin **($13,500)**

NON-PEER REVIEWED FUNDING

Ramping up Neurocognition (RUN): A the impact of a teacher-led active play Intervention on kindergarten children's cognitive, social and emotional development. — Public Health Agency of Canada
Principal Investigator: **Dr. Gary Goldfield ($36,000; 2018-2022)**
Co-Investigators: Drs. A D'Angiulli, K. Adamo, N., K Gunnell, PJ Naylor, V. Temple.

Marjorie Goodrich Summer Student Fellowship, 2002 — CHEO-RI
Principal Applicant: Gary Goldfield ($5,500)

Impact of Multiple Health Behavior Change Interventions in Children and Adolescents: 2001-2002 — Robert Wood Johnson Foundation
Principal Investigators: **Drs. G. Goldfield**, L. Epstein **($25,000 USD)**

Eating Disturbances in Bulimics and Bodybuilders: 1996 — Carleton University
Dissertation ($500) — Graduate student stipend

i) **PUBLICATIONS:**
Lifetime summary
Books authored …………………………………………………………………………………… 0
Books edited ……………………………………………………………………………………..0
Chapters in books………………………………………………………………………………...6
Papers in <u>refereed</u> journals………………………………………..……………………………………..205
Papers in refereed conference proceedings…………………………………….……………………..157
Major Invited Contributions and Technical reports……………………………………..………………..9
Abstract and/or papers read ………………………………………………………………………….>200
Others (Invited presentations/workshops presented) ………………………………………………………36

BOOK CHAPTERS:

Goldfield, G.S., & Epstein, L.H. (2002). Management of Obesity in Children. In K.D. Brownell & C. G. Fairburn (Eds). Eating Disorders and Obesity: A Comprehensive Handbook, 2nd Edition, pp 573-577. Guilford Press, New York, NY

Goldfield, G.S., Epstein, L.H. & Raynor, H.A. (2002). Pediatric obesity treatment. In T. A. Wadden and A. J. Stunkard (Eds.) Handbook of Obesity Treatment, (pp. 532-555). Guilford Press: New York, NY

Adamo KB, Jean-Philippe S, Wilson S, Ferraro ZM, Strychar I, Nerenberg K, **Goldfield G**. Weight Gain, Body Image and Attitudes over the course of Pregnancy. In Weight Gain: Women's Attitudes, Health Implications and Psychological Challenges. Editors: Alessio Pirotte & Tristan Libert. Nova Science Publishers Inc., New York; 2013

LeBlanc, C, **Goldfield GS**, Tremblay MT, (2019). Promoting mental health in children: The Importance of Healthy Active Living. In J Foy (Ed). Mental Health Care of Children and Adolescents: A Guide for Primary Care Clinicians. American Academy of Pediatrics Press

Jaeger Hintze, L., Doucet, É., **Goldfield, G.S**. (2022). Fat Mass and Obesity-Related Gene (FTO) and Binge Eating Disorder in Adults and Adolescents. In: Patel, V., Preedy, V. (eds) Eating Disorders. Springer, Cham. https://doi.org/10.1007/978-3-030-67929-3_61-1

Staiano, A. E., Button, A. M., **Goldfield, G. S**., Robinson, T. N., Mota, J., Woolford, S. J., & Katzmarzyk, P. T. (2025). Screen Media, Obesity, and Nutrition. In *Handbook of Children and Screens* (pp. 73-80). Springer, Cham.

Publications in Refereed Journals (names underlined denote students/trainees)

1. Blouin, A. G. & **Goldfield, G. S.** Body image and steroid use in male bodybuilders. **(1995).** International Journal of Eating Disorders, 18 (2), 159-165.
2. Blouin, A. G., Blouin, J.H., Iversen, H.S., Carter, J., Goldstein, C., **Goldfield, G. S**., & Perez, E. Light therapy in bulimia nervosa: A double-blind placebo-controlled investigation. **(1996).** Psychiatry Research, 60, 1-9.
3. **Goldfield, G. S.**, Harper, D. W., & Blouin, A. G. Are bodybuilders at risk for an eating disorder? **(1998).** Eating Disorders: The Journal of Treatment and Prevention, 6 (2), 133-158.
4. Epstein, L.H, **& Goldfield, G.S.** Physical activity in the treatment of childhood overweight and obesity: Current evidence and research issues. **(1999).** Medicine and Science in Sports and Exercise, 31 (11), S553-9.
5. **Goldfield, G. S,** Kalakanis, L., Myers-Ernst, M. D., & Epstein, L. H. **(2000).** Open-loop feedback to increase physical activity in obese children. International Journal of Obesity, 24, 888-892.
6. **Goldfield, G.S**., Epstein, L.H., Kilanowski, C., Paluch, R. & Kogut-Bossler, B. **(2001).** Cost-Effectiveness of group and mixed family-based treatment for childhood obesity. International Journal of Obesity, 25 (12), 1843-1849.

7. Kalakanis, L., **Goldfield, G.S.,** Paluch, R., & Epstein, L. H. **(2001).** Parental activity as a determinant of activity level and patterns of activity in obese children. Research Quarterly for Exercise and Sport, 72 (3), 202-209.
8. Epstein, L.H., Paluch, R.A., Kalakanis, L.E. **Goldfield, G.S.,** Cerny, F & Roemmich, J.N. **(2001).** How much activity do youth get? A quantitative review of heart-rate measured activity. Pediatrics, 108 (3), e44.
9. **Goldfield, G.S**. & Epstein, L.H. **(2002).** Can fruits and vegetables and activities substitute for snack foods? Health Psychology, 21 (3), 299-303.
10. **Goldfield, G.S., &** Boachie, A. **(2003).** Delivery of family therapy in the treatment of anorexia nervosa using telehealth. Telemedicine Journal and E-Health, 9 (1), 111-4.
11. Boachie, A., **Goldfield, G.S.**, & Spettigue, W. **(2003).** Use of Olanzapine as an adjunctive treatment for anorexia nervosa in hospitalized children. International Journal of Eating Disorders, 33 (1), 98-103.
12. Leddy, J.J., Epstein, L.H., Jaroni, J.L., Roemmich, J.N., Paluch, R.A., **Goldfield, GS**. & Lerman, C. **(2004).** The influence of Methylphenidate on laboratory eating in obese men. Obesity Research, 12, 224- 232.
13. **Goldfield, G.S.,** Davidson, M., Saad, F., and Epstein, L.H. **(2005).** Validation of a questionnaire measure of the reinforcing value of food. Eating Behaviors, 6 (3), 283-292.
14. **Goldfield, GS.**, Cloutier, P., Mallory, R., Prud'homme, D., Parker, T., Doucet, E. **(2006).** Validity of Foot-to-Foot Bioelectrical Impedance Analysis in Obese Children and Parents. The Journal of Sports Medicine and Physical Fitness, 46 (3), 447-53.
15. **Goldfield, GS,** & Legg, C. Dietary restraint, anxiety and the relative reinforcing value of snack-food in non-obese women. **(2006).** Eating Behaviors, 7, 323-337.
16. **Goldfield, G.S.,** Mallory, R., Parker, T., Lumb, A., Cunningham, T., Parker, K., Legg, C., Prud'homme, D. Gaboury, I., Adamo, K. **(2006).** Effects of Open-Loop Feedback on Physical Activity and Television Viewing in overweight and obese children. Pediatrics, 118 (1), e157-66.
17. **Goldfield, G.S.,** Paluch, RA, Keniray, K., Hadjiyannakis, S., Lumb, A., & Kadamo, K. **(2006).** Effects of Breast Feeding on Weight Changes in Family-Based Pediatric Obesity Treatment. Journal of Developmental and Behavioral Pediatrics, 27 (2), 93-7.
18. **Goldfield, GS**, Blouin, AG., Woodside, D.B. **(2006).** Body Image, Binge Eating and Bulimia Nervosa in Male Bodybuilders. Canadian Journal of Psychiatry, 51 (3), 160-168.
19. **Goldfield, G.S**., Mallory, R., Parker, T., Lumb, A., Cunningham, T., Parker, K., Legg, C., Prud'homme, D. Adamo, K. **(2007).** Effects of modifying physical activity and television viewing on psychosocial adjustment in overweight and obese children. Journal of Pediatric Psychology, 32 (7), 783-793.
20. **Goldfield, GS**, Lorrello, C., Doucet, E. (2007). Methylphenidate reduces energy intake and dietary fat intake: A mechanism of reduced food reward. American Journal of Clinical Nutrition, 86, 308-315.
21. Cameron, J., **Goldfield, GS,** Doucet, E**. (2008).** The effects of prolonged caloric restriction leading to weight loss on food hedonics and reinforcement. Physiology & Behaviour 94 (3), 474-80.
22. **Goldfield, GS**, Mallory, R., Prud'homme, D., Adamo, KB. **(2008).** Gender differences in response to a physical activity intervention in obese youth. Journal of Physical Activity and Health, 5 (4), 592-606.
23. **Goldfield, G.S.,** Adamo, K.B., Rutherford, J., Legg, C. **(2008).** Stress and the relative reinforcing value of food in female binge eaters. Physiology & Behaviour, 93 (3), 579-87.
24. Lorrello, C.L**, Goldfield, GS.,** Doucet, E. **(2008).** Methylphenidate Hydrochloride Increases Energy Expenditure in Healthy Adults. Obesity, 16 (2), 470-472.

25. **Goldfield, GS** & Lumb, A. **(2008)** Smoking, dietary restraint, and gender on the relative reinforcing value of snack food in university students. Appetite, 50 (2-3), 278-89.
26. **Goldfield, GS. (2009).** Predictors of Response to an Intervention Modifying Physical Activity and Sedentary behaviour in Overweight/Obese Children: Attitudes vs. Behaviour. Journal of Physical Activity & Health, 6 (4), 463-466.
27. **Goldfield, GS. (2009).** Body Image, Disordered Eating, and Anabolic steroid use in female bodybuilders. Eating Disorders: Journal of Treatment and Prevention, 17 (3), 200-210.
28. **Goldfield, GS &** Lumb, A. **(2009).** Effects of Dietary Restraint and Body Mass Index on the Relative Reinforcing Value of Snack Food. Eating Disorders: Journal of Treatment and Prevention, 17 (1), 46-62
29. **Goldfield, GS.,** Woodside B. **(2009).** Body Image, Disordered eating, and anabolic steroid use in male bodybuilders: Current vs. Former Users**.** The Physician & Sportsmedicine, 36 (2), 1-4.
30. **Goldfield, GS,** Moore, C., Henderson, K. Buchholz, A., Obeid, N. Flament, M. **(2010).** Body Dissatisfaction, Dietary Restraint, Depression and Weight Status in Adolescents. Journal of School Health, 80 (4), 186-192.
31. Tremblay, MS, **Goldfield, GS. (2010).** Commentary on "Outcomes and costs of primary care surveillance and intervention for overweight or obese children: The LEAP 2 randomised controlled trial. BMJ- Evidenced-Based Medicine, 15 (1), 23-24.
32. **Goldfield, GS,** Moore, C., Henderson, K. Buchholz, A., Obeid, N. Flament, M. **(2010)** The relationship Between Weight-based Teasing and Psychological Adjustment in Adolescents. Paediatrics & Child Health, 15 (5), 283-288.
33. Adamo, KB., Rutherford, JA, **Goldfield, GS. (2010).** Effects of interactive video game cycling on overweight and obese adolescent health. Applied Physiology, Nutrition & Metabolism, 35 (6), 805-815.
34. **Goldfield, GS.,** Henderson, K., Buchholz, A., Obeid, N., Nguyen, H., Flament, M. **(2011)**. Physical Activity and Psychosocial Adjustment in Adolescents. Journal of Physical Activity & Health, 8, 157-163.
35. **Goldfield, GS.,** Murray, MA, Henderson, K., Buchholz, A., Obeid, N., Kukaswadia, A., Flament, M.F. **(2011).** Family meals and body mass index among adolescents: Effects of gender. Applied Physiology, Nutrition & Metabolism, 36, 539-546.
36. Tremblay, MS., LeBlanc, A.G., Kho, M.E., Saunders, T.J., Larouche, R., Colley, RC., **Goldfield**, GS, Connor Gorber, S. **(2011).** Systematic review of sedentary behaviour and health indicators in school-aged children and youth. International Journal of Behavioral Nutrition and Physical Activity, 8, 98.
37. Raynor, HA**.**, Van Wallenberg, EJ., Osterholt, KM.,Hart, CN., Jelalian, E., Wing, RR & **Goldfield, GS**. **(2011).** The influence of child's and parent's food liking and parent's food intake on overweight/obese child's food intake. Journal of American Dietetic Association, 111 (3), 425-430.
38. **Goldfield, GS** & Lumb, AL., Colapinto, CK. **(2011).** Body Mass Index and the relative reinforcing value of snack food in overweight and obese individuals: A linear Relationship? Canadian Journal of Dietetic Practice and Research**,** 72 (4), 170-174.
39. Norwood, S., Bowker, A., Buchholz, A., Henderson, K., **Goldfield, G.S**., Flament, MF. (**2011)**. Self-Silencing and anger regulation as predictors of disordered eating among adolescent females. Eating Behaviors, 12 (2), 112-118.
40. **Goldfield, GS**., Lorrello, C., Cameron J., Chaput, JP. **(2011).** Gender differences in the effects of methylphenidate on energy intake in young adults: A preliminary study. Applied Physiology, Nutrition & Metabolism, 36 (6), 1009-1013.

41. **Goldfield, GS**., Kenny, GP., Hadjiyannakis, S., Phillips, P., Alberga, A., Saunders, TJ, Tremblay, MS, Malcolm, J, Prud'homme, D, Gougeon, R., & Sigal, RJ. **(2011).** Video game playing is independently associated with blood pressure and lipids in overweight and obese adolescents. PLoS ONE, 6 (11), e26643.
42. Flament, MF., Hill, E., Buchholz, A., Henderson, K., **Goldfield, G. (2012).** Internalization of the thin and muscular body ideal and disordered eating in adolescence: The mediation effects of body esteem. Body Image, 9 (1), 68-75.
43. **Goldfield, GS**. **(2012).** Making access to TV contingent on Physical Activity: Effects on liking and relative reinforcing value of TV and physical activity in overweight and obese children. Journal of Behavioral Medicine, 35 (1), 1-7
44. **Goldfield, GS**., Harvey, A., Grattan, K., Adamo, KB. **(2012).** Physical activity promotion in the preschool years: A critical period to intervene. International Journal of Environmental Research and Public Health, 9 (4), 1326-42.
45. **Goldfield, GS.,** Rutherford, J., Murray, M. Adamo, KB. **(2012).** The effects of aerobic exercise on psychosocial functioning of adolescents who are overweight or obese adolescents. Journal of Pediatric Psychology, 37 (10), 1136-1147.
46. Alberga, AS, **Goldfield, GS**., Kenny, GP., Hadjiyannakis, S, Phillips, P., Prud'homme, D., Tulluch, H., Gougeon, R, Wells, GA., Sigal, RJ. **(2012).** Healthy eating, aerobic and resistance training in youth (HEARTY): Study rationale, design, and methods. Contemporary Clinical Trials, 33 (4), 839-847.
47. Cameron, JD., **Goldfield, GS.,** Doucet, E. **(2012).** Fasting for 24 h improves nasal chemosensory performance and food palatability in a related manner. Appetite, 58 (3), 978-81.
48. Peeters, C., Marchand, H., Tulloch, H., Sigal, R., **Goldfield, GS**., Hadjiyannakis, S., & Kenny, G**.** **(2012**). Perceived Facilitators, barriers, and changes in a randomized controlled exercise trial for overweight and obese youth: A Qualitative inquiry. Journal of Physical Activity & Health, 9 (5), 650-660.
49. Alberga, AS, Sigal, RJ, **Goldfield, GS**, Prud'homme, D. Kenny, GP. **(2012).** Overweight and Obese Teenagers: Why is Adolescence a Critical Period? Pediatric Obesity, 7 (4), 261-273
50. Cameron, JD, Riou, ME, Tesson, F, **Goldfield, GS,** Rabasa-Lhoret, R, Brocu, M, Doucet, E. **(2013).** The Taq1A RFLP is associated with attenuated intervention-induced body weight loss and increased carbohydrate intake in post-menopausal obese women. Appetite, 60 (1), 111-116.
51. **Goldfield, GS**., Saunders, T., Kenny, G., Hadjiyannakis, S., Alberga, A., Phillips, P. Tremblay, MS., & Sigal, RJ. **(2013).** Screen viewing and diabetes risk factors in overweight and obese adolescents. American Journal of Preventive Medicine, 44, (4), S364-70.
52. **Goldfield, GS**, Dowler, L., Walker, M., Cameron, JD., Ferraro, ZM., Doucet, E., Adamo, KB. **(2013).** Are Dopamine-Related Genotypes Risk factors for Excessive Gestational Weight Gain? International Journal of Women's Health, 20 (5), 253-259.
53. Adamo, KB, Ferraro, ZM, **Goldfield, GS**, Keely, E., Stacey, D., Hadjiyannakis, S Jean-Philippe, Walker, M, Barrowman, NJ **(2013).** The Maternal Obesity Management (MOM) Trial Protocol: A lifestyle intervention during pregnancy to minimize downstream obesity. Contemporary Clinical Trials, 35 (1), 87-96
54. Alberga, AS, Medd, ER, Adamo, KB, **Goldfield, GS,** Prud'homme, D., Kenny, GP, Sigal, RJ **(2013).** Top 10 practical lessons learned from physical activity intervention in overweight and obese children and adolescents. Applied Physiology, Nutrition, and Metabolism, 38 (3), 249-258.
55. Chaput, JP, Leblanc, AG, **Goldfield, GS,** Tremblay, MS **(2013).** Are active video games useful in increasing physical activity and addressing obesity in children? JAMA Pediatrics, 167 (7), 677-678.

56. Saunders, TJ., Chaput, JP., **Goldfield, GS.**, Colley, RC, Kenny, GP, Doucet, E, Tremblay, MS **(2013).** Prolonged sitting and markers of cardiometabolic disease risk in children and youth: A randomized crossover study. Metabolism, 62(10); 1423-1428.

57. Adamo, KB., Colapinto, CK., Grattan, KP., Harvey, A., Barrowman, N, & **Goldfield, GS (2013).** Evaluating a fruit and vegetable program in Eastern Ontario schools. Canadian Journal of Dietetic Practice and Research, 74 (1), 167-174.

58. Cameron, JD, **Goldfield, GS,** Doucet, E. **(2014).** Fasting 24 hours heightens reward from food and food-related cues. Plos One. 9 (1), e85970

59. Saunders, TJ., Chaput, JP., **Goldfield, GS.**, Colley, RC, Kenny, GP, Doucet, E, Tremblay, MS **(2014).** Children and youth do not compensate for an imposed bout of prolonged sitting by reducing subsequent food intake or increasing physical activity levels: A randomized cross-over study. British J of Nutrition, 111 (4), 747-754.

60. Adamo, KB, Shen, GX, Motolla,M, Nascimento, S, Jean-Phillippe, S, Ferraro, Zm, Nerenberg, K, Smith, G, Chari, R, Gaudet, L, Piccinini-Vallis, H, McDonald, S, Atkinson, S, Godbout, A, Robitaille, J, Davidge, St, Gruslin, A, Prud'homme, D, Stacey, D, Rossiter, M, **Goldfield, GS**, Dodd, J. **(2014).** Obesity prevention from conception: A workshop to guide the development of a pan-Canadian trial targeting the gestational period. Nutrition and Metabolic Insights, 7, 7-18.

61. Adamo KB, Barrowman N, Naylor PJ, Yaya S, Harvey A, Grattan KP, **Goldfield GS. (2014).** Activity Begins in Childhood (ABC)-Inspiring healthy active behaviour in preschoolers: Study protocol for a cluster randomized controlled trial. Contemporary Clinical Trials, 15 (1), 305.

62. LeBlanc AG, Larouche R, Chaput JP, **Goldfield GS,** Tremblay MS. **(2014).** No clear evidence that exergames can prevent obesity. Obesity reviews, 15 (8), 692-693.

63. Adamo KB, Wilson SL, Ferraro ZM, Hadjiyannakis S, Doucet E, **Goldfield, GS**. **(2014)** Appetite sensations, appetite signaling proteins, and glucose in obese adolescents with subclinical binge eating disorder. J of Obesity, 312826.

64. Thivel, D, Chaput, JP, Adamo, KB, **Goldfield, GS. (2014).** Is Energy intake altered by a 10-week aerobic exercise intervention in obese adolescents? Physiology and Behavior, 135, 130-134.

65. **Goldfield, GS**, Cameron, JD, Chaput, JP **(2014).** Is Exergaming a viable tool in the fight against childhood obesity? J of Obesity, 304521.

66. Wilson, AL, **Goldfield, GS. (2014).** Overweight or obese young people are not at increased risk of depression, but young people with depression are at increased risk of obesity. Evidence Based Nursing, 17 (4), 112.

67. Sigal RJ, Alberga AS, **Goldfield GS**, Prud'homme D, Hadjiyannakis S, Gougeon R, Phillips P, Tulloch H, Malcolm J, Doucette S, Wells GA, Ma J, Kenny GP. **(2014).** Effects of aerobic training, resistance training, or both on percentage body fat and cardiometabolic risk markers in obese adolescents: the healthy eating aerobic and resistance training in youth randomized clinical trial. JAMA Pediatrics, 168 (11), 1006-14.

68. Flament, MF, Buchholz, A, Henderson K, Obeid N, Maras D, Schubert N, Paterniti, S, **Goldfield GS (2015).** Comparative distribution and validity of DSM-IV and DSM-5 diagnoses of eating disorders in adolescents from the community. European Eating Disorders Review, 23 (2), 100-110.

69. Yardley JE, Kenny GP, Perkins BA, Riddell MC, **Goldfield GS**, Donovan L, Hadjiyannakis S, Wells GA, Phillips P, Sigal RJ **(2015).** Resistance Exercise in Already-Active Diabetic Individuals (READI): Study rationale, design and methods for a randomized controlled trial of resistance and aerobic exercise in type 1 diabetes. Contemporary Clinical Trials, 41, 129-138.

70. Flament, MF, Henderson, K, Buchholz, A, Obeid, N, Nguyen, H, Birmingham, M & **Goldfield, GS**. **(2015).** Weight status and DSM-5 diagnoses of eating disorders in adolescents from the Community. Journal of the American Academy of Child and Adolescent Psychiatry, 54 (5), 403-411.

71. Adamo KB, Colley RC, Hadjiyannakis S & **Goldfield GS**. **(2015).** Physical activity and sedentary behavior in obese youth. Journal of Pediatrics, 166(5):1270-1275.

72. Maras D, Flament MF, Murray M, Buchholz A, Henderson KA, Obeid N, **Goldfield GS. (2015).** Screen time is associated with depression and anxiety in Canadian youth. Preventive Medicine, 73, 133-138.

73. Goldfield GS, Cameron JD, Murray M, Maras D, Wilson AL, Phillips P, Kenny GP, Hadjiyannakis S, Alberga AS, Tulloch H, Doucette S, Sigal RJ. **(2015).** Screen time is independently associated with health-related quality of life in overweight and obese adolescents. Acta Paediatrica, 104 (10), e448-54.

74. Alberga AS, Prud'homme D, Kenny GP, **Goldfield GS,** Hadjiyannakis S, Gougeon R, Phillips P, Malcolm J, Wells G, Doucette S, Ma J, Sigal RJ. **(2015).** Effects of aerobic and resistance training on abdominal fat, apolipoproteins and high-sensitivity C-reactive protein in adolescents with obesity: the HEARTY randomized clinical trial. International Journal of Obesity, 39 (10), 1494-1500.

75. Goldfield GS, Kenny GP, Alberga AS, Prud'homme D, Hadjiyannakis S, Gougeon R, Phillips P, Tulloch H, Malcolm J, Doucette S, Wells GA, Ma J, Cameron JD, and Sigal RJ. **(2015).** Effects of aerobic training, resistance training, or both on psychological health in adolescents with obesity: The HEARTY randomized controlled trial. Journal of Consulting & Clinical Psychology, 83 (6), 1123-35.

76. Alberga AS, Prud'homme D, Sigal RJ, **Goldfield GS,** Hadjiyannakis S, Phillips P, Malcolm J, Ma J, Doucette S, Gougeon R, Wells GA, Kenny GP **(2016).** Effects of aerobic training, resistance training, or both on cardiorespiratory and musculoskeletal fitness in adolescents with obesity: the HEARTY trial. Applied Physiology, Nutrition, and Metabolism, 41, 255–265.

77. Cameron JD, Sigal RJ, Kenny GP, Alberga AS, Prud'homme D, Phillips P, Doucette S, **Goldfield GS**. **(2016).** Body composition and energy intake - skeletal muscle mass is the strongest predictor of food intake in obese adolescents: The HEARTY trial. Applied Physiology, Nutrition, and Metabolism, 41 (6), 611-7.

78. Larouche R, Tremblay MS, **Goldfield GS. (2016).** Association Between Active Travel and Depression: Some Clarifications Needed. J Adolesc Health, 58 (5), 584.

79. Gunnell KE, Flament MF, Buchholz A, Henderson KA, Obeid N, Schubert N, **Goldfield GS. (2016).** Examining the bidirectional relationship between physical activity, screen time, and symptoms of anxiety and depression over time during adolescence. Prev Med, 14, 88, 147-152.

80. Cameron JD, **Goldfield GS**, Riou MÈ, Finlayson GS, Blundell JE, Doucet É. (**2016).** Energy depletion by diet or aerobic exercise alone: impact of energy deficit modality on appetite parameters. American Journal of Clinical Nutrition, 103 (4), 1008-16.

81. Goldfield GS, Harvey ALJ, Grattan KP, Temple V, Naylor PJ, Alberga AS, Ferraro ZM, Wilson S, Cameron JD, Barrowman, N, Adamo, KB. **(2016).** Effects of child care intervention on physical activity and body composition. American Journal of Preventive Medicine, 51 (2), 225-31.

82. Adamo KB, Wilson S, Harvey AL, Grattan KP, Naylor PJ, Temple VA, **Goldfield GS.** (2016). Does Intervening in Childcare Settings Impact Fundamental Movement Skill Development. Medicine & Science and Sports and Exercise, 48 (5), 926-32.

83. Goldfield GS, Murray M, Maras D, Wilson AL, Phillips P, Kenny GP, Hadjiyannakis S, Alberga A, Cameron JD, Tulloch H, Sigal RJ. (**2016).** Screen time is associated with depressive symptomatology among obese adolescents: a HEARTY study. European Journal of Pediatrics, 175 (7), 909-919.

84. Alberga AS, Sigal RJ, Kenny GP, Prud'homme D, **Goldfield G. (2016).** Promoting exercise for kids and teens: Let's NOT talk about weight. Medicine and Science and Sports and Exercise, 48 (5 supplement 1), 153.

85. Cameron JD, Maras D, Sigal RJ, Kenny GP, Borghese MM, Chaput JP, Alberga AS, **Goldfield GS. (2016).** The Mediating role of energy intake on the relationship between screen time behavior and body mass index in adolescents with obesity: The HEARTY study. Appetite, 107, 437-444.

86. Larouche, R., Garriguet, D., Gunnell, K. E., **Goldfield, G. S.,** & Tremblay, M. S. (**2016).** Outdoor time, physical activity, sedentary time and health-related indicators at ages 7-14: The 2012-2013 Canadian Health Measures Survey. Health Reports, 27 (9), 3-13.

87. Maras D, Obeid N, Flament M. Buchholz A, Henderson KA, Gick M, **Goldfield GS. (2016)** Attachment Style and Obesity: Disordered Eating Behaviors as a mediator in a community sample of Canadian youth. Journal of Developmental and Behavioral Pediatrics, 37 (9), 762-770.

88. Murray M, Maras D, **Goldfield GS. (2016).** Excessive Time on Social Networking Sites and Disordered Eating Behaviors Among Undergraduate Students: Appearance and Weight Esteem as Mediating Pathways. Cyberpsychology Behaviour & Social Networking, 19 (12), 709-715.

89. Ockenden H, Gunnell K, Giles A, Nerenberg K**, Goldfield GS,** Manyanga T, Adamo KB. **(2016).** Development and Preliminary Validation of a Comprehensive Questionnaire to Assess Women's Knowledge and Perception of the Current Weight Gain Guidelines during Pregnancy. International Journal of Environ Res Public Health, 13 (12), pii:E1187.

90. Alberga AS, Prud'homme D, Sigal RJ, **Goldfield GS**, Hadjiyannakis S, Gougeon R, Phillips P, Malcolm J, Wells GA, Doucette S, Ma J, Kenny GP. **(2017)** Does exercise training affect resting metabolic rate in adolescents with obesity. Applied Physiology, Nutrition and Metabolism, 42 (1), 15-22.

91. Patel BJ, Lai L, **Goldfield GS**, Sananes R, Longmuir PE. **(2017).** Psychosocial health and quality of life among children with cardiac diagnoses: agreement and discrepancies between parent and child reports. Cardiol Young, 27 (4), 713-721.

92. Obregón AM, Oyarce K, Santos JL, Valladares M, **Goldfield GS. (2017)** Association of the melanocortin 4 receptor gene rs17782313 polymorphism with rewarding value of food and eating behavior in Chilean children. J Physiol Biochem, 73 (1), 29-35.

93. Goldfield GS, Kenny GP, Alberga AS, Tulloch HE, Doucette S, Cameron JD, Sigal RJ. **(2017).** Effects of aerobic or resistance training or both on health-related quality of life in youth with obesity: the HEARTY Trial. Appl Physiol Nutr Metab, 42 (4), 361-370.

94. Obregón AM, Valladares M, **Goldfield GS**. **(2017).** Association of the dopamine D2 receptor rs1800497 polymorphism and eating behavior in Chilean children. Nutrition, 35, 139-145.

95. Cameron JD, Chaput JP, Sjödin AM, **Goldfield GS. (2017).** Brain on Fire: Incentive Salience, Hedonic Hot Spots, Dopamine, Obesity, and Other Hunger Games. Annual Review of Nutrition, 37, 183-205.

96. Adamo KB, Wilson S, Harvey AL, Grattan KP, Naylor PJ, Temple VA, **Goldfield GS. (2017).** Response. Med Sci Sports Exerc, 49 (1), 219-220.

97. Wasenius NS, Grattan KP, Harvey ALJ, Barrowman N, **Goldfield GS,** Adamo KB. **(2017).** Maternal gestational weight gain and objectively measured physical activity among offspring. PLoS One, 12 (6) e0180249.

98. Adamo KB, Wasenius NS, Grattan KP, Harvey ALJ, Naylor PJ, Barrowman NJ, **Goldfield GS. (2017).** Effects of a Preschool Intervention on Physical Activity and Body Composition. J Pediatr, 188, 42-49.e2.

99. McNeil, J, Lamothe G, Cameron JD, Riou MÈ, Cadieux S, Lafrenière J, **Goldfield G,** Willbond S, Prud'homme D, Doucet É. **(2017).** Investigating predictors of eating: is resting metabolic rate really the strongest proxy of energy intake? Am J Clin Nutr, 106 (5), 1206-1212.

100. Poitras, VJ, Gray, CE, Janssen X, Aubert S, Carson V, Faulkner G, **Goldfield GS,** Reilly JJ, Sampson M, Tremblay MS. **(2017).** Systematic review of the relationships between sedentary behavior and health indicators in the early years (0-4 years). BMC Public Health, 17 (Suppl 5), 868.

101. Tremblay MS, Chaput JP, Adamo KB, Aubert S, Barnes JD, Choquette L, Duggan M, Faulkner G, **Goldfield GS,** Gray CE, Gruber R, Janson K, Janssen I, Janssen X, Garcia AJ, Kuzik N, LeBlanc C, MacLean J, Okely AD, Poitras VJ, Rayner ME, Reilly JJ, Sampson M, Spence JC, Timmons BW, Carson V. **(2017).** Canadian 24-hour movement guidelines for the early years (0-4 years): An integration of physical activity, sedentary behavior, and sleep. BMC Public Health, 17 (Suppl 5), 874.

102. Guérin E, **Goldfield GS**, Prud'homme D. **(2017).** Trajectories of mood and stress and relationships with protective factors during the transition to menopause: results using latent class growth modeling in a Canadian cohort. Archives of Women's Mental Health, 20, (6), 733-745, 2017.

103. **Goldfield GS,** Kenny GP, Prud'homme D, Holcik M, Alberga AS, Fahnestock M, Cameron JD, Doucette S, Hadjiyannakis S, Tulloch H, Tremblay MS, Walsh J, Guerin E, Gunnell KE, D'Angiulli A, Sigal RJ. **(2018).** Effects of aerobic training, resistance training, or both on brain-derived neurotrophic factor in adolescents with obesity: The HEARTY randomized controlled trial. Physiology & Behavior, 191, 138-145.

104. Obregon Rivas, AM, Santos JL, Valladares, MS, Cameron, J, **Goldfield, GS. (2018)** Association of the FTO fat mass and obesity-associated gene rs9939609 polymorphism with rewarding value of food and eating behavior in Chilean children. Nutrition, 54, 105-110.

105. Cameron JD, Doucet É, Adamo KB, Walker M, Tirelli A, Barnes JD, Hafizi K, Murray M, **Goldfield GS. (2018).** Effects of prenatal exposure to cigarettes on anthropometrics, energy intake, energy expenditure, and screen time in children. Physiology & Behavior, 194, 394-400.

106. Wasenius NS, Grattan, K, Harvey, AL, Barrowman N, Naylor PJ, **Goldfield, GS** Adamo, KB. **(2018).** The effect of a physical activity intervention on preschoolers' fundamental motor skills - a cluster RCT Journal of Science and Medicine in Sport, 21, (7), 714-719.

107. Walsh JD, D'Angiulli A, Cameron JD, Sigal RJ, Kenny GP, Holcik M, Doucette S, Alberga AS, Prud'homme D, Hadjiyannakis S, Gunnell K, **Goldfield, GS (2018).** Changes in Brain-Derived Neurotrophic Factor Are Associated with Improvements in Diabetes Risk Factors after Exercise Training in Adolescents with Obesity: the HEARTY randomized controlled trial. Neural Plasticity, 7169583.

108. Walsh, JD, Barnes, JD., Cameron, JD, **Goldfield, GS**, Chaput, JP, Gunnell, KE, Ledoux, AA, Zemek, RL, Tremblay, MS. **(2018).** Association between 24-hour movement behaviours and global cognition in a cross-sectional sample of US children. Lancet: Child and Adolescent Health, 2 (11), 783-791.

109. Obeid N, Norris ML, Buchholz A, Henderson KA, **Goldfield GS,** Bedford S, Flament MF. **(2018).** Socioemotional predictors of body esteem in adolescent males. Psychology of men & Masculinity 19 (3), 439-445.

110. Valois DD, Davis CG, Buchholz A, Obeid N, Henderson K, Flament M, **Goldfield GS. (2019).** Effects of Weight Teasing and Gender on Body Esteem in Youth: A Longitudinal analysis from the REAL Study. Body Image, 29, 65-73.

111. Gunnell, KE, Poitras VJ, LeBlanc A, Schibli K, Barbeau K, Hedayati N, Pontifex MB, **Goldfield GS**, Dunlap C, Lehan E, Tremblay MS. (2019). Physical activity and brain structure, brain function, and cognition in children and youth: A systematic review of randomized controlled trials. Mental Health and Physical Activity, 16, 105-127.

112. Van Slingerland KJ, Durand-Bush N, Bradley L, **Goldfield G,** Archambault R, Smith D, Edwards C, Delenardo S, Taylor S, Werthner P, Benttä G. **(2019).** Canadian Centre for Mental Health and Sport (CCMHS) Position Statement: Principles of Mental Health in Competitive and High-Performance Sport. Clin J Sports Med, 29, (3), 173-180.

113. Obeid N, Norris ML, Valois DD, Buchholz A, **Goldfield GS**, Hadjiyannakis S, Henderson KA, Flament M, Hammond NG, Dunn J, Spettigue W. **(2019).** Bingeing, Purging, and Suicidal Ideation in Clinical and Non-Clinical Samples of Youth. Eat Disorders, 17, 1-19.

114. Cameron JD, Tasca GA, Little J, Chyurlia L, Ritchie K, Yeh E, Doucette S, Obregon AM, Bulman DE, Doucet É, **Goldfield GS. (2019).** Effects of fat mass and obesity-associated (FTO) gene polymorphisms on binge eating in women with binge-eating disorder: The moderating influence of attachment style. Nutrition, 61, 208-212.

115. Hintze LJ, **Goldfield G**, Seguin R, Damphousse A, Riopel A, Doucet É. (**2019).** The rate of weight loss does not affect resting energy expenditure and appetite sensations differently in women living with overweight and obesity. Physiology & Behavior, 199, 314-321.

116. Guerin, E., Biage, A. **Goldfield, GS**, Prud'Homme, D. **(2019).** Physical activity and perceptions of stress during the menopause transition: A longitudinal study. Journal of Health Psychology, 24 (6), 799-811.

117. Guerrero, MD, Barnes JD, Walsh JJ, Chaput JP, Tremblay MS, **Goldfield GS. (2019).** 24-hour movement behaviors and impulsivity. Pediatrics, 144 (3), e20190187.

118. Kakon, GA, Hadjiyannakis, S, Sigal RJ, Doucette S, **Goldfield GS,** Kenny GP, Prud'homme D, Buchholz A, Lamb M, Alberga AS. **(2019).** Edmonton Obesity Staging System for Pediatrics, quality of life and fitness in adolescents with obesity. Obesity Science & Practice, 5 (5), 449-458.

119. Tulloch, H, Heenan, A, Sweet, S., **Goldfield, G.S**., Kenny, G.P., Alberga, A., & Sigal, R.J. **(2020).** symptoms, perceived stress, self-efficacy, and outcome expectations: Predict fitness among adolescents with obesity. Journal of Health Psychology, 25 (6), 798-809.

120. Alberga AS, Sigal RJ, Sweet SN, Doucette S, Russell-Mayhew S, Tulloch H, Kenny GP, Prud'homme D, Hadjiyannakis S, **Goldfield GS (2019).** Understanding low adherence to an exercise program for adolescents with obesity: The HEARTY trial**.** Obesity Science & Practice, 5 (5), 437-448.

121. Obeid N, Norris ML, Buchholz A, Hadjiyannakis S, Spettigue W, Flament MF, Henderson KA, **Goldfield GS. (2019).** Development of Ottawa Disordered Eating Screen for youth: The ODES-Y. Journal of Pediatrics, 215, 209-215.

122. Walsh JJ, Bonafiglia JT, **Goldfield GS,** Sigal RJ, Kenny GP, Doucette S, Hadjiyannakis S, Alberga AS, Prud'homme D, Gurd BJ. **(2020).** Interindividual variability and individual responses to exercise training in adolescents with obesity. Appl Phsyiol Nutr Metab, 45 (1), 45-54.

123. Bang F, Roberts KC, Chaput JP, **Goldfield GS**, Prince SA. **(2020).** Physical activity, screen time and sleep duration: Combined associations with psychosocial health among Canadian children and youth. Health Reports; 31 (5), 9-16.

124. Sampasa-Kanyinga H, Colman I, **Goldfield GS**, Janssen I, Wang J, Podinic I, Tremblay MS, Saunders TJ, Sampson M, Chaput JP. **(2020).** Combinations of physical activity, sedentary time, and sleep duration and their associations with depressive symptoms and other mental health problems in children and adolescents: a systematic review. Int J Behav Nutr Phys Act, 17(1), 1-16.

125. Sampasa-Kanyinga H, Chaput JP, **Goldfield GS**, Janssen I, Wang J, Hamilton HA, Colman I. 24-hour movement guidelines and suicidality among adolescents. **(2020).** J Affect Disord, 274, 372-380.

126. Szwimer, E., Mougharbel, F., **Goldfield, G. S.**, & Alberga, A. S. **(2020).** The Association Between Weight-Based Teasing from Peers and Family in Childhood and Depressive Symptoms in Childhood and Adulthood: A Systematic Review. Current Obesity Reports, 9 (1), 15–29.

127. Sampasa-Kanyinga, H., **Goldfield, G. S.**, Kingsbury, M., Clayborne, Z., & Colman, I. **(2020).** Social media use and parent-child relationship: A cross-sectional study of adolescents. Journal of Community Psychology, 48 (3), 793–803.

128. Obregón, Valladares Vega, M. A., **Goldfield, G.,** & Llewellyn, C. **(2020).** Genetic variation of the dopamine D2 receptor gene: association with the reinforcing value of food and eating in the absence of hunger in Chilean children. Nutrición Hospitalaria : Organo Oficial de La Sociedad Española de Nutrición Parenteral y Enteral, 34 (3), 524–533

129. Sampasa-Kanyinga, H., Colman, I., **Goldfield, G. S.**, Janssen, I., Wang, J., Hamilton, H. A., & Chaput, J.-P. (2020). Associations between the Canadian 24 h movement guidelines and different types of bullying involvement among adolescents. Child Abuse & Neglect, 108, 104638.

130. Obeid, N., Norris, M. L., Valois, D. D., Buchholz, A., **Goldfield, G. S.**, Hadjiyannakis, S., Henderson, K. A., Flament, M., Hammond, N. G., Dunn, J., & Spettigue, W. **(2020).** Bingeing, Purging, and Suicidal Ideation in Clinical and Non-Clinical Samples of Youth. Eating Disorders, 28 (3), 289–307.

131. Nagpal, T. S., **Goldfield, G. S.**, da Silva, D. F., Souza, S., Burhunduli, P., Liu, R. H., Naylor, P.-J., & Adamo, K. B. **(2020).** The effects of intervening with physical activity in the early years (ages 3-5) on health-related quality of life: a secondary analysis of the Activity Begins in Childhood (ABC) trial. Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 1-7.

132. Booth, J. E., Leung, A. A., Benham, J. L., Rabi, D. M., **Goldfield, G. S.,** Sajobi, T. T., & Sigal, R. J. **(2020).** Objectively Measured Physical Activity, Sedentary Behaviour and Cardiometabolic Measures in Adults with Type 2 Diabetes: Results from the Canadian Health Measures Survey (2007-2017). Canadian Journal of Diabetes, 44 (7), S16–S16.

133. Benham, J. L., Booth, J. E., Corenblum, B., Friedenreich, C. M., Rabi, D. M., **Goldfield, G. S.,** & Sigal, R. J. **(2020).** Sleep Quality Associated With Body Mass Index and Hemoglobin A1c in Polycystic Ovary Syndrome. Canadian Journal of Diabetes, 44 (7), S33–S33.

134. Mougharbel, F., Valois, D. D., Lamb, M., Buchholz, A., Obeid, N., Flament, M., & **Goldfield, G. S. (2020).** Mediating role of disordered eating in the relationship between screen time and BMI in adolescents: longitudinal findings from the Research on Eating and Adolescent Lifestyles (REAL) study. Public Health Nutrition, 23 (18), 3336–3345.

135. Mougharbel, F., & **Goldfield, G. S. (2020).** Psychological Correlates of Sedentary Screen Time Behaviour Among Children and Adolescents: a Narrative Review. Current Obesity Reports, 9 (4), 493–511.

136. Hoffmann, M. D., Lang, J. J., Guerrero, M. D., Cameron, J. D., **Goldfield, G. S.**, Orpana, H. M., & de Groh, M. **(2020).** Evaluating the psychometric properties of the parent-rated Strengths and Difficulties Questionnaire in a nationally representative sample of Canadian children and adolescents aged 6 to 17 years. Health Reports, 31 (8), 13–20.

137. Buchholz, A., Howard, A. L., Baldwin, K., Hammond, N. G., Mohipp, C., Rutherford, J., Kazoun, F., Clark, L., Adamo, K., **Goldfield, G.**, & Hadjiyannakis, S. **(2020).** Health trajectories of children with severe obesity attending a weight management program. Paediatrics & Child Health, 25 (7), 439–446.

138. Brière, F. N., Imbeault, A., **Goldfield, G. S.**, & Pagani, L. S. **(2020).** Consistent participation in organized physical activity predicts emotional adjustment in children. Pediatric Research, 88 (1), 125–130.

139. Murray, M., Obeid, N., Buchholz, A., Flament, M., & **Goldfield, G. S. (2020).** Recreational Screen Time Activities and Depressive Symptomatology Among Adolescents: the Moderating Role of Interpersonal Factors and Gender. Journal of Technology in Behavioral Science, 6 (1), 88–99.

140. Zhang, Z., Kuzik, N., Adamo, K. B., Ogden, N., **Goldfield, G. S.**, Okely, A. D., Crozier, M., Hunter, S., Predy, M., & Carson, V. **(2021).** Associations Between the Child Care Environment and Children's In-Care Physical Activity and Sedentary Time. Health Education & Behavior: The Official Publication of the Society for Public Health Education, 48 (1), 42–53.

141. Beck, A., LeBlanc, J. C., Morissette, K., Hamel, C., Skidmore, B., Colquhoun, H., Lang, E., Moore, A., Riva, J. J., Thombs, B. D., Patten, S., Bragg, H., Colman, I., **Goldfield, G. S.**, Nicholls, S. G., Pajer, K., Potter, B. K., Meeder, R., Vasa, P., Stevens, A. **(2021).** Screening for depression in children and adolescents: a protocol for a systematic review update. Systematic Reviews, 10 (1), 1-13.

142. Sampasa-Kanyinga, H., Colman, I., **Goldfield, G. S.,** Janssen, I., Wang, J., Tremblay, M. S., Barnes, J. D., Walsh, J. J., & Chaput, J. P. **(2021).** 24-Hour Movement Behaviors and Internalizing and Externalizing Behaviors Among Youth. The Journal of adolescent health: official publication of the Society for Adolescent Medicine, 68 (5), 969–977.

143. Heidinger, B. A., Cameron, J. D., Vaillancourt, R., De Lisio, M., Ngu, M., Tasca, G. A., Chyurlia, L., Doucet, É., Doucette, S., Maria Obregón Rivas, A., & **Goldfield, G. S. (2021).** No association between dopaminergic polymorphisms and response to treatment of binge-eating disorder. Gene, 781, 145538.

144. Zhang, Z., Adamo, K. B., Ogden, N., **Goldfield, G. S.,** Okely, A. D., Kuzik, N., Crozier, M., Hunter, S., Predy, M., & Carson, V. **(2021).** Associations between sleep duration, adiposity indicators, and cognitive development in young children. Sleep medicine, 82, 54–60.

145. Sampasa-Kanyinga, H., Colman, I., **Goldfield, G. S.,** Janssen, I., Wang, J., Hamilton, H. A., & Chaput, J. P. **(2021).** 24-h Movement Guidelines and Substance Use among Adolescents: A School-Based Cross-Sectional Study. International journal of environmental research and public health, 18 (6), 3309.

146. Lamb, M., Buchholz, A., Gunnell, K. E., Valois, D. D., Obeid, N., Henderson, K., Flament, M., & **Goldfield, G. S. (2021).** Examining the Bidirectional Association Between Body Esteem and Body Mass Index During Adolescence. Journal of developmental and behavioral pediatrics : JDBP, 42 (8), 631–636.

147. Mougharbel, F., Sampasa-Kanyinga, H., Heidinger, B., Corace, K., Hamilton, H. A., & **Goldfield, G. S. (2021).** Psychological and Demographic Determinants of Substance Use and Mental Health During the COVID-19 Pandemic. Frontiers in public health, 9, 680028.

148. Sampasa-Kanyinga, H., Colman, I., Dumuid, D., Janssen, I., **Goldfield, G. S.,** Wang, J. L., Patte, K. A., Leatherdale, S. T., & Chaput, J. P. **(2021).** Longitudinal association between movement behaviours and depressive symptoms among adolescents using compositional data analysis. PloS one, 16(9), e0256867.

149. **Goldfield, G. S.,** Cameron, J. D., Sigal, R. J., Kenny, G. P., Holcik, M., Prud'homme, D., Guerin, E., Alberga, A. S., D'Angiulli, A., Tremblay, M. S., Mougharbel, F., & Walsh, J. **(2021).** Screen time is independently associated with serum brain-derived neurotrophic factor (BDNF) in youth with obesity. Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme, 46 (9), 1083–1090.

150. Obregón, A. M., Oyarce, K., García-Robles, M. A., Valladares, M., Pettinelli, P., & **Goldfield, G. S. (2021).** Association of the dopamine D2 receptor rs1800497 polymorphism with food addiction, food reinforcement, and eating behavior in Chilean adults. Eating and weight disorders : EWD.

151. Hintze, L. J., Doucet, É., & **Goldfield, G. S. (2021).** The relative reinforcing value of snack food is a significant predictor of fat loss in women with overweight or obesity. Applied physiology, nutrition, and metabolism = Physiologie appliquee, nutrition et metabolisme.

152. Bonafiglia, J. T., Preobrazenski, N., Islam, H., Walsh, J. J., Ross, R., Johannsen, N. M., Martin, C. K., Church, T. S., Slentz, C. A., Ross, L. M., Kraus, W. E., Kenny, G. P., **Goldfield, G. S.,** Prud'homme, D., Sigal, R. J., Earnest, C. P., & Gurd, B. J. **(2021).** Exploring Differences in Cardiorespiratory Fitness Response Rates Across Varying Doses of Exercise Training: A Retrospective Analysis of Eight Randomized Controlled Trials. Sports medicine (Auckland, N.Z.), 51 (8), 1785–1797.

153. Carson, V., Adamo, K. B., Ogden, N., **Goldfield, G. S.,** Okely, A. D., Kuzik, N., Crozier, M., Hunter, S., & Predy, M. **(2020).** Sedentary Time and Physical Activity Associations Between Child Care Educators and Children. American journal of preventive medicine, 58 (4), e105–e111.

154. D'Angiulli, A., Pham, D., Leisman, G., & **Goldfield, G. (2020).** Evaluating Preschool Visual Attentional Selective-Set: Preliminary ERP Modeling and Simulation of Target Enhancement Homology. Brain sciences, 10(2), 124.

155. Zhang, Z., Adamo, K. B., Ogden, N., **Goldfield, G. S.,** Okely, A. D., Kuzik, N., Crozier, M., Hunter, S., Predy, M., & Carson, V. **(2021).** Longitudinal correlates of sleep duration in young children. Sleep medicine, 78, 128–134.

156. Sampasa-Kanyinga, H., Colman, I., **Goldfield, G. S.,** Hamilton, H. A., & Chaput, J. P. **(2020).** Sex differences in the relationship between social media use, short sleep duration, and body mass index among adolescents. Sleep health, 6 (5), 601–608.

157. Sampasa-Kanyinga, H., Chaput, J. P., **Goldfield, G. S.,** Janssen, I., Wang, J., Hamilton, H. A., Ferro, M. A., & Colman, I. **(2021).** The Canadian 24-Hour Movement Guidelines and Psychological Distress among Adolescents: Les Directives canadiennes en matière de mouvement sur 24 heures et la détresse psychologique chez les adolescents. Canadian journal of psychiatry. Revue canadienne de psychiatrie, 66 (7), 624–633.

158. Hintze, L. J., **Goldfield, G.,** Séguin, R., Damphousse, A., Riopel, A., & Doucet, É. **(2021).** Early changes in appetite and energy expenditure are not associated to body weight and fat losses in pre-menopausal women living with overweight/obesity. Physiology & behavior, 228, 113201.

159. **Goldfield, G. S.,** Walsh, J., Sigal, R. J., Kenny, G. P., Hadjiyannakis, S., De Lisio, M., Ngu, M., Prud'homme, D., Alberga, A. S., Doucette, S., Goldfield, D. B., & Cameron, J. D. **(2021).** Associations of the BDNF Val66Met Polymorphism with Body Composition, Cardiometabolic Risk Factors, and Energy Intake in Youth With Obesity: Findings From the HEARTY Study. Frontiers in neuroscience, 15, 715330.

160. Harbec, M. J., **Goldfield, G**., & Pagani, L. S. **(2021).** Healthy body, healthy mind: Long-term mutual benefits between classroom and sport engagement in children from ages 6 to 12 years. Preventive medicine reports, 24, 101581.

161. El Amine,F., Heidinger, B. A., Cameron, J. D., Hafizi, K., BaniFatemi, S., Robaey, P., Vaillancourt, R., **Goldfield, G. S.,** & Doucet, E. **(2021).** Two-Month administration of Methylphenidate improves olfactory sensitivity and suppresses appetite in individuals with obesity. Canadian Journal of Physiology and Pharmacology.

162. Abdessemed, M.,, Mougharbel, F., Hafizi, K., Cameron, J. D., Heidinger, B., Barnes, J., D'Angiulli, A., Adamo, K. B., Carson, V., Okely, A. D., Lang, J. J., Timmons, B. W., Longmuir, P. E., Tremblay, M. S., Tucker, P., & Goldfield, G. S. **(2021).** Associations between physical activity, sedentary time and social-emotional functioning in young children. Mental Health and Physical Activity, 21, 100422–.

163. Zhang, Adamo, K. B., Ogden, N., **Goldfield, G. S.,** Okely, A. D., Kuzik, N., Crozier, M., Hunter, S., Predy, M., & Carson, V. **(2021).** Associations between screen time and cognitive development in preschoolers. Paediatrics & Child Health.

164. Sampasa-Kanyinga, Colman, I., **Goldfield, G. S.,** Janssen, I., Wang, J., Tremblay, M. S., Barnes, J. D., Walsh, J. J., & Chaput, J.-P. **(2021).** 24-Hour Movement Behaviors and Internalizing and Externalizing Behaviors Among Youth. Journal of Adolescent Health, 68 (5), 969–977.

165. Thai H, David CG, Stewart N, Gunnell K, Goldfield GS (2021). The effects of reducing social media use on body esteem among transitional-aged youth. Journal of Social and Clinical Psychology, Vol. 40, No. 6, 2021, pp. 381–407

166. Sampasa-Kanyinga, H., Hamilton, H. A., **Goldfield, G. S.,** & Chaput, J. P. **(2022).** Problem Technology Use, Academic Performance, and School Connectedness among Adolescents. International journal of environmental research and public health, 19 (4), 2337.

167. Byczynski, G.; Schibli, K.; **Goldfield, G.;** Leisman, G.; D'Angiulli, A. **(2022).** EEG Power Band Asymmetries in Children with and without Classical Ensemble Music Training. Symmetry, 14, 538.

168. Henderson, KH, Obeid, N., Buchholz, A., Flament, M.F., **Goldfield, G**. (**2022**). Coping in Adolescents: A mediator between stress and disordered eating. Eating Behaviors, 47, https://doi.org/10.1016/j.eatbeh.2022.101626.

169. Obeid, N., Flament, M.F., Buchholz, A., Henderson, K.A., Schubert, N., Tasca, G., Thai, H., **Goldfield, G**. (**2022**). Examining shared pathways for eating disorders and obesity in a community sample of adolescents: The REAL study. Frontiers of Psychology, 13, doi: 10.3389/fpsyg.2022.805596.

170. Vaillancourt R, Dhalla R, Merks P, Lougheed T, **Goldfield G**, Mansell, H, Cameron, J. (**2022**)

Concerns, beliefs and attitudes of pharmacists and pharmacy students on cannabis use in Canada Can Pharm J (Ott) Jul-Aug; 155(4): 219–229. Published online 2022 Jun 15. doi: 10.1177/17151635221102143 PMCID: PMC9266375

171. Carson V, Zhang Z, Kuzik N, Adamo KB, Predy M, Crozier M, Hunter S, Ogden N, **Goldfield GS**, Okely AD. (**2022**).The impact of new government childcare accreditation standards on children's in-care physical activity and sedentary time. BMC Public Health. 2022; 22: 616. Published online 2022 Mar 29. doi: 10.1186/s12889-022-12888-5 PMCID: PMC8966317

172. Bonafiglia JT, Swinton PA, Ross R, Johannsen NM, Martin CK, Church TS, Slentz CA, Ross LM, Kraus WE, Walsh JJ, Kenny GP, **Goldfield GS**, Prud'homme D, Sigal RJ, Earnest CP, Gurd BJ. (**2022**). Interindividual Differences in Trainability and Moderators of Cardiorespiratory Fitness, Waist Circumference, and Body Mass Responses: A Large-Scale Individual Participant Data Meta-analysis. Sports Med. 2022 Dec;52(12):2837-2851. doi: 10.1007/s40279-022-01725-9. Epub 2022 Jul 4. PMID: 35781787 Review.

173. Sigal RJ, Yardley JE, Perkins BA, Riddell MC, **Goldfield GS**, Donovan L, Malcolm J, Hadjiyannakis S, Edwards AL, Gougeon R, Wells GA, Pacaud D, Woo V, Ford GT, Coyle D, Phillips P, Doucette S, Khandwala F, Kenny GP. (**2022**). The Resistance Exercise in Already Active Diabetic Individuals (READI) Randomised Clinical Trial. J Clin Endocrinol Metab. 2022 Dec 2:dgac682. doi: 10.1210/clinem/dgac682. Online ahead of print.PMID: 36459469

174. Harbec, MJ, **Goldfield G**, Barnett TA, Pagani LS.(**2022**). Physical Activity as Both Predictor and Outcome of Emotional Distress Trajectories in Middle Childhood. J Dev Behav Pediatr. 2022 Apr 1;43(3):159-167.

175. El Amine F, Heidinger B, Cameron JD, Hafizi K, BaniFatemi S, Robaey P, Vaillancourt R, **Goldfield GS**, Doucet É.(2022). Two-month administration of methylphenidate improves olfactory sensitivity and suppresses appetite in individuals with obesity. Can J Physiol Pharmacol. **2022** May;100(5):432-440. doi: 10.1139/cjpp-2021-0318. PMID: 34910595

176. Obregón AM, Oyarce K, García-Robles MA, Valladares M, Pettinelli P, **Goldfield GS**. Association of the dopamine D2 receptor rs1800497 polymorphism with food addiction, food reinforcement, and eating behavior in Chilean adults. Eat Weight Disord. **2022** Feb;27(1):215-224. doi: 10.1007/s40519-021-01136-1. Epub 2021 Mar 18. PMID: 33738781

177. Hintze LJ, Doucet É, **Goldfield GS** (**2022**). The relative reinforcing value of snack food is a significant predictor of fat loss in women with overweight or obesity. Appl Physiol Nutr Metab. 2022 Feb;47(2):134-140. doi: 10.1139/apnm-2021-0382. PMID: 34570984 Clinical Trial.

178. Booth JE, Leung AA, Benham JL, Rabi DM, **Goldfield GS**, Sajobi T, Sigal RJ. Sociodemographic Factors Associated With Objectively Measured Moderate- to Vigorous-intensity Physical Activity in Adults With Type 2 Diabetes: Cross-sectional Results From the Canadian Health Measures Survey (2007 to 2017). Can J Diabetes. **2022** Aug;46(6):578-585.e4. doi: 10.1016/j.jcjd.2022.04.001. Epub 2022 Apr 7. PMID: 35864033

179. Goulet, N., McCormick, J. J., King, K. E., Notley, S. R., **Goldfield, G. S**., Fujii, N., ... & Kenny, G. P. (**2023**). Elevations in serum brain-derived neurotrophic factor following occupational heat stress are not influenced by age or common chronic disease. *Temperature*, 1-11

180. Ghodrati N, Haghighi AH, Hosseini Kakhak SA, Abbasian S, **Goldfield GS**.(**2022**). Effect of Combined Exercise Training on Physical and Cognitive Function in Women With Type 2 Diabetes. Can J Diabetes. 47(2):162-170.

181. Thai, H., Davis, C. G., Mahboob, W., Perry, S., Adams, A., & **Goldfield, G. S. (2023)**. Reducing social media use improves appearance and weight esteem in youth with emotional distress. *Psychology of Popular Media.* Advance online publication. https://doi.org/10.1037/ppm0000460

182. Benham JL, Booth JE, **Goldfield G**, Friedenreich CM, Rabi DM, Sigal RJ. Self-reported sleep quality and exercise in polycystic ovary syndrome: A secondary analysis of a pilot randomized controlled trial. Clin Endocrinol (Oxf). **2023** May;98(5):700-708. doi: 10.1111/cen.14900. Epub 2023 Mar 6. PMID: 36843192.

183. Morningstar B, Clayborne Z, Wong SL, Roberts KC, Prince SA, Gariépy G, **Goldfield GS**, Janssen I, Lang JJ. The association between social media use and physical activity among Canadian adolescents: a Health Behaviour in School-aged Children (HBSC) study. Can J Public Health. **2023** Mar 15. doi: 10.17269/s41997-023-00754-9. Epub ahead of print. PMID: 36920659.

184. de Lannoy, L., Barbeau, K., Vanderloo, L. M., **Goldfield, G**., Lang, J. J., MacLeod, O., & Tremblay, M. S. (**2023**). Evidence supporting a combined movement behavior approach for children and youth's mental health–A scoping review and environmental scan. *Mental Health and Physical Activity*, 100511. https://doi.org/10.1016/j.mhpa.2023.100511.

185. Mougharbel F, Chaput JP, Sampasa-Kanyinga H, Colman I, Leatherdale ST, Patte KA, **Goldfield GS**. Longitudinal associations between different types of screen use and depression and anxiety symptoms in adolescents. Front Public Health. **2023** Apr 27;11:1101594. doi: 10.3389/fpubh.2023.1101594. PMID: 37213617; PMCID: PMC10193840.

186. Murray MA, Obeid N, Gunnell KE, Buchholz A, Flament MF, **Goldfield GS**. Appearance satisfaction mediates the relationship between recreational screen time and depressive symptoms in adolescents. Child Adolesc Ment Health. 2023 Feb;28(1):12-21. doi: 10.1111/camh.12576. Epub **2022** Jul 18. PMID: 35848615.

187. Hidalgo Vira N, Oyarce K, Valladares Vega M, **Goldfield GS**, Guzmán-Gutiérrez E, Obregón AM. No association of the dopamine D2 receptor genetic bilocus score (rs1800497/rs1799732) on food addiction and food reinforcement in Chilean adults. Front Behav Neurosci. **2023** Mar 31;17:1067384. doi: 10.3389/fnbeh.2023.1067384. PMID: 37064299; PMCID: PMC10102336.

188. Tandon S, Patte KA, **Goldfield GS**, Leatherdale ST, Chaput JP. Loneliness during COVID-19 and its association with eating habits and 24-hour movement behaviours in a sample of Canadian adolescents. Prev Med Rep. **2023** Jun 16:102287. doi: 10.1016/j.pmedr.2023.102287. Epub ahead of print. PMCID: PMC10273770.

189. D'Angiulli, A., Byczynski, G., Yeh, W. H., Garrett, G., **Goldfield, G**., Devenyi, P., ... & Leisman, G. Cognitive control, bedtime patterns, and testing time in female adolescent students: Behavioral and neuro-electrophysiological correlates. **(2023)** *Frontiers in Public Health*, *11*, 1022731. DOI:10.3389/fpubh.2023.1022731

190. Sigal RJ, Yardley JE, Perkins BA, Riddell MC, **Goldfield GS**, Donovan L, Malcolm J, Hadjiyannakis S, Edwards AL, Gougeon R, Wells GA, Pacaud D, Woo V, Ford GT, Coyle D, Phillips P, Doucette S, Khandwala F, Kenny GP; READI Trial Investigators. The Resistance Exercise in Already Active Diabetic Individuals (READI) Randomized Clinical Trial. J Clin Endocrinol Metab. **2023** Apr 13;108(5):e63-e75. doi: 10.1210/clinem/dgac682.

191. LUENGO, N., Goldfield, G. S., & Obregón, A. M. Association between Dopamine Genes, Adiposity, Food addiction and Eating Behavior in Chilean adult. *Frontiers in Nutrition*, *11*, 1466384.

192. Mougharbel F, Chaput JP, Sampasa-Kanyinga H, Hamilton HA, Colman I, Leatherdale ST, **Goldfield GS. (2023).** Heavy social media use and psychological distress among adolescents: the moderating role of sex, age, and parental support. Front Public Health. Jun 15;11:1190390.

193. Beck A, Dryburgh N, Bennett A, Shaver N, Esmaeilisaraji L, Skidmore B, Patten S, Bragg H, Colman I, **Goldfield GS**, Nicholls SG, Pajer K, Meeder R, Vasa P, Shea BJ, Brouwers M, Little J, Moher D. Screening for depression in children and adolescents in primary care or non-mental health settings: a systematic review update. Syst Rev. 2024 Jan 31;13(1):48. doi: 10.1186/s13643-023-02447-3. PMID: 38291528; PMCID: PMC10829174.

194. Lucibello KM, **Goldfield GS**, Alberga AS, Leatherdale ST, Patte KA. Exploring the association between internalized weight bias and mental health among Canadian adolescents. Pediatr Obes. **2024** Jul;19(7):e13118. doi: 10.1111/ijpo.13118. Epub 2024 Apr 27. PMID: 38676448.

195. McInnis K, Doucet É, Hafizi K, El Amine F, Heidinger B, Cameron JD, BaniFatemi S, Robaey P, Vaillancourt R, **Goldfield GS**. Effects of 2 months of methylphenidate on energy expenditure in individuals with obesity: A randomized, double-blind, placebo-controlled pilot study. Physiol Rep. **2024** Jun;12(12):e16085. doi: 10.14814/phy2.16085. PMID: 38924673; PMCID: PMC11200105.

196. Dutil C, Podinic I, Featherstone RB, Eaton A, Sadler CM, **Goldfield GS**, Hadjiyannakis S, Gruber R, Tremblay MS, Prud'homme D, Chaput JP. Sleep and insulin sensitivity in adolescents at risk of type 2 diabetes: the Sleep Manipulation in Adolescents at Risk of Type 2 Diabetes randomized crossover study. Sleep. **2024** May 10;47(5):zsad313. doi: 10.1093/sleep/zsad313. PMID: 38070132; PMCID: PMC11082473.

197. Sicard, V., O'Kane, K., Brown, O., Butterfield, L., Kardish, R., Choi, E., ...**Goldfield, G**.,… & Ledoux, A. A. (**2024**). Acceptability, usability, and credibility of a mindfulness-based digital therapeutic for pediatric concussion: a mixed-method study. *Digital health*, *10*, 20552076241248296.

198. O'Kane, K. M., Otamendi, T., Silverberg, N. D., Choi, E., Sicard, V., Zemek, R., ...**Goldfield, G**., … & Cairncross, M. (**2024**). Development of Therapeutic Alliance and Social Presence in a Digital Intervention for Pediatric Concussion: Qualitative Exploratory Study. *JMIR Formative Research*, *8*(1), e49133.

199. Sicard V, Fang Z, Kardish R, Healey K, Smith AM, Reid S, Cron GO, Melkus G, Abdeen N, Yeates KO, **Goldfield G**, Reed N, Zemek R, Ledoux AA. Longitudinal Brain Perfusion and Symptom Presentation Following Pediatric Concussion: A Pediatric Concussion Assessment of Rest and Exertion^{+MRI} (PedCARE^{+MRI}) Substudy. J Neurotrauma. **2024** Mar;41(5-6):552-570. doi: 10.1089/neu.2023.0071. Epub 2024 Jan 30. PMID: 38204176.

200. Davis, C. G., & **Goldfield, G. S**. (2024). Limiting social media use decreases depression, anxiety, and fear of missing out in youth with emotional distress: A randomized controlled trial. *Psychology of Popular Media*

201. **Goldfield GS**, Cameron JD, Sigal RJ, Kenny GP, Prud'homme D, Ngu M, Alberga AS, Doucette S, Goldfield DB, Tulloch H, Thai H, Simas KR, Walsh J. The BDNF Val66Met polymorphism and health-related quality of life in youth with obesity. Physiol Rep. (**2024)** Jul;12(13):e16140. doi: 10.14814/phy2.16140. PMID: 38997217; PMCID: PMC11245332.

202. Beauregard, N., McInnis, K., **Goldfield, G. S**., & Doucet, É. (2024). Energy balance and obesity: the emerging role of glucagon like peptide-1 receptor agonists. *Current Opinion in Clinical Nutrition and Metabolic Care*, *27*(6), 472–478. https://doi.org/10.1097/MCO.0000000000001064

203. Clayborne, Z. M., Wong, S. L., Roberts, K. C., Prince, S. A., Gariépy, G., **Goldfield, G. S.**, Janssen, I., & Lang, J. J. (2024). Associations between social media use and positive mental health among adolescents: Findings from the Canadian Health Behaviour in School-aged Children Study. *Journal of Psychiatric Research*, *181*, 333–339. Advance online publication. https://doi.org/10.1016/j.jpsychires.2024.11.071

204. Robinson, J., Chaput, J. P., Roberts, K. C., **Goldfield, G. S.,** Wong, S. L., Janssen, I., Garépy, G., Prince, S. A., Capaldi, C. A., & Lang, J. J. (2024). Sleep health characteristics and positive mental health in Canadian youth: A cross-sectional analysis of the Health Behaviour in School-aged Children study. *Sleep Health*, *10*(6), 671–677. https://doi.org/10.1016/j.sleh.2024.09.008

205. Bradbury T, Lang JJ, Prince SA, **Goldfield GS,** de Lannoy L, Tremblay MS, Chaput JP. Outdoor physical activity, mental health, life satisfaction, happiness, and life stress among Canadian adolescents aged 12-17 years. *Health Promotion and Chronic Disease Prevention in Canada* (in press).

MANUSCRIPTS UNDER REVIEW (names underlined denote students/trainees)

J) Refereed Conference Presentations (names underlined denote students)

1. Blouin, A.G., Blouin, J.H., Iversen, H.S., Carter, J., Goldstein, C., **Goldfield, G.S.**, &

Perez, E. Light therapy in bulimia nervosa: A double-blind placebo-controlled investigation. Paper presented at the Sixth International Conference on Eating Disorders, New York, April 1992.

2. **Goldfield, G. S., &** Blouin, A.G. Body Image in Men. Paper presented at the Ottawa Men's Conference, Ottawa Civic Hospital, Ottawa, Ontario, May 1993.

3. **Goldfield, G.S.** Body image and steroid use in male bodybuilders. Invited presentation at the First Annual International Conference in Psychology of Men. Carleton University, Ottawa, June 1995.

4. Harper, D., Molnar, F., Hing, M., Dalziel, W., **Goldfield, G.**, Martel, C. Can community based geriatric assessment prevent institutional placement? Paper presented at the Canadian Gerontological Association Scientific Meeting, Halifax, Canada, October 1998.

5. Epstein L.H. & **Goldfield, G.S.** Exercise as a treatment for childhood and adolescent obesity. Paper presented at the American Council of Sports Medicine Conference: Physical Activity in the Prevention and Treatment of Obesity and its Co-Morbidities, Indianapolis, Indiana, February 1999.

6. **Goldfield, G.S.,** Epstein, L.H., & Raynor, H.A. Obesity Treatment and Prevention. Paper presented at the North American Association for the Study of Obesity Conference, Charleston, South Carolina, November 1999.

7. Flament M. F., Baillot D., La Roche M., Furino C., Buchholz A., G**oldfield G.S**, Henderson K.: A cross-cultural study of risk and protective factors for eating and weight disorders in youth living in France and North America. Paper presented at the *16th World Congress of the International Association for Child and Adolescent Psychiatry and Allied Professions (IACAPAP)*, Berlin, August 22–26, 2004.

8. La Roche M., Baillot D., Auger D., Furino C., Nguyen H., Buchholz A., **Goldfield G.**, Henderson K., Matheson K., Flament M.: Frequency and correlates of eating and weight disorders in adolescents: A France-US comparison. *University of Ottawa Department of Psychiatry's 25th Annual Academic and Research Day*. Ottawa, December 10, 2004.

9. LaRoche M., Baillot D., Furino C., Buchholz A., Henderson K., **Goldfield G**., Flament M.F. Troubles des conduites alimentaires et obésité : Différences entre adolescents canadiens, américains et francais. Paper presented at the *Annual Meeting of the Canadian Psychological Association*, June 2005.

10. **Goldfield**, GS, Mallory, R., Parker, T., Lumb, A., Cunningham, T., Parker, K., Legg, C., Prud'home, D. Adamo, K. Open-Loop feedback Increases Physical Activity in Obese Children. Invited Presentation at National Association for the Advancement and Study of Obesity, Vancouver, BC, October 2005.

11. Obeid, N., Henderson, K., Buchholz, A., **Goldfield, G**., Faregh, N., Irak, M., Matheson, K., Flament, M. Examining a Biopsychosocial Model of the Development of Body Image, Eating Behaviours, and Weight Control in Adolescence. *University of Ottawa Department of Psychiatry's 26th Annual Academic and Research Day.* Ottawa, December 2, 2005.

12. Flament M.F., Henderson K., Buchholz A., **Goldfield G**., Obeid N., Faregh N., Matheson

K. Correlates of eating and weight disorders in a community-based adolescent population: Investigating an integrative biopsychosocial model. *International Conference on Eating Disorders,* Barcelona, Spain, June 7-10, 2006.

13. Lorrello, C., Doucet, E. **Goldfield, GS**. Effects of Methylphenidate on Energy Balance. National Association for the Advancement and Study of Obesity (NAASO), October, Boston, MA., June 2006.

14. Drahovzal, D., Leclair, S**. Goldfield, GS.** Needs Assessment of a Child Weight Control Program at the Children's Hospital of Eastern Ontario: Poster session presented at the 67th Annual Convention of the Canadian Psychological Association: Calgary, Alberta, June 2006

15. Fried, P.A., Doucet, E. & **Goldfield, G**. Metabolism and body mass in young male adults prenatally exposed to cigarettes – a pilot study. Presentation at the Neurobehavioral Teratology Society, Tucson, Arizona, June 2006.

16. Lumb, A, B., **Goldfield, G. S**., & Gick, M. (2007, June). *The effect of a brief media literacy intervention on female body image*. Paper presented at the 2007 Annual Convention of the Canadian Psychological Association, Ottawa, ON.

17. Alberga, A.S., Lemiere, B., Prud'homme, D., **Goldfield, G.S.,** Hadjiyannakis, S., Kenny, G., Sigal, R.J., Baseline maximal oxygen uptake and BMI in obese adolescents aged 14-18 years old. International Conference on Childhood Obesity and Physical Activity, Toronto, Canada, June 2007.

18. Davis, H., Peeters, C., Tulloch, H., **Goldfield, G.**, Hadjiyannakis, S., Kenny, G. & Sigal, R. (2007). Exercise facilitators and barriers involved in a randomized trial of overweight and obese youth: A qualitative inquiry. *Annals of Behavioral Medicine,33 (suppl.),* S077.

19. B. Lemire, A.S. Alberga, **G.S. Goldfield**, S. Hadjiyannakis2, R.J. Sigal, G.P. Kenny. Musculoskeletal Fitness in Obese Adolescents aged 14 to 18 years old. Presented at the International Conference on Physical Activity & Obesity in Children. Published in the conference program. Toronto, Canada, June 24-June 27, 2007.

20. Alberga, A.S., Prud'homme, D., **Goldfield, G.S.,** Hadjiyannakis, S., Kenny, G.P., Sigal, R.J. Waist Circumference, BMI and Maximal Oxygen Uptake in Obese Adolescents Aged 14 to 18 Years Old. Poster Presentation at the Canadian Society for Exercise Physiology (CSEP) 2007 conference 'Targeted Training: Separating the Forest from the Trees'. London, Canada, November 14-17, 2007.

21. Lumb, A, B., **Goldfield, G. S.**, & Gick, M. (2008, June). *Determinants of the relative reinforcing value of food*. Paper presented at the 2008 Annual Convention of the Canadian Psychological Association, Halifax, NS.

22. Flament M, R Flewelling, **A Buchholz**, K Henderson, **G Goldfield**, K Matheson, G McVey. Research on Eating and Adolescent Lifestyles in Ontario – A Prospective Longitudinal School-Based Study (REAL study). **The Provincial Centre of Excellence for Child and Youth Mental Health Research Day** (Mississauga), 2008.

23. Obeid, N., Flament, M.F., Buchholz, A., Henderson, K., **Goldfield, G**.: The adolescent male divide: The muscular ideal versus the thin ideal. Academy of Eating Disorders: International Conference on Eating Disorders, Cancun, Mexico, April 30 – May 2, 2008.

24. Norwood, S.J., Buchholz, A., Bowker, A., Henderson, K., **Goldfield, G**., Flament M.F.: Gender differences in self-silencing behaviours as predictors of eating pathology among adolescents. Academy of Eating Disorders: International Conference on Eating Disorders, Cancun, Mexico, April 30 – May 2, 2008.

25. Alberga, A.S., Sigal, R.J., Prud'homme, D., Kenny, G.P., **Goldfield, G.S.,** Hadjiyannakis, S. Sex Differences in Abdominal Adiposity & Aerobic Fitness in Obese Adolescents Aged 14 to 18 Years Old: Preliminary Results. Poster Presentation at the 1st Canadian Obesity Student Meeting. Published in the conference program p. 47 (Abstract 20D). Universite Laval, Quebec, Canada, June 4-6, 2008.

26. Norwood, S.J., Buchholz, A., Henderson, K., Flament, M., **Goldfield, G**.: Self-silencing among females and males: Examining the psychometric properties of the STSS-A among adolescents. 69th Annual Convention of the Canadian Psychiatric Association, Halifax, Canada, June 12-14, 2008.

27. Brennan, A., Quirk Baillot, D., **Goldfield, GS** Van Lerberghe, C., Obeid, N., Peeters, C., Nguyen, H., Remy, B., Flament M.F.: Weight status, ideal-actual weight discrepancy, eating and weight control behaviours: A comparative study between French and American adolescents. 29th Annual Research Day of the University of Ottawa Department of Psychiatry, Ottawa, Canada, December 5, 2008.

28. Norwood, S. J., Buchholz, A., Henderson, K., Goldfield, G., Flament M.F.: Self-silencing in females and males: Examining the psychometric properties of the STSS-A among adolescents. 29th Annual Research Day of the University of Ottawa Department of Psychiatry, Ottawa, Canada, December 5, 2008.

29. Obeid, N., Henderson, K., Buchholz, A., **Goldfield, G**., Moore, C., Taljaard, M., Flament M.F.: Self-reported versus objective measures of weight and height in adolescents: Implications for eating disorders and obesity research. 29th Annual Research Day of the University of Ottawa Department of Psychiatry, Ottawa, Canada, December 5, 2008.

30. Squires, E.C., Obeid, N., Giasson, V., Byrne, A., Buchholz, A., Henderson, K., **Goldfield, G.,** Flewelling, R., Matheson, K., Flament M.F.: Research on eating and adolescent lifestyles in Ontario – A propective longitudinal school-based study (REAL study). Poster presented at the 29th Annual Research Day of the University of Ottawa Department of Psychiatry, Ottawa, Canada, December 5, 2008.

31. Leclair, S., Byrne, A**., Goldfield, GS.** Using the Internet to deliver Interventions: Strengths and Challenges. Oral session presented at the 70th Annual Canadian Psychological Association Conference, Montreal, QU, June 2009.

32. Hill, E. M., Kukaswadia, A., Buchholz, A., Henderson, K., *Goldfield, GS,* Virley, B., Flament, M.F. Parent weight teasing as a moderator in the relationship between "internalization of the ideal body figure" and restrained eating among adolescents: A cross-gender analysis. Paper presented at the *Royal Ottawa Hospital/University of Ottawa Academic & Research Day,* Ottawa, Canada, December 2009.

33. Rutherford, J, Adamo, K.B. **Goldfield, GS**. Effects of interactive video game cycling on obese adolescent health. Paper presented at the 2nd Annual CHEO Research Institute Research Day, October 2009.

34. Kukaswadia, A., Hill, E., Buchholz, A., Henderson, K., **Goldfield, G**., Virley, B., Flament, F. The Prevalence of Eating Disorder Symptoms among Competitive Youth Athletes Contrasted with Non-competitive Peers. *Royal Ottawa Hospital Academic & Research Day 2009*, Ottawa, Canada, December 4th, 2009.

35. Murray, M., Hill, E., Kukaswadia, A., Buchholz, A., Henderson, K., **Goldfield, G**., Flament, F. Body Mass Index and Age as Predictors of Sociocultural Attitudes about Thinness Among Female Adolescents. *Royal Ottawa Hospital Academic & Research Day 2009*, Ottawa, Canada, December 4th, 2009.

36. Goldfield, GS, Moore, C., Henderson, K., Buchholz, A., Obeid, N. & Flament, M. The relationship between weight-based teasing and psychological adjustment in adolescents. Poster presented at the 2nd Annual Research Day of the Children's Hospital of Eastern Ontario Research Institute, Ottawa, October 2009

37. Raynor, HA., Walleghen, E.V., **Goldfield, GS**., Osterholt, K., Hart, C., Jelalian, E., Wing, R. The influence of child food liking, parent food liking, and parent dietary intake on overweight children's dietary intake. Paper presented at the Society of Obesity Conference, Washington, DC, October 2009.

38. Adamo K.B., Z. Ferraro, J Rutherford, E. Keely, M. Walker, **G. Goldfield**, S. Hadjiyannakis, N Barrowman. The maternal obesity management (MOM) trial: a lifestyle intervention during pregnancy to minimize downstream obesity. Oral Presentation at the **2010 Canadian Society for Exercise Physiology Conference** (Toronto), 2010.

39. Hill, E., Henderson, K., Buchholz, A., **Goldfield, GS**, Kukaswadia,A., Birmingham, M., Flament, MF. What's your ideal weight? Sociocultural and psychological Influences on Actual-weight discrepancy and weight satisfaction in adolescents. Paper presented at the 8th annual Conference of the Australian and New Zealand Academy for Eating Disorders (ANZED), Auckland, New Zealand, 2010.

40. Murray, M., Hill, E., Buchholz, A., Henderson, K., **Goldfield, GS.,** Flament, MF. Predicting body esteem in Adolescents: Are risk factors gender specific? Paper presented at the **American Psychological Association**, Sand Diego, CA, USA, August 2010

41. Murray, M., Kukaswadia, A, Buchholz, A., Henderson, K., Flament, MF & **Goldfield, GS.** The effect of family meals on body mass index among Canadian adolescents. Poster presented at the 28th Annual the Obesity Society Conference, San Diageo, CA, October 2010.

42. Buchholz, A., Norwood, SJ., Bowker, A., Henderson, K., **Goldfield, GS**., Flament, MF. Self-silencing, restrained eating, and appearance esteem: A test of a meditational model among adolescents. Poster presented at the **Academy of Eating Disorders (AED) International Conference for Eating Disorders,** Salzburg, Austria, June 2010.

43. Henderson, K.A., Obeid, N., Buchholz, A., Flament, MF., & **Goldfield, GS**. Does coping matter? A meditational model of stress coping and eating pathology. Paper presented at the **Academy of Eating Disorders (AED) International Conference for Eating Disorders,** Salzburg, Austria, June 2010.

44. Norwood, SJ., Buchholz, A., Bowker, A., Henderson, KA., **Goldfield, GS**., Flament, MF. Gender differences in self-silencing as a predictor of eating pathology among adolescents. **Academy of Eating Disorders (AED) International Conference for Eating Disorders,** Salzburg, Austria, June 2010

45. Norwood, SJ., Buchholz, A., Bowker, A., Henderson, KA., **Goldfield, GS**., Flament, MF. Self-silencing and anger regulation as predictors of disordered eating among adolescent females. **Academy of Eating Disorders (AED) International Conference for Eating Disorders,** Salzburg, Austria, June 2010.

46. Wilson, A., Buchholz, A., Henderson, K., Flament, MF, Goldfield**, GS**. Physical activity and psychosocial adjustment in adolescents. Paper presented at the 3rd Annual Research Day of the Children's Hospital of eastern Ontario Research Institute, Ottawa, Canada, October 2010.

47. Adamo, KB., Rutherford, JA., Goldfield, GS. Effects of Interactive Video Game Cycling on Obese Adolescent Health. Presentation at the **North American Society for Pediatric Exercise Medicine Conference**, Niagara-on-the-Lake, 2010.

48. Tremblay, MS, Leblanc, AG, Colley, RC., **Goldfield, GS**., Saunders, T., Larouche, R. Systematic review of the relationship between sedentary behaviour and health indicators in school-aged children and youth. **Applied Physiology, Nutrition, and Metabolism**, 35 (Suppl. 1): S103, 2010.

49. Henderson, KA., Obeid, N., Buchholz, A., Flament, MF, **Goldfield, GS**. Does coping mediate the relationship between stress and disordered eating. Oral presentation of paper at the 3rd Annual Research Day of the Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada, October 2010.

50. Kukaswadia, A., Flament, MF., Buchholz, A., Henderson, K., **Goldfield, GS**., Talijard, M. Accuracy of self-reported weight and height in adolescents. Paper presented at the **2nd Canadian Obesity Network Student Meeting,** Ottawa, ON, June 2010.

51. Leblanc, AG., Saunders, T.J., Larouche, R., Colley, RC., **Goldfield, GS**., Tremblay, MS. Relation between sedentary behaviours and health outcomes in children and youth. **Proceeding of the North American Society for Pediatric Exercise Medicine and the European Group for Pediatric Work Physiology**, Niagara-on-the-Lake. September 2010.

52. Murray, M., Kukaswadia, A., Birmingham, M., Buchholz, A., Henderson, K., **Goldfield, GS**., Flament, MF. Factors associated with weight satisfaction among Canadian adolescents in different weight categories. **Child Development Conference**, Ottawa, ON, May 2010.

53. Alberga, AS., Tulloch, H., Kenny, GP., Prud'homme, D., **Goldfield, GS**., Hadjiyannakis, S., Sweet, S., & Sigal, RJ. What predicts drop-out of an exercise intervention with obese adolescents? Poster presented at the Canadian Obesity Network Summitt, Montreal, Quebec, April 2011.

54. **Goldfield, GS.,** Adamo, K., Colley, R., Naylor, PJ., Temple, V. Can we increase physical activity and reduce sedentary behaviour in preschoolers? Oral presentation at the Canadian Society for Exercise

Physiology, Quebec City, Canada. October 2011.

55. Davis, I., Gick, M., Sigal, RJ., Kenny, GP., Hadjiyannakis, S., Alberga, A., Phillips, P., Malcolm, J & **Goldfield, GS**. The relationship between aerobic fitness and psychological adjustment in overweight and obese adolescents. Poster presentation at the Society of Obesity conference, Orlando, FL. October 1-5, 2011.

56. Adamo KB, R Colley, S Hadjiyannakis**, G Goldfield**. Accelerometer-measured physical activity levels in a clinical sample of obese children and youth: A comparison to the Canadian health measures survey. Poster presented at the **Obesity Society 29th Annual Scientific Conference**, (Orlando, FL), 2011.

57. **Goldfield, GS,** T Saunders, GP Kenny, S Hadjiyannakis, A Alberga, P Phillips, MS Tremblay, RJ Sigal. TV viewing and diabetes risk factors in overweight and obese adolescents. Oral Presentation at the Children's Hospital of Eastern Ontario 4th Annual Research Day (Ottawa), October 2011.

58. Leclair S, Maras D, **Goldfield GS.** E Kristjansson. The needs and barriers of families seeking treatment for childhood overweight: A social-ecological perspective. **Canadian Psychological Association Convention** (Toronto), 2011.

59. Adamo, KB, Harvey, A., Grattan, K., **Goldfield, G.S**., Evaluation of "Freggie Friday" nutrition program in primary aged school children. Poster presentation at the 4th Congress of the European Academy of Pediatrics in Istanbul, Turkey from October 5-9, 2012

60. Obeid, N., Quirk Baillot, D., Henderson, K.A., Buchholz, A., **Goldfield, G.S.,** Godart, N., Flament, M.F. Prevalence of eating disorders in adolescents: A comparative study between France, the USA and Canada. Workshop symposium presented at the International Association for Child and Adolescent Psychiatry and Allied Professions (IACAPAP), Paris, France, July 2012.

61. Henderson, K.A., Buchholz, A., **Goldfield, G.S.,** Obeid, N., Flament, M.F. Coping in adolescents: A mediator between stress and disordered eating. Workshop symposium presented at the International Association for Child and Adolescent Psychiatry and Allied Professions (IACAPAP), Paris, France, July 2012.

62. Murray, M., Henderson, K.A., Bowker, A., Buchholz, A**., Goldfield, G.S.,** Obeid, N., Birmingham, M., Flament, M.F.: Perceived family rigidity and disordered eating behaviors among adolescents: The role of perfectionism. *Academy of Eating Disorders (AED) International Conference on Eating Disorders*, Austin, Texas, U.S., May 3-5, 2012.

63. Zimani, D., Robertson, T., Birmingham, M., Henderson, K.A., Buchholz, A., **Goldfield, G.S,** Obeid, N., Tasca, G., Vaillancourt, T., Flament, M.F.: Prevalence of weight and eating disorders in a community sample of adolescents from the Ottawa area (*REAL* study). *32nd Academic and Research Day of the University of Ottawa Department of Psychiatry*, Ottawa, Canada, June 7, 2012.

64. Alberga, A.S., Prud'homme, D., Kenny, G.P., **Goldfield, G.S.,** Hadjiyannakis, S., Malcolm, J., Sigal, R.J. Do Canadian Obese Adolescents Who Meet the Screen Time Guidelines Have a Better Metabolic Profile than those who Do Not Meet the Guidelines? Poster presentation at the 15th Annual Canadian Diabetes Association/ Canadian Society of Endocrinology & Metabolism in Vancouver, British Columbia from October 10-13, 2012.

65. <u>Alberga, A.S</u>., Prud'homme, D., Kenny, G.P**., Goldfield, G.S,** Hadjiyannakis, S., Malcolm, J., Sigal, R.J. Do Canadian obese adolescents who meet the recommended sedentary behavior guidelines have higher resting metabolism and fitness? Oral presentation at the International Congress on Physical Activity and Public Health in Sydney, Australia October 30-November 3, 2012, Journal of Science and Medicine in Sport December 2012 Supplement.

66. <u>Alberga, A.S</u>., Prud'homme, D., Kenny, G.P., **Goldfield, G**., Hadjiyannakis, S., Malcolm, J., **Sigal, R.J**. Do Canadian obese female adolescents who meet the sedentary behaviour guidelines have an improved metabolic profile compared to those that do not meet the guidelines? Oral presentation at the 3rd Annual SOMET-MONET Research Day on May 24, 2012, in Montreal, Quebec.

67. <u>Alberga, A.S</u>., Prud'homme, D., **Goldfield, G.S**., Kenny, G.P., Sigal, R.J. Top 10 practical lessons learned from physical activity interventions with children and adolescents. Oral presentation (08-OR p. 21 of the conference program) at the 3rd Canadian Obesity Student Meeting in Edmonton, Alberta from June 20-23, 2012.

68. <u>T.J. Saunders,</u> J.P. Chaput, **G. S Goldfield**, R.C. Colley, G. Kenny, E. Doucet, M.S. Tremblay. Effects of prolonged sitting and physical activity on markers of cardiometabolic risk in healthy children and youth: a pilot study. The International Congress on Physical Activity and Public Health in Sydney, Australia, 2012.

69. <u>Murray, MA</u>**, GS Goldfield**, K Henderson, A Buchholz, N Obeid & MF Flament. Perceived family adaptability as a mediating variable in the relationship between family meals and decreased emotional eating among adolescents. Academy of Eating disorders (AED) Poster presented at the International Conference on Eating Disorders, Austin, TX. May 2012.

70. Goldfield GS, A Harvey, K Grattan, RC Colley, <u>A Alberga, ZM Ferraro</u>, VA Temple, PJ Naylor, N Barrowman, <u>KB Adamo</u>. The Preschoolers Activity Trial: A Randomized Controlled Trial of Physical Activity in The Early Years. Poster presentation at the 4th Congress of the European Academy of Pediatrics in Istanbul, Turkey from October 5-9, 2012.

71. Tremblay, MS, <u>LeBlanc,A</u>., <u>Adamo, KB.,</u> **Goldfield, GS**. Healthy Active Living in the Early Years (aged 0-4 years). The International Life Sciences Institute Annual Meeting, Miami, Florida, January 2013.

72. Sigal RJ, <u>Alberga AS</u>, **Goldfield GS,** Kenny GP, Hadjiyannakis S, Prud'homme D, Malcolm J, Phillips P, Ma J, Tulloch H, Gougeon R, Wells GA. Effects of Aerobic Exercise, Resistance Exercise or Both on Percent Body Fat in Overweight Adolescents: the HEARTY Trial. Presented at the American Diabetes Association Scientific Sessions, Chicago, IL June 2013. Diabetes 2013 June; 62 (Suppl.).

73. Sigal RJ, <u>Alberga AS</u>, **Goldfield GS**, Kenny GP, Hadjiyannakis S, Prud'homme D, Malcolm J, Phillips P, Ma J, Tulloch H, Gougeon R, Wells GA. Effects of Aerobic Exercise, Resistance Exercise or Both on Percent Body Fat in Overweight Adolescents: the HEARTY Trial. Presented at 16th Annual CDA/CSEM Professional Conference and Annual Meetings in Montreal, Quebec from October 17-20, 2013, as part of the Vascular 2013 meeting.

74. Murray, M. A., Moorman, J., & **Goldfield, GS**. Problematic computer-mediated social networking as a predictor of body esteem among undergraduate students. Poster presented at the 6th Annual Conference on Emerging Adulthood, Chicago, IL. October 2013.

75. Maras, D., Murray, M. A., Buchholz, A., Henderson, K., Obeid, N., Flament, M., Birmingham, M., **Goldfield, GS.** Association between sedentary screen-based activities and symptoms of depression and anxiety in a community sample of Ontario youth. Presented at the 6th annual CHEO Research Day, Ottawa, ON October 2013,

76. Murray, M. A., Sigal, R. J., Kenny, G. P., Hadjiyannakis, S., Alberga, A. S., Phillips, P., Wilson, A., & **Goldfield, G. S.** Screen time behavior as a predictor of depressive symptoms in overweight and obese adolescents. Poster presented at the 2013 American Psychological Conference, Honolulu, HI. July 2013.

77. Murray, M. A., Hickey, A. J., Maras, D., Wilson, A., & **Goldfield, G. S.** Excessive time on social networking sites predicts dietary restraint among undergraduate students. Poster presented at the University of Ottawa Psychology. Outside the Box Conference, Ottawa, ON. May 2013.

78. Murray, M. A**.,** Obeid, N., Henderson, K., Flament, M. F., Buchholz, A., Birmingham, M., & **Goldfield, G.S**. *Perceived family adaptability as a mediating variable in the relationship between family meals and decreased emotional eating among adolescents.* Abstract presented at the 2013 International Conference on Eating Disorders, Montreal, QC. May 2013.

79. Alberga, A.S**.**, Kenny, G.P., Prud'homme, D., **Goldfield, G.S**., Hadjiyannakis, S., Malcolm, J., Phillips, P., Ma, J., Doucette, S., Gougeon, R., Wells, G.A., and Sigal, R.J. Effects of aerobic training, resistance training or both on cardiometabolic risk factors in obese adolescents: the HEARTY trial. *Applied Physiology, Nutrition and Metabolism* 2013;38(10):1020. Oral presentation at the Canadian Society for Exercise Physiology conference, Toronto, ON, October 16-19, 2013.

80. **Alberga, A.S.**, Prud'homme, D., Kenny, G.P., Goldfield, G.S., Hadjiyannakis, S., Gougeon, R., Malcolm, J., Ma, J., and Sigal, R.J. Effects of aerobic training, resistance training or both on resting energy expenditure, aerobic and musculoskeletal fitness: the HEARTY exercise trial. Oral presentation at the 3rd Canadian Obesity Summit, Vancouver, BC, May 1-4, 2013.

81. Adamo KB, Grattan KP, Harvey A, Naylor P, Temple V, Wilson S, **Goldfield GS**. Does a physical activity daycare intervention impact body composition and gross motor skills? A pilot randomized control trial. Canadian Obesity Network's 3rd Canadian Obesity Summit., Vancouver Canada May 1-4, 2013. (poster)

82. Maras, D., **Goldfield, G**., Gick, M., Henderson, K., Buchholz, A., Flament, M. (2013, June). *Attachment style and obesity: Examining mediators in a community sample of Ontario youth*. Poster presented at the 74th annual Canadian Psychological Association Convention, Quebec City, QC.

83. Vitoroulis, I., **Goldfield, G.S.,** Henderson, K., Buchholz, A., Obeid, N., Flament, M.F.: Acculturation and ethnic group differences in eating behaviors and attitudes among Canadian adolescents. *Institute of Mental Health Research Young Researchers' Conference*, Ottawa, Ontario, Canada, June 7, 2013.

84. Platts, J., Kristjansson,E., Flament, M**., Goldfield, G**., Henderson, K., Buchholz, A., & Vitoroulis, I.: Neighbourhood food environment, fast food near schools, and adolescent body weight. *Society for Community Research and Action*, Miami, Florida, USA, June 27-29, 2013.

85. Cameron JD, Sigal RJ, Kenny GP, Alberga AA, Hadjiyannakis S, Phillips S, Prud'homme D, Malcolm J, Doucette S, Tulloch H, **Goldfield GS.** Effects of Resistance training, Aerobic training or Both on Psychosocial Functioning in Obese Adolescents: The HEARTY trial. The Global Summit on Physical Activity, Toronto, Canada, May 2014.

86. Maras, D, Murray, M., Buchholz A, Henderson, K, Obeid N, Flament, M, **Goldfield, GS.** Sedentary screen-based activities are independently associated with symptoms of depression and anxiety in a community sample of Ontario youth. The Global Summit on Physical Activity, Toronto, Canada, May 2014.

87. Goldfield GS, Harvey A, Grattan K, Colley R, Alberga AS, Ferraro ZM., Temple VA., Naylor PJ, Barrowman N, Wilson, S, Adamo KB. The Preschoolers Activity Trial (PAT): A randomized controlled trial evaluating the effects of physical activity on adiposity in the early years. European Congress on Obesity, Sofia, Bulgaria, May 2014.

88. Cameron, JC, **Goldfield, GS**, Doucet, E. Deprivation by diet alone or by aerobic exercise alone: how modality of an acute intervention can differently impact 'wanting' and 'liking' of preferred foods**.** European Congress on Obesity, Sofia, Bulgaria, May 2014.

89. Cameron, JC, **Goldfield, GS**, Doucet, E. Deprivation by diet alone or by aerobic exercise alone: how modality of an acute intervention can differently impact olfaction, palatability and ad libitum feeding. The Obesity Society Conference, Boston MA, November 2014.

90. Patel, B, Lai, L, **Goldfield, GS**, Sananes, R, Longmuir, P. Examining Psychosocial distress in Pediatric Cardiology patients. Canadian national Medical Research Symposium, Winnipeg, Manitoba, June 2014.

91. Cameron, JD, **Goldfield, GS,** Kenny, GP, Alberga, AA, Phillips, P, Doucette, S, Sigal, RJ. Body Composition and Energy Intake—Fat Free Mass is the Strongest Predictor of Food Intake in Obese Adolescents: The HEARTY Trial. Poster presented at the Society for the Study of Ingestive Behavior 22nd Annual Meeting, Seattle, Washington, July 28-31, 2014.

92. Goldfield, GS, Kenny, GP, Alberga, AA, Phillips, P, Doucette, S, Cameron, JD, Sigal, RJ. Effects of aerobic training, resistance training, or both on food intake in obese adolescents: The HEARTY Trial. Poster presented at the Society for the Study of Ingestive Behavior 22nd Annual Meeting, Seattle, Washington, July 28-31, 2014.

93. Murray, MA, Wilson, A, Maras, D, Hickey, AJ, & **Goldfield, GS.** Computer-Mediated Social Networking Engagement and Restrained Eating among Undergraduate Students. Poster presented at the Society for the Study of Ingestive Behavior 22nd Annual Meeting, Seattle, Washington, July 28-31, 2014.

94. Murray, M. A**.,** & **Goldfield, G. S.** Computer-Mediated Social Networking, Withdrawal, and Emotional Eating among Undergraduate Students. Poster presented at the 2014 American Psychological Conference, Washington, DC, August 2014.

95. Murray, M.A**.** & Goldfield, G. S. Computer-Mediated Social Networking Engagement, Social Benefits, and Emotional Eating. Oral presentation delivered at the 4th Annual Canadian Obesity Student Meeting, Waterloo, ON. June 2014.

96. Flament, M., Buchholz, A., Henderson, K., Obeid, N., Schubert, N., Maras, D., Paterniti, S., **Goldfield, GS**. From DSM-IV to DSM-5: How do the changes affect the prevalence of eating disorders in adolescents from the community? Presentation at the International Conference on Eating Disorders, New York, NY. March 2014,

97. Adamo KB, Wilson S, Brett KE, Ferraro ZM, Nerenberg K, Goldfield GS, Keely E, Hadjiyannakis S, Walker M. The Maternal Obesity Management (MOM) Pilot RCT: A Prenatal Lifestyle Intervention. The Obesity Society meeting, Boston, Massachusetts, Nov 2014.

98. Ferraro ZM, Wilson S, Brett KE, Nerenberg K, **Goldfield GS,** Hadjiyannakis S, Walker M, Adamo KB. The timing of gestational weight gain & infant adiposity in the Maternal Obesity Management (MOM) Trial. The Obesity Society meeting, Boston, Massachusetts, Nov 2014.

99. Brett KE, Ferraro ZM, Wilson S, Ockenden H, Nerenberg K, **Goldfield GS**, Keely E, Adamo KB. Associations between objectively measured physical activity, pre-pregnancy body mass index and gestational weight gain. Canadian Society for Exercise Physiology annual meeting. St.Johns NFLD, October 2014.

100. Ferraro ZM, Wilson S, Brett KE, Nerenberg K, **Goldfield GS**, Keely E, Adamo KB. Associations between objectively measured physical activity, sedentary time and maternal social support and depression indices. Canadian Society for Exercise Physiology annual meeting. St.Johns NFLD, October 2014.

101. Harvey ALJ, Grattan KP, Adamo KB, Wilson S, **Goldfield GS.** Do outdoor daycares increase physical activity? Canadian Society for Exercise Physiology annual meeting. St.Johns NFLD, October 2014.

102. **Goldfield, G**., Maras, D., Murray, M., Buchholz, A., Henderson, K., Obeid, N., Birmingham, M., Flament, M., F.: Restrained eating mediates the relationship between insecure attachment and overweight/obesity in a community sample of Canadian youth. *Obesity Society*, Boston, MA, U.S., November 2-7, 2014.

103. Alberga, A.S., Kenny, G.P**., Goldfield, G.S**., Prud'homme, D., Hadjiyannakis, S., Gougeon, R., Sigal, R.J.; on behalf of the HEARTY research team. Why should resistance exercise be incorporated into physical activity programs for children and youth with obesity? Journal of Physical Activity and Health 2014,11(Supp 1, S126-198). Presentation at the Global Summit on Physical Activity in Children, May 19- 23, 2014.

104. Patel B, Lai L**, Goldfield G**, Sananes R, Longmuir PE. Examining Psychosocial Distress in Paediatric Cardiology Patients. University of Ottawa Undergraduate Research Opportunity Program Symposium (Ottawa, Ontario) March 25, 2014.

105. **Patel B,** Lai L**, Goldfield G**, Sananes R, Longmuir PE. Examining Psychosocial Distress in Paediatric Cardiology Patients. University of Ottawa Healthcare Symposium (Ottawa, Ontario) March 29, 2014.

106. Longmuir PE, Patel B, Lai L, **Goldfield G**, Sananes R. Recognizing Psychosocial Distress in Pediatric Cardiology Clinic Patients. Cardiology 2014 (Orlando, Florida) February 21, 2014.

107. Cameron JD, Sigal RJ, , Kenny GP, Alberga AS, Hadjiyannakis S, Phillips P, Gougeon R, Malcolm J, Ma J, Prud'homme D, Doucette S, **Goldfield GS**. Effects Resistance Training, Exercise Training or Both on Psychosocial Functioning in Obese Adolescents: the HEARTY exercise trial. Global Summit for Physical Activity. May 18-22, 2014, Toronto, Canada

108. Cameron, J.D., Adamo, K.B., Doucet, E, Fried, P., **Goldfield, G.S**. Effects of prenatal exposure to cigarette smoke on adiposity and metabolism: preliminary evidence of attenuated energy metabolism. Neurobehavioral Teratology Society, June 27th-July1st Montreal 2015.

109. Biagé A, Guérin E, Goldfield GS, Doucet E, Strychar I, Prud'homme D. Influence of menopause transition and physical activity on stress perception: A MONET Group Study. American College of Sports Medicine, San Diego, California, May 27, 2015

110. Gunnell, KE., Flament, M., Maras, D., Buchholz, A., Henderson, K., Obeid, N., Schubert, N., **Goldfield, G**. Changes in anxiety, screen time, and physical activity: A longitudinal REAL study over four years. Paper presented at the 14th European Congress of Sport Psychology, Bern, Switzerland, July 15, 2015.

111. Gunnell, K. E., Flament, M., Maras, D., Buchholz, A., Henderson, K. A., Obeid, N.,Schubert, N., **Goldfield, G**. Associations between screen time, physical activity, and depression in adolescents: A four year Longitudinal REAL study. Paper presented at the annual general meeting of the North American Society for Psychology of Sport and Physical Activity, Portland, OR. June 6,.2015.

112. Cameron, J., Sigal, R., Kenny, G., Alberga, A., Phillips, P., Maras, D., Borghese, M., Murray, M., **Goldfield, G.** Increased caloric intake mediates the relationship between screen time and body mass index in overweight/obese adolescents primarily by increased carbohydrate intake: The HEARTY trial. Presented at the Obesity Society's Annual meeting at Obesity Week, Los Angeles, CA. November 2015.

113. Murray, M. A**.,** Maras, D., & **Goldfield, G. S.** The relationship between social media engagement and externalized eating. Presented at the American Psychological Association Conference, Toronto, ON. August, .2015.

114. Maras, D. Murray, M. A., Schubert, N. Henderson, K., Buchholz, A., Flament, M. F., Obeid, N., & **Goldfield, G. S.** Negative body and weight esteem differentially mediate the relationship between thin-ideal internalization and mental health in female adolescents. Poster presented at the Psychology Outside the Box 2015, University of Ottawa, Ottawa, ON. May 2015.

115. Heenan, A., Sweet, S. N., **Goldfield, G. S**, Kenny, G. P., Sigal, R. J.,Alberga, A., Tulloch, H. (2016). Self-efficacy and outcome expectancies predict fitness in obese youth: The HEARTY trial. Poster presented at the 1st Annual International Behavioural Trials Network (IBTN) Conference, Montreal, QC [May19-21, 2016].

116. Valois D, Davis, C, Buchholz, A, Obeid, N, Henderson K, **Goldfield, GS.** Effects of weight teasing on body esteem in youth with obesity: Moderating effects of attachment style. Paper presented at the Recent Advances in the Prevention and Management of Childhood and Adolescent Obesity – Understanding the Interplay between Physical and Mental Health, Ottawa, ON (October 24-26, 2016).

117. Alberga AS, Sigal RJ, Kenny GP, Prud'homme D, **Goldfield GS.** Promoting Exercise for Kids and Teens: Let's NOT Talk About Weight. Presented in the highlighted symposium 'Physical Activity, Sports or Fitness: Fighting Fatness or Finding Enjoyment? The Youth Dilemma' at the 2016 ACSM

Annual Meeting, World Congress on Exercise is Medicine® and World Congress on the Basic Science of Energy Balance, Boston, Massachusetts, U.S.A, May 31-June 4, 2016

118. Murray, M. A. & **Goldfield, G. S**. Negative implications of social media use among undergraduate students: Emotional eating as a coping strategy. Poster presented at the 13th Annual International Conference on Obesity, Vancouver, BC. May 2016.

119. Valois D, Davis, C, **Goldfield, GS.** Effects of weight teasing on body esteem in youth with obesity: Moderating effects of attachment style. Oral presentation, Psychology Graduate Student Conference, Carleton University, Ottawa, ON (January 2016).

120. Heenan, A., Sweet, S. N., **Goldfield, G. S**, Kenny, G. P., Sigal, R. J., Alberga, A., Tulloch, H. (2016). The HEARTY Trial: Autonomy Support and Self-determined Motivation Predict Fitness in Obese Youth. Poster presented at the 37th Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine (SBM), Washington, DC [March 30-April 2, 2016].

121. Wasenius N, Harvey ALJ, Grattan KP, Barrowman N, **Goldfield GS**, Adamo KB. Preschoolers' Physical Activity and the Role of Maternal Gestational Weight Gain. ObesityWeek-2016 – The Annual Meetings of The Obesity Society (TOS) and American Society for Metabolic & Bariatric Surgery (ASMBS). New Orleans, Louisiana. October 31 – November 4, 2016.

122. Jaeger-Hintze, L, Seguin, RP, Damphouse A**, Goldfield GS**, Doucet. E. "Resting Metabolic Rate and Appetite sensations are not affected by different the degree of caloric restriction: Preliminary data. 5th Canadian Obesity Summit, Banff Alberta, Canada, 2017.

123. Gunnell, K. E., Larouche, R., **Goldfield, G. S**., & Tremblay, M. S. (June 2017). Physical activity, sedentary behaviour, body mass index, and mental health indicators: An investigation using direct measures and nationally representative data. Paper presented at the annual general meeting of the North American Society for Psychology of Sport and Physical Activity, San Diego, CA.

124. **Goldfield GS,** Cameron, JD, Barnes J, Doucet, E. Fried P, Adamo KB, Tremblay MS, Walker M, Tirelli A, Hafizi K, Murray M,. Effects of prenatal exposure to cigarette smoke on adiposity, physical activity patterns, and resting energy expenditure in young children. Oral presentation at the 24th European Congress of Obesity (ECO), Porto, Portugal, May 17-20, 2017.

125. Poitras VJ, Gray CE, Janssen X, Aubert S, Carson V, Faulkner G, **Goldfield GS**, Reilly JJ, Sampson M, Tremblay MS. Systematic review of the relationships between sedentary behavior and health indicators in the early years (aged 0-4 years). Canadian Society for Exercise Physiology Annual Scientific Conference (Winnipeg), October 2017.

126. Bastell KM, **Goldfield GS**, Santana MJ, Kenny GP, Hadjiyannakis S, Malcolm J, Donovan LE, Doucette S, Tulloch HE, Sigal RJ. The effects of aerobic, resistance and combined training on health-related quality of life (HRQOL) in previously sedentary people with type 1 diabetes: the T1-DARE trial.

Can J Diabetes 2017 Oct; 41(5) Suppl., S10. Oral presentation at Diabetes Canada Annual Scientific Sessions, Edmonton, AB Nov. 2, 2017.

127. Bastell KM, **Goldfield GS,** Santana MJ, Kenny GP, Hadjiyannakis S, Malcolm J, Perkins BA, Riddell MC, Donovan LE, Doucette S, Tulloch HE, Sigal RJ. The effects of resistance training on health-related quality of life (HRQOL) in already-aerobically-active people with type 1 diabetes: the READI trial. Can J Diabetes 2017 Oct; 41(5) Suppl: S64. Poster presentation at Diabetes Canada Annual Scientific Sessions, Edmonton, AB Nov. 3, 2017.

128. Wasenius N, Harvey AL, Grattan KP, Barrowman N, **Goldfield GS,** Adamo KB. Is there a relationship between maternal gestational weight gain and offspring fundamental motor skills? DOHaD 2017 – Life Course Health & Disease: Observations, experiments and interventions. 15th-18th October 2017. Rotterdam, the Netherlands.

129. Valois, D. D., Davis, C. G., **Goldfield, G. S**. Weight teasing and body esteem in youth with overweight and obesity: An investigation of protective factors. Talk presented at the Psychology Graduate Student Conference (PGSC) at Carleton University in Ottawa, ON January 2017.

130. Valois, D. D., Davis, C. G., Buchholz, A., Obeid, N., Henderson, K., Flament, M. F, & **Goldfield, G. S**. Effects of Weight Teasing on Body Image in Youth with Obesity: The Protective Role of Attachment Style and Social Support. Poster to be presented at the 19th annual Society for Personality and Social Psychology conference in Atlanta, Georgia, USA, February 2018.

131. Kakon G, Hadjiyannakis S, Sigal RJ, **Goldfield GS**, Prud'homme D, Kenny GP, Doucette S, Alberga, AS. The Edmonton Obesity Staging System for Pediatrics (EOSS-p), Cardiorespiratory Fitness and Quality of Life in Adolescents with Obesity. Canadian Obesity Network Student and New Professional (CON-SNP) Conference, London, Ontario, May 2018

132. Szwimer E, Mougharbel F, **Goldfield GS,** Alberga AS. The effects of familial and peer weight teasing in childhood and adolescence on mental health outcomes in youth and adulthood: A systematic review. Canadian Obesity Network Student and New Professional (CON-SNP) Conference, London, Ontario, May 2018

133. Mclaren, C. Buchholz A, Hammond N, **Goldfield GS,** Hadjiyannakis S, Norris ML, Spettigue W, Obeid N. Examining Shape and Weight Concerns Among Adolescents in Tertiary-Care Based Obesity and Eating Disorder Programs. Canadian Obesity Network Student and New Professional (CON-SNP) Conference, London, Ontario, May 2018.

134. Hintze LJ, **Goldfield G,** Doucet E. The rate of weight-loss does not affect appetite sensations differently in women living with obesity. 25th European Congress on Obesity in Vienna, Austria from 23-26 May 2018.

135. Gunnell, K. E., Poitras, V. J., LeBlanc, A. G., Schibli, K., Barbeau, K., Hedayati, N., Pontifex, M. B., **Goldfield, G. S**., & Tremblay, M. S. (2018). Physical activity and cognition in children and youth: A systematic review. Paper presented at the annual meeting of the Canadian Society for Psychomotor Learning and Sport Psychology, Toronto ON.

136. **Goldfield, GS**. Mental Health in Youth with Obesity. Invited presentation at the 4th Annual International Congress of Obesity: Treatment of Obesity and Non-Communicable Diseases. Maringa, Brazil, October 2018.

137. **Goldfield GS,** Valois D, Buchholz A. Obeid N, Henderson KA, Cameron JD, Murray MA, Mougharbel F, Chaput JP, Flament M, Restrained Eating Mediates the Relationship Between Weight-based Teasing and BMI in Canadian youth. Poster presentation at the International Obesity Week Conference, Nashville, TN. USA, November 2018.

138. Guerrero MD, Walsh JJ, Barnes JD, **Goldfield GS**, Tremblay MS. Associations between meeting the the Canadian 24-hour movement behaviours and impulsivity control in school-aged children. Canadian Society for Exercise Physiology Annual Conference, Niagara Falls, Canada, 2018.

139. Gunnell KE, Schibli K, Poitras VJ, Hedayati N, Barbeau K, **Goldfield GS**, Tremblay MS. Sedentary behavior and cognition in children and youth: A systematic review. International Congress of Applied Psychology, Montreal, Canada, 2018.

140. Lee J, Lai L, Gow RM, Gardin L, Sananes R, Goldfield GS, Longmuir PE. Mental health and quality of life concerns among children with cardiac diagnoses: which patients are at risk and how can they be identified. North American society for Pediatric Exercise medicine, Oakland, USA, 2018.

141. Tremblay MS, Chaput JP, Adamo K, Aubert S, Barnes J, Choquette L, Duggan M, Faulkner G, Goldfield GS, Gray C, Gruber R, Janson K, Janssen I, Janssen X, Jaramillo Garcia A, Kuzik N, LeBlanc C, Maclean J, Okely A, Poitras V, Raynor ME. Canadian 24-hour movement guidelines for early years (0-4 years): An integration of physical activity, sedentary behavior and sleep. International society for physical activity and health congress, London, UK, 2018.

142. Tremblay MS, Carson V, Chaput JP, Adamo KB, Aubert S, Choquette L, Duggan M, Faulkner g, Goldfield GS, Gray CE, Gruber R, Janson K, Janssen I, Janssen X, Kuzik N, LeBlanc C, MacleanJ, Okely A, Poitras VJ, Rayner ME, Reilly JJ, Sampson M, Spence JC, Timmons BW. Canadian 24-hour movement behaviour guidelines for the early years (0-4 years): An integration of physical activity, sedentary behavior and sleep. Active Living research Conference, Banff, Canada, 2018.

143. Walsh JJ, Barnes JD, Cameron JD, Goldfield GS, Chaput JP, Gunnell KE, Ledoux AA, Zemek R, tremblay MS. Associations between adherence to the 24-hour movement guidelines and global cognition in school-aged children. Canadian Society for Exercise Physiology Annual Conference, Niagara Falls, Canada, 2018.

144. Murray, M. A., Obeid, N., Henderson, K., Buchholz, A., Flament, M. F., & Goldfield, G. S. (2018, August). A Longitudinal Path Model of Screen Time, Depressive Symptoms, Body Image, and Disordered Eating. Poster presented at the 126thAnnual Convention of the American Psychological Association (APA), San Francisco, CA.

145. Hafizi, K., Heidinger, B.A., Bani-Fatemi, S., Cameron, J.D., Doucet, É., Robaey, P., El-Amine, F., Vaillancourt, R., Barrowman, N., Foudil-Bey, I., **Goldfield, G.S.** The Effect of Methylphenidate on Resting Energy Expenditure, Thermic Effect of Food and Physical Activity Energy Expenditure in Individuals Living with Obesity: A Pilot Study. Invited presentation at the 6th Canadian Obesity Summit (Ottawa), April, 2019

146. Heidinger, B.A., Hafizi, K., Bani-Fatemi, S., Cameron, J.D., Doucet, É., Robaey, P., El-Amine, F., Vaillancourt, R., Barrowman, N., Foudil-Bey, I., **Goldfield, G.S.** Methylphenidate (MPH) Increases

Odour Threshold with Associated Decreases in Appetite and Food Palatability. Invited presentation at the 6th Canadian Obesity Summit (Ottawa), April, 2019

147. BaniFatemi, S, Heidinger, B, Hafizi, K, Cameron, J.D., Doucet, E., Robaey, P; El-Amine, F; Vaillancourt, R, Barrowman, N, and **Goldfield, G.S.** Energy Intake Intake, and Body Composition in Individuals Living with Obesity: A Randomized, Double Blind, Placebo-Controlled Pilot Study. Presentation at the 6th Canadian Obesity Summit (Ottawa), April, 2019

148. Carson, V., Adamo, K., Ogden, N**., Goldfield, G.,** Okely, A., Kuzik, N., Crozier, M., Hunter, S., Predy, M. (2019, June). Are toddlers and preschoolers less sedentary and more active in childcare when their early child educators are less sedentary and more active? Oral presentation at International Society for Behavioral Nutrition and Physical Activity 2019 Annual Meeting, Prague, Czech Republic.

149. **Goldfield GS**. The role of Food reward and impulsivity in Childhood obesity. Keynote presentation at the 1st Annual International Network on Eating Behaviour Conference, Concepcion, Chile, October 2019.

150. **Goldfield GS**. Mental Health Correlates of Childhood Obesity. Oral presentation at the 1st Annual International Network on Eating Behaviour Conference, Concepcion, Chile, October 2019.

151. Dutil C, Featherstone RB, Podinic I, Sadler CM, Carlsen AN, Hadjiyannakis S, Goldfield GS, Tremblay MS, Chaput JP. Increasing sleep duration improves insulin sensitivity in adolescents with obesity: A Sleep Manipulation in Adolescents at Risk of Type 2 Diabetes study. Oral presentation at the European and International Congress on Obesity, Dublin, Ireland). Obesity Reviews 2020; 21 (Suppl. 1): 32

152. Featherstone RB, Dutil C, Podinic I, Hadjiyannakis S, Goldfield GS, Tremblay MS, Chaput JP. Increasing sleep duration improves depression symptoms and mood in adolescents with obesity: A Sleep Manipulation in Adolescents at Risk of Type 2 Diabetes Study. Oral presentation at the European and International Congress on Obesity, Dublin, Ireland. Obesity Reviews 2020; 21 (Suppl. 1): 22

153. Podinic I, Dutil C, Featherstone RB, Goldfield GS, Cameron JD, Hadjiyannakis S, Tremblay MS, Chaput JP. Effect of sleep duration manipulation and cognitive demand on hunger and energy intake: A Sleep Manipulation in Adolescents at Risk of Type 2 Diabetes (SMART2D) study. Oral presentation at European and International Congress on Obesity, Dublin, Ireland. Obesity Reviews 2020; 21 (Suppl. 1): 267

154. Hafizi K, Abdessemed, M, Mougharbel F, Heidinger B, Cameron J, Lang J, Adamo KB, Carson V, Naylor P, Timmons BW, D'angiulli A, Goldfield GS. The relationship between body composition, physical activity and social-emotional functioning in kindergarten-aged children: data from the Ramping up Neurocognition (RUN) study**.** Presentation at the European Congress on Obesity 2020, Dublin, Ireland. Obesity Reviews 2020; 21 (Suppl. 1): 223

155. Hafizi K, Mougharbel F, Heidinger B, Abdessemed, M, Cameron J, Lang J, Adamo KB, Carson V, Naylor P, Timmons BW, D'angiulli A, Goldfield GS. A cross sectional analysis of the relationship between body composition and cognition in kindergarten- aged children: The Ramping up Neurocognition (RUN) study. Presentation at the European Congress on Obesity 2020, Dublin, Ireland. Obesity Reviews 2020; 21 (Suppl. 1): 224

156. Heidinger B, Hafizi K, Mougharbel F, Abdessemed, M, Cameron J, Lang J, Adamo KB, Carson V, Naylor P, Timmons BW, D'angiulli A, Goldfield GS. Examining the relationship between body composition, cognition and psychosocial health in kindergarten aged children: data from the Ramping

Up Neurocognition (RUN) Study. Presentation at the European Congress on Obesity 2020, Dublin, Ireland. Obesity Reviews 2020; 21 (Suppl. 1):86

157. Benham JL, Booth JE, Correnblum B, Friedenreich CM, Rabbi DM, **Goldfield GS**, Sigal RJ. Sleep Quality Associated with Body Mass Index and Hemoglobin A1c in Polycystic Ovary Syndrome. Poster presented at the Canadian Society of Endocrinology and Metabolism Conference, Virtual Conference due to COVID-19, October 2020.

158. McCrindle, C., Gunnell, K. E., Davis, C. G., Mahboob, W., & **Goldfield, G. S**. (2024, October). Limiting social media and its impact on physical activity levels: A randomized controlled experiment. Poster presentation at the annual Canadian Society for Psychomotor Learning and Sport Psychology (SCAPPS) conference. Winnipeg, MB.

159. Walker KL, Gaudreault A, Prince SA, Goldfield G, Taler V, Taljaard M, Winters M, Kristjansson E. Cycling and cognition in middle-aged and older adults: A scoping review. Poster presentation at the Canadian Public Health Conference, Winnipeg, Manitoba, April 29th-May 1st, 2025.

K) MAJOR INVITED CONTRIBUTIONS OR TECHNICAL REPORTS

1. Epstein, L.H, & **Goldfield, G.S**. Physical activity in the treatment of childhood overweight and obesity: Current evidence and research issues. <u>Medicine and Science in Sports and Exercise, 1999;</u> 31 (11), 553-9. Invited meta-analytic review by the American College of Sports Medicine for a special issue publication on physical activity and pediatric obesity.

2. **Goldfield, GS**, Epstein, LH. (2002). Evidence Based Report or Robert Wood Johnson Foundation on the Impact of Multiple Health Behavior Change Interventions on childhood obesity. Invited Review

3. **Goldfield, G.S.,** & Epstein, L.H. (2002). Management of Obesity in Children. In K.D. Brownell & C. G. Fairburn (Eds). Eating Disorders and Obesity: A Comprehensive Handbook, 2nd Edition, pp 573-577. Guilford Press, New York, NY

4. **Goldfield, G.S**., Epstein, L.H. & <u>Raynor, H.A.</u> (2002). Pediatric obesity treatment. In T. A. Wadden and A. J. Stunkard (Eds.) Handbook of Obesity Treatment, (pp. 532-555). Guilford Press: New York, NY

5. **Goldfield, GS**., <u>Harvey, A</u>., Grattan, K., <u>Adamo, KB</u> (2012) Physical activity promotion in the preschool years: A critical period to intervene. International Journal of Environmental Research and Public Health, 9 (4), S1326-42. **Invited review for special issue.**

6. <u>Adamo KB, Jean-Philippe S,</u> Wilson S, <u>Ferraro ZM,</u> Strychar I, Nerenberg K, **Goldfield G.** Weight Gain, Body Image and Attitudes over the course of Pregnancy. In Weight Gain: Women's Attitudes, Health Implications and Psychological Challenges. Editors: Alessio Pirotte & Tristan Libert. Nova Science Publishers Inc., New York; 2013.

7. **Goldfield, GS**. Saunders, T, Kenny G, Hadjiyannakis S, Alberga A, Phillips P, Tremblay MS, Sigal, RJ (2013) Screen viewing and diabetes risk factors in overweight and obese adolescents.

American Journal of Preventive Medicine, 44, (4), S364-70. Invited manuscript for a special issue on diabetes and pediatric obesity.

8. Cameron JD, Chaput JP, Sjödin AM, **Goldfield GS.** (2017). Brain on Fire: Incentive Salience, Hedonic Hot Spots, Dopamine, Obesity, and Other Hunger Games. Annual Review of Nutrition; 37; 183-205. **Invited review paper by the editors of Annual Review of Nutrition (Impact Factor >9.2).**

9. LeBlanc, C. Tremblay MT, **Goldfield GS**. (2020). Promoting mental health in children: The Importance of Healthy Active Living. In J Foy (Ed). Mental Health Care of Children and Adolescents: A Guide for Primary Care Clinicians. **Invited narrative review by the American Academy of Pediatrics.**

10. Jaeger Hintze, L., Doucet, É., **Goldfield, G.S**. (2022). Fat Mass and Obesity-Related Gene (FTO) and Binge Eating Disorder in Adults and Adolescents. In: Patel, V., Preedy, V. (eds) Eating Disorders. Springer, Cham. https://doi.org/10.1007/978-3-030-67929-3_61-1

l) PUBLISHED ABSTRACTS (select from >200; names underlined denote students/trainees)

1. **Goldfield, G.S.** (1999). A comparison of eating attitudes and behavior and general psychological characteristics in bulimics and bodybuilders. Dissertation Abstracts International: The Sciences and Engineering, 60 (6-B), 2929.

2. **Goldfield, GS**., Cloutier, P., Mallory, R., Prud'homme, D., Parker, T., Doucet, EValidity of Foot-to-Foot Bioelectrical Impedance Analysis in Obese Children and Parents. Obesity Research, 12, A121, 2004.

3. **Goldfield, G.S.,** Mallory, R., Parker, T., Lumb, A., Cunningham, T., Parker, K., Legg, C., Prud'homme, D. Adamo, K. Effects of Open-Loop Feedback on Physical Activity in overweight and obese children. Obesity Research 12.

4. Cameron, J, D., **Goldfield, GS**., Finlayson, G., Blundell, J.E. & Doucet, E. Preferred snack foods are more reinforcing following a 24-hour complete fast; Evidence that energy deprivation alters food reward. **Obesity**18 (S2), S21, 2010.

5. Murray, M., Kukaswadia, A., Henderson, K., Buchholz, A. Flament, M., **Goldfield, GS.,**The effect of family meals on Body Mass Index among Canadian Adolescents. **Obesity,** 18 (S2), S23, 2010.

6. Adamo, KB., Ferraro, Z., Rutherford, J., Keely, E., Walker, M., **Goldfield, GS**., Hadjiyanakkis, S., Barrowman, N. The maternal obesity management (MOM) trial: A lifestyle intervention during pregnancy to minimize downstream obesity. Applied Physiology, Nutrition & metabolism, 35 (S1), S1, 2010.

7. Tremblay, MS, Leblanc, AG, Colley, RC., **Goldfield, GS**., Saunders, T., Larouche, R. Systematic review of the relationship between sedentary behaviour and health indicators in school-aged children and youth. Applied Physiology, Nutrition, and Metabolism, 35 (Suppl. 1): S103, 2010.

8. Davis, I., Gick, M., Sigal, RJ., Kenny, GP., Hadjiyannakis, S., Alberga, A., Phillips, P., Malcolm, J & **Goldfield, GS**. The relationship between aerobic fitness and psychological adjustment in overweight and obese adolescents. Obesity 19(1), S29. 2011.

9. Adamo K, R Colley, S Hadjiyannakis**, G Goldfield**. Accelerometer-measured physical activity levels in a clinical sample of obese children and youth: A comparison to the Canadian Health Measures Survey. Obesity (19) S206. 2011.

10. **Goldfield GS,** A Harvey, K Grattan, RC Colley, A Alberga, ZM Ferraro, VA Temple, PJ Naylor, N Barrowman, KB Adamo. The Preschoolers Activity Trial: A Randomized Controlled Trial of Physical Activity in The Early Years. Archives of Disease in Childhood 97 (Suppl. 2): A114, 2012.

11. Adamo KB, C Colapinto, A Harvey, K Grattan, N Barrowman, **GS Goldfield.** Evaluation of "Freggie Friday" program to promote fruit and vegetable consumption in Canadian elementary school-aged children. Archives of Disease in Childhood 97 (Suppl. 2): A409, 2012.

12. Saunders TJ, JP Chaput, **GS Goldfield**, RC Colley, G Kenny, E Doucet MS Tremblay. Effects of prolonged sitting and physical activity on markers of cardiometabolic risk in healthy children and youth: a pilot study. Journal of Science and Medicine in Sport 15 (Suppl. 6):92, 2012.

13. Cameron JD, **GS Goldfield**, E Doucet. Deprivation by diet alone or by aerobic exercise alone: how modality of acute intervention can differentially impact olfaction, palatability, and ad libitum feeding. Obes Facts (Suppl. 1): 113-155. 2012

14. Sigal RJ, Alberga AS, **Goldfield GS,** Kenny GP, Hadjiyannakis S, Prud'homme D, Malcolm J, Phillips P, Ma J, Tulloch H, Gougeon R, Wells GA. Effects of Aerobic Exercise, Resistance Exercise or Both on Percent Body Fat in Overweight Adolescents: the HEARTY Trial. Can J Diabetes 36(5) (Suppl.) 2013.

15. Alberga, A.S**.**, Kenny, G.P., Prud'homme, D., **Goldfield, G.S**., Hadjiyannakis, S., Malcolm, J., Phillips, P., Ma, J., Doucette, S., Gougeon, R., Wells, G.A., and Sigal, R.J. Effects of aerobic training, resistance training or both on cardiometabolic risk factors in obese adolescents: the HEARTY trial. Applied Physiology, Nutrition and Metabolism 2013; 38(10):1020.

16. Alberga, A.S**.**, Prud'homme, D., Kenny, G.P., **Goldfield, G.S.,** Hadjiyannakis, S., Gougeon, R., Malcolm, J., Ma, J., and Sigal, R.J. Effects on resting energy expenditure, aerobic and musculoskeletal fitness: the HEARTY exercise trial. *Canadian Journal of Diabetes*; April 2013, Vol. 37, Suppl 2 (Abstract #518-OR p. S225).

17. Tremblay, MS, Saunders TJ, **Goldfield GS,** Colley RC, Kenny GP, Doucet E, Chaput, JP. Children and youth do not compensate for an imposed bout of prolonged sitting by reducing subsequent food intake or increasing physical activity: a randomised crossover study. Applied Physiology, Nutrition and Metabolism, 38(10): 1085, 2013.

18. **Goldfield GS**, Murray M, Maras D, Wilson A, Phillips P, Kenny G, Hadjiyannakis S, Alberga A, Sigal R. Screen time and quality of life among obese adolescents: a HEARTY study. Obesity Reviews 15(suppl.2):116, 2014.

19. **Goldfield GS,** Harvey A, Grattan K, Colley R, Alberga AS, Ferraro ZM., Temple VA., Naylor PJ, Barrowman N, Wilson, S Adamo KB. The Preschoolers Activity Trial (PAT): A randomized controlled trial evaluating the effects of physical activity on adiposity in the early years. Obesity Facts, 7(Suppl 1); 121, 2014

20. Cameron, JC, **Goldfield, GS**, Doucet, E. Deprivation by diet alone or by aerobic exercise alone: how modality of an acute intervention can differently impact 'wanting' and 'liking' of preferred foods**.** Obesity Facts, 7(Suppl 1); 116, 2014

21. Maras, D., Murray, M., Buchholz, A., Henderson, K., Obeid, N., Birmingham, M., Flament, M., **Goldfield, G**. (Sedentary screen-based activities are independently associated with symptoms of depression and anxiety in a community sample of Ontario youth. Journal of Physical Activity and Health, *11(Supp 1), S126-S198;* 2014).

22. Alberga, A.S., Kenny, G.P**., Goldfield, G.S**., Prud'homme, D., Hadjiyannakis, S., Gougeon, R., Sigal, R.J.; on behalf of the HEARTY research team. (2014). Why should resistance exercise be incorporated into physical activity programs for children and youth with obesity? Journal of Physical Activity and Health,11(Supp 1, S126-198), 2014

23. Cameron, J.D., **Goldfield, G.S**., and Doucet, E. Deprivation by diet alone or by aerobic exercise alone: how modality of acute intervention can differentially impact olfaction, palatability, and ad libitum feeding. Obes Facts (Suppl. 1): 113-155. 2015.

24. Cameron, J.D., **Goldfield, G.S**., Finlayson, G., Blundell, J.E., and Doucet, E. Deprivation by diet alone or by aerobic exercise alone: how modality of an acute 3-day intervention can differently impact bias for sweet taste and fat preference. Canadian Journal of Diabetes), 39 (Suppl 1), 2015.

25. **Goldfield GS,** Kenny GP, Alberga AS, Hadjiyannakis S, Phillips P, Tulloch HE, Doucette S, Cameron JD, Sigal RJ. Effects of Aerobic Training, Resistance Training, or Both on Health-Related Quality of Life in Obese Adolescents: the HEARTY trial. Canadian Journal of Diabetes), 39 (Suppl 1), 2015

26. McNeil J, Lamothe G, Cameron J D, Riou M-È, Cadieux S, Lafrenière J, **Goldfield G,** Willbond S, Prud'homme D, Doucet É. Investigating predictors of eating: Is resting metabolic rate really the strongest proxy of energy intake? Canadian Journal of Diabetes 39 (Suppl 1), 2015.

27. Larouche R, Garriguet D, Gunnell KE, **Goldfield GS**, Tremblay MS. Relationship between time spent outdoors, physical activity and health-related indicators among children: the 2012-2013 Canadian Health Measures Survey. Pediatric Exercise Science 27(3 suppl):51, 2015.

28. Alberga, A.S., Prud'homme, D., Sigal, R.J., **Goldfield, G.S**., Hadjiyannakis, S., Gougeon, R., Phillips, P., Malcolm, J., Wells, G., Doucette, S., Ma, J., and Kenny, G.P. Effects of aerobic training, resistance training or both on fitness in adolescents with obesity: the HEARTY trial. Applied Physiology Nutrition and Metabolism; 41(3) 255-265, 2016

29. Alberga A.S., Prud'homme D., Kenny G.P., **Goldfield, G.S**., Hadjiyannakis, S., Gougeon, R., Phillips, P., Malcolm, J., Wells, G., Doucette, S., Ma, J., Sigal, R.J. Effects of aerobic and resistance training on abdominal fat, apolipoproteins and high-sensitivity C-reactive protein in adolescents with obesity: the HEARTY randomized clinical trial. The International Journal of Obesity.; 39(10): 1494-500, 2015.

30. Biagé, A., Guérin, E., **Goldfield, GS**, Doucet, É., Strychar, I., & Prud'homme, D. Influence of menopause transition and physical activity on stress perception: A MONET Group Study. Presented at the American College of Sports Medicine 2016 Annual Conference. Medicine & Science in Sport & Exercise, 48 (5S suppl. 2), p425. 2016.

31. Poitras VJ, Gray CE, Janssen X, Aubert S, Carson V, Faulkner G, **Goldfield GS,** Reilly JJ, Sampson M, Tremblay MS. Systematic review of the relationships between sedentary behavior and health indicators in the early years (aged 0-4 years). Applied Physiology, Nutrition, and Metabolism 42: S94-S95, 2017.

M). INVITED PRESENTATIONS/WORKSHOPS:

Invited Local Presentations

1. **Goldfield, G.S**. Prevalence and effects of anabolic steroid use in male athletes. Invited presentation at YMCA. Ottawa, ON. April 1995.

2. **Goldfield, G.S.** Steroid Use in bodybuilders. Invited presentation at Ottawa Athletic Club. Ottawa, ON. April 1995.

3. **Goldfield, G. S**. Effects of reducing sedentary behavior on physical activity in obese children. Invited presentation at Mental Health Research Rounds Ottawa, ON, October 2000.

4. **Goldfield, G. S.** Open-Loop feedback to increase physical activity in obese children. Invited presentation at Research Rounds, SCO Hospital, Ottawa, ON, September 2000.

5. **Goldfield, G. S.** Effects of stress and trauma on food intake: How to manage emotional eating. Invited presentation at the Centre for Treat of Sexual Abuse and Childhood Trauma. September 2001.

6. **Goldfield, G.S**. Increasing Physical Activity in Obese Children. Invited presentation by the Board of Directors of the Children's Hospital of Eastern Ontario Research Institute, Ottawa, ON. April 2002.

7. **Goldfield, G.S**. Obesity in Childhood and Youth: Classification, Causes & Consequences. Invited presentation to the inaugural meeting of The Central Ottawa Support Group for Overweight Young Women and Their Families. Ottawa, ON. October 2002

8. **Goldfield, G.S & Mallory, R**. Increasing Physical Activity and reducing Sedentary Behaviour in Obese Children. Invited Presentation at Canadian Institutes of Health Research. Ottawa, ON. March 2003

9. **Goldfield, G.S.,** Treatment and prevention of Child Obesity. Invited presentation to Department of Epidemiology and Community medicine graduate class, Ottawa, February 2004.

10. **Goldfield, GS**. Behavioural Engineering of Physical Activity in Obese Children. Invited Presentation to doctoral students in Clinical Psychology, University of Ottawa, 2005.

11. Adamo, K., **Goldfield, GS.** Diet and exercise in weight management of children and adults. Shriner's Association, Ottawa, 2006

12. **Goldfield, GS**. The rising Tide of Child Obesity. Parent-teachers Association Group., 2008.

13. **Goldfield, GS**., Modifying Food Intake and Physical Activity in Obese Children. B'Nai B'Rith of Ottawa Committee, Ottawa, 2008.

14. **Goldfield, G.S,** Adamo, KB**.** Behavioural Engineering of Physical Activity in Obese Children. Pediatric Grand Rounds. Children's Hospital of Eastern Ontario, July 2009

15. **Goldfield, GS.,** Overview of Pediatric Obesity Research Program. Invited Presentation, CHEO Volunteer Board Annual General meeting, May 2010

16. **Goldfield, GS** & Buchholz, A. Child obesity management strategies. Invited Presentation to the Children's Aid Society, Ottawa, Canada, April 2011.

17. **Goldfield, GS**. Overview of Child Obesity Treatment Research. Invited Presentation, CHEO Volunteer Board Annual General meeting, May 2011.

18. **Goldfield, GS**., Childhood Obesity in the 21st Century: Trends, Psychological Consequences and what we can do about it. Ottawa Academy of Psychologists General Annual Meeting, May, Ottawa, Canada. 2012

19. **Goldfield, GS.** Healthy Active Living and Mental Health Promotion. Keynote Presentation to Bell during Mental Health Week, Ottawa, Canada, May 2014.

20. **Goldfield, GS**. Promoting Resilience using Cognitive-Behavioural Strategies in Therapy: Workshop given to Psychologists, graduate students at Ottawa West Professional Services, Ottawa, ON, 2014

21. Goldfield, GS. A focus on Mental Health in Youth with Obesity. Presentation at Canadian Obesity Network-Student meeting, Children's Hospital of Eastern Ontario, Ottawa, Canada, November 28, 2016.

22. **Goldfield, GS**. Raising Resilient Children. Presentation given at Colonel By High School, Ottawa, ON, March, 2019.

23. Goldfield, GS. Pediatric Obesity and Co-morbid Clinical Considerations. Ottawa Academy of Psychology, June 2019

24. **Goldfield, GS** (2024). No More FoMO: Effects of Social Media Reduction on Mental Health in Youth: A Randomized Controlled Trial. Pediatric Grand Rounds, CHEO, Ottawa, April, 2024.

25. Goldfield, GS and Racine, N. Cohort Network For Adolescents And Youth With Multiple Mental Health Conditions (CALM): A Master Observational Trial. Pediatric Grand Rounds, CHEO, Ottawa, September, 2024.

26. Goldfield, GS & Lopes, MVV. (2024, October). *Social Media Use and Mental Health in Youth.* Presented to Ready Set GO/Mind Matters Group at CHEO RI.

27. Goldfield, GS, McLoud O, Racine, N. Cohort Network For Adolescents And Youth With Multiple Mental Health Conditions (CALM): A Master Observational Trial. Mental Health Research Rounds, CHEO-RI, Ottawa, October, 2024.

Invited National and International Conference Presentations/Workshops

28. Goldfield, GS. Can we increase physical activity and reduce sedentary behaviour in preschoolers? Invited presentation at the Canadian Society for Exercise Physiology, Quebec City, Canada. October 2011.

29. Goldfield, GS. Biological and Environmental contributors to child obesity; CALIBTATE Workshop: Calibrating Early Lifestyles to Manage Obesity: A Health and Education Practitioner Intervention Approach. Public Health Agency of Canada St. John, New Brunswick, November 15, 2012

30. Goldfield, GS., Behavioral Management of Pediatric Obesity Adapted for Primary Care. Public Health Agency of Canada. Ottawa, ON, November 30, 2012.

31. Goldfield GS, Effects of Aerobic Training & Resistance Training on Health-Related Quality of Life in Adolescents with Obesity. The 4th Annual Canadian Obesity Summit, Toronto, Canada, 2016.

32. Goldfield GS. The Preschoolers Activity Trial: A Randomized Controlled Trial of Physical Activity in The Early Years. Invited presentation at the 4th Congress of the European Academy of Pediatrics in Istanbul, Turkey, October 2012.

33. Goldfield GS. Effects of Aerobic Training, Resistance Training, or Both on Psychosocial Health in Obese Adolescents: the HEARTY trial. Invited Symposia at the Global Summit on Physical Activity, Toronto, Canada, May 2014

34. Goldfield, GS., Maras, D., Murray, M., Buchholz, A., Henderson, K., Obeid, N., Birmingham, M., Flament, M., F.: Restrained eating mediates the relationship between insecure attachment and overweight/obesity in a community sample of Canadian youth. The Obesity Society Annual Meeting, Boston, MA, U.S., November 2014.

35. Goldfield, GS. Effects of aerobic training, resistance training, or both on food intake in obese adolescents: The HEARTY Trial. The Society for the Study of Ingestive Behavior 22nd Annual Meeting, Seattle, Washington, July 28-31, 2014.

36. Goldfield GS. The Preschoolers Activity Trial (PAT): A randomized controlled trial evaluating the effects of physical activity on adiposity in the early years. European Congress on Obesity, Sofia, Bulgaria, May 2014.

37. **Goldfield GS**. Obesity and Mental Health. Keynote presentation at the 6th Conference on Recent Advances in the Prevention and Management of Childhood and Adolescent Obesity – Understanding the Interplay between Physical and Mental Health, Ottawa, ON. October 24-26, 2016.

38. **Goldfield GS**. Effects of prenatal exposure to cigarette smoke on adiposity, physical activity patterns, and resting energy expenditure in young children. Invited presentation at the 24th European Congress of Obesity (ECO), Porto, Portugal, May 17-20, 2017.

39. **Goldfield, GS**. Weight Teasing and Mental Health in Youth with Obesity. Invited presentation at the 4th Annual International Congress of Obesity: Treatment of Obesity and Non-Communicable Diseases. Maringa, Brazil, October 2019.

40. **Goldfield, GS.** The bio-behavioural and genetic determinants of food reinforcement. Invited presentation at the inaugural meeting of International Network of Children's Eating Behavior, Concepcion, Chile, March 2019.

41. Goldfield, GS. Screen Time, Energy Intake, and Obesity. Invited presentation to the Department of Behavioural Medicine, University at Buffalo, 2019.

42. Goldfield, GS. Dopamine, Hunger Games, and Hedonic Hot Spots. Invited Presentation to the Department of Nutrition, University of San Sebastien, Concepcion, Chile, 2020.

43. Goldfield GS. Effects of Physical Activity Modality on Eating Behaviour: The HEARTY study. Invited Presentation to the Department of Nutrition, University of Tennessee at Knoxville, 2021

44. Goldfield GS. Brain-derived Neurotrophic Factor (BDNF) Gene, Energy Intake and obesity. Presentation to the Obesity Society Conference, San Diego, USA, October, 2022.

45. Goldfield GS. Effects of Social Media Reduction on Mental Health in Youth. Presentation to the American Academy of Child and Adolescent Psychiatry Conference. October, New York, USA, 2023.

46. Goldfield GS. Mindful Eating and Regulation of Eating Behaviour. Invited Presentation to the International Network of Children's Eating Behavior Conference, Concepcion, Chile, March, 2024.

EXHIBIT B

Hourly rate: $825.00

My hourly rate is fixed and no aspect of my compensation depends on the substance of my opinions or the outcome of this matter.

Expert testimony during the previous four (4) years: none

EXHIBIT C

MATERIALS CONSIDERED

Documents

Bates Beg	Bates End
BEJAR0000004	BEJAR0000005
BEJAR0000051	BEJAR0000062
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GOOG-3047MDL-05716537 GOOG-3047MDL-05716552 GOOG-3047MDL-05716563 GOOG-3047MDL-05716575 GOOG-3047MDL-05716592 GOOG-3047MDL-05716616 GOOG-3047MDL-05716619 GOOG-3047MDL-05716628	
GOOG-3047MDL-05721996	GOOG-3047MDL-05721996
GOOG-3047MDL-05721997	GOOG-3047MDL-05722001
GOOG-3047MDL-05722002	GOOG-3047MDL-05722007
GOOG-3047MDL-05722160	
GOOG-3047MDL-05723191	GOOG-3047MDL-05723192
GOOG-3047MDL-1567290	
GOOG-MDL3047-00085593	
GOOG-MDL3047-02299400	
Haugen_00000797	Haugen_00000882
Haugen_00000934	Haugen_00000969
Haugen_00001033	Haugen_00001064
Haugen_00002372	Haugen_00002396
Haugen_00002527	Haugen_00002568
Haugen_00003463	Haugen_00003465
Haugen_00003739	Haugen_00003744
Haugen_00005378	Haugen_00005390
Haugen_00005458	Haugen_00005869
Haugen_00006240	Haugen_00006261
Haugen_00006798	Haugen_00006813
Haugen_00007055	Haugen_00007062
Haugen_00007080	Haugen_00007101
Haugen_00007350	Haugen_00007465
Haugen_00007481	Haugen_00007503
Haugen_00008207	Haugen_00008255
Haugen_00008303	Haugen_00008315
Haugen_00010114	Haugen_00010127
Haugen_00011969	Haugen_00011983
Haugen_00012303	Haugen_00012320
Haugen_00015958	Haugen_00016000
Haugen_00016373	Haugen_00016502
Haugen_00016699	Haugen_00016716
Haugen_00016728	Haugen_00016750

Documents

Bates Beg	Bates End
Haugen_00016893	Haugen_00016920
Haugen_00017069	Haugen_00017176
Haugen_00017177	Haugen_00017237
Haugen_00017238	Haugen_00017242
Haugen_00017263	Haugen_00017300
Haugen_00017698	Haugen_00017786
Haugen_00019219	Haugen_00019275
Haugen_00020135	Haugen_00020196
Haugen_00020607	Haugen_00020626
Haugen_00021096	Haugen_00021143
Haugen_00021247	Haugen_00021281
Haugen_00021690	Haugen_00021731
Haugen_00023066	Haugen_00023086
Haugen_00023087	Haugen_00023100
Haugen_00023849	Haugen_00023895
Haugen_00024450	Haugen_00024468
Haugen_00024997	Haugen_00025044
Haugen_00025741	Haugen_00025764
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META3047MDL-003-00000095	META3047MDL-003-00000100
META3047MDL-003-00000101	META3047MDL-003-00000127
META3047MDL-003-00001846	META3047MDL-003-00001889
META3047MDL-003-00001890	META3047MDL-003-00001913
META3047MDL-003-00002011	META3047MDL-003-00002020
META3047MDL-003-00002021	META3047MDL-003-00002030
META3047MDL-003-00002256	META3047MDL-003-00002261
META3047MDL-003-00002304	META3047MDL-003-00002310
META3047MDL-003-00003188	META3047MDL-003-00003189
META3047MDL-003-00003483	
META3047MDL-003-00003731	META3047MDL-003-00003732
META3047MDL-003-00004626	META3047MDL-003-00004628
META3047MDL-003-00005175	META3047MDL-003-00005176
META3047MDL-003-00005463	META3047MDL-003-00005469
META3047MDL-003-00009133	META3047MDL-003-00009134
META3047MDL-003-00009493	META3047MDL-003-00009494
META3047MDL-003-00010716	META3047MDL-003-00010819
META3047MDL-003-00010720	
META3047MDL-003-00010770	
META3047MDL-003-00010863	META3047MDL-003-00010864
META3047MDL-003-00011385	META3047MDL-003-00011386

Bates Beg	Bates End
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META3047MDL-003-00011718	META3047MDL-003-00011723
META3047MDL-003-00011735	META3047MDL-003-00011735
META3047MDL-003-00011736	META3047MDL-003-00011736
META3047MDL-003-00011737	META3047MDL-003-00011737
META3047MDL-003-00011738	META3047MDL-003-00011738
META3047MDL-003-00011760	META3047MDL-003-00011762
META3047MDL-003-00012994	META3047MDL-003-00012998
META3047MDL-003-00013254	META3047MDL-003-00013255
META3047MDL-003-00013951	META3047MDL-003-00013956
META3047MDL-003-00014331	META3047MDL-003-00014331
META3047MDL-003-00015911	META3047MDL-003-00015911
META3047MDL-003-00016693	META3047MDL-003-00016694
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META3047MDL-003-00021082	
META3047MDL-003-00021095	
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META3047MDL-003-00021773	META3047MDL-003-00021774
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META3047MDL-003-00027062	META3047MDL-003-00027071
META3047MDL-003-00027072	META3047MDL-003-00027072
META3047MDL-003-00028019	META3047MDL-003-00028020
META3047MDL-003-00028214	META3047MDL-003-00028219
META3047MDL-003-00028226	META3047MDL-003-00028226
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META3047MDL-003-00029988	META3047MDL-003-00030011
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META3047MDL-003-00041555	META3047MDL-003-00041555
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META3047MDL-003-00042548	META3047MDL-003-00042553
META3047MDL-003-00042949	META3047MDL-003-00042952
META3047MDL-003-00043617	META3047MDL-003-00043661
META3047MDL-003-00045087	
META3047MDL-003-00045154	
META3047MDL-003-00048349	META3047MDL-003-00048351

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META3047MDL-003-00048544	META3047MDL-003-00048552
META3047MDL-003-00048596	META3047MDL-003-00048603
META3047MDL-003-00048634	META3047MDL-003-00048636
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META3047MDL-003-00049695	META3047MDL-003-00049695
META3047MDL-003-00052264	
META3047MDL-003-00053271	META3047MDL-003-00053272
META3047MDL-003-00053543	
META3047MDL-003-00053803	META3047MDL-003-00053805
META3047MDL-003-00059620	META3047MDL-003-00059632
META3047MDL-003-00061599	
META3047MDL-003-00064697	META3047MDL-003-00064701
META3047MDL-003-00066361	META3047MDL-003-00066405
META3047MDL-003-00068860	META3047MDL-003-00068862
META3047MDL-003-00068863	META3047MDL-003-00068907
META3047MDL-003-00071396	
META3047MDL-003-00071459	META3047MDL-003-00071471
META3047MDL-003-00071534	META3047MDL-003-00071545
META3047MDL-003-00072336	META3047MDL-003-00072338
META3047MDL-003-00073288	META3047MDL-003-00073294
META3047MDL-003-00075698	
META3047MDL-003-00077933	META3047MDL-003-00077934
META3047MDL-003-00077939	META3047MDL-003-00077940
META3047MDL-003-00078419	META3047MDL-003-00078425
META3047MDL-003-00078598	META3047MDL-003-00078599
META3047MDL-003-00079909	
META3047MDL-003-00079927	META3047MDL-003-00079930
META3047MDL-003-00081708	META3047MDL-003-00081718
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META3047MDL-003-00085928	META3047MDL-003-00085959
META3047MDL-003-00086015	META3047MDL-003-00086016
META3047MDL-003-00086233	META3047MDL-003-00086263
META3047MDL-003-00086451	
META3047MDL-003-00087111	META3047MDL-003-00087117
META3047MDL-003-00088954	META3047MDL-003-00088954
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META3047MDL-003-00089132	
META3047MDL-003-00089141	

Documents

Bates Beg	Bates End
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META3047MDL-003-00089174	META3047MDL-003-00089178
META3047MDL-003-00089823	META3047MDL-003-00089824
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META3047MDL-003-00091414	META3047MDL-003-00091504
META3047MDL-003-00092938	META3047MDL-003-00092940
META3047MDL-003-00093303	META3047MDL-003-00093304
META3047MDL-003-00093530	META3047MDL-003-00093561
META3047MDL-003-00093898	META3047MDL-003-00093899
META3047MDL-003-00095008	META3047MDL-003-00095034
META3047MDL-003-00095993	
META3047MDL-003-00096479	META3047MDL-003-00096519
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META3047MDL-003-001 75682	
META3047MDL-003-001 76638	
META3047MDL-003-00102094	META3047MDL-003-00102096
META3047MDL-003-00102350	META3047MDL-003-00102352
META3047MDL-003-00103260	META3047MDL-003-00103260
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META3047MDL-003-00105552	
META3047MDL-003-00105559	META3047MDL-003-00105566
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META3047MDL-003-00107197	META3047MDL-003-00107200
META3047MDL-003-00109173	META3047MDL-003-00109239
META3047MDL-003-00109348	META3047MDL-003-00109399
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META3047MDL-003-00110240	META3047MDL-003-00110276
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META3047MDL-003-00111821	META3047MDL-003-00111837
META3047MDL-003-00114487	META3047MDL-003-00114487
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META3047MDL-003-00117852	META3047MDL-003-00117858
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META3047MDL-003-00118523	META3047MDL-003-00118535
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META3047MDL-003-00121715	META3047MDL-003-00121715
META3047MDL-003-00121726	
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META3047MDL-003-00123369	META3047MDL-003-00123373

Documents

Bates Beg	Bates End
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META3047MDL-003-00123974	META3047MDL-003-00123975
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META3047MDL-003-00128069	META3047MDL-003-00128072
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META3047MDL-003-00129107	META3047MDL-003-00129108
META3047MDL-003-00129298	META3047MDL-003-00129300
META3047MDL-003-00130863	META3047MDL-003-00130863
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META3047MDL-003-00134687	
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META3047MDL-003-00144406	META3047MDL-003-00144406
META3047MDL-003-00144407	META3047MDL-003-00144416
META3047MDL-003-00144496	META3047MDL-003-00144499
META3047MDL-003-00144500	META3047MDL-003-00144504
META3047MDL-003-00146240	META3047MDL-003-00146260
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META3047MDL-003-00156738	META3047MDL-003-00156766

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Bates Beg	Bates End
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META3047MDL-003-00157020	META3047MDL-003-00157027
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META3047MDL-003-00163233	META3047MDL-003-00163254
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META3047MDL-003-00165718	
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META3047MDL-003-00175961	META3047MDL-003-00175995
META3047MDL-003-00176638	META3047MDL-003-00176657
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META3047MDL-003-00177946	META3047MDL-003-00177946

Documents

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META3047MDL-003-00178926	
META3047MDL-003-00179245	META3047MDL-003-00179246
META3047MDL-003-00179247	META3047MDL-003-00179259
META3047MDL-003-00179481	META3047MDL-003-00179494
META3047MDL-003-00179884	META3047MDL-003-00179886
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META3047MDL-003-00183798	META3047MDL-003-00183803
META3047MDL-003-00184585	META3047MDL-003-00184589
META3047MDL-003-00186838	META3047MDL-003-00186840
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META3047MDL-003-00186973	META3047MDL-003-00186976
META3047MDL-003-00188109	META3047MDL-003-00188115
META3047MDL-003-00188731	META3047MDL-003-00188731
META3047MDL-003-00188992	META3047MDL-003-00189002
META3047MDL-003-00189060	
META3047MDL-003-00190950	META3047MDL-003-00190954
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META3047MDL-004-00000315	
META3047MDL-004-00000331	META3047MDL-004-00000333
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META3047MDL-004-00002225	META3047MDL-004-00002237
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META3047MDL-004-00003522	META3047MDL-004-00003558
META3047MDL-004-00003626	META3047MDL-004-00003630
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META3047MDL-004-00003732	META3047MDL-004-00003746
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META3047MDL-004-00009868	
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META3047MDL-004-00013865	META3047MDL-004-00013869
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META3047MDL-004-00014436	META3047MDL-004-00014495

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META3047MDL-004-00017402	
META3047MDL-004-00023181	
META3047MDL-004-00024089	
META3047MDL-004-00025094	META3047MDL-004-00025107
META3047MDL-004-00025195	
META3047MDL-004-00025341	
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META3047MDL-004-00027356	META3047MDL-004-00027375
META3047MDL-004-00027398	META3047MDL-004-00027446
META3047MDL-004-00027515	META3047MDL-004-00027533
META3047MDL-004-00029361	META3047MDL-004-00029364
META3047MDL-005-00000001	META3047MDL-005-00000013
META3047MDL-005-00000096	META3047MDL-005-00000131
META3047MDL-005-00000186	META3047MDL-005-00000205
META3047MDL-005-00000333	META3047MDL-005-00000357
META3047MDL-005-00000358	META3047MDL-005-00000399
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META3047MDL-006-00000188	META3047MDL-006-00000190
META3047MDL-006-00000194	META3047MDL-006-00000196
META3047MDL-006-00000255	
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META3047MDL-013-00000612	META3047MDL-013-00000616
META3047MDL-013-00000652	META3047MDL-013-00000656
META3047MDL-014-00000031	META3047MDL-014-00000034
META3047MDL-014-00002192	META3047MDL-014-00002193
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META3047MDL-014-00004316	
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META3047MDL-014-00010629	META3047MDL-014-00010629
META3047MDL-014-00012075	
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META3047MDL-014-00014794	META3047MDL-014-00014793
META3047MDL-014-00014795	META3047MDL-014-00014796
META3047MDL-014-00014797	META3047MDL-014-00014797
META3047MDL-014-00014801	META3047MDL-014-00014803
META3047MDL-014-00014804	META3047MDL-014-00014806
META3047MDL-014-00017094	

Documents

Bates Beg	Bates End
META3047MDL-014-00021931	META3047MDL-014-00021933
META3047MDL-014-00023622	META3047MDL-014-00023810
META3047MDL-014-00026273	META3047MDL-0014-00026273
META3047MDL-014-00026293	META3047MDL-014-00026296
META3047MDL-014-00027469	META3047MDL-014-00027469
META3047MDL-014-00029073	META3047MDL-014-00029116
META3047MDL-014-00029075	
META3047MDL-014-00029087	
META3047MDL-014-00029104	
META3047MDL-014-00042915	META3047MDL-014-00042916
META3047MDL-014-00043193	META3047MDL-014-00043194
META3047MDL-014-00044089	
META3047MDL-014-00045474	META3047MDL-014-00045474
META3047MDL-014-00046464	META3047MDL-014-00046476
META3047MDL-014-00046605	META3047MDL-014-00046618
META3047MDL-014-00046606	META3047MDL-014-00046618
META3047MDL-014-00046820	META3047MDL-014-00046821
META3047MDL-014-00046829	META3047MDL-014-00046831
META3047MDL-014-00046923	META3047MDL-014-00046924
META3047MDL-014-00046974	META3047MDL-014-00046974
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META3047MDL-014-00048189	
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META3047MDL-014-00052906	
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META3047MDL-014-00053599	META3047MDL-014-00053609
META3047MDL-014-00053851	
META3047MDL-014-00053863	META3047MDL-014-00053863
META3047MDL-014-00054063	
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META3047MDL-014-00055179	
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META3047MDL-014-00069514	
META3047MDL-014-00071620	META3047MDL-014-00071623
META3047MDL-014-00074230	
META3047MDL-014-00074579	META3047MDL-014-00074586
META3047MDL-014-00074582	META3047MDL-014-00074586

Documents

Bates Beg	Bates End
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META3047MDL-014-00092206	
META3047MDL-014-00128282	META3047MDL-014-00128774
META3047MDL-014-00128283	
META3047MDL-014-00128285	
META3047MDL-014-00128355	
META3047MDL-014-00128572	
META3047MDL-014-00128723	
META3047MDL-014-00128735	
META3047MDL-014-00128751	
META3047MDL-014-00128754	
META3047MDL-014-00133717	META3047MDL-014-00133734
META3047MDL-014-00151556	META3047MDL-014-00151558
META3047MDL-014-00152942	
META3047MDL-014-00156024	
META3047MDL-014-00159841	
META3047MDL-014-00163784	
META3047MDL-014-00206538	META3047MDL-014-00206544
META3047MDL-014-00208236	META3047MDL-014-00208237
META3047MDL-014-00211423	META3047MDL-014-00211427
META3047MDL-014-00223594	META3047MDL-014-00223594
META3047MDL-014-00244582	
META3047MDL-014-00247017	
META3047MDL-014-00247816	
META3047MDL-014-00248397	META3047MDL-014-00248398
META3047MDL-014-00252350	META3047MDL-014-00252352
META3047MDL-014-00255266	META3047MDL-014-00255273
META3047MDL-014-00255268	META3047MDL-014-00255273
META3047MDL-014-00255333	META3047MDL-014-00255333
META3047MDL-014-00258572	META3047MDL-014-00258572
META3047MDL-014-00258573	META3047MDL-014-00258627
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META3047MDL-014-00266094	META3047MDL-014-00266096
META3047MDL-014-00266111	META3047MDL-014-00266113
META3047MDL-014-00275609	META3047MDL-014-00275619
META3047MDL-014-00275614	META3047MDL-014-00275614
META3047MDL-014-00275615	
META3047MDL-014-00282987	META3047MDL-014-00282989
META3047MDL-014-00283405	META3047MDL-014-00283406
META3047MDL-014-00291926	META3047MDL-014-00291927
META3047MDL-014-00292189	META3047MDL-014-00292201

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Bates Beg	Bates End
META3047MDL-014-00292642	META3047MDL-014-00292654
META3047MDL-014-00292655	META3047MDL-014-00292656
META3047MDL-014-00298174	
META3047MDL-014-00298433	META3047MDL-014-00298433
META3047MDL-014-00301396	META3047MDL-014-00301398
META3047MDL-014-00301435	META3047MDL-014-00301436
META3047MDL-014-00306044	META3047MDL-014-00306056
META3047MDL-014-00310754	
META3047MDL-014-00314941	META3047MDL-014-00314949
META3047MDL-014-00316427	
META3047MDL-014-00334962	META3047MDL-014-00334962
META3047MDL-014-00335289	META3047MDL-014-00335290
META3047MDL-014-00335618	META3047MDL-014-00335619
META3047MDL-014-00336267	META3047MDL-014-00336270
META3047MDL-014-00341056	META3047MDL-014-00341057
META3047MDL-014-00346525	META3047MDL-014-00346526
META3047MDL-014-00346869	META3047MDL-014-00346873
META3047MDL-014-00347766	META3047MDL-014-00347768
META3047MDL-014-00347782	
META3047MDL-014-00349418	META3047MDL-014-00349421
META3047MDL-014-00349432	META3047MDL-014-00349436
META3047MDL-014-00350154	META3047MDL-014-00350159
META3047MDL-014-00350817	META3047MDL-014-00350819
META3047MDL-014-00351807	META3047MDL-014-00351809
META3047MDL-014-00352250	META3047MDL-014-00352251
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META3047MDL-014-00355558	META3047MDL-014-00355564
META3047MDL-014-00355780	
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META3047MDL-014-00358698	META3047MDL-014-00358702
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META3047MDL-014-00358776	META3047MDL-014-00358795
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META3047MDL-014-00359337	
META3047MDL-014-00360058	META3047MDL-014-00360058
META3047MDL-014-00361689	META3047MDL-014-00361689
META3047MDL-014-00369785	META3047MDL-014-00369787
META3047MDL-014-00375668	META3047MDL-014-00375671

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META3047MDL-014-00376297	META3047MDL-014-00376305
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META3047MDL-014-00376330	META3047MDL-014-00376336
META3047MDL-014-00377058	
META3047MDL-014-00377250	META3047MDL-014-00377251
META3047MDL-014-00377253	META3047MDL-014-00377257
META3047MDL-014-00377295	META3047MDL-014-00377298
META3047MDL-014-00377299	META3047MDL-014-00377301
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META3047MDL-014-00382301	
META3047MDL-014-00383313	
META3047MDL-014-00383478	
META3047MDL-014-00383542	META3047MDL-014-00383559
META3047MDL-014-00398229	META3047MDL-014-00398229
META3047MDL-014-00398230	META3047MDL-014-00398254
META3047MDL-014-00401896	META3047MDL-014-00401907
META3047MDL-014-00402698	
META3047MDL-014-00405380	
META3047MDL-014-00410112	
META3047MDL-014-00410126	
META3047MDL-015-00000400	META3047MDL-015-00000400
META3047MDL-016-00003321	
META3047MDL-017-00000017	META3047MDL-017-00000017
META3047MDL-019-00000534	META3047MDL-019-00000537
META3047MDL-019-00015192	META3047MDL-019-00015240
META3047MDL-019-00015695	META3047MDL-019-00015698
META3047MDL-019-00016249	META3047MDL-019-00016261
META3047MDL-019-00017593	META3047MDL-019-00017607
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META3047MDL-019-00020466	
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META3047MDL-019-00036538	META3047MDL-019-00036588
META3047MDL-019-00036714	META3047MDL-019-00036714

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META3047MDL-019-00053268	META3047MDL-019-00053268
META3047MDL-019-00055390	META3047MDL-019-00055390
META3047MDL-019-00057847	META3047MDL-019-00057851
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META3047MDL-019-00058356	META3047MDL-019-00058402
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META3047MDL-019-00059532	META3047MDL-019-00059532
META3047MDL-019-00059533	META3047MDL-019-00059533
META3047MDL-019-00061538	META3047MDL-019-00061547
META3047MDL-019-00064409	META3047MDL-019-00064414
META3047MDL-019-00064740	META3047MDL-019-00064782
META3047MDL-019-00066214	META3047MDL-019-00066214
META3047MDL-019-00066341	
META3047MDL-019-00066693	META3047MDL-019-00066693
META3047MDL-019-00067802	META3047MDL-019-00067802
META3047MDL-019-00067884	META3047MDL-019-00067884
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META3047MDL-019-00069084	META3047MDL-019-00069091
META3047MDL-019-00078581	
META3047MDL-019-00090467	META3047MDL-019-00090489
META3047MDL-019-00092508	META3047MDL-019-00092508
META3047MDL-019-00092870	META3047MDL-019-00092878
META3047MDL-019-00093170	META3047MDL-019-00093174
META3047MDL-019-00093564	META3047MDL-019-00093564
META3047MDL-019-00094148	META3047MDL-019-00094148
META3047MDL-019-00095647	
META3047MDL-019-00095829	
META3047MDL-019-00097173	META3047MDL-019-00097173
META3047MDL-019-00097380	META3047MDL-019-00097389
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META3047MDL-019-00098611	META3047MDL-019-00098611
META3047MDL-019-00099003	
META3047MDL-019-00099040	META3047MDL-019-00099050
META3047MDL-019-00099822	META3047MDL-019-00099822
META3047MDL-019-00099920	
META3047MDL-019-00101105	META3047MDL-019-00101107
META3047MDL-019-00101196	META3047MDL-019-00101196
META3047MDL-019-00104380	META3047MDL-019-00104397
META3047MDL-019-00106371	META3047MDL-019-00106390

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META3047MDL-019-00119896	META3047MDL-019-00119896
META3047MDL-019-00120925	META3047MDL-019-00120937
META3047MDL-019-00123373	META3047MDL-019-00123519
META3047MDL-019-00127577	META3047MDL-019-00127590
META3047MDL-019-00127662	META3047MDL-019-00127670
META3047MDL-020-00004213	META3047MDL-020-00004213
META3047MDL-020-00004989	META3047MDL-020-00004992
META3047MDL-020-00005199	META3047MDL-020-00005203
META3047MDL-020-00005380	META3047MDL-020-00005388
META3047MDL-020-00082810	META3047MDL-020-00082810
META3047MDL-020-00083041	META3047MDL-020-00083042
META3047MDL-020-00085101	META3047MDL-020-00085104
META3047MDL-020-00090951	META3047MDL-020-00090951
META3047MDL-020-00093973	META3047MDL-020-00093985
META3047MDL-020-00107843	
META3047MDL-020-00126630	META3047MDL-020-00126635
META3047MDL-020-00126635	
META3047MDL-020-00130679	
META3047MDL-020-00130765	META3047MDL-020-00130769
META3047MDL-020-00130769	
META3047MDL-020-00137195	
META3047MDL-020-00151907	META3047MDL-020-00151907
META3047MDL-020-00208020	
META3047MDL-020-00208021	
META3047MDL-020-00208027	
META3047MDL-020-00216374	META3047MDL-020-00216375
META3047MDL-020-00216683	
META3047MDL-020-00230760	META3047MDL-020-00230763
META3047MDL-020-00236842	
META3047MDL-020-00247953	
META3047MDL-020-00250464	META3047MDL-020-00250476
META3047MDL-020-00251106	META3047MDL-020-00251111
META3047MDL-020-00253760	
META3047MDL-020-00256107	META3047MDL-020-00256114
META3047MDL-020-00260850	META3047MDL-020-00260855
META3047MDL-020-00263115	META3047MDL-020-00263115
META3047MDL-020-00265122	META3047MDL-020-00265133
META3047MDL-020-00266510	META3047MDL-020-00266514
META3047MDL-020-00270223	META3047MDL-020-00270223
META3047MDL-020-00270795	META3047MDL-020-00270821

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Bates Beg	Bates End
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META3047MDL-020-00270821	
META3047MDL-020-00270857	
META3047MDL-020-00271171	META3047MDL-020-00271171
META3047MDL-020-00271442	META3047MDL-020-00271442
META3047MDL-020-00277373	META3047MDL-020-00277373
META3047MDL-020-00278479	
META3047MDL-020-00278850	META3047MDL-020-00278850
META3047MDL-020-00286823	META3047MDL-020-00286823
META3047MDL-020-00294288	META3047MDL-020-00294290
META3047MDL-020-00298458	META3047MDL-020-00298458
META3047MDL-020-00318806	META3047MDL-020-00318807
META3047MDL-020-00331811	META3047MDL-020-00331813
META3047MDL-020-00339981	META3047MDL-020-00339995
META3047MDL-020-00340046	META3047MDL-020-00340057
META3047MDL-020-00340104	META3047MDL-020-00340107
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META3047MDL-020-00340672	META3047MDL-020-00340681
META3047MDL-020-00341399	META3047MDL-020-00341499
META3047MDL-020-00342152	META3047MDL-020-00342153
META3047MDL-020-00342154	META3047MDL-020-00342154
META3047MDL-020-00342155	META3047MDL-020-00342155
META3047MDL-020-00342286	META3047MDL-020-00342373
META3047MDL-020-00344877	META3047MDL-020-00344878
META3047MDL-020-00347429	META3047MDL-020-00347436
META3047MDL-020-00349969	META3047MDL-020-00350077
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META3047MDL-020-00473498	META3047MDL-020-00473498
META3047MDL-020-00476530	META3047MDL-020-00476530
META3047MDL-020-00479648	META3047MDL-020-00479656
META3047MDL-020-00534035	META3047MDL-020-00534048
META3047MDL-020-00534211	META3047MDL-020-00534215
META3047MDL-020-00534216	META3047MDL-020-00534216
META3047MDL-020-00535032	META3047MDL-020-00535032
META3047MDL-020-00535383	META3047MDL-020-00535400
META3047MDL-020-00535497	META3047MDL-020-00535530
META3047MDL-020-00535571	META3047MDL-020-00535609
META3047MDL-020-00535837	META3047MDL-020-00535837
META3047MDL-020-00537909	META3047MDL-020-00537915
META3047MDL-020-00538133	META3047MDL-020-00538150
META3047MDL-020-00538209	META3047MDL-020-00538212

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META3047MDL-020-00545476	META3047MDL-020-00545478
META3047MDL-020-00546686	META3047MDL-020-00546690
META3047MDL-020-00546954	META3047MDL-020-00546954
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META3047MDL-020-00563113	META3047MDL-020-00563179
META3047MDL-020-00572432	
META3047MDL-020-00575591	META3047MDL-020-00575599
META3047MDL-020-00588051	META3047MDL-020-00588059
META3047MDL-020-00588060	META3047MDL-020-00588077
META3047MDL-020-00588207	META3047MDL-020-00588220
META3047MDL-020-00588248	META3047MDL-020-00588267
META3047MDL-020-00588281	META3047MDL-020-00588290
META3047MDL-020-00591925	
META3047MDL-020-00592294	
META3047MDL-020-00609837	META3047MDL-020-00609863
META3047MDL-020-00609932	META3047MDL-020-00609944
META3047MDL-020-00610029	META3047MDL-020-00610029
META3047MDL-020-00610413	
META3047MDL-020-00612694	META3047MDL-020-00612703
META3047MDL-020-00615908	
META3047MDL-020-00616083	
META3047MDL-020-00650356	
META3047MDL-020-00651532	META3047MDL-020-00651533
META3047MDL-020-00651572	META3047MDL-020-00651596
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META3047MDL-020-00694005	META3047MDL-020-00694025
META3047MDL-020-00694412	
META3047MDL-020-00711513	META3047MDL-020-00711524
META3047MDL-022-00006927	META3047MDL-022-00006927
META3047MDL-022-00015380	META3047MDL-022-00015395
META3047MDL-022-00024240	META3047MDL-022-00024248
META3047MDL-022-00024900	META3047MDL-022-00024901

Bates Beg	Bates End
META3047MDL-022-00024961	META3047MDL-022-00024962
META3047MDL-022-00024977	META3047MDL-022-00024978
META3047MDL-022-00046397	
META3047MDL-026-00120419	
META3047MDL-028-00001733	META3047MDL-028-00001742
META3047MDL-031-00004338	META3047MDL-031-00004364
META3047MDL-031-00017964	META3047MDL-031-00017992
META3047MDL-031-00024886	META3047MDL-031-00024933
META3047MDL-031-00029654	META3047MDL-031-00029706
META3047MDL-031-00044680	META3047MDL-031-00044715
META3047MDL-031-00048769	META3047MDL-031-00048808
META3047MDL-031-00077850	META3047MDL-031-00077853
META3047MDL-031-00078723	META3047MDL-031-00078725
META3047MDL-031-00079675	META3047MDL-031-00079676
META3047MDL-031-00084889	META3047MDL-031-00084917
META3047MDL-031-00086272	META3047MDL-031-00086290
META3047MDL-031-00088636	META3047MDL-031-00088644
META3047MDL-031-00089407	META3047MDL-031-00089430
META3047MDL-031-00096208	
META3047MDL-031-00113576	META3047MDL-031-00113584
META3047MDL-031-00114725	
META3047MDL-031-00115856	
META3047MDL-031-00118020	META3047MDL-031-00118029
META3047MDL-031-00118100	META3047MDL-031-00118102
META3047MDL-031-00118103	META3047MDL-031-00118105
META3047MDL-031-00118481	META3047MDL-031-00118486
META3047MDL-031-00120972	META3047MDL-031-00120984
META3047MDL-031-00121415	META3047MDL-031-00121429
META3047MDL-031-00121430	META3047MDL-031-00121441
META3047MDL-031-00121448	META3047MDL-031-00121456
META3047MDL-031-00131309	META3047MDL-031-00131312
META3047MDL-031-00131562	
META3047MDL-031-00131639	META3047MDL-031-00131653
META3047MDL-031-00133522	META3047MDL-031-00133588
META3047MDL-031-00135902	META3047MDL-031-00135902
META3047MDL-031-00136395	META3047MDL-031-00136403
META3047MDL-031-00136977	META3047MDL-031-00137021
META3047MDL-031-00137474	META3047MDL-031-00137489
META3047MDL-031-00150013	META3047MDL-031-00150042
META3047MDL-031-00156154	META3047MDL-031-00156166
META3047MDL-031-00170428	META3047MDL-031-00170437

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Bates Beg	Bates End
META3047MDL-031-00185017	META3047MDL-031-00185019
META3047MDL-031-00191726	META3047MDL-031-00191822
META3047MDL-031-00192305	META3047MDL-031-00192352
META3047MDL-031-00193154	META3047MDL-031-00193159
META3047MDL-031-00241716	META3047MDL-031-00241716
META3047MDL-031-00242456	META3047MDL-031-00242456
META3047MDL-031-00242502	META3047MDL-031-00242504
META3047MDL-031-00242612	META3047MDL-031-00242616
META3047MDL-031-00245499	META3047MDL-031-00245514
META3047MDL-031-00246731	META3047MDL-031-00246734
META3047MDL-031-00246746	META3047MDL-031-00246762
META3047MDL-031-00251445	META3047MDL-031-00251446
META3047MDL-031-00255353	META3047MDL-031-00255354
META3047MDL-031-00260002	
META3047MDL-031-00262845	META3047MDL-031-00262852
META3047MDL-031-00265234	META3047MDL-031-00265250
META3047MDL-031-00265655	META3047MDL-031-00265661
META3047MDL-031-00266889	META3047MDL-031-00266921
META3047MDL-032-00000888	META3047MDL-032-00000932
META3047MDL-034-00027362	META3047MDL-034-00027403
META3047MDL-034-00036923	META3047MDL-034-00036947
META3047MDL-034-00037237	META3047MDL-034-00037283
META3047MDL-034-00056779	META3047MDL-034-00056799
META3047MDL-034-00078516	META3047MDL-034-00078521
META3047MDL-034-00100478	META3047MDL-034-00100481
META3047MDL-034-00123032	META3047MDL-034-00123132
META3047MDL-034-00136153	META3047MDL-034-00136163
META3047MDL-034-00137594	
META3047MDL-034-00150172	META3047MDL-034-00150172
META3047MDL-034-00161950	META3047MDL-034-00161975
META3047MDL-034-00162434	META3047MDL-034-00162468
META3047MDL-034-00240501	META3047MDL-034-00240553
META3047MDL-034-00251794	META3047MDL-034-00251794
META3047MDL-034-00253730	META3047MDL-034-00253741
META3047MDL-034-00266406	META3047MDL-034-00266410
META3047MDL-034-00266446	META3047MDL-034-00266452
META3047MDL-034-00267058	META3047MDL-034-00267068
META3047MDL-034-00267061	META3047MDL-034-00267068
META3047MDL-034-00275527	META3047MDL-034-00275528
META3047MDL-034-00282570	META3047MDL-034-00282571
META3047MDL-034-00288804	META3047MDL-034-00288804

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Bates Beg	Bates End
META3047MDL-034-00297911	META3047MDL-034-00297911
META3047MDL-034-00320512	META3047MDL-034-00320512
META3047MDL-034-00329532	META3047MDL-034-00329535
META3047MDL-034-00333402	META3047MDL-034-00333402
META3047MDL-034-00337750	
META3047MDL-034-00354685	
META3047MDL-034-00375738	
META3047MDL-034-00378456	META3047MDL-034-00378458
META3047MDL-034-00385869	META3047MDL-034-00385870
META3047MDL-034-00385870	
META3047MDL-034-00496109	
META3047MDL-034-00496112	
META3047MDL-034-00504271	META3047MDL-034-00504281
META3047MDL-034-00504595	META3047MDL-034-00504596
META3047MDL-034-00504794	META3047MDL-034-00504794
META3047MDL-034-00504801	META3047MDL-034-00504801
META3047MDL-034-00504889	META3047MDL-034-00504890
META3047MDL-034-00504910	META3047MDL-034-00504937
META3047MDL-035-00001018	META3047MDL-035-00001018
META3047MDL-035-00001280	META3047MDL-035-00001329
META3047MDL-035-00001346	META3047MDL-035-00001346
META3047MDL-035-00001376	META3047MDL-035-00001376
META3047MDL-035-00002651	META3047MDL-035-00002658
META3047MDL-035-00002750	META3047MDL-035-00002750
META3047MDL-035-00002761	META3047MDL-035-00002761
META3047MDL-035-00002791	META3047MDL-035-00002791
META3047MDL-035-00002796	META3047MDL-035-00002796
META3047MDL-035-00002917	META3047MDL-035-00002917
META3047MDL-035-00004529	
META3047MDL-035-00005017	META3047MDL-035-00005017
META3047MDL-035-00005132	META3047MDL-035-00005146
META3047MDL-035-00007047	META3047MDL-035-00007047
META3047MDL-037-00005460	META3047MDL-037-00005472
META3047MDL-037-00006674	
META3047MDL-037-00006677	
META3047MDL-037-00006682	META3047MDL-037-00006697
META3047MDL-037-00006698	
META3047MDL-037-00007064	
META3047MDL-037-00007066	
META3047MDL-037-00007612	META3047MDL-037-00007658
META3047MDL-037-00016218	

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META3047MDL-037-00022598	
META3047MDL-037-00028264	META3047MDL-037-00028270
META3047MDL-037-00032900	
META3047MDL-037-00034373	META3047MDL-037-00034374
META3047MDL-037-00035244	META3047MDL-037-00035245
META3047MDL-037-00058561	
META3047MDL-037-00062295	META3047MDL-037-00062295
META3047MDL-037-00062404	META3047MDL-037-00062412
META3047MDL-037-00068917	META3047MDL-037-00068917
META3047MDL-037-00266408	META3047MDL-037-00266409
META3047MDL-038-00000085	META3047MDL-038-00000096
META3047MDL-038-00000234	META3047MDL-038-00000247
META3047MDL-039-00000058	META3047MDL-039-00000078
META3047MDL-039-00000400	META3047MDL-039-00000409
META3047MDL-040-00028597	
META3047MDL-040-00028639	
META3047MDL-040-00031943	META3047MDL-040-00031944
META3047MDL-040-00039982	META3047MDL-040-00039986
META3047MDL-040-00049387	
META3047MDL-040-00056476	
META3047MDL-040-00075210	META3047MDL-040-00075210
META3047MDL-040-00192417	META3047MDL-040-00192418
META3047MDL-040-00207835	META3047MDL-040-00207836
META3047MDL-040-00213905	
META3047MDL-040-00213905	
META3047MDL-040-00214157	META3047MDL-040-00214157
META3047MDL-040-00214303	META3047MDL-040-00214303
META3047MDL-040-00215891	META3047MDL-040-00215895
META3047MDL-040-00225130	
META3047MDL-040-00228309	
META3047MDL-040-00229264	META3047MDL-040-00229266
META3047MDL-040-00230480	META3047MDL-040-00230480
META3047MDL-040-00236842	META3047MDL-040-00236842
META3047MDL-040-00258969	META3047MDL-040-00258969
META3047MDL-040-00298255	
META3047MDL-040-00300433	META3047MDL-040-00300436
META3047MDL-040-00310565	META3047MDL-040-00310565
META3047MDL-040-00315267	META3047MDL-040-00315267
META3047MDL-040-00332134	META3047MDL-040-00332136
META3047MDL-040-00337135	META3047MDL-040-00337172
META3047MDL-040-00343339	META3047MDL-040-00343364

Bates Beg	Bates End
META3047MDL-040-00399807	META3047MDL-040-00399813
META3047MDL-040-00399876	
META3047MDL-040-00447851	META3047MDL-040-00447851
META3047MDL-040-00449305	
META3047MDL-040-00464241	META3047MDL-040-00464241
META3047MDL-040-00506062	
META3047MDL-040-00529614	META3047MDL-040-00529614
META3047MDL-040-00533249	META3047MDL-040-00533251
META3047MDL-040-00533261	META3047MDL-040-00533261
META3047MDL-040-00533279	META3047MDL-040-00533280
META3047MDL-040-00534305	META3047MDL-040-00534305
META3047MDL-040-00540964	META3047MDL-040-00540964
META3047MDL-040-00541113	META3047MDL-040-00541113
META3047MDL-040-00541333	META3047MDL-040-00541333
META3047MDL-040-00541685	META3047MDL-040-00541686
META3047MDL-040-00544758	META3047MDL-040-00544759
META3047MDL-040-00545973	
META3047MDL-040-00583291	
META3047MDL-040-00583725	META3047MDL-040-00583726
META3047MDL-040-00584195	META3047MDL-040-00584195
META3047MDL-040-00584298	
META3047MDL-040-00584298	
META3047MDL-040-00586070	META3047MDL-040-00586071
META3047MDL-040-00586960	
META3047MDL-040-00586960	
META3047MDL-040-00590304	
META3047MDL-040-00590832	META3047MDL-040-00590832
META3047MDL-040-00592481	
META3047MDL-040-00593105	META3047MDL-040-00593105
META3047MDL-040-00593848	META3047MDL-040-00593849
META3047MDL-040-00594798	META3047MDL-040-00594799
META3047MDL-040-00595529	META3047MDL-040-00595531
META3047MDL-040-00600566	
META3047MDL-040-00600566	
META3047MDL-040-00650630	META3047MDL-040-00650630
META3047MDL-040-00654288	
META3047MDL-044-00022409	
META3047MDL-044-00026817	META3047MDL-044-00026905
META3047MDL-044-00034973	META3047MDL-044-00034973
META3047MDL-044-00035618	META3047MDL-044-00035618
META3047MDL-044-00053669	META3047MDL-044-00053669

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Bates Beg	Bates End
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META3047MDL-044-00067085	META3047MDL-044-00067087
META3047MDL-044-00072643	META3047MDL-044-00072643
META3047MDL-044-00075012	META3047MDL-044-00075021
META3047MDL-044-00077299	META3047MDL-044-00077299
META3047MDL-044-00086786	
META3047MDL-044-00091392	
META3047MDL-044-00100788	META3047MDL-044-00100789
META3047MDL-044-00108564	META3047MDL-044-00108582
META3047MDL-044-00108566	
META3047MDL-044-00115499	META3047MDL-044-00115516
META3047MDL-044-00115793	META3047MDL-044-0015876
META3047MDL-044-00115878	META3047MDL-044-00115878
META3047MDL-044-00115893	META3047MDL-044-00115893
META3047MDL-044-00115894	META3047MDL-044-00115894
META3047MDL-044-00131401	META3047MDL-044-00131411
META3047MDL-044-00171345	
META3047MDL-044-00176279	META3047MDL-044-00176279
META3047MDL-046-00071961	META3047MDL-046-00071969
META3047MDL-046-00084241	META3047MDL-046-00084243
META3047MDL-046-00087019	META3047MDL-046-00087030
META3047MDL-046-00099995	META3047MDL-046-00099995
META3047MDL-046-00112605	
META3047MDL-046-00112613	
META3047MDL-046-00113377	
META3047MDL-046-00113378	
META3047MDL-046-00149690	META3047MDL-046-00149703
META3047MDL-046-00180441	
META3047MDL-046-00235157	META3047MDL-046-00235169
META3047MDL-046-00286948	META3047MDL-046-00286950
META3047MDL-046-00287714	META3047MDL-046-00287714
META3047MDL-046-00319359	META3047MDL-046-00319359
META3047MDL-046-00446151	
META3047MDL-046-00450187	META3047MDL-046-00450191
META3047MDL-047-00006815	
META3047MDL-047-00017209	
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META3047MDL-047-00018658	
META3047MDL-047-00018661	
META3047MDL-047-00045945	META3047MDL-047-00045945
META3047MDL-047-00058006	META3047MDL-047-00058006

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Bates Beg	Bates End
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META3047MDL-047-00066030	META3047MDL-047-00066030
META3047MDL-047-00075416	META3047MDL-047-00075417
META3047MDL-047-00097321	META3047MDL-047-00097342
META3047MDL-047-00187870	META3047MDL-047-00187871
META3047MDL-047-00191249	META3047MDL-047-00191257
META3047MDL-047-00242378	META3047MDL-047-00242379
META3047MDL-047-00342908	META3047MDL-047-00342945
META3047MDL-047-00343252	META3047MDL-047-00343252
META3047MDL-047-00347713	META3047MDL-047-00347713
META3047MDL-047-00396774	META3047MDL-047-00396777
META3047MDL-047-00575317	META3047MDL-047-00575317
META3047MDL-047-00579249	META3047MDL-047-00579249
META3047MDL-047-00603560	
META3047MDL-047-00646291	
META3047MDL-047-00647437	
META3047MDL-047-00706589	META3047MDL-047-00706589
META3047MDL-047-00706686	META3047MDL-047-00706686
META3047MDL-047-00706763	META3047MDL-047-00706765
META3047MDL-047-00706766	META3047MDL-047-00706766
META3047MDL-047-00706767	META3047MDL-047-00706767
META3047MDL-047-00707055	META3047MDL-047-00707057
META3047MDL-047-00912997	META3047MDL-047-00913052
META3047MDL-047-00977914	
META3047MDL-047-00979507	META3047MDL-047-00979510
META3047MDL-047-00979678	META3047MDL-047-00979678
META3047MDL-047-00990649	META3047MDL-047-00990676
META3047MDL-047-00993411	META3047MDL-047-00993417
META3047MDL-047-01003303	META3047MDL-047-01003309
META3047MDL-047-01027662	
META3047MDL-047-01028819	
META3047MDL-047-01030786	META3047MDL-047-01030786
META3047MDL-047-01075125	META3047MDL-047-01075126
META3047MDL-047-01075127	META3047MDL-047-01075127
META3047MDL-047-01120187	META3047MDL-047-01120188
META3047MDL-047-01167629	
META3047MDL-047-01170067	META3047MDL-047-01170068
META3047MDL-047-01170167	META3047MDL-047-01170167
META3047MDL-047-01177502	META3047MDL-047-01177502
META3047MDL-047-01177503	META3047MDL-047-01177503
META3047MDL-047-01197619	META3047MDL-047-01197619

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META3047MDL-047-01200842	META3047MDL-047-01200842
META3047MDL-047-01200843	META3047MDL-047-01200843
META3047MDL-047-01200848	META3047MDL-047-01200848
META3047MDL-047-01219169	META3047MDL-047-01219170
META3047MDL-047-01219676	META3047MDL-047-01219677
META3047MDL-047-01240922	META3047MDL-047-01240925
META3047MDL-047-01342635	
META3047MDL-047-01373649	META3047MDL-047-01373650
META3047MDL-047-01379753	META3047MDL-047-01379753
META3047MDL-050-00003830	META3047MDL-050-00003831
META3047MDL-050-00003832	META3047MDL-050-00003845
META3047MDL-050-00010878	META3047MDL-050-00010879
META3047MDL-050-00015077	
META3047MDL-050-00015079	
META3047MDL-050-00015847	
META3047MDL-050-00023736	
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META3047MDL-050-00124415	
META3047MDL-050-00172125	
META3047MDL-050-00184006	
META3047MDL-050-00206214	META3047MDL-050-00206223
META3047MDL-050-00215015	META3047MDL-050-00215029
META3047MDL-050-00215087	META3047MDL-050-00215087
META3047MDL-050-00272517	
META3047MDL-050-00272518	
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META3047MDL-050-00285759	META3047MDL-050-00285759
META3047MDL-050-00287718	META3047MDL-050-00287718
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META3047MDL-050-00343518	
META3047MDL-050-00351272	
META3047MDL-050-00352023	
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META3047MDL-053-00006142	
META3047MDL-053-00007843	

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META3047MDL-053-00010776	META3047MDL-053-00010783
META3047MDL-053-00018940	META3047MDL-053-00018964
META3047MDL-053-00019011	META3047MDL-053-00019101
META3047MDL-053-00028484	
META3047MDL-053-00045386	META3047MDL-053-00045386
META3047MDL-053-00048552	
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Documents

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Documents

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Documents

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Documents

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Documents

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Documents

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Documents

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Documents

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TIKTOK3047MDL-183-LARK-08031400	
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TIKTOK3047MDL-185-LARK-08146569	TIKTOK3047MDL-185-LARK-08146569
TIKTOK3047MDL-185-LARK-08152963	TIKTOK3047MDL-185-LARK-08152968
TIKTOK3047MDL-186-LARK-08176023	TIKTOK3047MDL-186-LARK-08176250
TIKTOK3047MDL-193-08385973	
TIKTOK3047MDL-197-04799946	TIKTOK3047MDL-197-04799960
TIKTOK3047MDL-198-LARK-08662336	

Documents

Bates Beg	Bates End
TIKTOK3047MDL-199-LARK-08546223	TIKTOK3047MDL-199-LARK-08546238
TIKTOK3047MDL-207-LARK-08711479	TIKTOK3047MDL-207-LARK-08711479
TIKTOK3047MDL-207-LARK-08711793	
TIKTOK3047MDL-217-LARK-04853956	TIKTOK3047MDL-217-LARK-04853981
TIKTOK3047MDL-231-04862947	
TIKTOK3047MDL-236-04863474	
TIKTOK3047MDL-239-04865085	TIKTOK3047MDL-239-04865102
TIKTOK3047MDL-239-04865103	TIKTOK3047MDL-239-04865111
TIKTOK3047MDL-242-04865350	TIKTOK3047MDL-242-04865367

Depositions

Defendant Entity	Witness Last Name	Witness First Name	Date	Description
Meta	Andrews	Kyle	11/19/2024	Deposition Transcripts and Exhibits of Kyle Andrews.
Meta	Andrews	Kyle	11/20/2024	Deposition Transcripts and Exhibits of Kyle Andrews.
Meta	Bejar	Arturo	4/7/2025	Deposition Transcripts and Exhibits of Arturo Bejar.
Meta	Bejar	Arturo	4/8/2025	Deposition Transcripts and Exhibits of Arturo Bejar.
Meta	Bejar	Arturo	4/9/2025	Deposition Transcripts and Exhibits of Arturo Bejar.
Meta	Bhutada	Shruti	11/18/2024	Deposition Transcripts and Exhibits of Shruti Bhutada.
Meta	Bhutada	Shruti	11/19/2024	Deposition Transcripts and Exhibits of Shruti Bhutada.
Meta	Burke	Moira	1/28/2025	Deposition Transcripts and Exhibits of Moira Burke.
Meta	Burke	Moira	1/29/2025	Deposition Transcripts and Exhibits of Moira Burke.
Meta	Dow	Paul Alexander	11/7/2024	Deposition Transcripts and Exhibits of Paul Alexander Dow.
Meta	Dow	Paul Alexander	11/8/2024	Deposition Transcripts and Exhibits of Paul Alexander Dow.
Meta	Gould Stewar	Margaret	10/21/2024	Deposition Transcripts and Exhibits of Margaret Stewart Gould.
Meta	Gross	Wendy	1/28/2025	Deposition Transcripts and Exhibits of Wendy Gross.
Meta	Guadagno	Jennifer	11/14/2025	Deposition Transcripts and Exhibits of Jennifer Guadagno.
Meta	Hendrix	Kristin	1/22/2025	Deposition Transcripts and Exhibits of Kristin Hendrix.
Meta	Hendrix	Kristin	1/23/2025	Deposition Transcripts and Exhibits of Kristin Hendrix.
Meta	Jayakumar	Vaishnavi	1/30/2025	Deposition Transcripts and Exhibits of Vaishnavi Jayakumar.
Meta	Jayakumar	Vaishnavi	1/31/2025	Deposition Transcripts and Exhibits of Vaishnavi Jayakumar.
Meta	Jayakumar	Vaishnavi	3/6/2025	Deposition Transcripts and Exhibits of Vaishnavi Jayakumar.
Meta	Jimenez	Shayli	2/11/2025	Deposition Transcripts and Exhibits of Shayli Jimenez.

Depositions

Defendant Entity	Witness Last Name	Witness First Name	Date	Description
Meta	Jimenez	Shayli	2/12/2025	Deposition Transcripts and Exhibits of Shayli Jimenez.
Meta	Jin	Kang-Xing	10/24/2024	Deposition Transcripts and Exhibits of Kang-Xing Jin.
Meta	Jin	Kang-Xing	10/25/2024	Deposition Transcripts and Exhibits of Kang-Xing Jin.
Meta	Kilstein	Darius	12/17/2024	Deposition Transcripts and Exhibits of Darius Kilstein.
Meta	Kilstein	Darius	12/18/2024	Deposition Transcripts and Exhibits of Darius Kilstein.
Meta	Lee	Alison	2/6/2025	Deposition Transcripts and Exhibits of Alison Lee.
Meta	Mosseri	Adam	3/17/2025	Deposition Transcripts and Exhibits of Adam Mosseri.
Meta	Mosseri	Adam	3/18/2025	Deposition Transcripts and Exhibits of Adam Mosseri.
Meta	Raskin	Aza	3/17/2025	Deposition Transcripts and Exhibits of Aza Raskin.
Meta	Rothschild	Michael	1/21/2025	Deposition Transcripts and Exhibits of Michael Rothschild.
Meta	Rothschild	Michael	1/22/2025	Deposition Transcripts and Exhibits of Michael Rothschild.
Meta	Rubaek	Lotte	4/1/2025	Deposition Transcripts and Exhibits of Lotte Rubaek.
Meta	Sinha	Ravi	12/5/2024	Deposition Transcripts and Exhibits of Ravi Sinha.
Meta	Sinha	Ravi	12/6/2024	Deposition Transcripts and Exhibits of Ravi Sinha.
Meta	Volichenko	George	12/16/2024	Deposition Transcripts and Exhibits of George Volichenko.
Meta	Wynter	Thomas	3/11/2025	Deposition Transcript and Exhibits of Thomas Wynter
Meta	Zuckerberg	Mark	3/27/2025	Deposition Transcripts and Exhibits of Mark Zuckerberg.
Meta	Zuckerberg	Mark	3/28/2025	Deposition Transcripts and Exhibits of Mark Zuckerberg.
Snap	Beauchere	Jacqueline	3/13/2025	Deposition Transcripts and Exhibits of Jacqueline Beauchere.
Snap	Beauchere	Jacqueline	3/14/2025	Deposition Transcripts and Exhibits Jacqueline Beauchere.

Depositions

Defendant Entity	Witness Last Name	Witness First Name	Date	Description
Snap	Boyle	David	2/26/2025	Deposition Transcripts and Exhibits David Boyle.
Snap	Boyle	David	2/27/2025	Deposition Transcripts and Exhibits of David Boyle.
Snap	Boyle	David	4/2/2025	Deposition Transcripts and Exhibits David Boyle.
Snap	Brody	Jonathan	2/5/2025	Deposition Transcripts and Exhibits of Jonathan Brody.
Snap	Chan	Claudia	2/7/2025	Deposition Transcripts and Exhibits of Claudia Chan.
Snap	Hammerstrom	Morgan	2/12/2025	Deposition Transcripts and Exhibits of Morgan Hammerstrom.
Snap	Lue	David	3/26/2025	David Lue Deposition Transcripts and Exhibits.
Snap	Osborne	Alex	1/10/2025	Deposition Transcripts and Exhibits of Alex Osborne.
Snap	Oshuntola	Deborah	2/4/2025	Deposition Transcripts and Exhibits of Deborah Oshuntola.
Snap	Sellis	Peter	2/6/2025	Deposition Transcripts and Exhibits of Peter Sellis.
Snap	Shen	Juliet	3/4/2025	Deposition Transcripts and Exhibits of Juliet Shen.
Snap	Siegel	Josh	3/20/2025	Deposition Transcripts and Exhibits of Josh Siegel.
Snap	Stout	Jennifer	3/26/2025	Deposition Transcripts and Exhibits of Jennifer Stout.
Snap	Stout	Jennifer	3/27/2025	Deposition Transcripts and Exhibits Jennifer Stout.
Snap	Tran	Abby	2/26/2025	Deposition Transcripts and Exhibits of Abby Tran
Snap	Voss	Jeremy	4/4/2025	Deposition Transcripts and Exhibits of Jeremy Voss.
Snap	Weissinger	Michael	12/18/2024	Deposition Transcripts and Exhibits of Michael Weissinger.
Snap	Yadegar	Nona	12/16/2024	Deposition Transcripts and Exhibits of Nona Yadegar.
Snap	Zicafoose	Kale	12/4/2024	Deposition Transcripts and Exhibits of Kale Zicafoose.
TikTok	Burchell	Amber	12/18/2024	Deposition Transcripts and Exhibits of Amber Burchell.

Depositions

Defendant Entity	Witness Last Name	Witness First Name	Date	Description
TikTok	Classen Ulucay	Amy	2/5/2025	Deposition Transcripts and Exhibits of Amy Classen Ulucay.
TikTok	Classen Ulucay	Amy	2/10/2025	Deposition Transcripts and Exhibits of Amy Classen Ulucay.
TikTok	Crimmins	Christina	2/26/2025	Deposition Transcripts and Exhibits of Christina Crimmins.
TikTok	De Bailliencourt	Julie	3/27/2025	Deposition Transcripts and Exhibits of Julie De Bailliencourt.
TikTok	Ebenstein	Eric	3/11/2025	Deposition Transcripts and Exhibits of Eric Ebenstein.
TikTok	Ebenstein	Eric	3/12/2025	Deposition Transcripts and Exhibits of Eric Ebenstein.
TikTok	Furlong	Jordan	4/11/2025	Deposition Transcripts and Exhibits of Jordan Furlong
TikTok	Furlong	Jordan	4/12/2025	Deposition Transcripts and Exhibits of Jordan Furlong.
TikTok	Gribbon	Emma	2/24/2025	Deposition Transcripts and Exhibits of Emma Gribbon.
TikTok	Grover	Sandeep	2/27/2025	Deposition Transcripts and Exhibits of Sandeep Grover.
TikTok	Han	Eric	3/11/2025	Deposition Transcripts and Exhibits of Eric Han.
TikTok	Han	Eric	3/12/2025	Deposition Transcripts and Exhibits of Eric Han.
TikTok	Keenan	Cormac	3/24/2025	Deposition Transcripts and Exhibits of Cormac Keenan.
TikTok	King	Rosie	4/29/2025	Deposition Transcripts and Exhibits of Rosie King.
TikTok	Kirchhoff	Andrew	3/16/2025	Deposition Transcripts and Exhibits of Andrew Kirchhoff.
TikTok	Linthicum	Ryn	4/17/2025	Deposition Transcripts and Exhibits of Ryn Linthicum.
TikTok	Maher	Reagan	2/21/2025	Deposition Transcripts and Exhibits of Reagan Maher.
TikTok	McCullough	Victoria	2/19/2025	Deposition Transcripts and Exhibits of Victoria McCullough.
TikTok	Ruiz	Jorge	3/10/2025	Deposition Transcripts and Exhibits of Jorge Ruiz.

Depositions

Defendant Entity	Witness Last Name	Witness First Name	Date	Description
TikTok	Tenenbaum	Matthew	1/28/2025	Deposition Transcripts and Exhibits of Matthew Tenenbaum.
TikTok	Tenenbaum	Matthew	1/29/2025	Deposition Transcripts and Exhibits of Matthew Tenenbaum.
YouTube	Ben-Yair	Shimrit	3/20/2025	Deposition Transcripts and Exhibits of Shimrit Ben-Yair.
YouTube	Beser	James	4/2/2025	Deposition Transcripts and Exhibits of James Beser.
YouTube	Beser	James	4/3/2025	Deposition Transcripts and Exhibits of James Beser.
YouTube	Beser	James	4/9/2025	Deposition Transcripts and Exhibits of James Beser.
YouTube	DiVento Dzuban	Jessica	2/26/2025	Deposition Transcripts and Exhibits of Jessica DiVento Dzuban.
YouTube	Goodrow	Cristos	2/19/2025	Deposition Transcripts and Exhibits of Cristos Goodrow.
YouTube	Goodrow	Cristos	2/20/2025	Deposition Transcripts and Exhibits of Cristos Goodrow.
YouTube	Iyengar	Raj	3/13/2025	Deposition Transcripts and Exhibits of Raj Iyengar.
YouTube	Jain	Adi	3/21/2025	Deposition Transcripts and Exhibits of Adi Jain.
YouTube	Niedermeyer	Caitlin	3/13/2025	Deposition Transcripts and Exhibits of Caitlin Niedermeyer
YouTube	Saffel	Tom	4/1/2025	Deposition Transcripts and Exhibits of Tom Saffel.
YouTube	Stovezky	Sharon	12/11/2024	Deposition Transcripts and Exhibits of Sharon Stovezky.
YouTube	Turner	Erin	1/22/2025	Deposition Transcripts and Exhibits of Erin Turner.
YouTube	Watson	Reid	3/12/2025	Deposition Transcripts and Exhibits of Reid Watson.
YouTube	Woojin	Kim	3/11/2025	Deposition Transcripts and Exhibits of Kim Woojin.

Description
Quora - What's the history of the "Awesome Button" (that eventually became the Like button) on Facebook? https://www.quora.com/Whats-the-history-of-the-Awesome-Button-that-eventually-became-the-Like-button-on-Facebook
16 CFR Part 312 Children's Online Privacy Protection Rule.
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Meta Platforms, Inc. Annual Report
Letter from Richard Blumenthal to Mark Zuckerberg Re: participation in a Congressional hearing on Instagram and kids
Letter from Congress to Mark Zuckerberg RE Facebook's recent announcement to launch an Instagram for users under 13
Let's chat (2012) Snapchat, Newsroom. https://newsroom.snap.com/lets-chat
Weissinger Exhibit 7 2021 OKR Review - Content
Demand Sage - How Many People Use Instagram 2025 (New Statistics)
Snapchat Support. When does Snapchat delete Snaps and Chats? https://help.snapchat.com/hc/en-us/articles/7012334940948-When-does-Snapchat-delete-Snaps-and-Chats
Statista. Share of teens in the United States who use selected social media platform as of October 2023, by frequency. U.S. teens' social media sites & apps used by frequency. https://www.statista.com/statistics/1327670/us-teens-social-media-sites-app-used-by-frequency/
United States Securities and Exchange Commission Washington, D.C. 20549 Schedule 14A Information Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934 (Amendment No.) Definitive Proxy Statement Meta Platforms, Inc. 2024 Notice of Annual meeting and proxy statement
Introducing Instagram Teen Accounts: Built-In Protections for Teens, Peace of Mind for Parents - updated https://about.fb.com/news/2024/09/instagram-teen-accounts/
Our tools, features and resources to help support teens and parents https://www.meta.com/help/policies/809291991003600/?srsltid=AfmBOorjE3jwUsrQTK27cSVLRaap9630ckGKgRI40Gm56oY7zdXKJ3Zd
Instagram Quiet Mode: A New Way to Manage Your Time and Focus, updated 1/28/2025 https://about.fb.com/news/2023/01/instagram-quiet-mode-manage-your-time-and-focus/
Instagram Community Guidelines FAQs https://about.instagram.com/blog/announcements/instagram-community-guidelines-faqs
Continuing to Make Instagram Safer for the Youngest Members of Our Community. https://about.instagram.com/blog/announcements/continuing-to-make-instagram-safer-for-the-youngest-members-of-our-community
Facebook Joins Industry Effort to Fight Child Exploitation Online. https://about.fb.com/news/2020/06/fighting-child-exploitation-online/

Description
New Protections to Give Teens More Age-Appropriate Experiences on Our Apps. https://about.fb.com/news/2024/01/teen-protections-age-appropriate-experiences-on-our-apps/
Giving People Control Over Their Time and What They See on Instagram. https://about.instagram.com/blog/announcements/new-ways-to-control-what-you-see-on-instagram
Instagram is "Predators' Paradise" for Sex Trafficking, Child Abuse, and Pedophilia #WakeUpInstagram - https://www.youtube.com/watch?v=NpkHYVYvb8s
Meta Transparency Center. Child Endangerment: Nudity and Physical Abuse and Sexual Exploitation, filtered to show Facebook results
New Tools and Resources for Parents and Teens in VR and on Instagram. https://about.instagram.com/blog/announcements/tools-and-resources-for-parents-and-teens-in-vr-and-on-instagram
Can I get a hug? The story of Facebook's care reaction. https://www.metacareers.com/blog/the-story-of-facebooks-care-reaction/
Instagram (2022) Updates to the Sensitive Content Control. https://about.instagram.com/blog/announcements/updates-to-the-sensitive-content-control
The Jed Foundation (JED) Recommendations for Safeguarding Youth Well-Being on Social Media Platforms
Instagram (2019) Making Instagram Safer for the Youngest Members of Our Community
North London Coroner's Service Regulation 28 Report to Prevent Future Deaths Re: Molly Rose Russell
BBC (2019) Instagram vows to remove all graphic self-harm images from site
Meta (2020) Suicide, Self-Injury, and Eating Disorders Policy Rationale
Meta (Current Version) Suicide, Self-Injury, and Eating Disorders Policy Rationale
Community Guidelines 2025-01-24
Systrom (2016) Keeping Instagram Safe: More Tools and Control
TikTok algorithms: 'Teenage boys are seeing more graphic violence' - Former Worker Andrew Kaung https://www.youtube.com/watch?v=5tWzyWa042E&t=98s
American Psychological Association. (n.d.). Apa Dictionary of Psychology. American Psychological Association. https://dictionary.apa.org/social-contagion
TikTok Support. https://support.tiktok.com/en
Bringing Age Verification to Facebook Dating. https://about.fb.com/news/2022/12/facebook-dating-age-verification/
Teens, social media, and body image presentation by Heather Gallivan Park Nicollet Melrose Center. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://lynnemaureenhurdle.com/wp-content/uploads/2017/01/18_Gallivan_Teens-social-media-body-image-presentation-H-Gallivan-Spring-2014.pdf
How Accurate is Mental Health Advice on TikTok? PlushCare. https://plushcare.com/blog/tiktok-mental-health/

Description
Children can bypass age verification procedures in popular social media apps by lying. LERO, News and Events. https://lero.ie/news-and-events/children-can-bypass-age-verification-procedures-popular-social-media-apps-lying
How TikTok recommends videos #ForYou. TikTok Newsroom. https://newsroom.tiktok.com/en-us/how-tiktok-recommends-videos-for-you
National Population by Characteristics: 2020-2023. Annual Estimates of the Resident Population by Single Year of Age and Sex for the United States: April 1, 2020 to July 1, 2023. U.S. Census Bureau. file:///C:/Users/skelley/Downloads/EPA-HQ-OAR-2024-0196-0003_attachment_147.pdf
Byers Market Podcast: Instagram's Adam Mosseri. Full transcript, MSNCB. https://www.msnbc.com/podcast/transcript-instagram-s-adam-mosseri-n1158106
Is social media addiction in the DSM-5? Spliced Online. https://splicedonline.com/is-social-media-addiction-in-the-dsm-5/
MDL Doc. 494 Plaintiffs' Second Amended Master Complaint (Personal Injury)
MDL Doc. 1802 TikTok Defendants' Answer to Plaintiffs' Second Amended Master Complaint (Personal Injury)
MDL Doc. 1804 Meta's Answer to the Personal Injury Plaintiffs' Second Amended Master Complaint
MDL Doc. 1805 Defendants YouTube, LLC and Google LLC's Answer to Plaintiffs' Second Amended Master Complaint (Personal Injury)
MDL Doc. 1806 Snap Inc.'s Answer and Affirmative Defenses to Plaintiffs' Second Amended Master Complaint (Personal Injury)
JCCP - Master Complaint (Personal Injury)
MDL Doc. 729 Plaintiffs' First Amended Master Complaint (Local Government and School District)
MDL Doc. 1419 Defendants YouTube, LLC and Google LLC's Answer to Plaintiffs' Amended Master Complaint (Local Government and School District)
MDL Doc. 1421 Defendants TikTok Defendants' Answer to Plaintiffs' Amended Master Complaint (Local Government and School District)
MDL Doc. 1423 Snap Inc.'s Answer and Affirmative Defenses to Plaintiffs' First Amended Master Complaint (Local Government and School District)
MDL Doc. 1424 Meta's Answer to the School District and Local Government Entities' First Amended Master Complaint
Predators Paradise (2019) Pedophile like sexualization of children is rampant on Instagram right now https://wcllp.box.com/s/ppfa4gi3rrcvf5748e37ahiiy4eg11xn Mosseri Exhibit 33
Predators Paradise (2019) It's clear Instagram is a massive network for sex trafficking https://wcllp.box.com/s/jn18whqeps64dyebtcsqah2knsbkv2oc Mosseri Exhibit 32
Video testimony from the deposition of Kyle Andrews November 19, 2024 pages 365-366. https://wcllp.box.com/s/pjvai9ng93dw0zz6incr9noke7ca1k17 Mosseri Exhibit 65

Description
Video testimony of Adam Mosseri from the United States Senate Subcommittee Hearing: Protecting Kids Online: Instagram and Reforms for Young Users - "My responsibility to help keep people safe" https://wcllp.box.com/s/qeey7bzoi56adungl0aezttpx1jicq0t Mosseri Exhibit 1
CBS This Morning - CBS News, Instagram head says they're "rethinking the whole experience" of the platform - "even if it affects your bottom line? 100%" https://wcllp.box.com/s/39ben93okjr6gqpky8z61v6hsl5wvibs Mosseri Exhibit 28
NBC News Byers Market Podcast Episode 3 Instagram's Adam Mosseri - "There's such a thing as being addicted" https://wcllp.box.com/s/nqectpccvpl6i4co19993kv9uzyvorol Mosseri Exhibit 4
NBC News Byers Market Podcast Episode 3 Instagram's Adam Mosseri - "sense of responsibility to make sure that we do something reasonable in those cases" https://wcllp.box.com/s/qgaynyfp3nr4c7833fuq251q8cf22dwx Mosseri Exhibit 5
NBC News Byers Market Podcast Episode 3 Instagram's Adam Mosseri - "equating problematic use with addiction" https://wcllp.box.com/s/tvn407m3apusz6h2176irrbyzmbj5x68 Mosseri Exhibit 6
Armchair Expert Podcast Episode 189 Adam Mosseri - "DMs are unmonitored" https://wcllp.box.com/s/49peq3r8rk5foq4kz7b3syjts6oog2ml Mosseri Exhibit 21
Video testimony of Adam Mosseri from the United States Senate Subcommittee Hearing: Protecting Kids Online: Instagram and Reforms for Young Users - "We are an advertising business" https://wcllp.box.com/s/covg4gxrmre7460901axeyigol8pqoze Mosseri Exhibit 13
The Breakfast Club Podcast, Head of Instagram Adam Mosseri On Combatting Hate Speech, Bots, Racism - "some users are addicted and some just use it too much" https://wcllp.box.com/s/5a6c5ioeu4vfszrn3jmbug2f9fkq4r8d Mosseri Exhibit 7
NBC News Byers Market Podcast Episode 3 Instagram's Adam Mosseri - "say true things to you and prove that they're true, probably for years, before I earn that trust back" https://wcllp.box.com/s/m5bwlvoki6sa7e884mhns97dw42799ay Mosseri Exhibit 66
Mosseri (2021) Facebook Knows Instagram Is Toxic for Teen Girls, Company Documents Show Mosseri Exhibit 64

Description
Meta (0000) Giving people the power to build community and bring the world closer together Mosseri Exhibit 2
Instagram (2021) How we're supporting people affected by eating disorders and negative body image Mosseri Exhibit 100
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Meta Platforms, Inc. Annual Report for the fiscal year end December 31, 2023 - COVER PAGE AND GRAPH Mosseri Exhibit 55
Updates to How We Protect Our Community from Abuse Mosseri Exhibit 102
Mosseri (2021) Raising the Standard for Protecting Teens and Supporting Parent Online - with update Mosseri Exhibit 103
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Facebook, Inc. Annual Report for the fiscal year end December 31, 2018 - COVER PAGE AND GRAPH Mosseri Exhibit 50
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Facebook, Inc. Annual Report for the fiscal year end December 31, 2019 - COVER PAGE AND GRAPH Mosseri Exhibit 51
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Facebook, Inc. Annual Report for the fiscal year end December 31, 2020 - COVER PAGE AND GRAPH Mosseri Exhibit 52
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Meta Platforms, Inc. Annual Report for the fiscal year end December 31, 2021 - COVER PAGE AND GRAPH Mosseri Exhibit 53
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Meta Platforms, Inc. Annual Report for the fiscal year end December 31, 2022 - COVER PAGE AND GRAPH Mosseri Exhibit 54
United States Securities and Exchange Commission Washington, D.C. 20549 FORM 10-K for Meta Platforms, Inc. Annual Report for the fiscal year end December 31, 2024 - COVER PAGE AND GRAPH Mosseri Exhibit 56
Instagram Community - A Safe & Supportive Experience - About Instagram. Everyone is welcome. Mosseri Exhibit 3

Description
Instagram Transparency Center Adult Nudity and Sexual Activity Prevalence - How prevalent were adult nudity and sexual activity violations? About 0.03% April - June 2021 Mosseri Exhibit 57 Mosseri Exhibit 60
Instagram Transparency Center Suicide, Self-Injury, and Eating Disorders Prevalence - How prevalent were suicide, self-injury, and eating disorder violations? Q4 2024 Mosseri Exhibit 61
Instagram Transparency Center Bullying and Harassment Prevalence - How prevalent were bullying and harassment violations? 0.05% to 0.06% Q3 2021 July - September 2021 - NO WEBSITE AT THE TOP Mosseri Exhibit 62
Instagram Transparency Center Violent and Graphic Content Prevalence - How prevalent were violent and graphic content violations? About 0.01% April - June 2021 Mosseri Exhibit 63
Sacks (2019) A Teen Died By Suicide After Explicit Messages Between Him And Another Boy Were Blaster On Social Media Mosseri Exhibit 69
CBS (2019) Instagram head says they're "rethinking the whole experience" of the platform Mosseri Exhibit 73
Suicide, Self-Injury, and Eating disorders. Meta Policies Mosseri Exhibit 99
Instagram Tools and Features Mosseri Exhibit 104
Our tools, features and resources to help support teens and parents - through December 2024 updated 13 weeks ago Mosseri Exhibit 105
Instagram (2021) Giving Young People a Safer, More Private Experience Update on December 10, 2021 Mosseri Exhibit 106
Podcast Excerpt - video Mosseri Exhibit 108
Media Clip, Mosseri Testimony Before Senate Mosseri Exhibit 109
JCCP - Meta Defendants' Master Answer to Plaintiffs' Master Complaint (Personal Injury)
JCCP - Snap Inc.'s Answer and Affirmative Defenses to the Master Complaint (Personal Injury)
JCCP - Defendants YouTube, LLC, Google LLC, and Alphabet Inc.'s Answer to Plaintiffs' Amended Master Complaint
JCCP - Defendants TikTok Inc., Bytedance Inc., Bytedance Ltd., TikTok Ltd., and TikTok LLC's Answer and Affirmative Defenses
Critical Analysis of Drs. Kara Bagot & Ramin Mojtabai Affidavits Prepared by Ian Colman, PhD.

Description
An Open Letter to Mr. Mark Zuckerberg: A Global Call to Act Now on Child and Adolescent Mental Health Science. University of Oxford https://www.oii.ox.ac.uk/an-open-letter-to-mark-zuckerberg/
Video testimony from the deposition of Adam Mosseri March 18, 2025 9:57:10 AM - 9:57:55 AM, No Bejar was clear that these problems were important but not severe. Bejar Exhibit 23 https://wcllp.box.com/s/hns395nvpr7uiqa7yr23lg027tyrlp64
Video testimony from the deposition of Kyle Andrews November 19, 2024 pages 362-369 regarding the BEEF survey - with document highlights. Bejar Exhibit 24 https://wcllp.box.com/s/tfdmo2f7qmtpgm2q1xetn85n95jwp6bo
Video testimony from the deposition of Adam Mosseri March 17, 2025 1:21:31 PM - 1:21:51 PM, We have never allowed under 13s to use the platform. Bejar Exhibit 11 https://wcllp.box.com/s/yym4a06v5gxd2j8mkpgx2j5ul36ted3n
Video testimony of Mark Zuckerberg from The House Committee on Energy & Commerce Virtual Hearing March 25, 2021, do you believe that your platform harms children? I don't believe so. Bejar Exhibit 48 https://wcllp.box.com/s/ltu5u3hxfojfdtztrkmkp8bn9lvnveid
Bullying Issues by all age groups, how prevalent were bullying and harassment violations - 0.05% to 0.06% Bejar Exhibit 40
Child Endangerment Issues by all age groups, How prevalent were child endangerment violations. Bejar Exhibit 41
SSI Issues by all age groups, how prevalent were suicide and self-injury violations - views are very infrequent and is removed before seen. Not enough samples to estimate prevalence. Bejar Exhibit 42
Written Testimony of Arturo Bejar before the Subcommittee on Privacy, Technology, and the Law, November 7, 2023. Bejar Exhibit 84
Instagram Transparency Center Bullying and Harassment Prevalence - How prevalent were bullying and harassment violations? Q3 2021 July - September 2021. Bejar Exhibit 26
Wayback Machine - Instagram Transparency Center Suicide and Self-Injury. Prevalence - How prevalent were suicide and self-injury violations? Q3 2021. Bejar Exhibit 28
Instagram Transparency Center Adult Nudity and Sexual Activity Prevalence - How prevalent were adult nudity and sexual activity violations? Q3 2021 July - September 2021. Bejar Exhibit 25

Description
Wayback Machine - Instagram Transparency Center Child Endangerment: Nudity and Physical Abuse and Sexual Exploitation. Prevalence - How prevalent were child endangerment violations? Q3 2021. Bejar Exhibit 27
Mosseri (2019) Changes We're Making to Do More to Support and Protect the Most Vulnerable People who Use Instagram. Bejar Exhibit 53
Meta (2018) New Tools to Manage Your Time on Facebook and Instagram. Bejar Exhibit 55
Factors that Cause Meta's Instagram App to be Unsafe for Kids, without icons Bejar Exhibit 10
We're Introducing New Bulit-In Restrictions for Instagram Teen Accounts, and Expanding to Facebook and Messenger. Bejar Exhibit 64
Orlowski J, Coombe D, Curtis V. The Social Dilemma. Netflix. 2020. https://thesocialdilemma.com/
Sean Parker, Axios Interview Zuckerberg Exhibit 2
Sean Parker, Axios Interview Zuckerberg Exhibit 4
15 USC 6501 et seq (Children's Online Privacy Protection Act)
2012 05 06. Jon Loomer. Detailed History of Facebook Changes 2004-12 [Research]. https://www.jonloomer.com/history-of-facebook-changes/
2014 02 04. The Associated Press. Timeline: Key dates in Facebook's 10-year history. https://phys.org/news/2014-02-timeline-key-dates-facebook-year.html
2022 07 14. Ofcom Presentation. Children's Online User Ages Quantitative Research Study. Produced by: Yonder Consulting. Fieldwork: 14th to 18th July, 2022.
2023 04 04. ICO fines TikTok 12.7 million pounds for misusing children's data. https://ico.org.uk/about-the-ico/media-centre/news-and-blogs/2023/04/ico-fines-tiktok-127-million-for-misusing-children-s-data/
2023 11 10. Canadian Social Survey - Quality of Life, Virtual Health Care and Trust, 2023. Statistics Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/231110/dq231110b-eng.htm
2023 Global Education Monitoring Report. Technology in education: A tool on whose terms? UNESCO. 2023 https://gem-report-2023.unesco.org/
2025 01 27. Snapchat Newsroom. Introducing Discover. https://newsroom.snap.com/introducing-discover
Snapchat Support. What happened to Quick Add? https://help.snapchat.com/hc/en-us/articles/34691800487316-What-happened-to-Quick-Add
Snapchat Support. How do I submit Snaps to Spotlight? https://help.snapchat.com/hc/en-us/articles/7012288096532-How-do-I-submit-Snaps-to-Spotlight

Description
Snapchat Support. What happens when I comment on a Spotlight Snap? https://help.snapchat.com/hc/en-us/articles/7012352337428-What-happens-when-I-comment-on-a-Spotlight-Snap
Snapchat Support. What is a Bitmoji? https://help.snapchat.com/hc/en-us/articles/7012342198676-What-is-a-Bitmoji
Hearing Before the United States Senate Committee on The Judiciary January 31, 2024 Testimony of Mark Zuckerberg Founder and Chief Executive Officer, Meta
2019 02 07. Meta Back to Newsroom. Partnering with Experts to Protect People from Self-Harm and Suicide. Rubaek Exhibit 10
Three Young Women Break the Silence. Rubaek Exhibit 3
Self-Harm and Suicide Plans. Rubaek Exhibit 4
Way Over the Line Bloody Self Harm. Rubaek Exhibit 5
(Danish) Self Harm, Work at the Pediatric and Juvenile Psychiatric Center. Rubaek Exhibit 6
Self Harm, Work at the Pediatric and Juvenile Psychiatric Center. Psychiatry. Rubaek Exhibit 7
April 9, 2024 Letter from Dawn Hawkins and Kindsey Chadwick CEO and Interim President of the National Center on Sexual Exploitation to Evan Spiegel Re: Snapchat to remain on the Watchlist for the 2024 Dirty Dozen List
Snap Inc.'s Second Supplemental Responses and Objections to Plaintiffs' Second Set of Interrogatories.
CBS News, Money Watch. Instagram uses AI to crack down on teens posing as adults online. https://www.cbsnews.com/news/instagram-ai-teens-pretending-to-be-adults/
The TikTok Defendants' Objections and Supplemental Responses to Plaintiffs' Fourth Set of Interrogatories - REDACTED
Carpani (2020) Social Media giants accused of fueling body dysmorphia with filters tell MPs they are 'playful'
Grahn (2024) Updates from our European Safety Forum: strengthening safety for our now 175m-strong European community
Demonstrative of TikTok Filters 2018-2024
CDC. (2025, March 7). About Prescription Opioids. Overdose Prevention. https://www.cdc.gov/overdose-prevention/about/prescription-opioids.html

Description
Colten HR, Altevogt BM, Research I of M (US) C. on S. M. Extent and Health Consequences of Chronic Sleep Loss and Sleep Disorders. Institute of Medicine (US) Committee on Sleep Medicine and Research. Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. Colten HR, Altevogt BM, editors. Washington (DC): National Academies Press (US); 2006. PMID: 20669438.
National Center for Drug Abuse Statistics. (n.d.). Teenage Drug Use Statistics [2023]: Data & Trends on Abuse. NCDAS. Retrieved April 10, 2025, from https://drugabusestatistics.org/teen-drug-use/
Social media use, connections and relationships in Canadian adolescents: Findings from the 2018 Health Behaviour in School-aged Children (HBSC) Study. (with Public Health Agency of Canada). (2021). Public Health Agency of Canada = Agence de santé publique du Canada.
Statistics Canada. (2021, November 24). The Daily — Canadian Social Survey: Loneliness in Canada. Government of Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/211124/dq211124e-eng.htm
Statistics Canada. (2023). Online digital media use and adolescent mental health. https://doi.org/10.25318/82-003-X202300200002-ENG
Substance Abuse and Mental Health Services Administration. (2024). Key Substance Use and Mental Health Indicators in the United States: Results from the 2023 National Survey on Drug Use and Health (Nos. PEP24-07–021). Department of Health and Human Services. https://www.samhsa.gov/data/report/2023-nsduh-annual-national-report
United Nations. (n.d.). Youth. United Nations. Retrieved April 15, 2025, from https://www.un.org/en/global-issues/youth
United States Census Bureau. (n.d.). QuickFacts United States PST045224. U.S. Department of Commerce. https://www.census.gov/quickfacts/fact/table/US/PST045224

Description
April 18, 2025 Expert Report of Kara Bagot.
April 18, 2025 Expert Report of Dimitri Chirstakis.
April 18, 2025 Expert Report of Drew Cingel.
April 18, 2025 Expert Report of Anna Lembke.
April 18, 2025 Expert Report of Ramin Mojtabai.
April 18, 2025 Expert Report of Stuart Murray.
April 18, 2025 Expert Report of Eva Telzer.
April 18, 2025 Expert Report of Jean Twenge.
April 18, 2025 Expert Report of Alan Berman.
April 18, 2025 Expert Report of Craig Bryan.
April 18, 2025 Expert Report of Robert Gibbons.
April 18, 2025 Expert Report of Scott Patten.
April 18, 2025 Expert Report of Robert Platt.

Cite
5Rights Foundation. Pathways: How digital design puts children at risk. 2021 Jul.
A Union of Professionals, American Psychological Association, Design it for us, fairplay, Parents Together. Likes vs. Learning: The Real Cost of Social Media for Schools. Educators, Parents, Students & Child Advocates Demand Platform Changes. 2023.
Abbasi J, Hswen Y. US Surgeon General Vivek Murthy: To Protect Adolescents, Social Media Needs Warning Labels. JAMA. News & Analysis. 2024 Aug. 9.
Åberg E, Koivula A, Kukkonen I. A feminine burden of perfection? Appearance-related pressures on social networking sites. Telematics and Informatics, 46, 101319. 2020.
Abma JC, Martinez GM. Sexual Activity and Contraceptive Use Among Teenagers in the United States, 2011-2015. Natl Health Stat Report. 2017 Jun;(104):1-23. PMID: 28696201.
Abrahamsson, S. Smartphone bans, student outcomes and mental health. In SAM (Discussion Paper No. 0804–6824; Vols. 01–24) 2024 Jan. https://url.usb.m.mimecastprotect.com/s/OC8vC7DqzwID3O5t8fWUoju2k?domain=openaccess.nhh.no
Abrams Z. Why young brains are especially vulnerable to social media. American Psychological Association. Mental Health, Social Media and Internet, Children, Teens. 2023 Aug. 3.
Abrams Z. Why young brains are especially vulnerable to social media. American Psychological Association. Mental Health, Social Media and Internet, Children, Teens. 2023 Aug. 3. https://www.apa.org/news/apa/2022/social-media-children-teens
Abreu RL, Kenny MC. Cyberbullying and LGBTQ Youth: A Systematic Literature Review and Recommendations for Prevention and Intervention. J Child Adolesc Trauma. 2017 Jul 24;11(1):81-97.
Abreu RL, Kenny MC. Cyberbullying and LGBTQ Youth: A Systematic Literature Review and Recommendations for Prevention and Intervention. J Child Adolesc Trauma. 2017 Jul 24;11(1):81-97. doi: 10.1007/s40653-017-0175-7. PMID: 32318140; PMCID: PMC7163911.
ACAMPS. Youth Mental Health Crisis: US Surgeon General Calls for Warning Labels on Social Media. ACAMPS.org, News. 2024 Oct.
Achenbach TM, Dumenci L. Advances in empirically based assessment: revised cross-informant syndromes and new DSM-oriented scales for the CBCL, YSR, and TRF: comment on Lengua, Sadowksi, Friedrich, and Fischer (2001). J Consult Clin Psychol. 2001 Aug;69(4):699-702.
Achterberg M, Becht A, van der Cruijsen R, van de Groep IH, Spaans JP, Klapwijk E, Crone EA. Longitudinal associations between social media use, mental well-being and structural brain development across adolescence. Dev Cogn Neurosci. 2022 Apr;54:101088.
Achterberg M, Becht A, van der Cruijsen R, van de Groep IH, Spaans JP, Klapwijk E, Crone EA. Longitudinal associations between social media use, mental well-being and structural brain development across adolescence. Dev Cogn Neurosci. 2022 Apr;54:101088. doi: 10.1016/j.dcn.2022.101088. Epub 2022 Feb 19. PMID: 35220022; PMCID: PMC8881643.
Acoba EF. Social support and mental health: the mediating role of perceived stress. Front Psychol. 2024 Feb 21;15:1330720. doi: 10.3389/fpsyg.2024.1330720. PMID: 38449744; PMCID: PMC10915202.
Acoba EF. Social support and mental health: The mediating role of perceived stress. Frontiers in Psychology, 15, Article 1330720. 2024.
Adams SK, Daly JF, Williford DN. Adolescent sleep and cellular phone use: recent trends and implications for research. Health Serv Insights. 2013 Oct 3;6:99-103.

Literature

Cite
Ademiluyi A, Li C, Park A Implications and Preventions of Cyberbullying and Social Exclusion in Social Media: Systematic Review JMIR Form Res 2022;6(1):e30286.
Ademiluyi A, Li C, Park A. Implications and Preventions of Cyberbullying and Social Exclusion in Social Media: Systematic Review. JMIR Form Res. 2022 Jan 4;6(1):e30286. doi: 10.2196/30286. PMID: 34982712; PMCID: PMC8767467.
Adinoff B. Neurobiologic processes in drug reward and addiction. Harv Rev Psychiatry. 2004 Nov-Dec;12(6):305-20.
Agüera Z, Lozano-Madrid M, Mallorquí-Bagué N, Jiménez-Murcia S, Menchón JM, Fernández-Aranda F. A review of binge eating disorder and obesity. Neuropsychiatr. 2021 Jun;35(2):57-67. English. doi: 10.1007/s40211-020-00346-w. Epub 2020 Apr 28. PMID: 32346850.
Agüera, Z., Lozano-Madrid, M., Mallorquí-Bagué, N., Jiménez-Murcia, S., Menchón, J. M., & Fernández-Aranda, F. (2021). A review of binge eating disorder and obesity. Neuropsychiatrie: Klinik, Diagnostik, Therapie und Rehabilitation: Organ der Gesellschaft Osterreichischer Nervenarzte und Psychiater, 35(2), 57-67
Ahmed E, Ahmed S. Social media addiction, personality traits, and disorders: an overview of recent literature. Curr Opin Psychiatry. 2025 Jan 1;38(1):72-77.
Ahmed E, Ahmed S. Social media addiction, personality traits, and disorders: an overview of recent literature. Curr Opin Psychiatry. 2025 Jan 1;38(1):72-77. doi: 10.1097/YCO.0000000000000969. Epub 2024 Sep 12. PMID: 39351848.
Ahmed O, Walsh EI, Dawel A, Alateeq K, Espinoza Oyarce DA, Cherbuin N. Social media use, mental health and sleep: A systematic review with meta-analyses. J Affect Disord. 2024 Dec 15;367:701-712.
Ahrens J, Brennan F, Eaglesham S, Buelo A, Laird Y, Manner J, Newman E, Sharpe H. A Longitudinal and Comparative Content Analysis of Instagram Fitness Posts. International journal of environmental research and public health, 19(11), 6845. 2022.
Aichner T, Grünfelder M, Maurer O, Jegeni D. Twenty-Five Years of Social Media: A Review of Social Media Applications and Definitions from 1994 to 2019. Cyberpsychol Behav Soc Netw. 2021 Apr;24(4):215-222. doi: 10.1089/cyber.2020.0134. Epub 2020 Oct 13. PMID: 33847527; PMCID: PMC8064945.
Aichner T, Grünfelder M, Maurer O, Jegeni D. Twenty-Five Years of Social Media: A Review of Social Media Applications and Definitions from 1994 to 2019. Cyberpsychology, Behavior, and Social Networking 2021 24:4, 215-22.
Akbari M, Seydavi M, Jamshidi S, Marino C, Spada MM. The Big-five personality traits and their link to problematic and compensatory Facebook use: A systematic review and meta-analysis. Addict Behav. 2023 Apr;139:107603.
Akbari M, Seydavi M, Palmieri S, Mansueto G, Caselli G, Spada MM. Fear of missing out (FoMO) and internet use: A comprehensive systematic review and meta-analysis. J Behav Addict. 2021 Dec 17;10(4):879–900.
Alexander-Bloch A, Giedd JN, Bullmore E. Imaging structural co-variance between human brain regions. Nat Rev Neurosci. 2013 May;14(5):322-36.
Alexander-Bloch A, Raznahan A, Bullmore E, Giedd J. The convergence of maturational change and structural covariance in human cortical networks. J Neurosci. 2013 Feb 13;33(7):2889-99.

Literature

Cite
Alexander-Bloch A, Raznahan A, Bullmore E, Giedd J. The convergence of maturational change and structural covariance in human cortical networks. J Neurosci. 2013 Feb 13;33(7):2889-99. doi: 10.1523/JNEUROSCI.3554-12.2013. PMID: 23407947; PMCID: PMC3711653.
Alfasi Y. The grass is always greener on my Friends' profiles: The effect of Facebook social comparison on state self-esteem and depression. Personality and Individual Differences. 147. 111-117. 2019.
Ali AM, Hendawy AO, Abd Elhay ES, Ali EM, Alkhamees AA, Kunugi H, Hassan NI. The Bergen Facebook Addiction Scale: its psychometric properties and invariance among women with eating disorders. BMC Womens Health. 2022 Mar 31;22(1):99.
Ali Homaid A. Problematic social media use and associated consequences on academic performance decrement during Covid-19. Addict Behav. 2022 Sep;132:107370. doi: 10.1016/j.addbeh.2022.107370. Epub 2022 May 18. PMID: 35605410.
Allcott H, Braghieri L, Eichmeyer S, Gentzkow M. The Welfare Effects of Social Media. American Economic Review. 110. 629-676. 2020.
Allcott H, Gentzkow M, Song L. Digital Addiction. American Economic Review, 112(7):2424-63. 2022.
Allcott H, Gentzkow M, Wittenbrink B, Cisneros JC, Crespo-Tenorio A, Dimmery D, Freelon D, González-Bailón S, Guess A, Kim YM, Lazer D, Malhotra N, Moehler D, Nair-Desai S, Nyhan B, Pan J, Settle J, Thorson E, Tromble R, Rivera CV, Wilkins A, Wojcieszak M, Franco A, Kiewiet de Jonge C, Mason W, Jomini Stroud N, Tucker J. The Effect of Deactivating Facebook and Instagram on Users' Emotional State. National Bureau of Economic Research. 2025.
Allcott H, Gentzkow M. Could a social media detox improve our well-being? The Washington Post, Opinion. 2025 Apr. 21.
Allen, K. A., Ryan, T., Gray, D. L. McInerney, D. M. & Waters, L. (2014). Social media use and social connectedness in adolescents: The positives and possible pitfalls. The Australian Educational and developmental Psychologist, 31(1), 18-31. doi:10.1017/edp.2014.2
Al-Menayes JJ. Social Media Use, Engagement and Addiction as Predictors of Academic Performance. International Journal of Psychological Studies. 2015. 7(4), 86. https://doi.org/10.5539/ijps.v7n4p86
Al-Menayes, Jamal. (2015). Social Media Use, Engagement and Addiction as Predictors of Academic Performance. International Journal of Psychological Studies. 7. 86-86.
Alzahrani AM, Hakami A, AlHadi A, Al-Maflehi N, Aljawadi MH, Alotaibi RM, Alzahrani MM, Alammari SA, Batais MA, Almigbal TH. The effectiveness of mindfulness training in improving medical students' stress, depression, and anxiety. PLoS One. 2023 Oct 31;18(10):e0293539.
Alzuabi I, Jafar A, Aljoumaa K. Predicting customer’s gender and age depending on mobile phone data. Journal of Big Data. 2019.
American Academy of Child & Adolescent Psychiatry. Social Media and Teens. American Academy of Child & Adolescent Psychiatry, Families and Youth, Fact Sheets. Mar 2018. https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Social-Media-and-Teens-100.aspx

Literature

Cite
American Psychiatric Association, DSM-5 Task Force. (2013). Diagnostic and statistical manual of mental disorders: DSM-5™ (5th ed.). American Psychiatric Publishing, Inc.
American Psychiatric Association, DSM-5 Task Force. Diagnostic and statistical manual of mental disorders: DSM-5™ (5th ed.). American Psychiatric Publishing, Inc. 2013.
American Psychological Association. Potential Risks of Content, Features, and Functions: A closer look at the science behind how social media affects youth. Psychology topics, Social media and the internet. 2024 Apr.
Amnesty International. Global: TikTok's 'For You' feed risks pushing children and young people towards harmful mental health content. Amnesty International. News. 2023 Nov. 7, https://www.amnesty.org/en/latest/news/2023/11/tiktok-risks-pushing-children-towards-harmful-content/
Anderson DR, Huston AC, Schmitt KL, Linebarger DL, Wright JC. Early childhood television viewing and adolescent behavior: the recontact study. Monogr Soc Res Child Dev. 2001;66(1):I-VIII, 1-147.
Anderson M, Faverio M, Gottfried J. Teens, Social Media and Technology 2023. Pew Research Center. 2023 Dec. 11.
Anderson M, Faverio M, Gottfried J. Teens, Social Media and Technology 2023. Pew Research Center. 2023 Dec. 11.
Anderson M, Faverio M, Park E. How teens and parents approach screen time. Pew Research Center. 2024 Mar. 11.
Anderson M, Faverio M, Park E. How teens and parents approach screen time. Pew Research Center. 2024 Mar. 11. https://www.pewresearch.org/internet/2024/03/11/how-teens-and-parents-approach-screen-time/
Anderson M, Jiang J. Teens' Social Media Habits and Experiences. Pew Research Center. 2018.
Anderson M, Vogels E, Perrin A, Rainie L. Connection, Creativity and Drama: Teen Life on Social Media in 2022. Pew Research Center. 2022 Nov. 16, https://www.pewresearch.org/internet/2022/11/16/connection-creativity-and-drama-teen-life-on-social-media-in-2022/
Anderson M, Vogels E, Perrin A, Rainie L. Connection, Creativity and Drama: Teen Life on Social Media in 2022. Pew Research Center. 2022 Nov. 16.
Anderson P. Assessment and development of executive function (EF) during childhood. Child Neuropsychol. 2002 Jun;8(2):71-82.
Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction - an overview. Current pharmaceutical design, 20(25), 4053–4061.
Andrianie PS, Japar M, Pratisti WD, Kasturi T, Purwandari E. The Role of Peer Relationships in Problematic Internet Use among Adolescents: A Scoping Review and Meta-analysis. *The Open Psychology Journal* , *17* (1). 2024. e18743501333973.
Angelini F, Marino C, Gini G. Friendship quality in adolescence: the role of social media features, online social support and e-motions. Curr Psychol. 2022 Sep 12:1-17.
Angold A, Costello EJ, Farmer EM, Burns BJ, Erkanli A. Impaired but undiagnosed. J Am Acad Child Adolesc Psychiatry. 1999 Feb;38(2):129-37.

Literature

Cite
Angwin J. Bad News: We've Lost Control of Our Social Media Fees. Good News: Courts Are Noticing. The New York Times, Opinion. 2024 Oct. 21. https://www.nytimes.com/2024/10/21/opinion/tiktok-meta-social-media-law.html
Anixiadis F, Wertheim EH, Rodgers R, Caruana B. Effects of thin-ideal instagram images: The roles of appearance comparisons, internalization of the thin ideal and critical media processing. Body Image. 2019 Dec;31:181-190.
Ansari S, Iqbal N, Asif R, Hashim M, Farooqi SR, Alimoradi Z. Social Media Use and Well-Being: A Systematic Review and Meta-Analysis. Cyberpsychol Behav Soc Netw. 2024 Oct;27(10):704-719.
Appel M, Marker C, Gnambs T. Are Social Media Ruining Our Lives? A Review of Meta-Analytic Evidence. Review of General Psychology, 24(1), 60-74. 2020.
Aragon-Guevara D, Castle G, Sheridan E, Vivanti G. The Reach and Accuracy of Information on Autism on TikTok. J Autism Dev Disord. 2023 Aug 6.
Aragon-Guevara, D., Castle, G., Sheridan, E., & Vivanti, G. (2023). The reach and accuracy of information on autism on TikTok. Journal of Autism and Developmental Disorders.
Arendt F, Scherr S, Romer D. Effects of exposure to self-harm on social media: Evidence from a two-wave panel study among young adults. New Media & Society, 21(11-12), 2422–2442. 2019.
Armstrong PW, Westerhout CM. Composite End Points in Clinical Research: A Time for Reappraisal. Circulation. 2017 Jun 6;135(23):2299-2307. doi: 10.1161/CIRCULATIONAHA.117.026229. PMID: 28584030.
Arnett JJ. Emerging adulthood. A theory of development from the late teens through the twenties. Am Psychol. 2000 May;55(5):469-80. PMID: 10842426.
Ata RN, Thompson JK, Small BJ. Effects of exposure to thin-ideal media images on body dissatisfaction: testing the inclusion of a disclaimer versus warning label. Body Image. 2013 Sep;10(4):472-80.
Atkinson L, Beitchman J, Gonzalez A, Young A, Wilson B, Escobar M, Chisholm V, Brownlie E, Khoury JE, Ludmer J, Villani V. Cumulative risk, cumulative outcome: a 20-year longitudinal study. PLoS One. 2015 Jun 1;10(6):e0127650.
Augner C, Vlasak T, Barth A. The relationship between problematic internet use and attention deficit, hyperactivity and impulsivity: A meta-analysis. J Psychiatr Res. 2023 Dec;168:1-12.
Australian Government. Australia's youth: Mental illness. Australian Institute of Health and Welfare. 2021. https://www.aihw.gov.au/reports/children-youth/mental-illness
Auxier B, Anderson M, Perrin A, Turner E. Parenting Children in the Age of Screens. Pew Research Center. 2020.
Aydın O, Obuća F, Boz C, Ünal-Aydın P. Associations between executive functions and problematic social networking sites use. J Clin Exp Neuropsychol. 2020 Aug;42(6):634-645. doi: 10.1080/13803395.2020.1798358. PMID: 32781930.
Ayorech Z, Krapohl E, Plomin R, von Stumm S. Genetic Influence on Intergenerational Educational Attainment. Psychol Sci. 2017 Sep;28(9):1302-1310. doi: 10.1177/0956797617707270. Epub 2017 Jul 17. PMID: 28715641; PMCID: PMC5595239.

Literature

Cite
Ayorech Z, von Stumm S, Haworth CM, Davis OS, Plomin R. Personalized Media: A Genetically Informative Investigation of Individual Differences in Online Media Use. PLoS One. 2017 Jan 23;12(1):e0168895.
Bagot KS, Matthews SA, Mason M, Squeglia LM, Fowler J, Gray K, Herting M, May A, Colrain I, Godino J, Tapert S, Brown S, Patrick K. Current, future and potential use of mobile and wearable technologies and social media data in the ABCD study to increase understanding of contributors to child health. Dev Cogn Neurosci. 2018 Aug;32:121-129.
Baker DA, Algorta GP. The Relationship Between Online Social Networking and Depression: A Systematic Review of Quantitative Studies. Cyberpsychol Behav Soc Netw. 2016 Nov;19(11):638-648.
Bányai F, Zsila Á, Király O, Maraz A, Elekes Z, Griffiths MD, Andreassen CS, Demetrovics Z. Problematic Social Media Use: Results from a Large-Scale Nationally Representative Adolescent Sample. PLoS One. 2017 Jan 9;12(1):e0169839
Bapaye JA, Bapaye HA. Demographic Factors Influencing the Impact of Coronavirus-Related Misinformation on WhatsApp: Cross-sectional Questionnaire Study JMIR Public Health Surveill 2021;7(1):e19858
Bapaye, J. A., & Bapaye, H. A. (2021). Demographic factors influencing the impact of coronavirus-related misinformation on WhatsApp: Cross-sectional questionnaire study. JMIR Public Health and Surveillance, 7(1).
Barakat, S., McLean, S. A., Bryant, E., Le, A., Marks, P., National Eating Disorder Research Consortium, Touyz, S., & Maguire, S. (2023). Risk factors for eating disorders: findings from a rapid review. Journal of eating disorders, 11(1), 8. https://doi.org/10.1186/s40337-022-00717-4
Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. Patient Educ Couns. 2002 Oct-Nov;48(2):177-87. doi: 10.1016/s0738-3991(02)00032-0. PMID: 12401421.
Barrett K. Social Media's Impact on Students' Mental Health Comes into Focus. NEA Today. 2018 Sep. 27.
Barry E, Kang C. Surgeon General Calls for Warning Labels on Social Media Platforms. The New York Times, Opinion. 2024 Jun. 17. https://www.nytimes.com/2024/06/17/opinion/social-media-health-warning.html
Barry E. Teen Girls' Brains Aged Rapidly During Pandemic, Study Finds. The New York Times, Health. 2024 Sep. 9. https://www.nytimes.com/2024/09/09/health/teen-brains-pandemic-girls.html?smid=nytcore-ios-share&referringSource=articleShare&sgrp=c-cb&ngrp=mnp&pvid=F1B22923-5CBD-4353-9BE4-360E26253A54
Baumgartner S, van der Schuur W, Lemmens J, te Poel F. The Relationship Between Media Multitasking and Attention Problems in Adolescents: Results of Two Longitudinal Studies. Human Communication Research. 44. 3-30. 2018.
Beaver KM, Schwartz JA, Connolly EJ, Al-Ghamdi MS, Kobeisy AN. The role of parenting in the prediction of criminal involvement: findings from a nationally representative sample of youth and a sample of adopted youth. Dev Psychol. 2015 Mar;51(3):301-8. doi: 10.1037/a0038672. Epub 2015 Jan 19. PMID: 25602937.
B. F., Emery, G. W., DeRubeis, R. J., Hollon, S. D., & Clark, D. M. (2024). *Cognitive therapy of depression* (Seco
Beeres DT, Andersson F, Vossen HGM, Galanti MR. Social Media and Mental Health Among Early Adolescents in Sweden: A Longitudinal Study With 2-Year Follow-Up (KUPOL Study). J Adolesc Health. 2021 May;68(5):953-960. doi: 10.1016/j.jadohealth.2020.07.042. Epub 2020 Sep 14. PMID: 32943289.

Literature

Cite
Bekalu, M. A., Sato, T., & Viswanath, K. (2023). Conceptualizing and measuring social media use in health and well-being studies: Systematic review. Journal of Medical Internet Research, 25, e43191. https://doi.org/10.2196/43191
Berg L. Apple Defied App Store Injunction For Revenge, Judge Says. Law360. 2025 May 1.
Berger MN, Taba M, Marino JL, Lim MSC, Skinner SR. Social Media Use and Health and Well-being of Lesbian, Gay, Bisexual, Transgender, and Queer Youth: Systematic Review. J Med Internet Res. 2022 Sep 21;24(9):e38449.
Bergfeld, N. S. and Van den Bulck, J. (2021). "It's not all about the likes: Social media affordances with nighttime, problematic, and adverse use as predictors of adolescent sleep indicators." Sleep Health **7**(5): 548-555.
Berridge, K. C. (2012). From prediction error to incentive salience: Mesolimbic computation of reward motivation. European Journal of Neuroscience, 35(7), 1124–1143.
Betz, Diana E., Natalie J. Sabik, and Laura R. Ramsey. "Ideal comparisons: Body ideals harm women's body image through social comparison." Body image 29 (2019): 100-109.
Bhandari A, Bimo S. Why's Everyone on TikTok Now? The Algorithmized Self and the Future of Self-Making on Social Media. Social Media + Society, 8(1). 2022.
Bhattarai A. Retailers are marketing directly to kids shopping on their smartphones. The Washington Post, Business. 2018 Aug. 10.
Biernesser C, Sewall CJR, Brent D, Bear T, Mair C, Trauth J. Social Media Use and Deliberate Self-Harm Among Youth: A Systematized Narrative Review. Child Youth Serv Rev. 2020 Sep;116:105054.
Bij de Vaate, N. A. J. D., Veldhuis, J., & Konijn, E. (2020). How online self-presentation affects well-being and body image: A systematic review. Telematics and Informatics, 47(April), Article 101316.
Bilton N. Meet Facebook's Mr. Nice. The New York Times, Disruptions. 2014 Oct. 22.
Blackburn, M. R., & Hogg, R. C. (2024). #ForYou? the impact of pro-ana TikTok content on body image dissatisfaction and internalisation of societal beauty standards. PloS one, 19(8), e0307597. https://doi.org/10.1371/journal.pone.0307597
Blakemore, SJ., Robbins, T. Decision-making in the adolescent brain. Nat Neurosci 15, 1184–1191 (2012).
Blasi, M. D., Giardina, A., Giordano, C., Coco, G. L., Tosto, C., Billieux, J., & Schimmenti, A. (2019). Problematic video game use as an emotional coping strategy: Evidence from a sample of MMORPG gamers. Journal of Behavioral Addictions, 8(1), 25–34.
Blomquist KK, Pate SP, Hock AN, Austin SB. Evidence-based policy solutions to prevent eating disorders: Do disclaimer labels on fashion advertisements mitigate negative impact on adult women? Body Image. 2022 Dec;43:180-192.
Boer M, Stevens G, Finkenauer C, de Looze M, van den Eiginden R. Social media use intensity, social media use problems, and mental health among adolescents: Investigating directionality and mediating processes. Computers in Human Behavior, vol 116, 106645. 2021 Mar.
Boer M, Stevens G, Finkenauer C, van den Eijnden R. Attention Deficit Hyperactivity Disorder-Symptoms, Social Media Use Intensity, and Social Media Use Problems in Adolescents: Investigating Directionality. Child Dev. 2020 Jul;91(4):e853-e865. doi: 10.1111/cdev.13334. Epub 2019 Oct 26. PMID: 31654398; PMCID: PMC7497191.

Cite
Boer M, Stevens G, Finkenauer C, van den Eijnden R. Attention Deficit Hyperactivity Disorder-Symptoms, Social Media Use Intensity, and Social Media Use Problems in Adolescents: Investigating Directionality. Child development, 91(4), e853–e865. 2020.
Boer, M., Stevens, G. W. J. M., Finkenauer, C., & van den Eijnden, R. J. J. M. (2022). The complex association between social media use intensity and adolescent wellbeing: A longitudinal investigation of five factors that may affect the association. Computers in Human Behavior, 128, 107084.
Boer, M., Stevens, G. W. J. M., Finkenauer, C., Koning, I. M., & van den Eijnden, R. J. J. M. (2022). Validation of the Social Media Disorder Scale in Adolescents: Findings From a Large-Scale Nationally Representative Sample. Assessment, 29(8), 1658–1675. https://doi.org/10.1177/10731911211027232
Boers E, Afzali MH, Newton N, Conrod P. Association of Screen Time and Depression in Adolescence. JAMA Pediatr. 2019 Sep 1;173(9):853-859.
Boers, E., Afzali, M. H. and Conrod, P. (2020). "Temporal Associations of Screen Time and Anxiety Symptoms Among Adolescents." Can J Psychiatry **65**(3): 206-208.
Bollinger C. TikTok's New Streak Feature Keeps You Coming Back Daily. Jumper Media. 2025 Jan. 7. https://jumpermedia.co/tiktoks-new-streak-feature-keeps-you-coming-back-daily/
Bond RM, Fariss CJ, Jones JJ, Kramer AD, Marlow C, Settle JE, Fowler JH. A 61-million-person experiment in social influence and political mobilization. Nature. 2012 Sep 13;489(7415):295-8. doi: 10.1038/nature11421. PMID: 22972300; PMCID: PMC3834737.
Boniel-Nissim M, Marino C, Galeotti T, Blinka L, Ozoliņa K, Craig W, Lahti H, Wong S, Brown J, Wilson M, Inchley J, Eijnden R. A focus on adolescent social media use and gaming in Europe, central Asia and Canada. 2024.
Bonsaksen T, Steigen AM, Stea TH, Kleppang AL, Lien L, Leonhardt M. Negative social media-related experiences and lower general self-efficacy are associated with depressive symptoms in adolescents. Front Public Health. 2023 Jan 6;10:1037375.
Booker, C. L., Kelly, Y. J., & Sacker, A. (2018). Gender differences in the associations between age trends of social media interaction and well-being among 10-15 year olds in the UK. BMC Public Health, 18(1), 321. https://doi.org/10.1186/s12889-018-5220-4
Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2021). Introduction to Meta-Analysis (1st ed.). Wiley. https://doi.org/10.1002/9781119558378
Borges do Nascimento IJ, Pizarro AB, Almeida JM, Azzopardi-Muscat N, Gonçalves MA, Björklund M, Novillo-Ortiz D. Infodemics and health misinformation: a systematic review of reviews. Bull World Health Organ. 2022 Sep 1;100(9):544-561.
Bornioli A, Lewis-Smith H, Smith A, Slater A, Bray I. Adolescent body dissatisfaction and disordered eating: Predictors of later risky health behaviours. Soc Sci Med. 2019 Oct;238:112458.
Böttger H, Költzsch D. The fear factor: Xenoglossophobia or how to overcome the anxiety of speaking foreign languages. Training, Language and Culture, 4(2), 43-55. 2020.

Literature

Cite
Boursier V, Gioia F, Griffiths MD. Objectified Body Consciousness, Body Image Control in Photos, and Problematic Social Networking: The Role of Appearance Control Beliefs. Frontiers in Psychology, 11. 2020.
Bozzola E, Spina G, Agostiniani R, Barni S, Russo R, Scarpato E, Di Mauro A, Di Stefano AV, Caruso C, Corsello G, Staiano A. The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks. Int J Environ Res Public Health. 2022 Aug 12;19(16):9960.
Bradford hill richard Doll 1950 paper "smoking and carcinoma of the lung, a preliminary report
Bradley, S. W., Roberts, J. A., & Bradley, P. W. (2019). Experimental evidence of observed social media status cues on perceived likability. Psychology of Popular Media Culture, 8(1), 41–51.
Braghieri L, Levy R, Makarin A. Social Media and Mental Health. SSRN Electronic Journal. 2021.
Brailovskaia J, Teismann T, Margraf J. Positive Mental Health Mediates the Relationship Between Facebook Addiction Disorder and Suicide-Related Outcomes: A Longitudinal Approach. Cyberpsychol Behav Soc Netw. 2020 May;23(5):346-350.
Brailovskaia, J., Ströse, F., Schillack, H., & Margraf, J. (2020). Less Facebook use—More well-being and a healthier lifestyle? An experimental intervention study. Computers in Human Behavior, 108, Article 106332.
Brand M, Rumpf HJ, Demetrovics Z, MÜller A, Stark R, King DL, Goudriaan AE, Mann K, Trotzke P, Fineberg NA, Chamberlain SR, Kraus SW, Wegmann E, Billieux J, Potenza MN. Which conditions should be considered as disorders in the International Classification of Diseases (ICD-11) designation of "other specified disorders due to addictive behaviors"? J Behav Addict. 2020 Jun 30;11(2):150–9.
Brandes, S. B., & Levin, D. (2014). “Like My Status” Israeli teenage girls constructing their social connections on the Facebook social network. Feminist Media Studies, 14(5), 743-758.
Branje S, de Moor EL, Spitzer J, Becht AI. Dynamics of Identity Development in Adolescence: A Decade in Review. J Res Adolesc. 2021 Dec;31(4):908-927.
Brannigan, R., Gil-Hernandez, C. J., McEvoy, O., Cronin, F., Stanistreet, D. and Layte, R. (2022). "Digital engagement and its association with adverse psychiatric symptoms: A longitudinal cohort study utilizing latent class analysis." Computers in Human Behavior 133: 107290.
Brasil KM, Mims CE, Pritchard ME, McDermott RC. Social media and body image: Relationships between social media appearance preoccupation, self-objectification, and body image. Body Image. 2024 Dec;51:101767.
Brautsch L, Lund L, Andersen M, Jennum P, Folker A, Andersen S. Digital media use and sleep in late adolescence and young adulthood: A systematic review. Sleep medicine reviews, 68, 101742. 2023.
Brosnan, B., Haszard, J. J., Meredith-Jones, K. A., Wickham, S. R., Galland, B. C., & Taylor, R. W. (2024). Screen Use at Bedtime and Sleep Duration and Quality Among Youths. JAMA pediatrics, 178(11), 1147–1154. https://doi.org/10.1001/jamapediatrics.2024.2914
Brown A, Dittmar H. Think "thin" and feel bad: The role of appearance schema activation, attention level, and thin-ideal internalization for young women's responses to ultra-thin media ideals. Journal of Social and Clinical Psychology. 2005.
Brown L, Kuss DJ. Fear of Missing Out, Mental Wellbeing, and Social Connectedness: A Seven-Day Social Media Abstinence Trial. Int J Environ Res Public Health. 2020 Jun 24;17(12):4566.

Cite
Brown, A., & Dittmar, H. (2005). Think “thin” and feel bad: The role of appearance schema activation, attention level, and thin–ideal internalization for young women’s responses to ultra–thin media ideals. Journal of Social and Clinical Psychology, 24(8), 1088–1113.
Brownstein M. Targeting kids generates billions in ad revenue for social media. The Harvard Gazette, Nation & World. 2024 Jan. 2. https://news.harvard.edu/gazette/story/2024/01/social-media-platforms-make-11b-in-ad-revenue-from-u-s-teens/
Buchanan, T. (2003). Internet-based questionnaire assessment: appropriate use in clinical contexts. Cognitive behaviour therapy, 32(3), 100-109.
Buodo G, Moretta T, Santucci VG, Chen S, Potenza MN. Using Social Media for Social Motives Moderates the Relationship between Post-Traumatic Symptoms during a COVID-19-Related Lockdown and Improvement of Distress after Lockdown. Behav Sci (Basel). 2023 Jan 6;13(1):53.
Burhan (2020) Neurotransmitter Dopamine (DA) and its Role in Development of Social Media Addiction. Journal of Neurology & Neurophys, Vol 11 Iss 7, 507. 2020.
Burnell K, Kurup A, Underwood M. Snapchat lenses and body image concerns. New Media & Society vol 24(9) 2088-2106. 2021.
Burnell K, Meter DJ, Andreade FC, Slocum A, George MJ. The Effects of Social Media Restriction: Meta-Analytic Evidence from Randomized Controlled Trials. SSM - Mental Health. 2025 May 4.
Burstein, B., Agostino, H., & Greenfield, B. (2019). Suicidal Attempts and Ideation Among Children and Adolescents in US Emergency Departments, 2007-2015. JAMA pediatrics, 173(6), 598–600.
Butler N, Quigg Z, Bates R, Jones L, Ashworth E, Gowland S, Jones M. The Contributing Role of Family, School, and Peer Supportive Relationships in Protecting the Mental Wellbeing of Children and Adolescents. School Ment Health. 2022;14(3):776-788.
Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989 May;28(2):193-213. doi: 10.1016/0165-1781(89)90047-4. PMID: 2748771.
C.S. Mott Children's Hospital. Mott Poll Report. Sharing Too Soon? Children and Social Media Apps. University of Michigan Health. National Poll on Children's Health, Vol 39, Iss 4. 2021 Oct. 18.
Callan, M. J., Kim, H., & Matthews, W. J. (2015). Age differences in social comparison tendency and personal relative deprivation. Personality and Individual Differences, 87, 196–199.
Cameron, J. D., Chaput, J.-P., Sjödin, A. M., & Goldfield, G. S. (2017). Brain on fire: Incentive salience, hedonic hot spots, dopamine, obesity, and other hunger games. Annual Review of Nutrition, 37, 183–205.
Campaign for a Commercial-Free Childhood et al (2018) Letter from multiple organizations to Mark Zuckerberg RE: Facebook Messenger Kids. Campaign for a Commercial-Free Childhood. 2018 Jan. 30.
Campbell R, Wright C, Hickman M, Kipping RR, Smith M, Pouliou T, Heron J. Multiple risk behaviour in adolescence is associated with substantial adverse health and social outcomes in early adulthood: Findings from a prospective birth cohort study. Prev Med. 2020 Sep;138:106157.
Canadian Centre for Child Protection. Reviewing Child Sexual Abuse Material Reporting Functions On Popular Platforms. 2020.

Cite
Canady VA. CDC data finds sharp rise in suicide attempts among teen girls amid COVID-19. Mental Health Weekly. 2021 Jun 21;31(24):1–3.
Carr C, Hayes R. Social Media: Defining, Developing, and Divining. Atlantic Journal of Communication. 23. 46-65. 2015.
Carr, C. T., & Hayes, R. A. (2015). Social Media: Defining, Developing, and Divining. Atlantic Journal of Communication, 23(1), 46–65. https://doi.org/10.1080/15456870.2015.972282
Carraturo F, Di Perna T, Giannicola V, Nacchia MA, Pepe M, Muzii B, Bottone M, Sperandeo R, Bochicchio V, Maldonato NM, Scandurra C. Envy, Social Comparison, and Depression on Social Networking Sites: A Systematic Review. Eur J Investig Health Psychol Educ. 2023 Feb 1;13(2):364-376.
Caruana EJ, Roman M, Hernández-Sánchez J, Solli P. Longitudinal studies. J Thorac Dis. 2015 Nov;7(11):E537-40.
Carville O. Meta's Nudity-Blurring Feature to Deter Teen Sextortion Draws Fire. Bloomberg. 2024 Apr. 24, https://www.bloomberg.com/news/articles/2024-04-24/meta-whistleblower-slams-nudity-blurring-feature-meant-to-deter-teen-sextortion
Casale S, Gemelli G, Calosi C, Giangrasso B, Fioravanti G. Multiple exposure to appearance-focused real accounts on instagram: Effects on body image among both genders. Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 40(6), 2877–2886. 2021.
Casale S, Gemelli G, Calosi C, Giangrasso B, Fioravanti G. Multiple exposure to appearance-focused real accounts on instagram: Effects on body image among both genders. Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 40(6), 2877–2886. 2021.
Casale S, Musicò A, Spada MM. A systematic review of metacognitions in Internet Gaming Disorder and problematic Internet, smartphone and social networking sites use. Clin Psychol Psychother. 2021 Nov;28(6):1494-1508. doi: 10.1002/cpp.2588. Epub 2021 May 4. PMID: 33783920; PMCID: PMC9290093.
Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. Developmental Review, 28(1), 62–77.
Caspi A, Houts RM, Ambler A, Danese A, Elliott ML, Hariri A, et al. Longitudinal Assessment of Mental Health Disorders and Comorbidities Across 4 Decades Among Participants in the Dunedin Birth Cohort Study. JAMA Netw Open. 2020 Apr 21;3(4):e203221.
Castelo N, Kushlev K, Ward AF, Esterman M, Reiner PB. Blocking mobile internet on smartphones improves sustained attention, mental health, and subjective well-being. PNAS Nexus. 2025 Feb 18;4(2):pgaf017.
Cataldo I, de Luca I, Giorgetti V, Cicconcelli D, Bersani FS, Imperatori C, Abdi S, Negri A, Esposito G, Corazza O. Fitspiration on social media: Body-image and other psychopathological risks among young adults. A narrative review. Emerging Trends in Drugs, Addictions, and Health. 2021.
Cataldo, I., Billieux, J., Esposito, G., & Corazza, O. (2022). Assessing problematic use of social media: where do we stand and what can be improved?. Current Opinion in Behavioral Sciences, 45, 101145.
Cénat JM, Hébert M, Blais M, Lavoie F, Guerrier M, Derivois D. Cyberbullying, psychological distress and self-esteem among youth in Quebec schools. J Affect Disord. 2014 Dec;169:7-9. doi: 10.1016/j.jad.2014.07.019. Epub 2014 Jul 18. PMID: 25128859; PMCID: PMC4679325.
Center for Countering Digital Hate. Deadly By Design - TikTok pushes harmful content promoting eating disorders and self-harm into young users' feeds. Center for Countering Digital Hate. Research and policy, 2022 Dec. https://counterhate.com/research/deadly-by-design/

Cite
Cerniglia L, Griffiths MD, Cimino S, De Palo V, Monacis L, Sinatra M, Tambelli R. A latent profile approach for the study of internet gaming disorder, social media addiction, and psychopathology in a normative sample of adolescents. Psychol Res Behav Manag. 2019 Aug 13;12:651-659.
Chansiri K, Wongphothiphan T. The indirect effects of Instagram images on women's self-esteem: The moderating roles of BMI and perceived weight. New Media & Society, 25(10), 2572-2594. 2023.
Chaput JP, Gray CE, Poitras VJ, Carson V, Gruber R, Olds T, Weiss SK, Connor Gorber S, Kho ME, Sampson M, Belanger K, Eryuzlu S, Callender L, Tremblay MS. Systematic review of the relationships between sleep duration and health indicators in school-aged children and youth. Appl Physiol Nutr Metab. 2016 Jun;41(6 Suppl 3):S266-82.
Chen B. How Tech Created a 'Recipe for Loneliness'. The New York Times, Technology. 2024 Nov. 10. https://www.nytimes.com/2024/11/10/technology/personaltech/technology-loneliness.html?smid=nytcore-ios-share&referringSource=articleShare
Chen CY, Chen IH, Hou WL, Potenza MN, O'Brien KS, Lin CY, Latner JD. The Relationship Between Children's Problematic Internet-related Behaviors and Psychological Distress During the Onset of the COVID-19 Pandemic: A Longitudinal Study. J Addict Med. 2022 Mar-Apr 01;16(2):e73-e80.
Chen IH, Pakpour AH, Leung H, Potenza MN, Su JA, Lin CY, Griffiths MD. Comparing generalized and specific problematic smartphone/internet use: Longitudinal relationships between smartphone application-based addiction and social media addiction and psychological distress. J Behav Addict. 2020 Jun 26;9(2):410-419.
Chen IH, Pakpour AH, Leung H, Potenza MN, Su JA, Lin CY, Griffiths MD. Comparing generalized and specific problematic smartphone/internet use: Longitudinal relationships between smartphone application-based addiction and social media addiction and psychological distress. J Behav Addict. 2020 Jun 26;9(2):410-419.
Chen J, Ishii M, Bater KL, Darrach H, Liao D, Huynh PP, Reh IP, Nellis JC, Kumar AR, Ishii LE. Association Between the Use of Social Media and Photograph Editing Applications, Self-esteem, and Cosmetic Surgery Acceptance. JAMA Facial Plast Surg. 2019 Sep 1;21(5):361-367.
Chen S, Xiao L, Kumar A. Spread of misinformation on social media: What contributes to it and how to combat it. Computers in Human Behavior. 141. 107643. 2022
Chen Z, Liao X, Yang J, Tian Y, Peng K, Liu X, Li Y. Association of screen-based activities and risk of self-harm and suicidal behaviors among young people: A systematic review and meta-analysis of longitudinal studies. Psychiatry Res. 2024 Aug;338:115991.
Chen, Y., Li, S., Tian, Y., Li, D., & Yin, H. (2024). Problematic social media use may be ruining our sleep: A meta-analysis on the relationship between problematic social media use and sleep quality. International Journal of Mental Health and Addiction. Advance online publication.
Cheng C, Lau YC, Chan L, Luk JW. Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. Addict Behav. 2021 Jun;117:106845.
Cheng C, Lau YC, Chan L, Luk JW. Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. Addict Behav. 2021 Jun;117:106845.

Literature

Cite
Cheng J, Burke M, Davis E. Understanding Perceptions of Problematic Facebook Use: When People Experience Negative Life Impact and a Lack of Control. 1-13. 2019.
Cheng, Q., Li, H., Silenzio, V., & Caine, E. D. (2014). Suicide contagion: A systematic review of definitions and research utility. PloS one, 9(9), e108724.
Choudhury S, McKinney KA. Digital media, the developing brain and the interpretive plasticity of neuroplasticity. Transcult Psychiatry. 2013 Apr;50(2):192-215.
Choukas-Bradley S, Maheux A, Roberts S, Hutchinson E, Lu C, Ladouceur C, Silk J. Picture perfect during a pandemic? Body image concerns and depressive symptoms in U.S. adolescent girls during the COVID-19 lockdown. Journal of Children and Media. 2022.
Chow, T. S., & Wan, H. Y. (2017). Is there any 'Facebook Depression'? Exploring the moderating roles of neuroticism, Facebook social comparison and envy. Personality and Individual Differences, 119, 277–282.
Christakis DA, Mathew GM, Reichenberger DA, Rodriguez IR, Ren B, Hale L. Adolescent Smartphone Use During School Hours. JAMA Pediatr. 2025 Apr 1;179(4):475-478.
Christakis DA, Ramirez JSB, Ferguson SM, Ravinder S, Ramirez JM. How early media exposure may affect cognitive function: A review of results from observations in humans and experiments in mice. Proc Natl Acad Sci U S A. 2018 Oct 2;115(40):9851-9858.
Chu J, Ganson KT, Baker FC, Testa A, Jackson DB, Murray SB, Nagata JM. Screen time and suicidal behaviors among U.S. children 9-11 years old: A prospective cohort study. Prev Med. 2023 Apr;169:107452.
Clayborne ZM, Varin M, Colman I. Systematic Review and Meta-Analysis: Adolescent Depression and Long-Term Psychosocial Outcomes. J Am Acad Child Adolesc Psychiatry. 2019 Jan;58(1):72-79.
Clements-Nolle K, Marx R, Katz M. Attempted suicide among transgender persons: The influence of gender-based discrimination and victimization. J Homosex. 2006;51(3):53-69.
Collis A, Eggers F. Effects of restricting social media usage on wellbeing and performance: A randomized control trial among students. PLoS One. 2022 Aug 24;17(8):e0272416.
Connect Safely. A Parents' Guide to Instagram. 2014. ConnectSafely.org
Corrigan NM, Rokem A, Kuhl PK. COVID-19 lockdown effects on adolescent brain structure suggest accelerated maturation that is more pronounced in females than in males. Proc Natl Acad Sci U S A. 2024 Sep 17;121(38):e2403200121.
Costello CR, McNiel DE, Binder RL. Adolescents and Social Media: Privacy, Brain Development, and the Law. J Am Acad Psychiatry Law. 2016 Sep;44(3):313-21.
Costello, N., Sutton, R., Jones, M., Almassian, M., Raffoul, A., Ojumu, O., … Austin, S. B. (2023). ALGORITHMS, ADDICTION, AND ADOLESCENT MENTAL HEALTH: An Interdisciplinary Study to Inform State-level Policy Action to Protect Youth from the Dangers of Social Media. American Journal of Law & Medicine, 49(2–3), 135–172.

Cite
Coulthard N, Ogden J. The impact of posting selfies and gaining feedback ('likes') on the psychological wellbeing of 16-25 year olds: an experimental study. Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 12(2), article 4. 2018.
Course-Choi J, Hammond L. Social Media Use and Adolescent Well-Being: A Narrative Review of Longitudinal Studies. Cyberpsychol Behav Soc Netw. 2021 Apr;24(4):223-236.
Cover R. Digital Identities: Creating and Communicating the Online Self. 2015.
Cover, R. (2012). Performing and undoing identity online: Social networking, identity theories and the incompatibility of online profiles and friendship regimes. Convergence: The International Journal of Research into New Media Technologies, 18(2), 177–193. https://doi.org/10.1177/1354856511433684
Coyne S, Padilla-Walker L, Day R, Harper J, Stockdale L. A friend request from dear old dad: associations between parent-child social networking and adolescent outcomes. Cyberpsychology, behavior and social networking, 17(1), 8–13. 2014.
Coyne S, Rogers A, Zurcher J, Stockdale L, Booth M. Does time spent using social media impact mental health?: An eight year longitudinal study. Computers in Human Behavior, 104, Article 106160. 2020.
Coyne S, Weinstein E, Sheppard J, James S, Gale M, Van Alfen M, Ririe N, Monson C, Ashby S, Weston A, Banks K. Analysis of Social Media Use, Mental Health, and Gender Identity Among US Youths. JAMA network open, 6(7), e2324389. 2023.
Coyne SM, Hurst JL, Dyer WJ, Hunt Q, Schvanaveldt E, Brown S, Jones G. Suicide Risk in Emerging Adulthood: Associations with Screen Time over 10 years. J Youth Adolesc. 2021 Dec;50(12):2324-2338.
Coyne SM, Radesky J, Collier KM, Gentile DA, Linder JR, Nathanson AI, Rasmussen EE, Reich SM, Rogers J. Parenting and Digital Media. Pediatrics. 2017 Nov;140(Suppl 2):S112-S116. doi: 10.1542/peds.2016-1758N. PMID: 29093044.
Craig W, Boniel-Nissim M, King N, Walsh SD, Boer M, Donnelly PD, Harel-Fisch Y, Malinowska-Cieślik M, Gaspar de Matos M, Cosma A, Van den Eijnden R, Vieno A, Elgar FJ, Molcho M, Bjereld Y, Pickett W. Social Media Use and Cyber-Bullying: A Cross-National Analysis of Young People in 42 Countries. J Adolesc Health. 2020 Jun;66(6S):S100-S108.
Crews F, He J, Hodge C. Adolescent cortical development: a critical period of vulnerability for addiction. Pharmacol Biochem Behav. 2007 Feb;86(2):189-99.
Crone E, Konijn E. Media use and brain development during adolescence. Nat Commun 9, 588 (2018).
Crone E, Konijn E. Media use and brain development during adolescence. Nat Commun 9, 588 (2018).
Cuijpers P, Miguel C, Harrer M, Plessen CY, Ciharova M, Ebert D, Karyotaki E. Cognitive behavior therapy vs. control conditions, other psychotherapies, pharmacotherapies and combined treatment for depression: a comprehensive meta-analysis including 409 trials with 52,702 patients. World Psychiatry. 2023 Feb;22(1):105-115.
Culp S. There's an Alternative to the Infinite Scroll. Wired, Ideas. 2023 Sep. 19.

Cite
Cunningham S, Hudson CC, Harkness K. Social Media and Depression Symptoms: a Meta-Analysis. Res Child Adolesc Psychopathol. 2021 Feb;49(2):241-253.
Curley C. 2020 Technical Report: a Review of Age Verification Mechanism for 10 Social Media Apps. Dublin CybersafeIreland. Technological University Dublin. Centre for Social and Educational Research. 2020 May 21.
Curry D. Social Networking App Revenue and Usage Statistics (2024). Business of Apps, Data, Social App Market. 2024 Mar. 1. https://www.businessofapps.com/data/social-app-market/
Cuthbert BN, Insel TR. Toward the future of psychiatric diagnosis: the seven pillars of RDoC. BMC Med. 2013 May 14;11:126. doi: 10.1186/1741-7015-11-126. PMID: 23672542; PMCID: PMC3653747.
Cybulski L, Ashcroft DM, Carr MJ, Garg S, Chew-Graham CA, Kapur N, Webb RT. Temporal trends in annual incidence rates for psychiatric disorders and self-harm among children and adolescents in the UK, 2003-2018. BMC Psychiatry. 2021 May 3;21(1):229.
da Silva Pinho A, Céspedes Izquierdo V, Lindström B, van den Bos W. Youths' sensitivity to social media feedback: A computational account. Sci Adv. 2024 Oct 25;10(43):eadp8775.
Dane A, Bhatia K. The social media diet: A scoping review to investigate the association between social media, body image and eating disorders amongst young people. PLOS Glob Public Health. 2023 Mar 22;3(3):e0001091.
Danthinne ES, Giorgianni FE, Rodgers RF. Labels to prevent the detrimental effects of media on body image: A systematic review and meta-analysis. Int J Eat Disord. 2020 May;53(5):377-391.
D'Arienzo M, Boursier V, Griffiths MD. Addiction to social media and attachment styles: A systematic literature review. International Journal of Mental Health and Addiction, 17(4), 1094–1118. 2019.
Davies T, Cranston P. Youth Work and Social Networking Final Research Report. 2008.
Davis C, Goldfield G. Limiting Social Media Use Decreases Depression, Anxiety, and Fear of Missing Out in Youth With Emotional Distress: A Randomized Controlled Trial. Psychology of Popular Media. 14. 1-11. 2025.
Davis K, Weinstein E, Gardner H. In Defense of Complexity: Beware of Simplistic Narratives about Teens and Technology. Medium. 2017 Aug. 13, https://medium.com/@kedavis/in-defense-of-complexity-beware-of-simplistic-narratives-about-teens-and-technology-f9a7cb59176
Davis K. Arkansas passes new laws to curb social media harm to kids, allow parents to sue platforms for damages. 5News Online, Local news. 2025 Apr. 16.
Dayan J, Bernard A, Olliac B, Mailhes AS, Kermarrec S. Adolescent brain development, risk-taking and vulnerability to addiction. J Physiol Paris. 2010 Nov;104(5):279-86. doi: 10.1016/j.jphysparis.2010.08.007. Epub 2010 Sep 8. PMID: 20816768.
de Hesselle LC, Montag C. Effects of a 14-day social media abstinence on mental health and well-being: results from an experimental study. BMC Psychol. 2024 Mar 13;12(1):141.
de Lenne O, Vandenbosch L, Eggermont S, Karsay K, Trekels J. Picture-perfect lives on social media: a cross-national study on the role of media ideals in adolescent well-being. Media Psychology. 2020.

Cite
de Valle MK, Gallego-García M, Williamson P, Wade TD. Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. Body Image. 2021 Dec;39:276-292.
de Valle MK, Wade TD. Targeting the link between social media and eating disorder risk: A randomized controlled pilot study. Int J Eat Disord. 2022 Aug;55(8):1066-1078.
Dean, B. (2021). Social Network Usage & Growth Statistics (2022). Backlinko. https://backlinko.com/social-media-users
DeAngelis T. Teens are spending nearly 5 hours daily on social media. Here are the mental health outcomes. American Psychological Association, Monitor on Psychology, col 55, no. 3. 2024 Apr. 1.
Denniss E, Lindberg R, Marchese LE, McNaughton SA. #Fail: the quality and accuracy of nutrition-related information by influential Australian Instagram accounts. Int J Behav Nutr Phys Act. 2024 Feb 14;21(1):16.
Denniss E, Lindberg R, McNaughton SA. Quality and accuracy of online nutrition-related information: a systematic review of content analysis studies. Public Health Nutr. 2023 Jul;26(7):1345-1357.
Denniss, E., Lindberg, R., & McNaughton, S. A. (2023). Quality and accuracy of online nutrition-related information: A systematic review of Content Analysis Studies. Public Health Nutrition, 26(7), 1345–1357.
Denniss, E., Lindberg, R., Marchese, L. E., & McNaughton, S. A. (2024). #fail: The Quality and accuracy of nutrition-related information by influential Australian Instagram accounts. International Journal of Behavioral Nutrition and Physical Activity, 21(1).
Denniss, E., Lindberg, R., Marchese, L.E. et al. #Fail: the quality and accuracy of nutrition-related information by influential Australian Instagram accounts. Int J Behav Nutr Phys Act 21, 16 (2024).
Di Cara N, Winstone L, Sloan L, Davis O, Haworth C. The mental health and well-being profile of young adults using social media. npj Mental Health Research. 1. 2022.
Di Gesto C, Matera C, Policardo G, Nerini A. Instagram As A Digital Mirror: The Effects of Instagram Likes and Disclaimer Labels on Self-awareness, Body Dissatisfaction, and Social Physique Anxiety Among Young Italian Women. Curr Psychol 42, 14663–14672. 2023.
Digennaro S. The Body and Its Duplications: The Impact of The Use of Social Media on Preadolescents' Body Image. Italian Journal of Health Education, Sports, and Inclusive Didactics. 6. 2022.
Dixon, S. (2024, December 5). U.S. teens social media engagement frequency 2023. Statista. https://www.statista.com/statistics/1327670/us-teens-social-media-sites-app-used-by-frequency/
Dohnt, H. K., & Tiggemann, M. (2006). Body image concerns in young girls: The role of peers and media prior to adolescence. Journal of Youth and Adolescence, 35(2), 135.
Donaldson SI, Dormanesh A, Perez C, Majmundar A, Allem JP. Association Between Exposure to Tobacco Content on Social Media and Tobacco Use: A Systematic Review and Meta-analysis. JAMA Pediatr. 2022 Sep 1;176(9):878-885.
Dondzilo, L., Mahalingham, T., & Clarke, P. J. F. (2024). A preliminary investigation of the causal role of social media use in eating disorder symptoms. Journal of Behavior Therapy and Experimental Psychiatry, 82, 1–4.

Cite
Doron J, Trouillet R, Maneveau A, Ninot G, Neveu D. Coping profiles, perceived stress and health-related behaviors: a cluster analysis approach. Health Promot Int. 2015 Mar;30(1):88-100.
Doron, J., Trouillet, R., Maneveau, A., Neveu, D., & Ninot, G. (2014). Coping profiles, perceived stress, and health-related behaviors: A cluster analysis approach. Health Promotion International, 30(1), 88–100.
Dried N. Ohio's 'Breathtakingly Blunt' Social Media Age Limit Law Axed. Law360.2025 Apr 16.
Drouin M, Kaise D, Miller D. Phantom vibrations among undergraduates: Prevalence and associated psychological characteristics. Computers in Human Behavior, vol 28, iss 4, pp 1490-1496. 2012 Jul.
D'Souza K. Eight out of 10 Gen Zers say Social Media distracts from school. EdSource, News Brief. 2021 Dec. 8.
Du M, Zhao C, Hu H, Ding N, He J, Tian W, Zhao W, Lin X, Liu G, Chen W, Wang S, Wang P, Xu D, Shen X, Zhang G. Association between problematic social networking use and anxiety symptoms: a systematic review and meta-analysis. BMC Psychol. 2024 May 12;12(1):263. doi: 10.1186/s40359-024-01705-w. PMID: 38735963; PMCID: PMC11089718.
Dunn T, Langlais M. “Oh, Snap!”: A Mixed-Methods Approach to Analyzing the Dark Side of Snapchat. The Journal of Social Media in Society, 9(2), 69-104. 2020.
Dyson MP, Hartling L, Shulhan J, et al. A systematic review of social media use to discuss and view deliberate self-harm acts. PLoS One 2016;11:e0155813
Dziura SL, Hosangadi A, Shariq D, Merchant JS, Redcay E. Partner similarity and social cognitive traits predict social interaction success among strangers. Soc Cogn Affect Neurosci. 2023 Sep 20;18(1):nsad045.
Dziura SL, McNaughton KA, Giacobbe E, Yarger HA, Hickey AC, Shariq D, Redcay E. Neural sensitivity to social reward predicts links between social behavior and loneliness in youth during the COVID-19 pandemic. Dev Psychobiol. 2023 Sep;65(6):e22413. doi: 10.1002/dev.22413. PMID: 37607890; PMCID: PMC10454977.
E. Kross, P. Verduyn, G. Sheppes, C.K. Costello, J. Jonides, O. Ybarra. Social media and well-being: pitfalls, progress, and next steps. Trends Cognit Sci, 25 (2021), pp. 55-66
Eckstrand KL, Choukas-Bradley S, Mohanty A, Cross M, Allen NB, Silk JS, Jones NP, Forbes EE. Heightened activity in social reward networks is associated with adolescents' risky sexual behaviors. Dev Cogn Neurosci. 2017 Oct;27:1-9.
Eden, A., Ellithorpe, M. E., Meshi, D., Ulusoy, E., & Grady, S. M. (2021). All night long: Problematic media use is differentially associated with sleep quality and depression by medium. Communication Research Reports, 38(3), 143–149. https://doi.org/10.1080/08824096.2021.1902798
Eide TA, Aarestad SH, Andreassen CS, Bilder RM, Pallesen S. Smartphone Restriction and Its Effect on Subjective Withdrawal Related Scores. Front Psychol. 2018 Aug 13;9:1444. doi: 10.3389/fpsyg.2018.01444. PMID: 30150959; PMCID: PMC6099124.
Elisabeth Hahn, Martin Reuter, Frank M. Spinath, Christian Montag, Internet addiction and its facets: The role of genetics and the relation to self-directedness, Addictive Behaviors, Volume 65, 2017, Pages 137-146, ISSN 0306-4603.
Elkin N, Mohammed Ashraf AK, Kılınçel O, KılınçeL Ş, Ranganathan M, Sakarya AK, Soydan AM. Screens and scars: SEM analysis of the relationship between childhood trauma, emotion regulation, and social media addiction. Front Psychol. 2025 Jan 24;16:1502968. doi: 10.3389/fpsyg.2025.1502968. PMID: 39927217; PMCID: PMC11802521.

Literature

Cite
Emirtekin E, Balta S, İrfan Sural I, Kircaburun K, Griffiths MD, Billieux J. The role of childhood emotional maltreatment in problematic smartphone use among adolescents: A mediation model. Psychiatry Research, 271, 634-639. 2018.
Engeln R, Loach R, Imundo MN, Zola A. Compared to Facebook, Instagram use causes more appearance comparison and lower body satisfaction in college women. Body Image. 2020 Sep;34:38-45.
Erevik E, Pallesen S, Vedaa Ø, Andreassen C, Dhir A, Torsheim T. General and alcohol-related social media use and mental health: A large-sample longitudinal study. International Journal of Mental Health and Addiction, 19(6), 1991–2002. 2021.
Erikson E. Childhood and society. W W Norton & Co. 1950.
Evans GW, Li D, Whipple SS. Cumulative risk and child development. Psychol Bull. 2013 Nov;139(6):1342-96.
Evens O, Stutterheim SE, Alleva JM. Protective filtering: A qualitative study on the cognitive strategies young women use to promote positive body image in the face of beauty-ideal imagery on Instagram. Body Image. 2021 Dec;39:40-52.
Eyal N, Hoover R. HOOKED How to Build Habit-Forming Products. Business & Economics. 2014.
Faelens L, Hoorelbeke K, Soenens B, Van Gaeveren K, De Marez L, De Raedt R, Koster E. Social media use and well-being: A prospective experience-sampling study. Computers in Human Behavior, 114, Article 106510. 2021.
Fairplay. Designing for Disorder: Instagram's Pro-eating Disorder Bubble. 2022 Apr.
Fam, J. Y., Männikkö, N., Juhari, R., & Kääriäinen, M. (2023). Is parental mediation negatively associated with problematic media use among children and adolescents? A systematic review and meta-analysis. Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement, 55(2), 89–99.
Fardouly J, Holland E. Social media is not real life: The effect of attaching disclaimer-type labels to idealized social media images on women’s body image and mood. New media & society 2018, Vol. 20(11) 4311 –4328. 2018.
Fardouly J, Magson NR, Johnco CJ, Oar EL, Rapee RM. Parental Control of the Time Preadolescents Spend on Social Media: Links with Preadolescents' Social Media Appearance Comparisons and Mental Health. J Youth Adolesc. 2018 Jul;47(7):1456-1468.
Farid H. An Overview of Perceptual Hashing. Journal of Online Trust and Safety, 1(1). 2021.
Farid H. Reining in Online Abuses. Technology and Innovation, vol 19, pp 593-599. 2018.
Fassi L, Thomas K, Parry DA, Leyland-Craggs A, Ford TJ, Orben A. Social Media Use and Internalizing Symptoms in Clinical and Community Adolescent Samples: A Systematic Review and Meta-Analysis. JAMA Pediatr. 2024;178(8):814–822.

Cite
Fassi L, Thomas K, Parry DA, Leyland-Craggs A, Ford TJ, Orben A. Supplemental Online Content. Social media use and internalizing symptoms in clinical and community adolescent samples: a systematic review and meta-analysis. JAMA Pediatr. 2024 Jun. 24.
Fassi, L., Ferguson, A.M., Przybylski, A.K. *et al.* Social media use in adolescents with and without mental health conditions. *Nat Hum Behav* (2025). https://doi.org/10.1038/s41562-025-02134-4
Faverio M, Anderson M, Park E. Teens, Social Media, and Mental Health. Pew Research Center.2025 Apr. 22.
Faverio M, Sidoti O. Teens, Social Media and technology 2024. Pew Research Center. 2024
Faverio M, Sidoti O. Teens, social media and technology 2024. Pew Research Center. 2024.
Fedak KM, Bernal A, Capshaw ZA, Gross S. Applying the Bradford Hill criteria in the 21st century: how data integration has changed causal inference in molecular epidemiology. Emerg Themes Epidemiol. 2015 Sep 30;12:14.
Federal Trade Commission. A Look Behind the Screens: Examining the Data Practices of Social Media and Video Streaming Services. 2024 Sep.
Federal Trade Commission. FTC Investigation Leads to Lawsuit Against TikTok and ByteDance for Flagrantly Violating Children's Privacy Law. Federal Trade Commission. 2024 Aug.
Federal Trade Commission. FTC Staff Report Finds Large Social Media and Video Streaming Companies Have Engaged in Vast Surveillance of Users with Lax Privacy Controls and Inadequate Safeguards for Kids and Teens. FTC, News and Events, Press Releases. 2024 Sep. 19.
Fehr E, Gächter S. Fairness and Retaliation: The Economics of Reciprocity. Journal of Economic Perspectives. 14. 159-181. 2000.
Fenton R.Instagram 'fueling mental health crisis' with "Fix Me" plasti surgery filter Mirror Online. 2019.https://www.mirror.co.uk/news/uk-news/instagram-fuelling-mental-health-crisis-20551865
Ferguson C, Muñoz M, Garza A, Galindo M. Concurrent and prospective analyses of peer, television and social media influences on body dissatisfaction, eating disorder symptoms and life satisfaction in adolescent girls. Journal of youth and adolescence, 43(1), 1–14. 2014.
Ferguson C, Muñoz M, Garza A, Galindo M. Concurrent and prospective analyses of peer, television and social media influences on body dissatisfaction, eating disorder symptoms and life satisfaction in adolescent girls. Journal of youth and adolescence, 43(1), 1–14. 2014.
Ferguson CJ, Kaye LK, Branley-Bell D, Markey P. There is no evidence that time spent on social media is correlated with adolescent mental health problems: Findings from a meta-analysis. Professional Psychology: Research and Practice, 56(1), 73–83. 2025.
Ferguson CJ. Do social media experiments prove a link with mental health: A methodological and meta-analytic review. Psychology of Popular Media. Advance online publication. 2024.
Ferguson CJ. Do social media experiments prove a link with mental health: A methodological and meta-analytic review. Psychology of Popular Media. Advance online publication. 2024.
Ferguson KT, Cassells RC, MacAllister JW, Evans GW. The physical environment and child development: an international review. Int J Psychol. 2013;48(4):437-68. doi: 10.1080/00207594.2013.804190. Epub 2013 Jun 28. PMID: 23808797; PMCID: PMC4489931.
Ferguson, C. J., Kaye, L. K., Branley-Bell, D., & Markey, P. (2025). There is no evidence that time spent on social media is correlated with adolescent mental health problems: Findings from a meta-analysis. Professional Psychology: Research and Practice, 56(1), 73–83. https://doi.org/10.1037/pro0000589

Cite
Ferguson, C. J., Kaye, L. K., Branley-Bell, D., Markey, P., Ivory, J. D., Klisanin, D., Elson, M., Smyth, M., Hogg, J. L., McDonnell, D., Nichols, D., Siddiqui, S., Gregerson, M., & Wilson, J. (2022). Like this meta-analysis: Screen media and mental health. Professional Psychology: Research and Practice, 53(2), 205–214.
Fernandez DP, Kuss DJ, Griffiths MD. Short-term abstinence effects across potential behavioral addictions: A systematic review. Clin Psychol Rev. 2020 Mar;76:101828. doi: 10.1016/j.cpr.2020.101828. Epub 2020 Feb 3. PMID: 32062303.
Festinger, L. (1954). A Theory of Social Comparison Processes. Human Relations, 7(2), 117-140.
Finkle, E. (2022, December 5). Bringing Age Verification to Facebook Dating. Meta. https://about.fb.com/news/2022/12/facebook-dating-age-verification/
Fioravanti G, Bocci Benucci S, Ceragioli G, Casale S. How the exposure to beauty ideals on social networking sites influences body image: a systematic review of experimental studies. Adolesc Res Rev. 2022.
Fioravanti, G., Casale, S., Benucci, S. B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. Computers in Human Behavior, 122, Article 106839.
Firth J, Torous J, Stubbs B, Firth JA, Steiner GZ, Smith L, Alvarez-Jimenez M, Gleeson J, Vancampfort D, Armitage CJ, Sarris J. The "online brain": how the Internet may be changing our cognition. World Psychiatry. 2019 Jun;18(2):119-129. doi: 10.1002/wps.20617. PMID: 31059635; PMCID: PMC6502424.
Fitz N, Kushlev K, Jagannathan R, Lewis T, Paliwal D, Ariely D. Batching smartphone notifications can improve well-being. Computers in Human Behavior. 101. 2019.
Flament MF, Henderson K, Buchholz A, Obeid N, Nguyen HN, Birmingham M, Goldfield G. Weight Status and DSM-5 Diagnoses of Eating Disorders in Adolescents From the Community. J Am Acad Child Adolesc Psychiatry. 2015 May;54(5):403-411.e2.
Flayelle M, Brevers D, King D, Maurage P, Perales J, Billieux J. A taxonomy of technology design features that promote potentially addictive online behaviours. Nature Reviews Psychology, 2(3), 136–150. 2023.
Flayelle M, Brevers D, King D, Maurage P, Perales J, Billieux J. A taxonomy of technology design features that promote potentially addictive online behaviours. Nature Reviews Psychology, 2(3), 136–150. 2023.
Fournier L, Schimmenti A, Musetti A, Boursier V, Flayelle M, Cataldo I, Starcevic V, Billieux J. Deconstructing the components model of addiction: An illustration through “addictive” use of social media. Addictive Behaviors, 143, 1–9. 2023.
Fournier L, Schimmenti A, Musetti A, Boursier V, Flayelle M, Cataldo I, Starcevic V, Billieux J. Deconstructing the components model of addiction: An illustration through “addictive” use of social media. Addictive Behaviors, 143, 1–9. 2023.
Franchina V, Vanden Abeele M, van Rooij AJ, Lo Coco G, De Marez L. Fear of Missing Out as a Predictor of Problematic Social Media Use and Phubbing Behavior among Flemish Adolescents. Int J Environ Res Public Health. 2018 Oct 22;15(10):2319.
French D. The Viral Blackout Challenge Is Killing Young People. Courts Are Finally Taking It Seriously. The New York Times, Opinion. 2024 Sep. 5. https://www.nytimes.com/2024/09/05/opinion/tiktok-blackout-challenge-anderson.html

Cite
Frieiro P, González-Rodríguez R, Domínguez-Alonso J. Self-esteem and socialisation in social networks as determinants in adolescents' eating disorders. Health Soc Care Community. 2022 Nov;30(6):e4416-e4424.
Frison E, Eggermont S. Browsing, Posting, and Liking on Instagram: The Reciprocal Relationships Between Different Types of Instagram Use and Adolescents' Depressed Mood. Cyberpsychology, behavior and social networking, 20(10), 603–609. 2017.
Frison E, Eggermont S. Browsing, Posting, and Liking on Instagram: The Reciprocal Relationships between Different Types of Instagram Use and Adolescents' Depressed Mood. Cyberpscyhology, Behavior, and Social Networking, 20, 603-609. 2017.
Frison E, Subrahmanyam K, Eggermont S. The Short-Term Longitudinal and Reciprocal Relations Between Peer Victimization on Facebook and Adolescents' Well-Being. J Youth Adolesc. 2016 Sep;45(9):1755-71.
Frison, E., & Eggermont, S. (2015). The impact of daily stress on adolescents' depressed mood: The role of social support seeking through Facebook. Computers in Human Behavior, 44, 315–325.
Frison, E., & Eggermont, S. (2016). Exploring the Relationships Between Different Types of Facebook Use, Perceived Online Social Support, and Adolescents' Depressed Mood. Social Science Computer Review, 34(2), 153–171. https://doi.org/10.1177/0894439314567449
Frost R, Rickwood D. A systematic review of the mental health outcomes associated with Facebook use. 2017.
Funder DC, Ozer DJ. Evaluating Effect Size in Psychological Research: Sense and Nonsense. Advances in Methods and Practices in Psychological Science. 2019;2(2):156-168.
Galea, S., & Buckley, G. J. (2024). Social media and adolescent mental health: A consensus report of the National Academies of Sciences, Engineering, and Medicine. PNAS Nexus, 3(2)
Galica VL, Vannucci A, Flannery KM, Ohannessian CM. Social Media Use and Conduct Problems in Emerging Adults. Cyberpsychol Behav Soc Netw. 2017 Jul;20(7):448-452. doi: 10.1089/cyber.2017.0068. PMID: 28715261.
Gambo S, Özad BO. The demographics of computer-mediated communication: A review of social media demographic trends among social networking site giants. Computers in Human Behavior Reports, 2, 100016. 2020
Gambo S, Ozad BO. The demographics of computer-mediated communication: A review of social media demographic trends among social networking site giants. Science Direct 2020
Garrett SL, Burnell K, Armstrong-Carter EL, Nelson BW, Prinstein MJ, Telzer EH. Links Between Objectively-Measured Hourly Smartphone Use and Adolescent Wake Events Across Two Weeks. J Clin Child Adolesc Psychol. 2023 Dec 1:1-11.
Gaylor, E. M., Krause, K. H., Welder, L. E., Cooper, A. C., Ashley, C., Mack, K. A., Crosby, A. E., Trinh, E., Ivey-Stephenson, A. Z., & Whittle, L. (2023). Suicidal thoughts and behaviors among high school students — Youth Risk Behavior Survey, United States, 2021. MMWR Supplements, 72(1), 45–54.
Gaysynsky A, Senft Everson N, Heley K, Chou WS. Perceptions of Health Misinformation on Social Media: Cross-Sectional Survey Study. JMIR Infodemiology. 2024 Apr 30;4:e51127.
Gaysynsky, A., Senft Everson, N., Heley, K., & Chou, W.-Y. S. (2024). Perceptions of health misinformation on social media: Cross-sectional Survey Study. JMIR Infodemiology, 4.

Literature

Cite
Gentzler AL, Hughes JL, Johnston M, Alderson JE. Which social media platforms matter and for whom? Examining moderators of links between adolescents' social media use and depressive symptoms. J Adolesc. 2023 Dec;95(8):1725-1748.
George AS, George AH, Baskar T, Karthikeyan MM. Reclaiming Our Minds: Mitigating the Negative Impacts of Excessive Doomscrolling. 01. 17-39. 2024.
George M, Russell M, Piontak J, Odgers C. Concurrent and Subsequent Associations Between Daily Digital Technology Use and High-Risk Adolescents' Mental Health Symptoms. Child development, 89(1), 78–88. 2018.
George M. The Importance of Social Media Content for Teens' Risks for Self-harm. J Adolesc Health. 2019 Jul;65(1):9-10.
Georgiades K, Duncan L, Wang L, Comeau J, Boyle MH; 2014 Ontario Child Health Study Team. Six-Month Prevalence of Mental Disorders and Service Contacts among Children and Youth in Ontario: Evidence from the 2014 Ontario Child Health Study. Can J Psychiatry. 2019 Apr;64(4):246-255. doi: 10.1177/0706743719830024. PMID: 30978138; PMCID: PMC6463361.
Ghai S, Fassi L, Awadh F, Orben A. Lack of Sample Diversity in Research on Adolescent Depression and Social Media Use: A Scoping Review and Meta-Analysis. Clin Psychol Sci. 2023 Sep;11(5):759-772.
Ghai S, Magis-Weinberg L, Stoilova M, Livingstone S, Orben A. Social media and adolescent well-being in the Global South. Curr Opin Psychol. 2022 Aug;46:101318.
Ghali S, Afifi S, Suryadevara V, Habab Y, Hutcheson A, Panjiyar BK, Davydov GG, Nashat H, Nath TS. A Systematic Review of the Association of Internet Gaming Disorder and Excessive Social Media Use With Psychiatric Comorbidities in Children and Adolescents: Is It a Curse or a Blessing? Cureus. 2023 Aug 21;15(8):e43835.
Ghaznavi J, Taylor LD. Bones, body parts, and sex appeal: An analysis of #thinspiration images on popular social media. Body Image. 2015 Jun;14:54-61.
Ghaznavi, J., & Taylor, L. D. (2015). Bones, body parts, and sex appeal: An analysis of #thinspiration images on popular social media. Body Image, 14, 54–61.
GilPress. Tiktok Statistics For 2024: Users, Demographics, Trends. What's The Big Data. 2023 Nov. 29, https://whatsthebigdata.com/tiktok-statistics/#google_vignette
GilPress. Worldwide Daily Social Media Usage (New 2024 Data). What's The Big Data. 2024 Jan. 31, https://whatsthebigdata.com/social-media-users-statistics/
Ginsberg D, Burke M. Hard Questions: Is Spending Time on Social Media Bad for Us? Meta, news. 2017 Dec. 15. https://about.fb.com/news/2017/12/hard-questions-is-spending-time-on-social-media-bad-for-us/
Gkiouleka M, Stavraki C, Sergentanis TN, Vassilakou T. Orthorexia Nervosa in Adolescents and Young Adults: A Literature Review. Children (Basel). 2022 Mar 4;9(3):365.
Goldfield G. The Dark Side of Social Media. Psychology Today, Social Media. 2024 Jun. 21

Cite
Goldfield GS, Cameron JD, Sigal RJ, Kenny GP, Holcik M, Prud'homme D, Guerin E, Alberga AS, D'Angiulli A, Tremblay MS, Mougharbel F, Walsh J. Screen time is independently associated with serum brain-derived neurotrophic factor (BDNF) in youth with obesity. Appl Physiol Nutr Metab. 2021 Sep;46(9):1083-1090.
Goldfield GS, Cameron JD, Sigal RJ, Kenny GP, Prud'homme D, Ngu M, Alberga AS, Doucette S, Goldfield DB, Tulloch H, Thai H, Simas KR, Walsh J. The BDNF Val66Met polymorphism and health-related quality of life in youth with obesity. Physiol Rep. 2024 Jul;12(13):e16140.
Goldfield GS, Moore C, Henderson K, Buchholz A, Obeid N, Flament MF. Body dissatisfaction, dietary restraint, depression, and weight status in adolescents. J Sch Health. 2010 Apr;80(4):186-92.
Goldfield GS, Walsh J, Sigal RJ, Kenny GP, Hadjiyannakis S, De Lisio M, Ngu M, Prud'homme D, Alberga AS, Doucette S, Goldfield DB, Cameron JD. Associations of the BDNF Val66Met Polymorphism With Body Composition, Cardiometabolic Risk Factors, and Energy Intake in Youth With Obesity: Findings From the HEARTY Study. Front Neurosci. 2021 Nov 12;15:715330. doi: 10.3389/fnins.2021.715330. PMID: 34867148; PMCID: PMC8633533.
ecreases Depression, Anxiety and FoMO in Youth with Emotional Distress: A Randomized Controlled Trial . Can
Gong F, Gong Z, Liu H, Yi P, Jia Y, Zhuang J, Shu J, Huang X, Wu Y. The Impact of Problematic Internet Use on Adolescent Loneliness-Chain Mediation Effects of Social Support and Family Communication. Psychol Res Behav Manag. 2024 May 6;17:1903-1916. doi: 10.2147/PRBM.S443349. PMID: 38737671; PMCID: PMC11086433.
Gong J, Preminger Z, Steptoe A, Fancourt D. Protein signatures associated with loneliness and social isolation: plasma proteome analyses in the English Longitudinal Study of Ageing, with causal evidence from Mendelian randomization. medRxiv [Preprint]. 2024 Jul 26:2024.07.25.24310989.
Gonzales, A. L., & Hancock, J. T. (2008). Identity shift in computer-mediated environments. Media Psychology, 11(2), 167–185.
Goodyear V, Randhawa A, Adab P, Al-Janabi H, Fenton S, Jones K, Michail M, Morrison B, Patterson P, Quinlan J, Sitch A, Twardochleb R, Wade M, Pallan M. School phone policies and their association with mental wellbeing, phone use, and social media use (SMART Schools): a cross-sectional observational study. The Lancet Regional Health - Europe. 51. 101211. 2025.
Gordon CS, Jarman HK, Rodgers RF, McLean SA, Slater A, Fuller-Tyszkiewicz M, Paxton SJ. Outcomes of a Cluster Randomized Controlled Trial of the SoMe Social Media Literacy Program for Improving Body Image-Related Outcomes in Adolescent Boys and Girls. Nutrients. 2021 Oct 27;13(11):3825.
Grabe S, Ward LM, Hyde JS. The role of the media in body image concerns among women: a meta-analysis of experimental and correlational studies. Psychol Bull. 2008 May;134(3):460-76.
Gratz, K. L., Richmond, J. R., Scamaldo, K. M., Edmonds, K. A., Rose, J. P., & Tull, M. T. (2023). Prospective Impact of Borderline Personality Disorder Symptoms and Social Media Addiction on Coping and Health Related Outcomes During a Global Pandemic. International Journal of Cognitive Therapy, 16(4), 571–593. https://doi.org/10.1007/s41811-023-00183-z
Griffiths M. A 'components' model of addiction within a biopsychosocial framework. Journal of Substance Use, 10(4), 191–197. 2005.
Griffiths S, Murray SB, Krug I, McLean SA. The Contribution of Social Media to Body Dissatisfaction, Eating Disorder Symptoms, and Anabolic Steroid Use Among Sexual Minority Men. Cyberpsychol Behav Soc Netw. 2018 Mar;21(3):149-156.

Cite
Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. Journal of Substance Use, 10(4), 191–197.
Griffiths, S., Harris, E. A., Whitehead, G., Angelopoulos, F., Stone, B., Grey, W., & Dennis, S. (2024). Does TikTok contribute to eating disorders? A comparison of the TikTok algorithms belonging to individuals with eating disorders versus healthy controls. Body image, 51, 101807. https://doi.org/10.1016/j.bodyim.2024.101807
Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. International Journal of Eating Disorders, 31(1), 1–16.
Grose J. Get Tech Out of the Classroom Before It's Too Late. The New York Times, 2024 Apr. 10, https://www.nytimes.com/2024/04/10/opinion/schools-technology.html
Grose J. The Alarm Over Social Media is Getting Through to Teens. The New York Times, Opinion. 2015 Apr. 22.
Grunewald, K., Deng, J., Wertz, J. et al. The effect of online social evaluation on mood and cognition in young people. Sci Rep 12, 20999 (2022).
Gugushvili N, Täht K, Ruiter RAC, Verduyn P. Facebook use intensity and depressive symptoms: a moderated mediation model of problematic Facebook use, age, neuroticism, and extraversion. BMC Psychol. 2022 Nov 28;10(1):279.
Gupta R, Ariefdjohan M. Mental illness on Instagram: a mixed method study to characterize public content, sentiments, and trends of antidepressant use. J Ment Health. 2021 Aug;30(4):518-525.
Gupta, R., & Ariefdjohan, M. (2020). Mental illness on Instagram: A mixed method study to characterize public content, sentiments, and trends of antidepressant use. Journal of Mental Health, 30(4), 518–525.
Hafner K. To Deal With Obsession, Some Defriend Facebook. The New York Times, Internet. 2009 Dec. 20.
Hahn E, Reuter M, Spinath FM, Montag C. Internet addiction and its facets: The role of genetics and the relation to self-directedness. Addict Behav. 2017 Feb;65:137-146. doi: 10.1016/j.addbeh.2016.10.018. Epub 2016 Oct 24. PMID: 27816039.
Haidt J. The Anxious Generation: How the Great Rewiring of Childhood is Causing an Epidemic of Mental Illness. Penguin Press 2024
Hall J, Johnson R, Ross E. Where does the time go? An experimental test of what social media displaces and displaced activities' associations with affective well-being and quality of day. New Media & Society, 21(3), 674-692. 2018.
Hamilton J, Jørgensen S, Crichlow Z, Biernesser C, Zelazny J, Franzen P, Goldstein T, Brent D. Social Media Use and Sleep Outcomes among Adolescents at High Risk for Suicide. International Journal of Cognitive Therapy. 2023.
Hamm MP, Newton AS, Chisholm A, et al. Prevalence and Effect of Cyberbullying on Children and Young People: A Scoping Review of Social Media Studies. JAMA Pediatr. 2015;169(8):770–777.

Literature

Cite
Han S, Jee D, Kang YJ, Park YJ, Cho JH. Possible association between oral health and sleep duration: A cross-sectional study based on the Korean National Health and Nutrition Examination Surveys from 2010 to 2015. Medicine (Baltimore). 2021 Dec 3;100(48):e28035.
Han X, Zhou E, Liu D. Electronic Media Use and Sleep Quality: Updated Systematic Review and Meta-Analysis. J Med Internet Res. 2024 Apr 23;26:e48356. doi: 10.2196/48356.
Hancock J, Liu SX, Luo M, Mieczkowski H. Psychological Well-Being and Social Media Use: A Meta-Analysis of Associations between Social Media Use and Depression, Anxiety, Loneliness, Eudaimonic, Hedonic and Social Well-Being. Dept. of Comm. Stanford Univ. 2022 Mar. 9.
Harris LM, Huang X, Linthicum KP, Bryen CP, Ribeiro JD. Sleep disturbances as risk factors for suicidal thoughts and behaviours: a meta-analysis of longitudinal studies. Sci Rep. 2020 Aug 17;10(1):13888.
Harrison K, Hefner V. Virtually perfect: Image retouching and adolescent body image. Media Psychology, 17(2), 134–153. 2014.
Hay, C., Meldrum, R., & Mann, K. (2010). Traditional Bullying, Cyber Bullying, and Deviance: A General Strain Theory Approach. Journal of Contemporary Criminal Justice, 26(2), 130-147.
Haynes T. Dopamine, Smartphones & You: A battle for your time Havard University. Harvard University, SITN, Blog. 2018 May 1.
Hazen, E., Schlozman, S., & Beresin, E. (2008). Adolescent psychological development: A review. Pediatrics in Review, 29(5), 161–168.
He Q, Turel O, Bechara A. Brain anatomy alterations associated with Social Networking Site (SNS) addiction. Sci Rep. 2017 Mar 23;7:45064.
Headspace. headspace National Youth Mental Health Survey 2018: mental health and wellbeing over time. Headspace National Youth Mental Health Foundation. 2018.
Heffer T, Good M, Daly O, MacDonell E, Willoughby T. The Longitudinal Association Between Social-Media Use and Depressive Symptoms Among Adolescents and Young Adults: An Empirical Reply to Twenge et al. (2018). Clinical Psychological Science, 7(3), 462-470. 2019.
Heijmans P. Singapore Engages Australia to Study Social Media Age Limits. Bloomberg, Technology, Asia. 2025 Jan. 7. https://url.usb.m.mimecastprotect.com/s/dDLgCP6ql9FmxNVs1ixSxtAn3?domain=bloomberg.com
Hellman, M., Schoenmakers, T. M., Nordstrom, B. R., & van Holst, R. J. (2013). Is there such a thing as online video game addiction? A cross-disciplinary review. Addiction Research & Theory, 21(2), 102–112.
Hendrickse, J., Clayton, R. B., Ray, E. C., Ridgway, J. L., & Secharan, R. (2020). Experimental Effects of Viewing Thin and Plus-Size Models in Objectifying and Empowering Contexts on Instagram. In Health Communication (Vol. 36, Issue 11, pp. 1417–1425). Informa UK Limited. https://doi.org/10.1080/10410236.2020.1761077
Heron M. Deaths: Leading Causes for 2018. National Vital Statistics Reports. Vol 70 No 4. CDC.
Herrero, J., & Meneses, J. (2006). Short Web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: A comparison to pencil and paper responses among Internet users. Computers in human behavior, 22(5), 830-846

Cite
Hilbert M, Thakur A, Flores P, Zhang X, Bhan J, Bernhard P, Ji F. 8–10% of algorithmic recommendations are 'bad', but… an exploratory risk-utility meta-analysis and its regulatory implications. International Journal of Information Management, Vol. 75, 2024, 102743, ISSN 0268-4012, https://www.sciencedirect.com/science/article/pii/S026840122300124X
Hilbert M, Thakur A, Ji F, Flores P, Zhang X, Bhan J, Bernhard P. DRAFT Recommender Algorithms Do No Harm ~90% But… An Exploratory Risk-Utility Meta-Analysis of Algorithmic Audits. SSRN Electronic Journal. 2023.
Hill AB. The Environment and Disease: Association or Causation? Proc R Soc Med. 1965 May;58(5):295-300.
Hill K. Mark Zuckerberg Is Wrong About Kids Under 13 Not Being Allowed on Facebook. Forbes. 2011 May 20.
Hisler G, Twenge JM, Krizan Z. Associations between screen time and short sleep duration among adolescents varies by media type: evidence from a cohort study. Sleep Med. 2020 Feb;66:92-102.
Hobbs W, Burke M, Christakis N, Fowler J. Online social integration is associated with reduced mortality risk. Proceedings of the National Academy of Sciences. 113. 201605554. 2016.
Hofstede, G. (1980). Culture and Organizations. International Studies of Management & Organization, 10(4), 15–41.
Hofstede, G. (1983). National Cultures Revisited. Behavior Science Research, 18(4), 285-305.
Hofstede, G. (2001), Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations, 2nd ed. Sage, Thousand Oaks, CA.
Holland G, Tiggemann M. A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. Body Image. 2016 Jun;17:100-10.
Holland G, Tiggemann M. A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. Body Image. 2016 Jun;17:100-10.
Hood R, Zabatiero J, Zubrick SR, Silva D, Straker L. The association of mobile touch screen device use with parent-child attachment: a systematic review. Ergonomics. 2021 Dec;64(12):1606-1622.
Horwitz J, Seetharaman D. Facebook Executives Shut Down Efforts to Make the Site Less Divisive. The Wall Street Journal, Tech. 2020 May 26. https://www.wsj.com/articles/facebook-knows-it-encourages-division-top-executives-nixed-solutions-11590507499
Horwitz J. Broken Code: Inside FACEBOOK and the Fight to Expose Its Harmful Secrets. Doubleday New York, Penguin Random House. 2023.
Horwitz J. His Job Was to Make Instagram Safe for Teens. His 14-Year-Old Showed Him What the App Was Really Like. The Wall Street Journal. 2023 Nov. 2. https://www.wsj.com/tech/instagram-facebook-teens-harassment-safety-5d991be1
Horwitz J.Facebook Parent Meta Platforms Cuts Responsible Innovation Team.The Wall Street Journal.2022.

Literature

Cite
Houghton S, Lawrence D, Hunter SC, Rosenberg M, Zadow C, Wood L, Shilton T. Reciprocal Relationships between Trajectories of Depressive Symptoms and Screen Media Use during Adolescence. J Youth Adolesc. 2018 Nov;47(11):2453-2467.
Hristova D, Jovicic S, Göbl B, De Freitas S, Slunecko T. "Why did we lose our snapchat streak?". Social media gamification and metacommunication. Computers in Human Behavior Reports, 5, 100172. 2022.
Hristova D, Jovicic S, Göbl B, De Freitas S, Slunecko T. "Why did we lose our snapchat streak?". Social media gamification and metacommunication. Computers in Human Behavior Reports, 5, 100172. 2022.
Hu B, Yu Y, Yan LF, Qi GQ, Wu D, Li YT, Shi AP, Liu CX, Shang YX, Li ZY, Cui GB, Wang W. Intersubject correlation analysis reveals the plasticity of cerebral functional connectivity in the long-term use of social media. Hum Brain Mapp. 2022 May;43(7):2262-2275. doi: 10.1002/hbm.25786. Epub 2022 Jan 24. PMID: 35072320; PMCID: PMC8996346.
Hu J, Small H, Kean H, Takahashi A, Zekelman L, Kleinman D, Ryan E, Nieto-Castañón A, Ferreira V, Fedorenko E. Precision fMRI reveals that the language-selective network supports both phrase-structure building and lexical access during language production. Cereb Cortex. 2023 Apr 4;33(8):4384-4404.
Hu Y, Bai Y, Pan Y, Li S. Cyberbullying victimization and depression among adolescents: A meta-analysis. Psychiatry Res. 2021 Nov;305:114198.
Huang C. A meta-analysis of the problematic social media use and mental health. Int J Soc Psychiatry. 2022 Feb;68(1):12-33.
Huang C. Time Spent on Social Network Sites and Psychological Well-Being: A Meta-Analysis. Cyberpsychol Behav Soc Netw. 2017 Jun;20(6):346-354.
Huang PC, Chen JS, Potenza MN, Griffiths MD, Pakpour AH, Chen JK, Lin YC, Hung CH, O'Brien KS, Lin CY. Temporal associations between physical activity and three types of problematic use of the internet: A six-month longitudinal study. J Behav Addict. 2022 Nov 25;11(4):1055-1067.
Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: A meta-analysis on media and body image. Media Psychology, 24(4), 437–489. https://doi.org/10.1080/15213269.2020.1737545
Hunt M, All K, Burns B, Li K. Too Much of a Good Thing: Who We Follow, What We Do, And How Much Time We Spend on Social Media Affects Well-Being. Journal of Social and Clinical Psychology. 40. 46-68. 2021.
Hunt M, Young J, Marx R, Lipson C. No More FOMO: Limiting Social Media Decreases Loneliness and Depression. Journal of Social and Clinical Psychology. 37. 751-768. 2018.
Hunt M, Young J, Marx R, Lipson C. No More FOMO: Limiting Social Media Decreases Loneliness and Depression. Journal of Social and Clinical Psychology. 37. 751-768. 2018.
Hussain Z, Griffiths MD. Problematic Social Networking Site Use and Comorbid Psychiatric Disorders: A Systematic Review of Recent Large-Scale Studies. Front Psychiatry. 2018 Dec 14;9:686.
Hysing M, Pallesen S, Stormark KM, Jakobsen R, Lundervold AJ, Sivertsen B. Sleep and use of electronic devices in adolescence: results from a large population-based study. BMJ Open. 2015 Feb 2;5(1):e006748.

Cite
Instagram. Giving Young People a Safer, More Private Experience. Meta. 2021 Jul. 27.
Instagram. Introducing New Ways to Verify Age on Instagram. Meta. 2022 Jun. 23. https://about.instagram.com/blog/announcements/new-ways-to-verify-age-on-instagram
Instagram. Introducing Stricter Message Settings for Teens on Instagram and Facebook. Meta. 2024 Jan. 25.
Instagram. Making Instagram Safer for the Youngest Members of Our Community. Meta. 2019 Dec. 4. https://about.instagram.com/blog/announcements/making-instagram-safer-for-the-youngest-members-of-our-community
Iqbal M. Facebook Revenue and Usage Statistics (2024). Business of Apps, Data, Facebook. 2024 Apr. 18. https://www.businessofapps.com/data/facebook-statistics/
Iqbal M. Instagram Revenue and Usage Statistics (2024). Business of Apps, Data, Instagram. 2024 Jul. 8. https://www.businessofapps.com/data/instagram-statistics/
Iqbal M. TikTok Revenue and Usage Statistics (2024). Business of Apps, Data, TikTok. 2024 Jul. 8. https://www.businessofapps.com/data/tik-tok-statistics/
Iqbal M. YouTube Revenue and Usage Statistics (2024). Business of Apps, Data, YouTube. 2024 Sep. 4. https://www.businessofapps.com/data/youtube-statistics/
Isaac M, Frenkel S, Conger K. Inside Mark Zuckerberg's Sprint to Remake Meta for the Trump Era. The New York Times, Technology. 2025 Jan. 10. https://www.nytimes.com/2025/01/10/technology/meta-mark-zuckerberg-trump.html?smid=nytcore-ios-share&referringSource=articleShare&tgrp=ctr&pvid=E6D7BED3-BB36-4C5C-B30E-B84E3EF19068
Isaac M, Singer N. Instagram, Facing Pressure Over Child Safety Online, Unveils Sweeping Changes. The New York Times, Technology. 2024 Sep. 17. https://www.nytimes.com/2024/09/17/technology/instagram-teens-safety-privacy-changes.html
Isarabhakdi, P., & Pewnil, T. (2016). Engagement with family, peers, and Internet use and its effect on mental well-being among high school students in Kanchanaburi Province, Thailand. International Journal of Adolescence and Youth, 21(1), 15–26.
Ivie EJ, Pettitt A, Moses LJ, Allen NB. A meta-analysis of the association between adolescent social media use and depressive symptoms. J Affect Disord. 2020 Oct 1;275:165-174.
Jaeschke R, Singer J, Guyatt GH. Measurement of health status. Ascertaining the minimal clinically important difference. Control Clin Trials. 1989 Dec;10(4):407-15. doi: 10.1016/0197-2456(89)90005-6. PMID: 2691207.
Jain, L., Velez, L., Karlapati, S., Forand, M., Kannali, R., Yousaf, R. A., Ahmed, R., Sarfraz, Z., Sutter, P. A., Tallo, C. A., & Ahmed, S. (2025). Exploring Problematic TikTok Use and Mental Health Issues: A Systematic Review of Empirical Studies. Journal of primary care & community health, 16, 21501319251327303. https://doi.org/10.1177/21501319251327303

Cite
Janine S Senekal, Gabriella Ruth Groenewald, Lisa Wolfaardt, Cisca Jansen, and Kayla Williams. 2023.Social media and adolescent psychosocial development: a systematic review.South African Journal of Psychology 53, 2 (2023), 157–171.
Jarman HK, Marques MD, McLean SA, Slater A, Paxton SJ. Social media, body satisfaction and well-being among adolescents: A mediation model of appearance-ideal internalization and comparison. Body Image. 2021 Mar;36:139-148. doi: 10.1016/j.bodyim.2020.11.005. Epub 2020 Dec 4. PMID: 33285385.
Jarman HK, McLean SA, Griffiths S, Teague SJ, Rodgers RF, Paxton SJ, Austen E, Harris E, Steward T, Shatte A, Khanh-Dao Le L, Anwar T, Mihalopoulos C, Parker AG, Yager Z, Fuller-Tyszkiewicz M. Critical measurement issues in the assessment of social media influence on body image. Body Image. 2022 Mar;40:225-236.
Jarman HK, McLean SA, Paxton SJ, Sibley CG, Marques MD. Examination of the temporal sequence between social media use and well-being in a representative sample of adults. Soc Psychiatry Psychiatr Epidemiol. 2023 Aug;58(8):1247-1258.
Jarman HK, McLean SA, Paxton SJ, Sibley CG, Marques MD. Examination of the temporal sequence between social media use and well-being in a representative sample of adults. Soc Psychiatry Psychiatr Epidemiol. 2023 Aug;58(8):1247-1258.
Jarman, H. K., Fuller-Tyszkiewicz, M., McLean, S. A., Rodgers, R. F., Slater, A., Gordon, C. S., & Paxton, S. J. (2023). Who's most at risk of poor body image? Identifying subgroups of adolescent social media users over the course of a year. Computers in Human Behavior, 147, 107823.
Javornik A, Marder B, Pizzetti M, Warlop L. Research: How AR Filters Impact People’s Self-Image. Harvard Business Review, Psychology. 2021 Dec 22. https://hbr.org/2021/12/research-how-ar-filters-impact-peoples-self-image
Jaworska, N., & MacQueen, G. (2015). Adolescence as a unique developmental period. Journal of Psychiatry & Neuroscience, 40(5), 291–293.
Jelenchick LA, Eickhoff J, Christakis DA, Brown RL, Zhang C, Benson M, Moreno MA. The Problematic and Risky Internet Use Screening Scale (PRIUSS) for Adolescents and Young Adults: Scale Development and Refinement. Comput Human Behav. 2014 Jun 1;35:10.1016/j.chb.2014.01.035.
Jensen F, Nutt A. The Teenage Brain A Neuroscientist's Survival Guide to Raising Adolescents and Young Adults. Psychology. 2015 Jan. 6.
Jensen M, George M, Russell M, Odgers C. Young Adolescents' Digital Technology Use and Mental Health Symptoms: Little Evidence of Longitudinal or Daily Linkages. Clin Psychol Sci. 2019 Nov;7(6):1416-1433.
Jerónimo F, Carraça EV. Effects of fitspiration content on body image: a systematic review. Eat Weight Disord. 2022 Dec;27(8):3017-3035.
Jerónimo, F., & Carraça, E. V. (2022). Effects of fitspiration content on Body image: A systematic review. Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity, 27(8), 3017–3035.

Cite
Jiotsa B, Naccache B, Duval M, Rocher B, Grall-Bronnec M. Social Media Use and Body Image Disorders: Association between Frequency of Comparing One's Own Physical Appearance to That of People Being Followed on Social Media and Body Dissatisfaction and Drive for Thinness. Int J Environ Res Public Health. 2021 Mar 11;18(6):2880.
Jo H, Baek E. Predictors of social networking service addiction. Scientific reports, 13(1), 16705. 2023.
Jo H, Baek E. Predictors of social networking service addiction. Scientific reports, 13(1), 16705. 2023.
Johannes N, Masur P, Vuorre M, Przybylski A. How should we investigate variation in the relation between social media and well-being? 2021.
Johannes N, Nguyen T, Weinstein N, Przybylski A. Objective, subjective, and accurate reporting of social media use: No evidence that daily social media use correlates with personality traits, motivational states, or well-being. Technology, Mind, and Behavior, 2(2). 2021.
Johnson A. No, You Can't Get Paid For TikTok Streaks, Company Says. Forbes, Innovation, Breaking. 2024 Jul. 10. https://www.forbes.com/sites/ariannajohnson/2024/07/10/no-you-cant-get-paid-for-tiktok-streaks-company-says/
Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2018). Monitoring the Future National Survey Results on Drug Use, 1975-2017: Overview, Key Findings on Adolescent Drug Use. Institute for Social Research. https://eric.ed.gov/?id=ED589762
Jones, C. N., Rudaizky, D., Mahalingham, T., & Clarke, P. J. F. (2024). Investigating the links between objective social media use, attentional control, and psychological distress. Social science & medicine (1982), 361, 117400. https://doi.org/10.1016/j.socscimed.2024.117400
Jong, S. T., & Drummond, M. J. N. (2016). Hurry up and 'like' me: Immediate feedback on social networking sites and the impact on adolescent girls. Asia-Pacific Journal of Health, Sport and Physical Education, 7(3), 251-267.
Jude Mary Cénat, Kevin Smith, Martine Hébert, Daniel Derivois, Cybervictimization and suicidality among French undergraduate Students: A mediation model, Journal of Affective Disorders, Volume 249, 2019, Pages 90-95, ISSN 0165-0327.
Kann L, McManus T, Harris WA, Shanklin SL, Flint KH, Queen B, Lowry R, Chyen D, Whittle L, Thornton J, Lim C, Bradford D, Yamakawa Y, Leon M, Brener N, Ethier KA. Youth Risk Behavior Surveillance - United States, 2017. MMWR Surveill Summ. 2018 Jun 15;67(8):1-114. doi: 10.15585/mmwr.ss6708a1. PMID: 29902162; PMCID: PMC6002027.
Karazsia, B. T., Murnen, S. K., & Tylka, T. L. (2017). Is body dissatisfaction changing across time? A cross-temporal meta-analysis. Psychological Bulletin, 143(3), 293–320.
Karim F, Oyewande AA, Abdalla LF, Chaudhry Ehsanullah R, Khan S. Social Media Use and Its Connection to Mental Health: A Systematic Review. Cureus. 2020 Jun 15;12(6):e8627.
Kass E. Parents' Perspectives on Youth and Social Media Use. 2024 Aug. 15.
Kbaier D, Kane A, McJury M, Kenny I. Prevalence of Health Misinformation on Social Media-Challenges and Mitigation Before, During, and Beyond the COVID-19 Pandemic: Scoping Literature Review. J Med Internet Res. 2024 Aug 19;26:e38786.

Cite
Kbaier, D., Kane, A., McJury, M., & Kenny, I. (2022). Prevalence of Health Misinformation on Social Media—Challenges and Mitigation before, during, and beyond the COVID-19 Pandemic: Scoping Literature Review (Preprint).
Keles B, McCrae N, Grealish A. A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents, International Journal of Adolescence and Youth, 25:1, 79-93. 2020.
Keller M, Dance GJX. The Internet Is Overrun With Images of Child Sexual Abuse. What Went Wrong? The New York Times. 2019 Sep. 29. https://www.nytimes.com/interactive/2019/09/28/us/child-sex-abuse.html
Kellner S. Study: Teens Average 1.5 hours of smartphone use per day during school hours. 2025 Feb. 28.
Kelly Y, Zilanawala A, Booker C, Sacker A. Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study. EClinicalMedicine. 2019 Jan 4;6:59-68.
Kennard, B. D., Hughes, J. L., Minhajuddin, A., Jones, S. M., Jha, M. K., Slater, H., Mayes, T. L., Storch, E. A., LaGrone, J. M., Martin, S. L., Hamilton, J. L., Wildman, R., Pitts, S., Blader, J. C., Upshaw, B. M., Garcia, E. K., Wakefield, S. M., & Trivedi, M. H. (2025). Problematic social media use and relationship to mental health characteristics in youth from the Texas Youth Depression and Suicide Research Network (TX-YDSRN). Journal of Affective Disorders, 374, 128–140.3
Kerr B, Garimella A, Pillarisetti L, Charlly N, Sullivan K, Moreno MA. Associations Between Social Media Use and Anxiety Among Adolescents: A Systematic Review Study. J Adolesc Health. 2025 Jan;76(1):18-28.
Keyes CL. Mental illness and/or mental health? Investigating axioms of the complete state model of health. J Consult Clin Psychol. 2005 Jun;73(3):539-48. doi: 10.1037/0022-006X.73.3.539. PMID: 15982151.
Keyes, C. L. M. (2006). Subjective well-being in mental health and human development research worldwide: An introduction. Social Indicators Research, 77(1), 1–10.
Keyes, K. M., & Kreski, N. (2020). Is There an Association Between Social Media Use and Mental Health? The Timing of Confounding Measurement Matters. JAMA Psychiatry (Chicago, Ill.), 77(4), 437–437.
Khalaf AM, Alubied AA, Khalaf AM, Rifaey AA. The Impact of Social Media on the Mental Health of Adolescents and Young Adults: A Systematic Review. Cureus. 2023 Aug 5;15(8):e42990.
Khalil SA, Kamal H, Elkholy H. The prevalence of problematic internet use among a sample of Egyptian adolescents and its psychiatric comorbidities. Int J Soc Psychiatry. 2022 Mar;68(2):294-300.
Kim H, Schlicht R, Schardt M, Florack A. The contributions of social comparison to social network site addiction. PLoS One. 2021 Oct 28;16(10):e0257795. doi: 10.1371/journal.pone.0257795. PMID: 34710108; PMCID: PMC8553147.
Kim HHS.The impact of online social networking on adolescent psychological well-being (WB): a population-level analysis of Korean school-aged children. *International Journal of Adolescence and Youth. 2016. 22* (3), 364–376.
Kim J, Kadkol S, Solomon I, Yeh H, Soh J, Nguyen T, Choi J, Lee S, Srivatsa A, Nahass G, Ajilore O. AI Anxiety: A Comprehensive Analysis of Psychological Factors and Interventions. SSRN Electronic Journal. 2023.
Kim S, Colwell S, Kata A, Boyle M, Georgiades K. Cyberbullying Victimization and Adolescent Mental Health: Evidence of Differential Effects by Sex and Mental Health Problem Type. Journal of Youth and Adolescence. 47. 2018.

Cite
Kim S, Kimber M, Boyle MH, Georgiades K. Sex Differences in the Association Between Cyberbullying Victimization and Mental Health, Substance Use, and Suicidal Ideation in Adolescents. The Canadian Journal of Psychiatry. 2018;64(2):126-135.
Kim YK, Kim YJ, Maleku A, Moon SS. Typologies of Peer Victimization, Depression, and Alcohol Use among High School Youth in the United States: Measuring Gender Differences. Soc Work Public Health. 2019;34(4):293-306. doi: 10.1080/19371918.2019.1606750. Epub 2019 Apr 29. PMID: 31033420.
Kim, H. M. (2021). What do others' reactions to body posting on Instagram tell us? The effects of social media comments on viewers' body image perception. New Media & Society, 23(12), 3448–3465.
Kim, S., Kimber, M., Boyle, M. H., & Georgiades, K. (2019). Sex differences in the association between cyberbullying victimization and mental health, substance use, and suicidal ideation in adolescents. The Canadian Journal of Psychiatry / La Revue canadienne de psychiatrie, 64(2), 126–135.
Kingsbury, M., Reme, B.-A., Skogen, J. C., Sivertsen, B., Øverland, S., Cantor, N., Hysing, M., Petrie, K., & Colman, I. (2021). Differential associations between types of social media use and university students' non-suicidal self-injury and suicidal behavior. Computers in Human Behavior, 115, 106614. https://doi.org/10.1016/j.chb.2020.106614
Kirlic N, Colaizzi JM, Cosgrove KT, Cohen ZP, Yeh HW, Breslin F, Morris AS, Aupperle RL, Singh MK, Paulus MP. Extracurricular Activities, Screen Media Activity, and Sleep May Be Modifiable Factors Related to Children's Cognitive Functioning: Evidence From the ABCD Study®. Child Dev. 2021 Sep;92(5):2035-2052. doi: 10.1111/cdev.13578. Epub 2021 Apr 26. PMID: 33900639; PMCID: PMC8478798.
Kiss O, de Zambotti M, Schaefer E, Durley I, Kerr E, Dulai T, Arra N, Obilor T, Camacho L, Hsu C, Baker F. Screen Time and Sleep In Young Adolescents Before and Across The First Year of The COVID-19 Pandemic. Center for Health Sciences, SRI International. 2022 Jul. 30
Kitchenham, Barbara & Charters, Stuart. (2007). Guidelines for performing Systematic Literature Reviews in Software Engineering. 2.
Kleemans M, Daalmans S, Carbaat I, Anschütz D. Picture Perfect: The Direct Effect of Manipulated Instagram Photos on Body Image in Adolescent Girls. Media Psychology, 21:1, 93-110. 2018.
eiderhiser, J. M., DeFries, J. C., & Plomin, R. (2017). *Behavioral genetics* (seventh edition). Worth Publishers Mac
Kofoed J, Larsen M. A snap of intimacy: Photo-sharing practices among young people on social media. First Monday. 21. 2016.
Konijn, E. A., Bijvank, M. N. & Bushman, B. J. I wish I were a warrior: the role of wishful identification in the effects of violent video games on aggression in adolescent boys. Dev. Psychol. 43, 1038–1044 (2007).
Koob GF, Volkow ND. Neurobiology of addiction: a neurocircuitry analysis. Lancet Psychiatry. 2016 Aug;3(8):760-773.
Koob GF. Neurocircuitry of alcohol addiction: synthesis from animal models. Handb Clin Neurol. 2014;125:33-54.
Kostyrka-Allchorne, K., Stoilova, M., Bourgaize, J., Rahali, M., Livingstone, S., & Sonuga-Barke, E. (2023). Review: Digital experiences and their impact on the lives of adolescents with pre-existing anxiety, depression, eating and nonsuicidal self-injury conditions - a systematic review. Child and adolescent mental health, 28(1), 22–32. https://doi.org/10.1111/camh.12619

Literature

Cite
Krabbe KS, Nielsen AR, Krogh-Madsen R, Plomgaard P, Rasmussen P, Erikstrup C, Fischer CP, Lindegaard B, Petersen AM, Taudorf S, Secher NH, Pilegaard H, Bruunsgaard H, Pedersen BK. Brain-derived neurotrophic factor (BDNF) and type 2 diabetes. Diabetologia. 2007 Feb;50(2):431-8.
Krach S, Paulus FM, Bodden M, Kircher T. The rewarding nature of social interactions. Front Behav Neurosci. 2010 May 28;4:22.
Krach S, Paulus FM, Bodden M, Kircher T. The rewarding nature of social interactions. Front Behav Neurosci. 2010 May 28;4:22.
Kramer A, Guillory J, Hancock J. Editorial Expression of Concern and Correction. PNAS. 2014 Jul. 22.
Kramer AD, Guillory JE, Hancock JT. Experimental evidence of massive-scale emotional contagion through social networks. Proc Natl Acad Sci U S A. 2014 Jun 17;111(24):8788-90.
Kraus S, Jones P, Kailer N, Weinmann A, Chaparro-Banegas N, Roig-Tierno N. Digital Transformation: An Overview of the Current State of the Art of Research. SAGE Open, 11(3). 2021.
Krause, H.-V., Baum, K., Baumann, A., & Krasnova, H. (2021). Unifying the detrimental and beneficial effects of social network site use on self-esteem: A systematic literature review. Media Psychology, 24(1), 10–47. https://doi.org/10.1080/15213269.2019.1656646
Krause, H.-V., große Deters, F., Baumann, A., & Krasnova, H. (2023). Active social media use and its impact on well-being—An experimental study on the effects of posting pictures on instagram. Journal of Computer-Mediated Communication, 28(1), zmac037. https://doi.org/10.1093/jcmc/zmac037
Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? American Psychologist, 53(9), 1017–1031.
Kroshus E, Tandon PS, Zhou C, Johnson AM, Steiner MK, Christakis DA. Problematic Child Media Use During the COVID-19 Pandemic. Pediatrics. 2022 Sep 1;150(3):e2021055190.
Kunz P, Woolcott M. Season's greetings: From my status to yours. Social Science Research, 5(3), 269–278. 1976.
Kurten S, Ghai S, Odgers C, Kievit R, Orben A. Deprivation's roel in adoelscent social media use and its links to life satisfaction. Computers in Human Behavior vol 165 108541. 2025 Apr.
Kuş M. A meta-analysis of the impact of technology related factors on students' academic performance. Front Psychol. 2025 Feb 21;16:1524645.
Kushlev K, Proulx J, Dunn E. “Silence Your Phones”: Smartphone Notifications Increase Inattention and Hyperactivity Symptoms. Conference on Human Factors in Computing Systems. 2016.
Kuss DJ, Griffiths MD. Online gaming addiction in children and adolescents: A review of empirical research. J Behav Addict. 2012 Mar;1(1):3-22. doi: 10.1556/JBA.1.2012.1.1. PMID: 26166826.
Kuss DJ, Griffiths MD. Online social networking and addiction--a review of the psychological literature. Int J Environ Res Public Health. 2011 Sep;8(9):3528-52.
Kuss, D. J., & Griffiths, M. D. (2012). Internet Gaming Addiction: A Systematic Review of Empirical Research. International Journal of Mental Health and Addiction, 10(2), 278–296. https://doi.org/10.1007/s11469-011-9318-5

Cite
Kuther R. Child & Adolescent Development in Context. Psychology. 2019.
Lacida, Acegen & Murcia, John Vianne. (2015). Influence of Facebook Addiction on the Study Habits of College Students. SSRN Electronic Journal.
Lambert J, Barnstable G, Minter E, Cooper J, McEwan D. Taking a One-Week Break from Social Media Improves Well-Being, Depression, and Anxiety: A Randomized Controlled Trial. Cyberpsychol Behav Soc Netw. 2022 May;25(5):287-293.
Landesman R, Radesky J, Hiniker A. Let Kids Wonder, Question and Make Mistakes: How the Designers of Children's Technology Think about Child Well-being. 310-321. 2023.
Langberg JM, Dvorsky MR, Evans SW. What specific facets of executive function are associated with academic functioning in youth with attention-deficit/hyperactivity disorder? J Abnorm Child Psychol. 2013 Oct;41(7):1145-59.
Lash, T. L., VanderWeele, T. J., Haneuse, S., & Rothman, K. J. (2020). Modern epidemiology (Fourth edition). Wolters Kluwer / Lippincott Williams & Wilkins.
Lauer, D. (2021). You cannot have AI ethics without ethics. AI and Ethics, 1(1), 21–25. https://doi.org/10.1007/s43681-020-00013-4
Lauer, D. Facebook's ethical failures are not accidental; they are part of the business model. AI Ethics 1, 395–403 (2021).
Laura Marciano, Jeffrey Lin, Taisuke Sato, Sundas Saboor, Kasisomayajula Viswanath. Does social media use make us happy? A meta-analysis on social media and positive well-being outcomes, SSM - Mental Health, Volume 6, 2024, 100331, ISSN 2666-5603.
Lee D, Lee J, Namkoong K, Jung YC. Altered functional connectivity of the dorsal attention network among problematic social network users. Addict Behav. 2021 May;116:106823. doi: 10.1016/j.addbeh.2021.106823. Epub 2021 Jan 8. PMID: 33460991.
Lee HY, Jamieson JP, Reis HT, Beevers CG, Josephs RA, Mullarkey MC, O'Brien JM, Yeager DS. Getting Fewer "Likes" Than Others on Social Media Elicits Emotional Distress Among Victimized Adolescents. Child Dev. 2020 Nov;91(6):2141-2159.
Lee J. The effects of social comparison orientation on psychological well-being in social networking sites: Serial mediation of perceived social support and self-esteem. Current Psychology, 41, 6247 - 6259. 2020.
Lee J. Unveiling the relationships among adolescents' persistent academic possible selves, academic self-concept, self-regulation, and achievement: A longitudinal and moderated mediation study. Self and Identity, 21(4), 474–498. 2022.
Lee TA, Pickard AS. Exposure Definition and Measurement. In: Velentgas P, Dreyer NA, Nourjah P, et al., editors. Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide. Rockville (MD): Agency for Healthcare Research and Quality (US); 2013 Jan. Chapter 4.
Lee, H. Y., Jamieson, J. P., Reis, H. T., Beevers, C. G., Josephs, R. A., Mullarkey, M. C., O'Brien, J. M., & Yeager, D. S. (2020). Getting Fewer "Likes" Than Others on Social Media Elicits Emotional Distress Among Victimized Adolescents. Child development, 91(6), 2141–2159. https://doi.org/10.1111/cdev.13422
Lee, T. A., & Pickard, A. S. (2013). Exposure Definition and Measurement. In Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide. Agency for Healthcare Research and Quality (US). https://www.ncbi.nlm.nih.gov/books/NBK126191/

Cite
Leggitt B. How The Internet Destroyed Your Attention Span. Popzazzle. 2021 Apr. 30.
Lei H, Huang Y, Chai Y, Zhang X. Social Media Disorder, Mental Health, and Validation of the Chinese Version of 27-Item Social Media Disorder Scale in Chinese College Students. Front Public Health. 2022 Jul 5;10:942720.
Lemahieu, L., Vander Zwalmen, Y., Mennes, M. et al. The effects of social media abstinence on affective well-being and life satisfaction: a systematic review and meta-analysis. Sci Rep 15, 7581 (2025).
Lembke, A. (2021). Dopamine Nation: Finding Balance in the Age of Indulgence. Penguin Publishing Group.
Levenson JC, Shensa A, Sidani JE, Colditz JB, Primack BA. The association between social media use and sleep disturbance among young adults. Prev Med. 2016 Apr;85:36-41.
Levine B, Stuss DT, Winocur G, Binns MA, Fahy L, Mandic M, Bridges K, Robertson IH. Cognitive rehabilitation in the elderly: effects on strategic behavior in relation to goal management. J Int Neuropsychol Soc. 2007 Jan;13(1):143-52.
Levine LE, Waite BM, Bowman LL. Electronic media use, reading, and academic distractibility in college youth. Cyberpsychol Behav. 2007 Aug;10(4):560-6. doi: 10.1089/cpb.2007.9990. PMID: 17711365.
Levine M. A New Resource for the Parents of Teens on Instagram. Instagram Blog. 2018 09 06. https://about.instagram.com/blog/tips-and-tricks/new-resource-for-what-parents-need-to-know-about-instagram
Lewis SP, Heath NL, Sornberger MJ, et al. Helpful or harmful? An examination of viewers' responses to nonsuicidal self-injury videos on YouTube. J Adolesc Health 2012;51:380–5.
Li H, Sakamoto Y. Social impacts in social media: An examination of perceived truthfulness and sharing of information. Computers in Human Behavior, vol. 41, pp. 278-287. 2014 Dec.
Li M, Chen J, Li N, Li X. A twin study of problematic internet use: its heritability and genetic association with effortful control. Twin Res Hum Genet. 2014 Aug;17(4):279-87. doi: 10.1017/thg.2014.32. Epub 2014 Jun 16. PMID: 24933598.
Li P, Chang L, Hui Hui Cha T, Sze Ming Loh R. "Likes" as KPI: An examination of teenage girls' perspective on peer feedback on Instagram and its influence on coping response. Telematics and Informatics 35 (2018): 1994–2005. 2018.
Li, Y. Y., Koning, I. M., Finkenauer, C., Boer, M., & van den Eijnden, R. J. (2024). The bidirectional relationships between fear of missing out, problematic social media use and adolescents' well-being: A random intercept cross-lagged panel model. Computers in Human Behavior, 154, 108160.
Lieberman DZ, Long ME. The Molecule of More: How a Single Chemical in your Brain Drives Love, Sex, and Creativity-and Will Determine the Fate of the Human Race. Banbella Books. 2018
Lim KS, Wong CH, McIntyre RS, Wang J, Zhang Z, Tran BX, Tan W, Ho CS, Ho RC. Global Lifetime and 12-Month Prevalence of Suicidal Behavior, Deliberate Self-Harm and Non-Suicidal Self-Injury in Children and Adolescents between 1989 and 2018: A Meta-Analysis. Int J Environ Res Public Health. 2019 Nov 19;16(22):4581. doi: 10.3390/ijerph16224581. PMID: 31752375; PMCID: PMC6888476.
Lin CY, Broström A, Nilsen P, Griffiths MD, Pakpour AH. Psychometric validation of the Persian Bergen Social Media Addiction Scale using classic test theory and Rasch models. J Behav Addict. 2017 Dec 1;6(4):620-629.
Lin H, Garro H, Wernerfelt N, Shore JC, Hughes A, Deisenroth D, Barr N, Berinsky A, Eckles D, Pennycook G, Rand D. Reducing misinformation sharing at scale using digital accuracy prompt ads. 2024 Feb. 7.

Cite
Lin LY, Sidani JE, Shensa A, Radovic A, Miller E, Colditz JB, Hoffman BL, Giles LM, Primack BA. ASSOCIATION BETWEEN SOCIAL MEDIA USE AND DEPRESSION AMONG U.S. YOUNG ADULTS. Depress Anxiety. 2016 Apr;33(4):323-31.
Lin, C. Y., Potenza, M. N., Ulander, M., Broström, A., Ohayon, M. M., Chattu, V. K., & Pakpour, A. H. (2021). Longitudinal Relationships between Nomophobia, Addictive Use of Social Media, and Insomnia in Adolescents. Healthcare (Basel, Switzerland), 9(9), 1201. https://doi.org/10.3390/healthcare9091201
Lin, H., Wang, C., & Sun, Y. (2024). How big five personality traits influence information sharing on social media: A meta analysis. PLOS ONE, 19(6), e0303770. https://doi.org/10.1371/journal.pone.0303770
Lindström, B., Bellander, M., Schultner, D.T. *et al.* A computational reward learning account of social media engagement. *Nat Commun* **12**, 1311 (2021). https://doi.org/10.1038/s41467-020-19607-x
Lipsit A. What My Rules for Social Media Would Be if I Were a Gen Z Parent. Niles West News. 2020 Oct. 6.
Lipsitz JD, Markowitz JC. Mechanisms of change in interpersonal therapy (IPT). Clin Psychol Rev. 2013 Dec;33(8):1134-47.
Liu H, Wu L, Li X. Social Media Envy: How Experience Sharing on Social Networking Sites Drives Millennials' Aspirational Tourism Consumption. Journal of Travel Research. 58. 355-369. 2018.
Liu M, Kamper-DeMarco KE, Zhang J, Xiao J, Dong D, Xue P. Time Spent on Social Media and Risk of Depression in Adolescents: A Dose-Response Meta-Analysis. Int J Environ Res Public Health. 2022 Apr 24;19(9):5164.
Liu X, Buysse DJ. Sleep and youth suicidal behavior: a neglected field. Curr Opin Psychiatry. 2006 May;19(3):288-93.
Liu Y, Mohamad EMW, Azlan AA, Tan Y. Am I Happier Without You? Social Media Detox and Well-Being: A Meta-Analysis of Randomized Controlled Trials. Behav Sci (Basel). 2025 Mar 1;15(3):290. doi: 10.3390/bs15030290. PMID: 40150185; PMCID: PMC11939267.
Livingston J, Holland E, Fardouly J. Exposing digital posing: The effect of social media self-disclaimer captions on women's body dissatisfaction, mood, and impressions of the user. Body Image. 2020 Mar;32:150-154.
Livingstone S, Helsper EJ. Parental mediation of children's Internet use. Journal of Broadcasting & Electronic Media, 52(4), 581–599. 2008.
Livingstone S. iGen: why today's super-connected kids are growing up less rebellious, more tolerant, less happy – and completely unprepared for adulthood. Journal of Children and Media, 12(1), 118–123. 2020.
Livingstone, S. (2008). Taking risky opportunities in youthful content creation: Teenagers' use of social networking sites for intimacy, privacy and self-expression. New Media & Society, 10(3), 393–411. https://doi.org/10.1177/1461444808089415
Lo CB, Bridge JA, Shi J, Ludwig L, Stanley RM. Children's Mental Health Emergency Department Visits: 2007-2016. Pediatrics. 2020 Jun;145(6):e20191536.

Cite
Lonergan AR, Bussey K, Fardouly J, Griffiths S, Murray SB, Hay P, Mond J, Trompeter N, Mitchison D. Protect me from my selfie: Examining the association between photo-based social media behaviors and self-reported eating disorders in adolescence. Int J Eat Disord. 2020 May;53(5):485-496.
Lonergan AR, Bussey K, Mond J, Brown O, Griffiths S, Murray SB, Mitchison D. Me, my selfie, and I: The relationship between editing and posting selfies and body dissatisfaction in men and women. Body Image. 2019 Mar;28:39-43.
Long EC, Verhulst B, Neale MC, Lind PA, Hickie IB, Martin NG, Gillespie NA. The Genetic and Environmental Contributions to Internet Use and Associations With Psychopathology: A Twin Study. Twin Res Hum Genet. 2016 Feb;19(1):1-9. doi: 10.1017/thg.2015.91. Epub 2015 Dec 23. PMID: 26693596; PMCID: PMC4756632.
Long M, Burgess Dowdell E. Cyberbullying and Victimization: An Examination of Online and Health Risk Behaviors in High School. Pediatric Nursing, vol. 47, Iss. 5, pp. 226-231,251. 2021 Oct.
López E, Flecha J, Santos-Corrada M, Dones V. The Gratifications of Ephemeral Marketing Content, the Use of Snapchat by the Millennial Generation and Their Impact on Purchase Motivation. Global Business Review. 25. 2021.
Lorenzo-Luaces L, Dierckman C, Adams S. Attitudes and (Mis)information About Cognitive Behavioral Therapy on TikTok: An Analysis of Video Content. J Med Internet Res. 2023 Mar 13;25:e45571.
Lorenzo-Luaces, L., Dierckman, C., & Adams, S. (2023). Attitudes and (Mis)Information about Cognitive-Behavioral Therapy (CBT) on TikTok: An Analysis of Video Content.
Lotter LD, Saberi A, Hansen JY, Misic B, Paquola C, Barker GJ, Bokde ALW, Desrivières S, Flor H, Grigis A, Garavan H, Gowland P, Heinz A, Brühl R, Martinot JL, Paillère ML, Artiges E, Papadopoulos Orfanos D, Paus T, Poustka L, Hohmann S, Fröhner JH, Smolka MN, Vaidya N, Walter H, Whelan R, Schumann G; IMAGEN Consortium; Nees F, Banaschewski T, Eickhoff SB, Dukart J. Regional patterns of human cortex development correlate with underlying neurobiology. Nat Commun. 2024 Sep 12;15(1):7987. doi: 10.1038/s41467-024-52366-7. PMID: 39284858; PMCID: PMC11405413.
Loynds J. Instagram is putting teens at risk with self-harm content. readwrite. 2024 12 02. https://readwrite.com/instagram-is-putting-teens-at-risk-with-self-harm-content/
Lozano-Blasco, R., Barreiro-Collazo, A., Romero-Gonzalez, B., & Soto-Sanchez, A. (2023). The Family Context in Cybervictimization: A Systematic Review and Meta-Analysis. Trauma, Violence, & Abuse, 25(3), 2143-2157.
Luijten CC, van de Bongardt D, Nieboer AP. The Roles of Social Media Use and Friendship Quality in Adolescents' Internalizing Problems and Well-being. J Happiness Stud. 2022;23(7):3161-3178.
Luís G. Spínola, Cláudia Calaboiça, Irene P. Carvalho. The use of social networking sites and its association with non-suicidal self-injury among children and adolescents: A systematic review. Journal of Affective Disorders Reports, Volume 16, 2024, 100781, ISSN 2666-9153.

Cite
Lup K, Trub L, Rosenthal L. Instagram #instasad?: exploring associations among instagram use, depressive symptoms, negative social comparison, and strangers followed. Cyberpsychol Behav Soc Netw. 2015 May;18(5):247-52.
Lupinacci L. ‘Absentmindedly scrolling through nothing’: liveness and compulsory continuous connectedness in social media. Media, Culture & Society. 43. 2020.
Luxton DD, June JD, Fairall JM. Social media and suicide: a public health perspective. Am J Public Health. 2012 May;102 Suppl 2(Suppl 2):S195-200.
Macnow T, Curran T, Tolliday C, Martin K, McCarthy M, Ayturk D, Babu KM, Mannix R. Effect of Screen Time on Recovery From Concussion: A Randomized Clinical Trial. JAMA Pediatr. 2021 Nov 1;175(11):1124-1131.
Madge, C., Meek, J., Wellens, J., and Hooley, T. (2009). Facebook, social integration and informal learning at university:‘It is more for socialising and talking to friends about work than for actually doing work’. Learn. Media Technol. 34, 141–155.
Mahalingham T, Howell J, Clarke PJF. Assessing the effects of acute reductions in mobile device social media use on anxiety and sleep. Journal of behavior therapy and experimental psychiatry. 2023. 78, 101791. https://doi.org/10.1016/j.jbtep.2022.101791
Maheux AJ, Roberts SR, Nesi J, Widman L, Choukas-Bradley S. Longitudinal associations between appearance-related social media consciousness and adolescents' depressive symptoms. J Adolesc. 2022 Feb;94(2):264-269.
Mahler MS. Symbiosis and individuation. The psychological birth of the human infant. Psychoanal Study Child. 1974;29:89-106.
Manago AM, Walsh AS, Barsigian LL. The contributions of gender identification and gender ideologies to the purposes of social media use in adolescence. Front Psychol. 2023 Jan 10;13:1011951.
Mangunkusumo, R. T., Moorman, P. W., Van Den Berg-de, A. E., Van Der Lei, J., De Koning, H. J., & Raat, H. (2005). Internet-administered adolescent health questionnaires compared with a paper version in a randomized study. Journal of Adolescent Health, 36(1), 70-e1.
Marciano L, Camerini AL, Morese R. The Developing Brain in the Digital Era: A Scoping Review of Structural and Functional Correlates of Screen Time in Adolescence. Front Psychol. 2021 Aug 27;12:671817. doi: 10.3389/fpsyg.2021.671817. PMID: 34512437; PMCID: PMC8432290.
Marciano L, Driver C, Schulz P, Camerini AL. Dynamics of adolescents' smartphone use and well-being are positive but ephemeral. Nature portfolio 12:1316. 2022.
Marciano L, Ostroumova M, Schulz PJ, & Camerini AL. (2021). Digital Media Use and Adolescents’ Mental Health During the Covid-19 Pandemic: A Systematic Review and Meta-Analysis. Front Public Health, 9, 793868. https://doi.org/10.3389/fpubh.2021.793868
Markey CH, Daniels EA. An examination of preadolescent girls' social media use and body image: Type of engagement may matter most. Body Image. 2022 Sep;42:145-149.
Markowitz JC, Weissman MM. Interpersonal psychotherapy: principles and applications. World Psychiatry. 2004 Oct;3(3):136-9. PMID: 16633477

Cite
Martínez V, Jiménez-Molina Á, Gerber MM. Social contagion, violence, and suicide among adolescents. Curr Opin Psychiatry. 2023 May 1;36(3):237-242.
Marttila, Eetu & Koivula, Aki & Räsänen, Pekka. (2021). Does excessive social media use decrease subjective well-being? A longitudinal analysis of the relationship between problematic use, loneliness and life satisfaction. Telematics and Informatics. 59. 101556. 10.1016/j.tele.2020.101556.
Mason D, Ingham B, Urbanowicz A, Michael C, Birtles H, Woodbury-Smith M, Brown T, James I, Scarlett C, Nicolaidis C, Parr JR. A Systematic Review of What Barriers and Facilitators Prevent and Enable Physical Healthcare Services Access for Autistic Adults. J Autism Dev Disord. 2019 Aug;49(8):3387-3400.
Mason M, Mennis J, Russell M, Moore M, Brown A. Adolescent Depression and Substance Use: the Protective Role of Prosocial Peer Behavior. J Abnorm Child Psychol. 2019 Jun;47(6):1065-1074. doi: 10.1007/s10802-018-0501-z. PMID: 30547314; PMCID: PMC6788757.
Maurya C, Muhammad T, Dhillon P, Maurya P. The effects of cyberbullying victimization on depression and suicidal ideation among adolescents and young adults: a three year cohort study from India. BMC Psychiatry. 2022 Sep 9;22(1):599. doi: 10.1186/s12888-022-04238-x. PMID: 36085004; PMCID: PMC9461154.
Mayukh N, AManaf A. Relationship between Instagram usage, social comparison, and self-esteem among young adults during the Covid-19 pandemic. Jurnal Pengajian Media Malaysia, 24(1), 93–108. 2022.
Maza MT, Fox KA, Kwon SJ, Flannery JE, Lindquist KA, Prinstein MJ, Telzer EH. Association of Habitual Checking Behaviors on Social Media With Longitudinal Functional Brain Development. JAMA Pediatr. 2023 Feb 1;177(2):160-167.
McAllister C, Hisler GC, Blake AB, Twenge JM, Farley E, Hamilton JL. Associations Between Adolescent Depression and Self-Harm Behaviors and Screen Media Use in a Nationally Representative Time-Diary Study. Res Child Adolesc Psychopathol. 2021 Dec;49(12):1623-1634.
McComb C, Vanman E, Tobin S. A Meta-Analysis of the Effects of Social Media Exposure to Upward Comparison Targets on Self-Evaluations and Emotions. Media Psychology, 26(5), 612–635. 2023.
McComb C, Vanman E, Tobin S. A Meta-Analysis of the Effects of Social Media Exposure to Upward Comparison Targets on Self-Evaluations and Emotions. Media Psychology, 26(5), 612–635. 2023.
McComb S, Gobin K, Mills J. The effects of self-disclaimer Instagram captions on young women's mood and body image: The moderating effect of participants' own photo manipulation practices. Body Image., vol 38 251-261. 2021 Sep.
McComb SE, Mills JS. Eating and body image characteristics of those who aspire to the slim-thick, thin, or fit ideal and their impact on state body image. Body Image. 2022 Sep;42:375-384.
McComb SE, Mills JS. Eating and body image characteristics of those who aspire to the slim-thick, thin, or fit ideal and their impact on state body image. Body Image. 2022 Sep;42:375-384.
McComb, S. E., & Mills, J. S. (2022). The effect of physical appearance perfectionism and social comparison to thin-, slim-thick-, and fit-ideal Instagram imagery on young women's body image. Body Image, 40, 165-175.
Mccrae N, Gettings S, Purssell E. Social Media and Depressive Symptoms in Childhood and Adolescence: A Systematic Review. Adolescent Research Review. 2. 2017.

Literature

Cite
McDool E, Powell P, Roberts J, Taylor K. Social Media Use and Children's Wellbeing. IZA Discussion Papers 10412, Institute of Labor Economics (IZA). 2016. https://ideas.repec.org/p/iza/izadps/dp10412.html
McLean SA, Paxton SJ, Wertheim EH, Masters J. Photoshopping the selfie: Self photo editing and photo investment are associated with body dissatisfaction in adolescent girls. Int J Eat Disord. 2015 Dec;48(8):1132-40.
McLean SA, Paxton SJ, Wertheim EH. The role of media literacy in body dissatisfaction and disordered eating: A systematic review. Body Image. 2016 Dec;19:9-23.
McMahon G, Howard S, Manunta E, Griffin S, Bradshaw D, Nightingale A, Muldoon O. Social group membership and biomarkers of health. Journal of Applied Social Psychology. 2024 May 29.
McMahon, L., Singleton, T., & Hayes, G. (2024, November 28). Do "much, much more" on age verification, social media apps told. BBC. https://www.bbc.com/news/articles/cn4v52ezx17o
McNamee P, Mendolia S, Yerokhin O. Social media use and emotional and behavioural outcomes in adolescence: Evidence from British longitudinal data. Econ Hum Biol. 2021 May;41:100992.
Meier A, Reinecke L. Computer-mediated communication, social media, and mental health: A conceptual and empirical meta-review. Communication Research, 48(8), 1182–1209. 2021.
Meier A, Reinecke L. Computer-mediated communication, social media, and mental health: A conceptual and empirical meta-review. Communication Research, 48(8), 1182–1209. 2021.
Memon AM, Sharma SG, Mohite SS, Jain S. The role of online social networking on deliberate self-harm and suicidality in adolescents: A systematized review of literature. Indian J Psychiatry. 2018 Oct-Dec;60(4):384-392.
Meng, S.-Q., Cheng, J.-L., Li, Y.-Y., Yang, X.-Q., Zheng, J.-W., Chang, X.-W., Shi, Y., Chen, Y., Lu, L., Sun, Y., Bao, Y.-P., & Shi, J. (2022). Global prevalence of digital addiction in general population: A systematic review and meta-analysis. Clinical Psychology Review, 92, 102128.
Mérelle SYM, Kleiboer AM, Schotanus M, Cluitmans TLM, Waardenburg CM, Kramer D, van de Mheen D, van Rooij AJ. Which health-related problems are associated with problematic video-gaming or social media use in adolescents? A large-scale cross-sectional study. Clinical Neuropsychiatry: Journal of Treatment Evaluation, 14(1), 11–19. 2017.
Merelli A. What's the evidence for the surgeon general's proposed social media warning? STATNews, Health. 2024 Jun. 17. https://www.statnews.com/2024/06/17/surgeon-general-social-media-warning-praise-pushback/
Meshi D, Morawetz C, Heekeren HR. Nucleus accumbens response to gains in reputation for the self relative to gains for others predicts social media use. Front Hum Neurosci. 2013 Aug 29;7:439.
Meshi D, Tamir DI, Heekeren HR. The Emerging Neuroscience of Social Media. Trends Cogn Sci. 2015 Dec;19(12):771-782.
Meshi, D., Mamerow, L., Kirilina, E. et al. Sharing self-related information is associated with intrinsic functional connectivity of cortical midline brain regions. Sci Rep 6, 22491 (2016).
Meshi, Dar & Morawetz, Carmen & Heekeren, Hauke. (2013). Facebook, Being Cool, and Your Brain: What Science Tells Us. Frontiers for Young Minds. 1.

Cite
Meta. Facebook to Acquire Instagram. 2012 Apr. 9. https://about.fb.com/news/2012/04/facebook-to-acquire-instagram/
Meta. Giving people the power to build community and bring the world closer together.
Metheekul P. The Development and Effectiveness of Digital Well-being Intervention on Enhancing Digital Literacy and Psychological Well-Being of Thai Adolescents. The Journal of Behavioral Science , 19 (2), 89–102. 2024.
Micali, N., Ploubidis, G., De Stavola, B., Simonoff, E., & Treasure, J. (2014). Frequency and patterns of eating disorder symptoms in early adolescence. The Journal of adolescent health: Official publication of the Society for Adolescent Medicine, 54(5), 574–581.
Michelle Richey & Aparna Gonibeed & M. N. Ravishankar, 2018. "The Perils and Promises of Self-Disclosure on Social Media," Information Systems Frontiers, Springer, vol. 20(3), pages 425-437, June.
Midgley, C., Thai, S., Lockwood, P., Kovacheff, C., & Page-Gould, E. (2021). When every day is a high school reunion: Social media comparisons and self-esteem. Journal of Personality and Social Psychology, 121(2), 285–307.
Mignano M. The End of Social Media and the Rise of Recommendation Media. Medium. 2022 Jul. 27.
Mikami AY, Khalis A, Karasavva V. Logging out or leaning in? Social media strategies for enhancing well-being. J Exp Psychol Gen. 2024 Nov 7.
Miljeteig K, Soest T. An Experience Sampling Study on the Association Between Social Media Use and Self-Esteem. Journal of Media Psychology. 34. 2022.
Mohammad S, Jan RA, Alsaedi SL. Symptoms, Mechanisms, and Treatments of Video Game Addiction. Cureus. 2023 Mar 31;15(3):e36957.
Mojtabai R, Olfson M, Han B. National Trends in the Prevalence and Treatment of Depression in Adolescents and Young Adults. Pediatrics. 2016 Dec;138(6):e20161878.
Mojtabai R, Olfson M, Han B. National Trends in the Prevalence and Treatment of Depression in Adolescents and Young Adults. Pediatrics. 2016 Dec;138(6):e20161878.
Molly Rose Foundation. Preventable yet pervasive. The prevalence and characteristics of harmful content, including suicide and self-harm material, on Instagram, TikTok and Pinterest. 2023 Nov.
Montag C, Lachmann B, Herrlich M, Zweig K. Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories. Int J Environ Res Public Health. 2019 Jul 23;16(14):2612.
Montag C, Lachmann B, Herrlich M, Zweig K. Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories. Int J Environ Res Public Health. 2019 Jul 23;16(14):2612.
Montag C, Markett S. Depressive inclinations mediate the association between personality (neuroticism/conscientiousness) and TikTok Use Disorder tendencies. BMC psychology, 12(1), 81. 2024.
Moreno MA, Jelenchick L. Problematic and Risky Internet Use Screening Scale (PRIUSS). Table 1 - PRIUSS-18 Tool. J Pediatr. 2016.

Cite
Moreno MA, Ton A, Selkie E, Evans Y. Secret Society 123: Understanding the Language of Self-Harm on Instagram. J Adolesc Health. 2016 Jan;58(1):78-84.
Moreno MA, Whitehill JM. Influence of Social Media on Alcohol Use in Adolescents and Young Adults. Alcohol Res. 2014;36(1):91-100. PMID: 26259003; PMCID: PMC4432862.
Moretta T, Buodo G, Demetrovics Z, Potenza MN. Tracing 20 years of research on problematic use of the internet and social media: Theoretical models, assessment tools, and an agenda for future work. Compr Psychiatry. 2022 Jan;112:152286.
Moretta T, Buodo G, Demetrovics Z, Potenza MN. Tracing 20 years of research on problematic use of the internet and social media: Theoretical models, assessment tools, and an agenda for future work. Compr Psychiatry. 2022 Jan;112:152286.
Moretta T, Buodo G, Santucci V, Chen S, Potenza M. Problematic social media use is statistically predicted by using social media for coping motives and by positive reinforcement processes in individuals with high COVID-19-related stress levels. Journal of Psychiatric Research. 158. 2022.
Mori C, Temple JR, Browne D, Madigan S. Association of Sexting With Sexual Behaviors and Mental Health Among Adolescents: A Systematic Review and Meta-analysis. JAMA Pediatr. 2019 Aug 1;173(8):770-779.
Morningstar B, Clayborne Z, Wong SL, Roberts KC, Prince SA, Gariépy G, Goldfield GS, Janssen I, Lang JJ. The association between social media use and physical activity among Canadian adolescents: a Health Behaviour in School-aged Children (HBSC) study. Can J Public Health. 2023 Aug;114(4):642-650.
Moshel ML, Warburton WA, Batchelor J, Bennett JM, Ko KY. Neuropsychological Deficits in Disordered Screen Use Behaviours: A Systematic Review and Meta-analysis. Neuropsychol Rev. 2024 Sep;34(3):791-822.
Mosquera, R., Odunowo, M., McNamara, T., Guo, X., & Petrie, R. (2020). The economic effects of Facebook. Experimental Economics, 23(2), 575-602. https://doi.org/10.1007/s10683-019-09625-y
Mosseri A. Raising the Standard for Protecting Teens and Supporting Parents Online. Instagram, blog, announcements. 2021 Dec. 7. https://about.instagram.com/blog/announcements/raising-the-standard-for-protecting-teens-and-supporting-parents-online
Mosseri, A. Pausing "Instagram Kids" and Building Parental Supervision Tools. Meta, Instagram. 2021 Sep. 27. https://about.fb.com/news/2021/09/pausing-instagram-kids-building-parental-supervision-tools/
Mougharbel F, Chaput JP, Sampasa-Kanyinga H, Colman I, Leatherdale ST, Patte KA, Goldfield GS. Longitudinal associations between different types of screen use and depression and anxiety symptoms in adolescents. Front Public Health. 2023 Apr 27;11:1101594.
Mougharbel F, Chaput JP, Sampasa-Kanyinga H, Hamilton HA, Colman I, Leatherdale ST, Goldfield GS. Heavy social media use and psychological distress among adolescents: the moderating role of sex, age, and parental support. Front Public Health. 2023 Jun 15;11:1190390. doi: 10.3389/fpubh.2023.1190390. PMID: 37397708; PMCID: PMC10310995.
Mougharbel F, Goldfield GS. Psychological Correlates of Sedentary Screen Time Behaviour Among Children and Adolescents: a Narrative Review. Curr Obes Rep. 2020 Dec;9(4):493-511.
Mu W, Zhu D, Wang Y, Li F, Ye L, Wang K, Zhou M. Three-Wave Longitudinal Survey on the Relationship between Neuroticism and Depressive Symptoms of First-Year College Students: Addictive Use of Social Media as a Moderated Mediator. Int J Environ Res Public Health. 2020 Aug 20;17(17):6074. doi: 10.3390/ijerph17176074. PMID: 32825502; PMCID: PMC7504589.

Cite
Mullen S. Major depressive disorder in children and adolescents. Ment Health Clin. 2018 Nov 1;8(6):275-283.
Mundy LK, Canterford L, Moreno-Betancur M, Hoq M, Sawyer SM, Allen NB, Patton GC. Social networking and symptoms of depression and anxiety in early adolescence. Depress Anxiety. 2021 May;38(5):563-570.
Murcia, J. V., & de Asis, A. (2016). Influence of Facebook addiction on study habits of college students. SSRN. https://scholar.google.com/scholar?cluster=14486697813687323057&hl=en&oi=scholarr
Murray L, Creswell C, Cooper PJ. The development of anxiety disorders in childhood: an integrative review. Psychol Med. 2009 Sep;39(9):1413-23.
Murthy V. Surgeon General: Why I'm Calling for a Warning Label on Social Media Platforms. The New York Times. Opinion. 2024 Jun. 17. https://www.nytimes.com/2024/06/17/opinion/social-media-health-warning.html
Naga, J. F., & Ebardo, R. A. (2025). Social Network Sites (SNS) an archetype of techno-social stress: A systematic review. Heliyon, 11(1).
Nan, Y., Qin, J., Li, Z., Kim, N. G., Kim, S. S. Y., & Miller, L. C. (2024). Is social media use related to social anxiety? A meta-analysis. Mass Communication & Society, 27(3), 441–474.
National Academies of Sciences, Engineering, and Medicine. Social Media and Adolescent Health. Washington, DC: The National Academies Press. 2023.
National Population by Characteristics: 2020-2023. Annual Estimates of the Resident Population by Single Year of Age and Sex for the United States: April 1, 2020 to July 1, 2023. U.S. Census Bureau.
Nema P, Srivastava R, Bhalla R, Chakarboty A. Impact of social media distraction on student evaluation of teacher effectiveness. International Journal of Education Management. 2023.
Nesi J, Burke TA, Bettis AH, Kudinova AY, Thompson EC, MacPherson HA, Fox KA, Lawrence HR, Thomas SA, Wolff JC, Altemus MK, Soriano S, Liu RT. Social media use and self-injurious thoughts and behaviors: A systematic review and meta-analysis. Clin Psychol Rev. 2021 Jul;87:102038.
Nesi J, Burke TA, Lawrence HR, MacPherson HA, Spirito A, Wolff JC. Online Self-Injury Activities among Psychiatrically Hospitalized Adolescents: Prevalence, Functions, and Perceived Consequences. Res Child Adolesc Psychopathol. 2021 Apr;49(4):519-531.
Nesi J, Choukas-Bradley S, Prinstein MJ. Transformation of Adolescent Peer Relations in the Social Media Context: Part 1-A Theoretical Framework and Application to Dyadic Peer Relationships. Clin Child Fam Psychol Rev. 2018 Sep;21(3):267-294.
Nesi J, Prinstein MJ. In Search of Likes: Longitudinal Associations Between Adolescents' Digital Status Seeking and Health-Risk Behaviors. J Clin Child Adolesc Psychol. 2019 Sep-Oct;48(5):740-748.
Nesi J, Prinstein MJ. Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms. J Abnorm Child Psychol. 2015 Nov;43(8):1427-1438.

Cite
Nesi J, Rothenberg WA, Bettis AH, Massing-Schaffer M, Fox KA, Telzer EH, Lindquist KA, Prinstein MJ. Emotional Responses to Social Media Experiences Among Adolescents: Longitudinal Associations with Depressive Symptoms. J Clin Child Adolesc Psychol. 2022 Nov-Dec;51(6):907-922.
Nesi J, Telzer E, Prinstein M. Handbook of Adolescent Digital Media Use and Mental Health. Cambridge Univ. Press. 2022 Jul. 7.
Nesi J, Wolff JC, Hunt J. Patterns of Social Media Use Among Adolescents Who Are Psychiatrically Hospitalized. J Am Acad Child Adolesc Psychiatry. 2019 Jun;58(6):635-639.e1.
Neuman, S. B. (1988). The displacement effect: Assessing the relation between television viewing and reading performance. Reading Research Quarterly, 23(4), 414–440.
Nick EA, Kilic Z, Nesi J, Telzer EH, Lindquist KA, Prinstein MJ. Adolescent Digital Stress: Frequencies, Correlates, and Longitudinal Association With Depressive Symptoms. J Adolesc Health. 2022 Feb;70(2):336-339.
Nicklin LL, Swain E, Lloyd J. Reactions to Unsolicited Violent, and Sexual, Explicit Media Content Shared over Social Media: Gender Differences and Links with Prior Exposure. Int J Environ Res Public Health. 2020 Jun 16;17(12):4296.
Niederkrotenthaler T, Till B, Kirchner S, Sinyor M, Braun M, Pirkis J, Tran US, Voracek M, Arendt F, Ftanou M, Kovacs R, King K, Schlichthorst M, Stack S, Spittal MJ. Effects of media stories of hope and recovery on suicidal ideation and help-seeking attitudes and intentions: systematic review and meta-analysis. Lancet Public Health. 2022 Feb;7(2):e156-e168.
Nitschinsk L, Tobin SJ, Vanman EJ. The Disinhibiting Effects of Anonymity Increase Online Trolling. Cyberpsychol Behav Soc Netw. 2022 Jun;25(6):377-383.
Nixon CL. Current perspectives: the impact of cyberbullying on adolescent health. Adolesc Health Med Ther. 2014 Aug 1;5:143-58. doi: 10.2147/AHMT.S36456. PMID: 25177157; PMCID: PMC4126576.
Noë B, Turner LD, Linden DEJ, Allen SM, Winkens B, Whitaker RM. Identifying Indicators of Smartphone Addiction Through User-App Interaction. Comput Human Behav. 2019 Oct;99:56-65.
Noe R, Clarke A, Klein H. Learning in the Twenty-First-Century Workplace. Annual Review of Organizational Psychology and Organizational Behavior. 1. 245-275. 2014.
Noe, R. A., Tews, M. J., & Marand, A. D. (2013). Individual differences and informal learning in the workplace. Journal of Vocational Behavior, 83(3), 327–335. https://doi.org/10.1016/j.jvb.2013.06.009
Nuss K, Coulter R, Liu S. Content of Social Media Fitspiration and Its Effect on Physical Activity-Related Behavior: A Systematic Review. Psychology of Popular Media. 13. 2023.
Nuss, K., Coulter, R., & Liu, S. (2024). Content of social media fitspiration and its effect on physical activity-related behavior: A systematic review. Psychology of Popular Media, 13(3), 353–362.
Nutley S, Thorell L. Digital media and mental health problems in children and adolescents: A research overview. English summary. Statens medierad. 2022.
Oberst U, Wegmann E, Stodt B, Brand M, Chamarro A. Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. J Adolesc. 2017 Feb;55:51-60.

Cite
O'Day E, Heimberg R. Social media use, social anxiety, and loneliness: A systematic review. Computers in Human Behavior, vol 3. 2021 Jul.
Odgers C. Smartphones are bad for some teens, not all. Nature. 2018 Feb 22;554(7693):432-434.
Odgers C. The great rewiring: is social media really behind an epidemic of teenage mental illness? Nature 2024 Mar. 29.
O'Donnell S, Epstein LH. Smartphones are more reinforcing than food for students. Addict Behav. 2019 Mar;90:124-133. doi: 10.1016/j.addbeh.2018.10.018. Epub 2018 Oct 18. PMID: 30390436.
Ofcom. Protecting children from harms online. Volume 1: Overview, scope and regulatory approach. Ofcom. 2024 May 8.
Ofcom. Protecting children from harms online. Volume 2: Identifying the services children are using. Ofcom. 2024 May 8.
Office of the U.S. Surgeon General. Social Media and Youth Mental Health: The U.S. Surgeon General's Advisory (Executive Summary).
Orben A, Blakemore SJ. How social media affects teen mental health: a missing link. nature. 2023 Feb. 14. https://www.nature.com/articles/d41586-023-00402-9
Orben A, Dienlin T, Przybylski A. Social media's enduring effect on adolescent life satisfaction. Psychological and Cognitive Sciences. 2019 May 6.
Orben A, Meier A, Dalglesih T, Blakemore SJ. Mechanisms linking social media use to adolescent mental health vulnerability. Nature Reviews Psychology, vol 3 2024 Jun, 407-423.
Orben A, Przybylski A. Corrigendum: Screens, teens, and psychological well-being: Evidence from three time-use-diary studies. Psychological Science, 30, 682–696. 2019.
Orben A, Przybylski AK, Blakemore SJ, Kievit RA. Windows of developmental sensitivity to social media. Nat Commun. 2022 Mar 28;13(1):1649.
Orben A, Przybylski AK. Reply to: Underestimating digital media harm. Nat Hum Behav. 2020 Apr;4(4):349-351.
Orben A, Przybylski AK. Reply to: Underestimating digital media harm. Nat Hum Behav. 2020 Apr;4(4):349-351.
Orben A, Przybylski AK. The association between adolescent well-being and digital technology use. Nat Hum Behav. 2019 Feb;3(2):173-182.
Orben A. Teenagers, screens and social media: a narrative review of reviews and key studies. Soc Psychiatry Psychiatr Epidemiol. 2020 Apr;55(4):407-414.
Oremus W. How Facebook designed the like button and made social media into a popularity contest. Fast Company, Tech. 2022 Nov. 15. https://www.fastcompany.com/90780140/the-inside-story-of-how-facebook-designed-the-like-button-and-made-social-media-into-a-popularity-contest

Literature

Cite
Ozimek, P., & Bierhoff, H.-W. (2020). All my online-friends are better than me – three studies about ability-based comparative social media use, self-esteem, and depressive tendencies. Behaviour & Information Technology, 39(10), 1110–1123. https://doi.org/10.1080/0144929X.2019.1642385
Ozimek, P., Lainas, S., Bierhoff, H.-W., & Rohmann, E. (2023). How photo editing in social media shapes self-perceived attractiveness and self-esteem via self-objectification and physical appearance comparisons. BMC Psychology, 11(99).
Padín P, González-Rodríguez R, Verde-Diego C, Vázquez-Pérez R. Social media and eating disorder psychopathology: A systematic review. Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 15(3), Article 6. 2021.
Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021 Mar 29;372:n71. doi: 10.1136/bmj.n71. PMID: 33782057; PMCID: PMC8005924.
Pagliaccio D, Tran KT, Visoki E, DiDomenico G, Auerbach R, Barzilay R. Probing the digital exposome: associations of social media use patterns with youth mental health. NPP—Digit Psychiatry Neurosci 2, 5 (2024).
Pan, W., Liu, D., & Fang, J. (2021). An examination of factors contributing to the acceptance of online health misinformation. Frontiers in Psychology, 12.
Panayiotou M, Black L., Carmichael-Murphy P, Qualter P, Humphrey N. Time Spent On Social Media Among The Least Influential Factors In Adolescent Mental Health: Preliminary Results From A Panel Network Analysis. Nature Mental Health. 2023. 1, 316–326. https://doi.org/10.1038/s44220-023-00063-7.
Pancani L, Petilli M, Riva P, Rusconi P. I can't live without you: delay discounting in smartphone usage. Journal of Cognitive Psychology. 35. 1-15. 2023.
Parry DA, Davidson BI, Sewall CJR, Fisher JT, Mieczkowski H, Quintana DS. A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use. Nat Hum Behav. 2021 Nov;5(11):1535-1547.
Parry, D. A., Fisher, J. T., Mieczkowski, H., Sewall, C. J. R., & Davidson, B. I. (2022). Social media and well-being: A methodological perspective. Current Opinion in Psychology, 45, 101285.
Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, Malow BA, Maski K, Nichols C, Quan SF, Rosen CL, Troester MM, Wise MS. Recommended Amount of Sleep for Pediatric Populations: A Consensus Statement of the American Academy of Sleep Medicine. J Clin Sleep Med. 2016 Jun 15;12(6):785-6.
Paschke K, Austermann MI, Thomasius R. ICD-11-Based Assessment of Social Media Use Disorder in Adolescents: Development and Validation of the Social Media Use Disorder Scale for Adolescents. Front Psychiatry. 2021 Apr 22;12:661483.
Paterna A, Alcaraz-Ibáñez M, Aguilar-Parra JM, Salavera C, Demetrovics Z, Griffiths MD. Problematic smartphone use and academic achievement: A systematic review and meta-analysis. J Behav Addict. 2024 Apr 26;13(2):313-326.

Cite
Patton D. There is One Major Element Missing From the Debate on Kids and Social Media. Newsweek. Opinion. 2024 Apr. 30, https://www.newsweek.com/there-one-major-element-missing-debate-kids-social-media-opinion-1895270
Paul A. Kirschner, Aryn C. Karpinski, Facebook and academic performance, Computers in Human Behavior,Volume 26, Issue 6, 2010, Pages 1237-1245, ISSN 0747-5632.
Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. Journal of Research in Personality, 36(6), 556–563. https://doi.org/10.1016/S0092-6566(02)00505-6
Paulus MP, Squeglia LM, Bagot K, Jacobus J, Kuplicki R, Breslin FJ, Bodurka J, Morris AS, Thompson WK, Bartsch H, Tapert SF. Screen media activity and brain structure in youth: Evidence for diverse structural correlation networks from the ABCD study. Neuroimage. 2019 Jan 15;185:140-153.
Paulus MP, Zhao Y, Potenza MN, Aupperle RL, Bagot KS, Tapert SF. Screen media activity in youth: A critical review of mental health and neuroscience findings. J Mood Anxiety Disord. 2023 Oct;3:100018.
Paus T, Keshavan M, Giedd JN. Why do many psychiatric disorders emerge during adolescence? Nat Rev Neurosci. 2008 Dec;9(12):947-57.
Pawlowski CS, Nielsen JV, Schmidt T. A Ban on Smartphone Usage during Recess Increased Children's Physical Activity. Int J Environ Res Public Health. 2021 Feb 16;18(4):1907. doi: 10.3390/ijerph18041907. PMID: 33669387; PMCID: PMC7920279.
Pedalino F, Camerini AL. Instagram Use and Body Dissatisfaction: The Mediating Role of Upward Social Comparison with Peers and Influencers among Young Females. Int J Environ Res Public Health. 2022 Jan 29;19(3):1543.
Pedrouzo SB, Krynski L. Hyperconnected: children and adolescents on social media. The TikTok phenomenon. Arch Argent Pediatr. 2023 Aug 1;121(4):e202202674. English, Spanish.
Peng, P., & Liao, Y. (2023). Six addiction components of problematic social media use in relation to depression, anxiety, and stress symptoms: A latent profile analysis and network analysis. BMC Psychiatry, 23, 321.
Pera A. The Psychology of Addictive Smartphone Behavior in Young Adults: Problematic Use, Social Anxiety, and Depressive Stress. Front Psychiatry. 2020 Sep 15;11:573473. doi: 10.3389/fpsyt.2020.573473. PMID: 33101087; PMCID: PMC7522217.
Pera, R., Quinton, S., & Baima, G. (2020). I am who I am: Sharing photos on social media by older consumers and its influence on subjective well-being. Psychology & Marketing, 37(6), 782–795.
Petrillo S. What Makes TikTok so Addictive?: An Analysis of the Mechanisms Underlying the World’s Latest Social Media Craze. Brown Undergraduate Journal of Public Health. 2021 Dec 13. https://sites.brown.edu/publichealthjournal/2021/12/13/tiktok/
Picardo J, McKenzie SK, Collings S, Jenkin G. Suicide and self-harm content on Instagram: A systematic scoping review. PLoS One. 2020 Sep 2;15(9):e0238603.

Literature

Cite
Pickles A, Angold A. Natural categories or fundamental dimensions: on carving nature at the joints and the rearticulation of psychopathology. Dev Psychopathol. 2003 Summer;15(3):529-51.
Pigott L. Social Media Rewires Young Minds - Here's How. The Conversation, Health. 2025 Jan. 20.
Pike, G.R., Saupe, J.L. Does High School Matter? An Analysis of Three Methods of Predicting First-Year Grades. Research in Higher Education 43, 187–207 (2002).
Pınar Ünal-Aydın, Kuzeymen Balıkçı, İpek Sönmez, Orkun Aydın. Associations between emotion recognition and social networking site addiction. Psychiatry Research, Volume 284, 2020, 112673.
Piper, Sandler. Taking Stock With Teens: 21 Years Of Researching U.S. Teens GenZ Insights. Piper, Sandler. Fall 2021.
Piteo, E. W. (2020). Review: Social networking sites and associations with depressive and anxiety symptoms in children and adolescents - a systematic review. *Child Adolesc Ment Health, 25* (4), 201-216.
Plaisier, X. S. & Konijn, E. A. Rejected by peers-attracted to antisocial media content: rejection-based anger impairs moral judgment among adolescents. Dev. Psychol. 49, 1165–1173 (2013).
Plummer F, Manea L, Trepel D, McMillan D. Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. Gen Hosp Psychiatry. 2016 Mar-Apr;39:24-31.
Politte-Corn, M., Dickey, L., Abitante, G., Pegg, S., Bean, C. A. L., & Kujawa, A. (2024). Social Media Use as a Predictor of Positive and Negative Affect: An Ecological Momentary Assessment Study of Adolescents with and without Clinical Depression. Research on child and adolescent psychopathology, 52(5), 743–755. https://doi.org/10.1007/s10802-024-01177-x
Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015). Clinical psychology of internet addiction: A review of its conceptualization, prevalence, neuronal processes, and implications for treatment. Neuroscience and Neuroeconomics, 4, 11–23.
Primack BA, Shensa A, Sidani JE, Escobar-Viera CG, Fine MJ. Temporal Associations Between Social Media Use and Depression. Am J Prev Med. 2021 Feb;60(2):179-188.
Primack, B. A., Shensa, A., Escobar-Viera, C. G., Barrett, E. L., Sidani, J. E., Colditz, J. B., & James, A. E. (2017). Use of multiple social media platforms and symptoms of depression and anxiety: A nationally-representative study among U.S. young adults. Computers in Human Behavior, 69, 1–9. https://doi.org/10.1016/j.chb.2016.11.013
Przybylski A, Weinstein N. A large-scale test of the Goldilocks hypothesis: Quantifying the relations between digital-screen use and the mental well-being of adolescents. Psychological Science, 28(2), 204–215. 2017.
Przybylski AK, Murayma K, DeHann CR, Galdwell V. Fear of Missing Out Scale. Journal of Social and Clinical Psychology. 2013
Przybylski AK. Digital Screen Time and Pediatric Sleep: Evidence from a Preregistered Cohort Study. J Pediatr. 2019 Feb;205:218-223.e1.
Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. Computers in Human Behavior, 29(4), 1841–1848.
Purba AK, Thomson RM, Henery PM, Pearce A, Henderson M, Katikireddi SV. Social media use and health risk behaviours in young people: systematic review and meta-analysis. BMJ. 2023 Nov 29;383:e073552.

Cite
Puukko K, Hietajärvi L, Maksniemi E, Alho K, Salmela-Aro K. Social Media Use and Depressive Symptoms-A Longitudinal Study from Early to Late Adolescence. Int J Environ Res Public Health. 2020 Aug 14;17(16):5921.
Qi, C. (2019). A double-edged sword? Exploring the impact of students' academic usage of mobile devices on technostress and academic performance. Behaviour & Information Technology, 38(12), 1337–1354. https://doi.org/10.1080/0144929X.2019.1585476
Qin Y, Musetti A, Omar B. Flow Experience Is a Key Factor in the Likelihood of Adolescents' Problematic TikTok Use: The Moderating Role of Active Parental Mediation. Int J Environ Res Public Health. 2023 Jan 23;20(3):2089.
Raffoul A, Ward ZJ, Santoso M, Kavanaugh JR, Austin SB. Social media platforms generate billions of dollars in revenue from U.S. youth: Findings from a simulated revenue model. PLoS One. 2023 Dec 27;18(12):e0295337.
Rajanala S, Maymone MBC, Vashi NA. Selfies-Living in the Era of Filtered Photographs. JAMA Facial Plast Surg. 2018 Dec 1;20(6):443-444.
Rajesh T, Rangaiah B. Relationship between personality traits and facebook addiction: A meta-analysis. Heliyon. 2022 Aug 19;8(8):e10315. doi: 10.1016/j.heliyon.2022.e10315. PMID: 36061026; PMCID: PMC9434056.
Rajesh, S., & Draper, L. . (2022). Impact of Adolescent Social Media Use on Body Image, Mental Health and Eating Disorders: A Review. Journal of Student Research, 11(4).
Ramadhan RN, Rampengan DD, Yumnanisha DA, Setiono SB, Tjandra KC, Ariyanto MV, Idrisov B, Empitu MA. Impacts of digital social media detox for mental health: A systematic review and meta-analysis. Narra J. 2024 Aug;4(2):e786.
Ranker LR, Wu J, Hong T, Wijaya D, Benjamin EJ, Bhatnagar A, Robertson RM, Fetterman JL, Xuan Z. Social media use, brand engagement, and tobacco product initiation among youth: Evidence from a prospective cohort study. Addict Behav. 2024 Jul;154:108000.
Ranker LR, Wu J, Hong T, Wijaya D, Benjamin EJ, Bhatnagar A, Robertson RM, Fetterman JL, Xuan Z. Social media use, brand engagement, and tobacco product initiation among youth: Evidence from a prospective cohort study. Addict Behav. 2024 Jul;154:108000.
Rapee RM, Oar EL, Johnco CJ, Forbes MK, Fardouly J, Magson NR, Richardson CE. Adolescent development and risk for the onset of social-emotional disorders: A review and conceptual model. Behav Res Ther. 2019 Dec;123:103501.
Raudsepp L. (2019). Brief report: Problematic social media use and sleep disturbances are longitudinally associated with depressive symptoms in adolescents. Journal of adolescence, 76, 197–201. https://doi.org/10.1016/j.adolescence.2019.09.005
Raudsepp, L., & Kais, K. (2019). Longitudinal associations between problematic social media use and depressive symptoms in adolescent girls. Preventive medicine reports, 15, 100925. https://doi.org/10.1016/j.pmedr.2019.100925
Rebecca Godard, Susan Holtzman, Are active and passive social media use related to mental health, wellbeing, and social support outcomes? A meta-analysis of 141 studies, Journal of Computer-Mediated Communication, Volume 29, Issue 1, January 2024.

Cite
Rehman ZU, Baharun R, Salleh NZM. Antecedents, consequences, and reducers of perceived risk in social media: A systematic literature review and directions for further research. Psychology & Marketing, 37(1), 74–86. 2020.
Reich SM, Subrahmanyam K, Espinoza G. Friending, IMing, and hanging out face-to-face: overlap in adolescents' online and offline social networks. Dev Psychol. 2012 Mar;48(2):356-68.
Reid Chassiakos YL, Radesky J, Christakis D, Moreno MA, Cross C; COUNCIL ON COMMUNICATIONS AND MEDIA. Children and Adolescents and Digital Media. Pediatrics. 2016 Nov;138(5):e20162593.
Richards J, Niitus K, Kenworthy N. Mental Health v. Social Media: How US pretrial filings against social media platforms frame and leverage evidence for claims of youth mental health harms. SSM - Mental Health vol 7 100378. 2025 Jun.
Rideout V, Peebles A, Mann S, Robb M. The Common Sense Census: Media Use by Tweens and Teens, 2021. San Francisco, CA: Common Sense. 2022.
Ridley BJ, Cornelissen PL, Maalin N, Mohamed S, Kramer RSS, McCarty K, Tovée MJ. The degree to which the cultural ideal is internalized predicts judgments of male and female physical attractiveness. Front Psychol. 2022 Oct 19;13:980277.
Riehm KE, Feder KA, Tormohlen KN, Crum RM, Young AS, Green KM, Pacek LR, La Flair LN, Mojtabai R. Associations Between Time Spent Using Social Media and Internalizing and Externalizing Problems Among US Youth. JAMA Psychiatry. 2019 Dec 1;76(12):1266-1273.
Riley C. Instagram says it's working on body image issue after report details 'toxic' effect on teen girls. CNN, Business. 2021 Sep. 15. https://www.cnn.com/2021/09/15/tech/instagram-teen-girls/index.html
Rizwan B, Zaki M, Javaid S, Jabeen Z, Mehmood M, Riaz M, Maqbool L, Omar H. Increase in body dysmorphia and eating disorders among adolescents due to social media. Pakistan BioMedical Journal. 5. 2022.
Roberts RE, Duong HT. The prospective association between sleep deprivation and depression among adolescents. Sleep. 2014 Feb 1;37(2):239-44.
Roberts S, Malcolm C, Mccarty K, Pollet T. No relationships between self-reported Instagram use or type of use and mental well-being: A study using a nationally representative online sample of UK adults. Cyberpsychology: Journal of Psychosocial Research on Cyberspace. 18. 2024.
Roberts SR, Maheux A, Ladd B, Choukas-Bradley S. The Role of Digital Media in Adolescents' Body Image and Disordered Eating. Cambridge Univ. Press. 2022.
Robertson A. House committee advances Kids Online Safety Act / Kosa and COPPA 2.0 passed despite last-minute modifications that left some lawmakers discontent. The Verge, Policy, Speech. 2024 Sep. 18.
Robinson M. A lip-syncing app teens are obsessed with just got bought for $1 billion - here's how to use Musical.ly. Business Insider. 2017 Nov 10.
Robinson TN, Banda JA, Hale L, Lu AS, Fleming-Milici F, Calvert SL, Wartella E. Screen Media Exposure and Obesity in Children and Adolescents. Pediatrics. 2017 Nov;140(Suppl 2):S97-S101.

Cite
Rodgers R, McLean S, Gordon C, Slater A, Marques M, Jarman H, Paxton S. Development and Validation of the Motivations for Social Media Use Scale (MSMU) Among Adolescents. Adolescent Research Review. 6. 1-11. 2021.
Romer D. Adolescent risk taking, impulsivity, and brain development: implications for prevention. Developmental psychobiology, 52(3), 263–276. 2010.
Romo V. 4 takeaways from senator's grilling of Instagram's CEO about kids and safety. Npr, technology. 2021 Dec. 8.
Ross B, Heisel J, Jung AK, Stieglitz S. Fake News on Social Media: The (In)Effectiveness of Warning Messages. Thirty Ninth International Conference on Information Systems, San Francisco 2018. 2018.
Roth E. 'Careless People' author to testify during a Senate hearing about Facebook / The ex-Meta staffer Sarah Wynn-Williams will address Facebook's 'cooperation' with China. The Verge, News. 2025 Apr. 4.
Rothenberg, E. (2023, November 26). Meta collected children's data from Instagram accounts, unsealed court document alleges | CNN Business. CNN. https://www.cnn.com/2023/11/26/business/meta-collecting-data-children-facebook/index.html
Rounsefell K, Gibson S, McLean S, Blair M, Molenaar A, Brennan L, Truby H, McCaffrey TA. Social media, body image and food choices in healthy young adults: A mixed methods systematic review. Nutr Diet. 2020 Feb;77(1):19-40.
Rounsefell, K., Gibson, S., McLean, S., Blair, M., Molenaar, A., Brennan, L., Truby, H., & McCaffrey, T. A. (2019). Social media, body image and food choices in Healthy Young Adults: A mixed methods systematic review. Nutrition & Dietetics, 77(1), 19–40.
Royal Society For Public Health. #StatusofMind: Social media and young people's mental health and wellbeing. 2017 May. https://www.rsph.org.uk/static/uploaded/d125b27c-0b62-41c5-a2c0155a8887cd01.pdf
Rozgonjuk D, Sindermann C, Elhai JD, Montag C. Fear of Missing Out (FoMO) and social media's impact on daily-life and productivity at work: Do WhatsApp, Facebook, Instagram, and Snapchat Use Disorders mediate that association? Addict Behav. 2020 Nov;110:106487.
Rozgonjuk D, Sindermann C, Elhai JD, Montag C. Fear of Missing Out (FoMO) and social media's impact on daily-life and productivity at work: Do WhatsApp, Facebook, Instagram, and Snapchat Use Disorders mediate that association? Addict Behav. 2020 Nov;110:106487.
Ruan C, Lu Z, Li H, Lin W, Li D, Yuan J. More friends on SNS, more materialism? The moderating roles of self-esteem and social comparison orientation. PLoS One. 2023 May 10;18(5):e0283723. doi: 10.1371/journal.pone.0283723. PMID: 37163545; PMCID: PMC10171683.
Rubinia Celeste Bonfanti, Francesco Melchiori, Arianna Teti, Gaia Albano, Stéphane Raffard, Rachel Rodgers, Gianluca Lo Coco. The association between social comparison in social media, body image concerns and eating disorder symptoms: A systematic review and meta-analysis, Body Image, Volume 52, 2025, 101841, ISSN 1740-1445.
Rushton K. Facebook lets teenagers see porn: Children as young as 13 are being exposed to explicit images, gambling websites and dangerous diet plans. Daily Mail, Politics. 2017 May 22. https://www.dailymail.co.uk/news/article-4531934/Facebook-lets-teenagers-porn.html

Cite
Russell J. Musical.ly defends its handling of young users, as it races past 40M MAUs. TechCruch. 2016 Dec. 6.
Sagliano L, Ponari M, Conson M, Trojano L. Editorial: The interpersonal effects of emotions: The influence of facial expressions on social interactions. Front Psychol. 2022 Nov 8;13:1074216.
Saiphoo A, Vahedi Z. A meta-analytic review of the relationship between social media use and body image disturbance. Computers in Human Behavior. 101. 2019.
Saiphoo A, Vahedi Z. A meta-analytic review of the relationship between social media use and body image disturbance. Computers in Human Behavior. 101. 2019.
Sala A, Porcaro L, Gomez E. Social Media Use and adolescents' mental health and well-being: An umbrella review. Computers in Human Behavior, vol 14, 100404. 2024 May.
Sala A, Porcaro L, Gomez E. Social Media Use and adolescents' mental health and well-being: An umbrella review. Computers in Human Behavior, vol 14, 100404. 2024 May.
Sala MN, Pons F, Molina P. Emotion regulation strategies in preschool children. Br J Dev Psychol. 2014 Nov;32(4):440-53.
Salamone JD, Correa M. The mysterious motivational functions of mesolimbic dopamine. Neuron. 2012 Nov 8;76(3):470-85.
Salari N, Zarei H, Rasoulpoor S, Ghasemi H, Hosseinian-Far A, Mohammadi M. The impact of social networking addiction on the academic achievement of university students globally: A meta-analysis. Public Health Pract (Oxf). 2025 Jan 13;9:100584.
Saleem, N., Young, P., & Yousuf, S. (2024). Exploring the Relationship Between Social Media Use and Symptoms of Depression and Anxiety Among Children and Adolescents: A Systematic Narrative Review. Cyberpsychology, behavior and social networking, 27(11), 771–797. https://doi.org/10.1089/cyber.2023.0456
Salerno-Ferraro AC, Erentzen C, Schuller RA. Young Women's Experiences With Technology-Facilitated Sexual Violence From Male Strangers. J Interpers Violence. 2022 Oct;37(19-20):NP17860-NP17885.
Salgado-Pineda P, Delaveau P, Blin O, Nieoullon A. Dopaminergic contribution to the regulation of emotional perception. Clin Neuropharmacol. 2005 Sep-Oct;28(5):228-37.
Salomon I. "The Selfie Generation: Examining the Relationship Between Social Media Use and Early Adolescent Body Image". Theses and Dissertations--Psychology. 112. 2017. https://uknowledge.uky.edu/psychology_etds/112
Salty World. An Investigation into Algorithmic Bias in Content Policing of Marginalized Communities on Instagram and Facebook. 2019. https://saltyworld.net/algorithmicbiasreport-2/
Sampasa-Kanyinga H, Chaput JP, Hamilton HA. Social Media Use, School Connectedness, and Academic Performance Among Adolescents. J Prim Prev. 2019 Apr;40(2):189-211.
Sampasa-Kanyinga H, Colman I, Goldfield GS, Hamilton HA, Chaput JP. Sex differences in the relationship between social media use, short sleep duration, and body mass index among adolescents. Sleep Health. 2020 Oct;6(5):601-608. doi: 10.1016/j.sleh.2020.01.017. Epub 2020 Apr 21. PMID: 32331866.
Sampasa-Kanyinga H, Hamilton HA, Chaput JP. Use of social media is associated with short sleep duration in a dose-response manner in students aged 11 to 20 years. Acta Paediatr. 2018 Apr;107(4):694-700.

Literature

Cite
Sampasa-Kanyinga H, Hamilton HA, Goldfield GS, Chaput JP. Problem Technology Use, Academic Performance, and School Connectedness among Adolescents. Int J Environ Res Public Health. 2022 Feb 18;19(4):2337. doi: 10.3390/ijerph19042337. PMID: 35206526; PMCID: PMC8871851.
Sampasa-Kanyinga, H., & Hamilton, H. A. (2015). Social networking sites and mental health problems in adolescents: The mediating role of cyberbullying victimization. European psychiatry, 30(8), 1021-1027.
Sampasa-Kanyinga, H., Goldfield, G. S., Kingsbury, M., Clayborne, Z., & Colman, I. (2020). Social media use and parent–child relationship: A cross-sectional study of adolescents. Journal of Community Psychology, 48(3), 793–803.
San Martín Iñiguez L, Luis García E, Rosado Luna E, Garcia-Rodriguez L, Aoiz Pinillos M, de la Fuente Arias J, Moron Henche I. Relationship between regulatory processes and problematic social media use: A systematic review. Computers in Human Behavior Reports, Vol. 16, 100507, ISSN 2451-9588. 2024
Sánchez Chamorro L, Lallemand C, Gray C. "My Mother Told Me These Things are Always Fake" - Understanding Teenagers' Experiences with Manipulative Designs. 1469-1482. 2024.
Sandra Tang, Megan E. Patrick.Technology and interactive social media use among 8th and 10th graders in the U.S. and associations with homework and school grades. Computers in Human Behavior, Volume 86, 2018, Pages 34-44, ISSN 0747-5632.
Sanzari CM, Gorrell S, Anderson LM, Reilly EE, Niemiec MA, Orloff NC, Anderson DA, Hormes JM. The impact of social media use on body image and disordered eating behaviors: Content matters more than duration of exposure. Eat Behav. 2023 Apr;49:101722.
Sapien Labs. The Youth Mind: Rising aggression and anger. The Global Mind Project/Rapid Report. 2025 Jan.
Sarmiento-Lawrence, Irene & Olson, Chelsea & Hong, Yeo & Chen, Y. & Toma, Catalina & Brown, B. & Bellmore, Amy & Mares, Marie-Louise. (2020). How Does Social Media Use Relate to Adolescents' Internalizing Symptoms? Conclusions from a Systematic Narrative Review. 1-24.
Savage M. Health secretary tells social media firms to protect children after girl's death. The Observer, Matt Hancock. 2019 Jan. 26.
Sax L. Is TikTok Dangerous for Teens? Institute for Family Studies. 2022 Mar. 29. https://ifstudies.org/blog/is-tiktok-dangerous-for-teens-
Schaeffer K. 7 facts about Americans and Instagram. Pew Research Center, Short Reads. 2021 Oct 7. https://www.pewresearch.org/short-reads/2021/10/07/7-facts-about-americans-and-instagram/
Schag, K., Schönleber, J., Teufel, M., Zipfel, S., & Giel, K. E. (2013). Food-related impulsivity in obesity and Binge Eating Disorder–a systematic review. Obesity reviews, 14(6), 477-495
Schemer C, Masur PK, Geiß S, Müller P, Schäfer S. The Impact of Internet and Social Media Use on Well-Being: A Longitudinal Analysis of Adolescents Across Nine Years. Journal of Computer-Mediated Communication. 26. 2020.
Schisterman, E. F., Cole, S. R. and Platt, R. W. (2009). "Overadjustment bias and unnecessary adjustment in epidemiologic studies." Epidemiology **20**(4): 488-495.
Schmidt-Persson J, Rasmussen MGB, Sørensen SO, Mortensen SR, Olesen LG, Brage S, Kristensen PL, Bilenberg N, Grøntved A. Screen Media Use and Mental Health of Children and Adolescents: A Secondary Analysis of a Randomized Clinical Trial. JAMA Netw Open. 2024 Jul 1;7(7):e2419881.

Literature

Cite
Schmitz R, Blackburn M, Raffoul A. One reason social media companies aren't doing more to protect children? Ad revenue. Npr, tech. 2023 Dec. 31. https://www.npr.org/2023/12/31/1222337123/one-reason-social-media-companies-arent-doing-more-to-protect-children-ad-revenu
Schou Andreassen C, Billieux J, Griffiths MD, Kuss DJ, Demetrovics Z, Mazzoni E, Pallesen S. Bergen Social Networking Addiction Scale (BSNAS). Psychol Addict Behav, App B, Addictive Use of Social Media and Video Games. 2012.
Schou Andreassen C, Billieux J, Griffiths MD, Kuss DJ, Demetrovics Z, Mazzoni E, Pallesen S. The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. Psychol Addict Behav. 2016 Mar;30(2):252-62.
Schwartz, J. A., & Beaver, K. M. (2015). A Partial Test of Moffitt's Developmental Taxonomy: Examining the Role of Genetic Risk. Justice Quarterly, 32(5), 768–791. https://doi.org/10.1080/07418825.2013.805798
Schwartz, J. A., Beaver, K. M., & Barnes, J. C. (2015). The association between mental health and violence among a nationally representative sample of college students from the United States. PLoS ONE, 10(10), Article e0138914.
Scott G, Pinkosova Z, Jardine E, Hand C. "Thinstagram": Image content and observer body satisfaction influence the when and where of eye movements during instagram image viewing. Computers in Human Behavior. 138. 107464. 2022.
Scott H, Woods HC. Fear of missing out and sleep: Cognitive behavioural factors in adolescents' nighttime social media use. J Adolesc. 2018 Oct;68:61-65. doi: 10.1016/j.adolescence.2018.07.009. Epub 2018 Jul 20. PMID: 30031979.
Scully M, Swords L, Nixon E. Social comparisons on social media: online appearance-related activity and body dissatisfaction in adolescent girls. Ir J Psychol Med. 2023 Mar;40(1):31-42. doi: 10.1017/ipm.2020.93. Epub 2020 Sep 11. PMID: 32912367.
Seabrook EM, Kern ML, Rickard NS. Social Networking Sites, Depression, and Anxiety: A Systematic Review. JMIR Ment Health. 2016 Nov 23;3(4):e50.
Sebastian C, Viding E, Williams KD, Blakemore SJ. Social brain development and the affective consequences of ostracism in adolescence. Brain Cogn. 2010 Feb;72(1):134-45.
Sebastian Kurten, Robyn Vanherle, Kathleen Beullens, Winifred A. Gebhardt, Bas van den Putte, Hanneke Hendriks. Like to drink: Dynamics of liking alcohol posts and effects on alcohol use. Computers in Human Behavior, Volume 129, 2022, 107145, ISSN 0747-5632.
Seekis V, Barker G. Does #beauty have a dark side? Testing mediating pathways between engagement with beauty content on social media and cosmetic surgery consideration. Body Image. 2022 Sep;42:268-275.
Semken C, Rossell D. Specification Analysis for Technology Use and Teenager Well-Being: Statistical Validity and a Bayesian Proposal. Journal of the Royal Statistical Society Series C: Applied Statistics, 71(5), 1330–1355. 2022.
Senekal, J. S., Ruth Groenewald, G., Wolfaardt, L., Jansen, C., & Williams, K. (2023). Social media and adolescent psychosocial development: A systematic review. South African Journal of Psychology, 53(2), 157–171. https://doi.org/10.1177/00812463221119302

Literature

Cite
Seong E, Noh G, Lee KH, Lee JS, Kim S, Seo DG, Yoo JH, Hwang H, Choi CH, Han DH, Hong SB, Kim JW. Relationship of Social and Behavioral Characteristics to Suicidality in Community Adolescents With Self-Harm: Considering Contagion and Connection on Social Media. Front Psychol. 2021 Jul 13;12:691438.
Sepas A, Bangash AH, Nielsen RE, Yang W, El-Hussuna A. The Association between Problematic Instagram Use, Psychological Distress, and Well-Being: A Systematic Review and Meta-Analysis. Cyberpsychol Behav Soc Netw. 2024 Sep;27(9):641-650. doi: 10.1089/cyber.2023.0222. Epub 2024 Jul 17. PMID: 39016530.
Sewall CJR, Goldstein TR, Wright AGC, Rosen D. Does Objectively Measured Social-Media or Smartphone Use Predict Depression, Anxiety, or Social Isolation Among Young Adults? Clin Psychol Sci. 2022 Sep;10(5):997-1014.
Shabahang R, Shim H, Aruguete MS, Zsila Á. Oversharing on Social Media: Anxiety, Attention-Seeking, and Social Media Addiction Predict the Breadth and Depth of Sharing. Psychol Rep. 2024 Apr;127(2):513-530. doi: 10.1177/00332941221122861. Epub 2022 Aug 22. PMID: 35993372.
Shabahang, R., Ghaemi, Z., Aruguete, M. S., Saeedi, M., Shim, H., & Sedighian, S. F. (2022). Measuring gratification from and consequences of likes: The potential for maladaptive social media behavior. Journal of Media Psychology. Advance online publication.
Shakya HB, Christakis NA. Association of Facebook Use With Compromised Well-Being: A Longitudinal Study. Am J Epidemiol. 2017 Feb 1;185(3):203-211.
Shanahan N, Brennan C, House A. Self-harm and social media: thematic analysis of images posted on three social media sites. BMJ Open. 2019 Feb 19;9(2):e027006.
Shannon H, Bush K, Villeneuve PJ, Hellemans KG, Guimond S. Problematic Social Media Use in Adolescents and Young Adults: Systematic Review and Meta-analysis. JMIR Ment Health. 2022 Apr 14;9(4):e33450.
Sharif I, Wills TA, Sargent JD. Effect of visual media use on school performance: a prospective study. J Adolesc Health. 2010 Jan;46(1):52-61.
Shawcroft J, Gale M, Coyne SM, Twenge JM, Carroll JS, Brad Wilcox W, James S. Teens, screens and quarantine; the relationship between adolescent media use and mental health prior to and during COVID-19. Heliyon. 2022 Jul;8(7):e09898.
Sherlock, M., & Wagstaff, D. L. (2019). Exploring the relationship between frequency of Instagram use, exposure to idealized images, and psychological well-being in women. Psychology of popular media culture., 8(4), 482-490. https://doi.org/10.1037/ppm0000182
Sherman LE, Greenfield PM, Hernandez LM, Dapretto M. Peer Influence Via Instagram: Effects on Brain and Behavior in Adolescence and Young Adulthood. Child Dev. 2018 Jan;89(1):37-47.
Sherman LE, Payton AA, Hernandez LM, Greenfield PM, Dapretto M. The Power of the Like in Adolescence: Effects of Peer Influence on Neural and Behavioral Responses to Social Media. Psychol Sci. 2016 Jul;27(7):1027-35.
Sherman LE, Payton AA, Hernandez LM, Greenfield PM, Dapretto M. The Power of the Like in Adolescence: Effects of Peer Influence on Neural and Behavioral Responses to Social Media. Psychol Sci. 2016 Jul;27(7):1027-35.

Cite
Shimkhada R, Ponce NA. Social Media Use and Serious Psychological Distress Among Adolescents. JMIR Pediatr Parent. 2024 May 23;7:e57041. doi: 10.2196/57041. PMID: 38786983; PMCID: PMC11120505.
Shimoga SV, Erlyana E, Rebello V. Associations of Social Media Use With Physical Activity and Sleep Adequacy Among Adolescents: Cross-Sectional Survey. J Med Internet Res. 2019 Jun 18;21(6):e14290.
Shin M, Juventin M, Chu J, Manor Y, Kemps E. Online media consumption and depression in young people: A systematic review and meta-analysis. Computers in Human Behavior. 128. 107129. 2021.
Shin S, McCoy D. Pathways between family SES, parent characteristics, early experiences, and child language outcomes in South Korea: A combined analysis of the family stress model and the family investment model. Developmental Psychology, 58(11), 2081–2095. 2022.
Shulman E, Smith A, Silva K, Icenogle G, Duell N, Chein J, Steinberg L. The dual systems model: Review, reappraisal, and reaffirmation. Developmental Cognitive Neuroscience, 17, 103–117. 2016.
Silvia Casale, Laura Rugai, Giulia Fioravanti. Exploring the role of positive metacognitions in explaining the association between the fear of missing out and social media addiction, Addictive Behaviors, Volume 85, 2018,Pages 83-87, SSN 0306-4603.
Simister E, Bridgland V, Takarangi M. Adding brief content-related information to sensitive-content screens does not exacerbate screen- or image-related distress. Cognition and Emotion. 2024.
Simister E, Bridgland V, Takarangi M. To look or not to look: Instagram’s sensitive-content screens do not deter vulnerable people from viewing negative content. Behavior Therapy, 55(2), 233–247. 2024.
Singer N. How Mark Zuckerberg's Meta Failed Children on Safety, States Say. The New York Times. 2024 Jun. 22. https://www.nytimes.com/2024/06/22/technology/zuckerberg-instagram-child-safety-lawsuits.html
Singh B, Olds T, Curtis R, Dumuid D, Virgara R, Watson A, Szeto K, O'Connor E, Ferguson T, Eglitis E, Miatke A, Simpson CE, Maher C. Effectiveness of physical activity interventions for improving depression, anxiety and distress: an overview of systematic reviews. Br J Sports Med. 2023 Sep;57(18):1203-1209.
Skogen JC, Bøe T, Finserås TR, Sivertsen B, Hella RT, Hjetland GJ. Lower Subjective Socioeconomic Status Is Associated With Increased Risk of Reporting Negative Experiences on Social Media. Findings From the "LifeOnSoMe"-Study. Front Public Health. 2022 Jun 13;10:873463.
Skowronski M, Busching R, Krahé B. Predicting Adolescents’ Self-Objectification from Sexualized Video Game and Instagram Use: A Longitudinal Study. Sex Roles. 84. 2021.
Slater A, Varsani N, Diedrichs P. #fitspo or #loveyourself? The impact of fitspiration and self-compassion Instagram images on women's body image, self-compassion, and mood. Body image, 22, 87–96. 2017.
Slomski A. Teen Girls Are Faring Worse Than Boys on Nearly All Mental Health Measures-Here's Why. JAMA. 2023 Apr 18;329(15):1243-1245.
Snyder RL. We Underestimate the Manosphere at Our Peril. The New York Times., Guest Essay. 2025 Mar. 28. https://www.nytimes.com/2025/03/28/opinion/manosphere-online-boys-parents.html
Soares FB, Gruzd A, Jacobson J, Hodson J. To troll or not to troll: Young adults' anti-social behaviour on social media. PLoS One. 2023 May 24;18(5):e0284374. doi: 10.1371/journal.pone.0284374. PMID: 37224126; PMCID: PMC10208514.
Soares L, Thorell LB, Barbi M, Crisci G, Nutley SB, Burén J. The role of executive function deficits, delay aversion and emotion dysregulation in internet gaming disorder and social media disorder: Links to psychosocial outcomes. J Behav Addict. 2023 Mar 22;12(1):94-104.

Cite
Sobkin VS, Fedotova AV. Adolescents on Social Media: Aggression and Cyberbullying. Psychol Russ. 2021 Jul 12;14(4):186-201. doi: 10.11621/pir.2021.0412. PMID: 36733812; PMCID: PMC9888041.
Sobkin, V. S., & Fedotova, A. V. (2019). Adolescent Aggression in Social Media: Perception and Personal Experience. Psychological Science and Education, 24(2), 5–18. https://doi.org/10.17759/pse.2019240201
Solinas M, Belujon P, Fernagut PO, Jaber M, Thiriet N. Dopamine and addiction: what have we learned from 40 years of research. J Neural Transm (Vienna). 2019 Apr;126(4):481-516. doi: 10.1007/s00702-018-1957-2. Epub 2018 Dec 19. PMID: 30569209.
Solmi M, Radua J, Olivola M, Croce E, Soardo L, Salazar de Pablo G, Il Shin J, Kirkbride JB, Jones P, Kim JH, Kim JY, Carvalho AF, Seeman MV, Correll CU, Fusar-Poli P. Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. Mol Psychiatry. 2022 Jan;27(1):281-295.
Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Shin, J. I., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. Molecular Psychiatry, 27, 281–295.
Soloman A. Has Social Media Fuelled A Teen-Suicide Crisis? Mental-health struggles have risen sharply among young Americans, and parents and lawmakers alike are scrutinizing life online for answers. Annals of Psychology. 2024 Sep. 30.
Somerville, L. H. (2013). The teenage brain: Sensitivity to social evaluation. Current Directions in Psychological Science, 22(2), 121–127.
Sowell ER, Peterson BS, Thompson PM, Welcome SE, Henkenius AL, Toga AW. Mapping cortical change across the human life span. Nat Neurosci. 2003 Mar;6(3):309-15. doi: 10.1038/nn1008. PMID: 12548289.
Sowell ER, Thompson PM, Welcome SE, Henkenius AL, Toga AW, Peterson BS. Cortical abnormalities in children and adolescents with attention-deficit hyperactivity disorder. Lancet. 2003 Nov 22;362(9397):1699-707. doi: 10.1016/S0140-6736(03)14842-8. PMID: 14643117.
Specia M. The U.K. Government Wouldn't Ban Phones in Schools. These Parents Stepped Up. The New York Times. 2025 Apr. 1
Speranza L, di Porzio U, Viggiano D, de Donato A, Volpicelli F. Dopamine: The Neuromodulator of Long-Term Synaptic Plasticity, Reward and Movement Control. Cells. 2021 Mar 26;10(4):735.
Starvaggi I, Dierckman C, Lorenzo-Luaces L. Mental health misinformation on social media: Review and future directions. Curr Opin Psychol. 2024 Apr;56:101738.
Starvaggi, I., Dierckman, C., & Lorenzo-Luaces, L. (2023). Mental Health Misinformation on Social Media: Review and Future Directions.
Statistics Canada. Rising mental health concerns among youth. Statistics Canada, StatsCANplus. 2025 Jan. 16. https://www.statcan.gc.ca/o1/en/plus/7642-rising-mental-health-concerns-among-youth#shr-pg-pnl1
Steele, R. G., Khetawat, D., Christofferson, J. L., & Hall, J. A. (2023). Concurrent Validity of Self-Reported Social Media Use in Adolescents and Young Adults: Associations with Objective Data and Psychosocial Functioning. Journal of Psychopathology and Behavioral Assessment, 45(1), 97–108. https://doi.org/10.1007/s10862-022-10013-9
Steers, M.L.N., Wickham, R.E. and Acitelli, L.K. (2014) Seeing Everyone Else's Highlight Reels: How Facebook Usage Is Linked to Depressive Symptoms. Journal of Social and Clinical Psychology, 33, 701-731.
Stein D. Fundamental Flaws in Meta-Analytical Review of Social Media Experiements. The Shores of Academia. 2024 Apr. 30.

Cite
Steinberg L, Icenogle G, Shulman EP, Breiner K, Chein J, Bacchini D, Chang L, Chaudhary N, Giunta LD, Dodge KA, Fanti KA, Lansford JE, Malone PS, Oburu P, Pastorelli C, Skinner AT, Sorbring E, Tapanya S, Tirado LMU, Alampay LP, Al-Hassan SM, Takash HMS. Around the world, adolescence is a time of heightened sensation seeking and immature self-regulation. Dev Sci. 2018 Mar;21(2):10.1111/desc.12532.
Steinberg L. A dual systems model of adolescent risk-taking. Dev Psychobiol. 2010 Apr;52(3):216-24. doi: 10.1002/dev.20445. PMID: 20213754.
Steinberg L. Risk taking in adolescence: what changes, and why? Ann N Y Acad Sci. 2004 Jun;1021:51-8.
Steinsbekk S, Nesi J, Wichstrøm L. Social media behaviors and symptoms of anxiety and depression. A four-wave cohort study from age 10–16 years. Computers in Human Behavior, 147, 107859. 2023.
Steinsbekk, S., Wichstrøm, L., Stenseng, F., Nesi, J., Hygen, B. W., & Skalická, V. (2021). The impact of social media use on appearance self-esteem from childhood to adolescence—A 3-wave community study. Computers in Human Behavior, 114, Article 106528. https://doi.org/10.1016/j.chb.2020.106528
Stice E, Shaw HE. Role of body dissatisfaction in the onset and maintenance of eating pathology: a synthesis of research findings. J Psychosom Res. 2002 Nov;53(5):985-93. doi: 10.1016/s0022-3999(02)00488-9. PMID: 12445588.
Stieger S, Lewetz D. A Week Without Using Social Media: Results from an Ecological Momentary Intervention Study Using Smartphones. Cyberpsychol Behav Soc Netw. 2018 Oct;21(10):618-624.
Stockdale LA, Coyne SM. Bored and online: Reasons for using social media, problematic social networking site use, and behavioral outcomes across the transition from adolescence to emerging adulthood. J Adolesc. 2020 Feb;79:173-183.
Stokel-Walker C. TikTok Boom: China's Dynamite App and the Superpower Race for Social Media. Canbury Press, Business & Economics. 2021.
Stöven LM, Herzberg P. Relationship 2.0: A systematic review of associations between the use of social network sites and attachment style. Journal of Social and Personal Relationships, 38(3), 1103-1128. 2020.
Su C, Zhou H, Gong L, Teng B, Geng F, Hu Y. Viewing personalized video clips recommended by TikTok activates default mode network and ventral tegmental area. Neuroimage. 2021 Aug 15;237:118136. doi: 10.1016/j.neuroimage.2021.118136. Epub 2021 May 2. PMID: 33951514.
Su D, Zhang X, He K, Chen Y. Use of machine learning approach to predict depression in the elderly in China: A longitudinal study. Journal of Affective Disorders, vol. 282, pp. 289-298. 2021 Mar.
Suarez-Lledo V, Alvarez-Galvez J Prevalence of Health Misinformation on Social Media: Systematic Review J Med Internet Res 2021;23(1):e17187.
Suarez-Lledo, V., & Alvarez-Galvez, J. (2021). Prevalence of health misinformation on social media: Systematic review. Journal of Medical Internet Research, 23(1).
Sun, Y., & Zhang, Y. (2020). A review of theories and models applied in studies of social media addiction and implications for future research. Addictive Behaviors, 106, 106699.
Susi K, Glover-Ford F, Stewart A, Knowles Bevis R, Hawton K. Research Review: Viewing self-harm images on the internet and social media platforms: systematic review of the impact and associated psychological mechanisms. J Child Psychol Psychiatry. 2023 Aug;64(8):1115-1139.

Cite
Swanson SA, Crow SJ, Le Grange D, Swendsen J, Merikangas KR. Prevalence and correlates of eating disorders in adolescents. Results from the national comorbidity survey replication adolescent supplement. Arch Gen Psychiatry. 2011 Jul;68(7):714-23.
Swedo EA, Beauregard JL, de Fijter S, Werhan L, Norris K, Montgomery MP, Rose EB, David-Ferdon C, Massetti GM, Hillis SD, Sumner SA. Associations Between Social Media and Suicidal Behaviors During a Youth Suicide Cluster in Ohio. J Adolesc Health. 2021 Feb;68(2):308-316.
Systrom K. Welcome to IGTV, our New Video App. Instagram. 2018 Jun. 20. https://about.instagram.com/blog/announcements/welcome-to-igtv
Szwedo DE, Mikami AY, Allen JP. Qualities of Peer Relations on Social Networking Websites: Predictions from Negative Mother-Teen Interactions. J Res Adolesc. 2011 Sep;21(3):595-607.
Takarangi M, Bridgland V, Simister E. A nervous wait: Instagram's sensitive-content screens cause anticipatory anxiety but do not mitigate reactions to negative content, Cognition and Emotion, 37:8, 1315-1329. 2023.
Talbot CV, Gavin J, van Steen T, Morey Y. A content analysis of thinspiration, fitspiration, and bonespiration imagery on social media. J Eat Disord. 2017 Sep 26;5:40.
Talbot, C. V., Gavin, J., van Steen, T., & Morey, Y. (2017). A content analysis of thinspiration, fitspiration, and bonespiration imagery on social media. Journal of eating disorders, 5, 40.
Tamplin NC, McLean SA, Paxton SJ. Social media literacy protects against the negative impact of exposure to appearance ideal social media images in young adult women but not men. Body Image. 2018 Sep;26:29-37.
Tang S, Werner-Seidler A, Torok M, Mackinnon AJ, Christensen H. The relationship between screen time and mental health in young people: A systematic review of longitudinal studies. Clin Psychol Rev. 2021 Jun;86:102021.
Tao, S., Reichert, F., Law, N. W. Y., & Rao, N. (2023). Digital Technology use and adolescent mental health before and during the COVID-19 pandemic: The roles of internet addiction and digital competence. Cyberpsychology, Behavior, and Social Networking, 26(10), 739–746.
Tao, X., & Fisher, C. B. (2022). Exposure to social media racial discrimination and mental health among adolescents of color. Journal of Youth and Adolescence, 51(1), 30–44.
Tariq, A., Muñoz Sáez, D., & Khan, S. R. (2021). Social media use and family connectedness: A systematic review of quantitative literature. New Media & Society, 24(3), 815-832.
Tech Transparency Project. Facebook's Repeat Fail on Harmful Teen Ads. 2021 Oct. 1.
Tech Transparency Project. Meta Approves Harmful Teen Ads with Images from its Own AI Tool. 2024 Jan. 30.
Tech Transparency Project. 'Thinstagram': Instagram's algorithm fuels eating disorder epidemic. 2021 Dec. 8. https://www.techtransparencyproject.org/articles/thinstagram-instagrams-algorithm-fuels-eating-disorder-epidemic
Telecommunications Reports. Surgeon General Wants Warning Labels on Social Media Platforms. Telecommunications Reports. Vol. 90, No. 12. 2024 Jun. 28.
Tereshchenko SY. Neurobiological risk factors for problematic social media use as a specific form of Internet addiction: A narrative review. World J Psychiatry. 2023 May 19;13(5):160-173.

Cite
Terlizzi EP, Zablotsky B. Symptoms of Anxiety and Depression Among Adults: United States, 2019 and 2022. Natl Health Stat Report. 2024 Nov 7;(213):CS353885. doi: 10.15620/cdc/64018. PMID: 39591466; PMCID: PMC11616099.
Thai H, Davis C, Mahboob W, Perry S, Adams A, Goldfield G. Reducing social media use improves appearance and weight esteem in youth with emotional distress. Psychology of Popular Media. 2023.
Thai H, Davis C, Mahboob W, Perry S, Adams A, Goldfield G. Reducing social media use improves appearance and weight esteem in youth with emotional distress. Psychology of Popular Media. 2023.
Thai H, Davis C, Stewart N, Gunnell K, Goldfield G. The Effects of Reducing Social Media Use on Body Esteem Among Transitional-Aged Youth. Journal of Social and Clinical Psychology. 40. 481-507. 2021.
Thai, Helen & Davis, Christopher & Stewart, Niall & Gunnell, Katie & Goldfield, Gary. (2021). The Effects of Reducing Social Media Use on Body Esteem Among Transitional-Aged Youth. Journal of Social and Clinical Psychology. 40. 481-507. 10.1521/jscp.2021.40.6.481.
The Associated Press. Timeline: Key dates in Facebook's 10-year history. Phys.Org, Technology, Internet. 2014 Feb. 4. https://phys.org/news/2014-02-timeline-key-dates-facebook-year.html
The Coroners Service. Regulation 28 Report to Prevent Future Deaths. 2022 Oct. 13.
The New York Times. Highlights of the Supreme Court Argument on TikTok. The New York Times. 2025 Jan. 12. https://www.nytimes.com/live/2025/01/10/us/tiktok-ban-supreme-court?smid=nytcore-ios-share&referringSource=articleShare&tgrp=ctr&pvid=3C1DD109-0AA5-46EA-8B69-5DB741186805
Thoma BC, Salk RH, Choukas-Bradley S, Goldstein TR, Levine MD, Marshal MP. Suicidality Disparities Between Transgender and Cisgender Adolescents. Pediatrics. 2019 Nov;144(5):e20191183.
Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). Exacting beauty: Theory, Assessment and Treatment of Body Image Disturbance. American Psychological Association.
Thorell LB, Burén J, Ström Wiman J, Sandberg D, Nutley SB. Longitudinal associations between digital media use and ADHD symptoms in children and adolescents: a systematic literature review. Eur Child Adolesc Psychiatry. 2024 Aug;33(8):2503-2526.
Thorisdottir IE, Sigurvinsdottir R, Asgeirsdottir BB, Allegrante JP, Sigfusdottir ID. Active and Passive Social Media Use and Symptoms of Anxiety and Depressed Mood Among Icelandic Adolescents. Cyberpsychol Behav Soc Netw. 2019 Aug;22(8):535-542.
Throuvala MA, Griffiths MD, Rennoldson M, Kuss DJ. Perceived Challenges and Online Harms from Social Media Use on a Severity Continuum: A Qualitative Psychological Stakeholder Perspective. Int J Environ Res Public Health. 2021 Mar 20;18(6):3227.
Thrul J, Devkota J, AlJuboori D, Regan T, Alomairah S, Vidal C. Social media reduction or abstinence interventions are providing mental health benefits—Reanalysis of a published meta-analysis. Psychology of Popular Media, 14(2), 207–209. 2025.
Tibber M, Zhao J, Butler S. The association between self-esteem and dimensions and classes of cross-platform social media use in a sample of emerging adults – Evidence from regression and latent class analyses. Computers in Human Behavior. 109. 2020.

Cite
Tibbs M, Deschênes S, van der Velden P, Fitzgerald A. An Investigation of the Longitudinal Bidirectional Associations Between Interactive Versus Passive Social Media Behaviors and Youth Internalizing Difficulties. A Within-Person Approach. J Youth Adolesc. 2025 Apr;54(4):849-862. doi: 10.1007/s10964-024-02093-5. Epub 2024 Oct 12. PMID: 39395918; PMCID: PMC11933239.
Tiggemann M, Slater A. Nettweens: The internet and body image concerns in preteenage girls. The Journal of Early Adolescence, 34(5), 606–620. 2014.
Tiggemann M, Zinoviev K. The effect of #enhancement-free Instagram images and hashtags on women's body image - Appendix A. Body image. 31. 131-138. 2019.
Tiggemann M. The Status of Media Effects on Body Image Research: Commentary on Articles in the Themed Issue on Body Image and Media. Media Psychology, 17:2, 127-133. 2014.
Tiggemann M. 'This image has been digitally altered': disclaimer labels are meant to protect viewers' body image, but do they work? The Conversation, Politics & Society. 2021 Nov. 21. https://theconversation.com/this-image-has-been-digitally-altered-disclaimer-labels-are-meant-to-protect-viewers-body-image-but-do-they-work-172044
Tiggemann, M., & Miller, J. (2010). The Internet and adolescent girls' weight satisfaction and drive for thinness. Sex roles, 63, 79-90.
Tran HGN, Thai TT, Dang NTT, Vo DK, Duong MHT. Cyber-Victimization and Its Effect on Depression in Adolescents: A Systematic Review and Meta-Analysis. Trauma Violence Abuse. 2023 Apr;24(2):1124-1139. doi: 10.1177/15248380211050597. Epub 2021 Oct 23. PMID: 34689637.
Tromholt M. The Facebook Experiment: Quitting Facebook Leads to Higher Levels of Well-Being. Cyberpsychol Behav Soc Netw. 2016 Nov;19(11):661-666.
Tseng FY, Yang HJ. Internet use and web communication networks, sources of social support, and forms of suicidal and nonsuicidal self-injury among adolescents: different patterns between genders. Suicide Life Threat Behav. 2015 Apr;45(2):178-91.
Tseng FY, Yang HJ. Internet use and web communication networks, sources of social support, and forms of suicidal and nonsuicidal self-injury among adolescents: different patterns between genders. Suicide Life Threat Behav. 2015 Apr;45(2):178-91. doi: 10.1111/sltb.12124. Epub 2014 Sep 25. PMID: 25255896.
Tsitsika A, Janikian M, Schoenmakers TM, Tzavela EC, Olafsson K, Wójcik S, Macarie GF, Tzavara C, Richardson C. Internet addictive behavior in adolescence: a cross-sectional study in seven European countries. Cyberpsychol Behav Soc Netw. 2014 Aug;17(8):528-35. doi: 10.1089/cyber.2013.0382. Epub 2014 May 22. PMID: 24853789.
Tsitsika AK, Tzavela EC, Janikian M, Ólafsson K, Iordache A, Schoenmakers TM, Tzavara C, Richardson C. Online social networking in adolescence: patterns of use in six European countries and links with psychosocial functioning. J Adolesc Health. 2014 Jul;55(1):141-7. doi: 10.1016/j.jadohealth.2013.11.010. Epub 2014 Mar 4. PMID: 24618179.
Turel O, He Q, Xue G, Xiao L, Bechara A. Examination of neural systems sub-serving facebook "addiction". Psychol Rep. 2014 Dec;115(3):675-95.
Turner, G., Ferguson, A. M., Katiyar, T., Palminteri, S., & Orben, A. (2024). Old strategies, new environments: Reinforcement learning on social media. Biological Psychiatry. Advance online publication.
Twenge J, Haidt J, Lozano J, Cummins K. Specification curve analysis shows that social media use is linked to poor mental health, especially among girls. Acta Psychologica. 224. 103512. 2022.

Cite
Twenge J, Joiner T, Rogers M, Martin G. Increases in Depressive Symptoms, Suicide-Related Outcomes, and Suicide Rates Among U.S. Adolescents After 2010 and Links to Increased New Media Screen Time. Clinical Psychological Science. 6. 216770261772337. 2017.
Twenge J, Martin G, Spitzberg B. Trends in U.S. Adolescents' Media Use, 1976-2016: The Rise of Digital Media, the Decline of TV, and the (Near) Demise of Print. Psychology of Popular Media Culture. 8. 2018.
Twenge JM, Blake A, Haidt J, Campbell WK. Commentary: Screens, Teens, and Psychological Well-Being: Evidence From Three Time-Use-Diary Studies. Sec. Psychopathology, vol. 11. 2020 Feb. 17.
Twenge JM, Campbell WK. Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. Prev Med Rep. 2018 Oct 18;12:271-283.
Twenge JM, Campbell WK. Media Use Is Linked to Lower Psychological Well-Being: Evidence from Three Datasets. Psychiatr Q. 2019 Jun;90(2):311-331.
Twenge JM, Farley E. Not all screen time is created equal: associations with mental health vary by activity and gender. Soc Psychiatry Psychiatr Epidemiol. 2021 Feb;56(2):207-217.
Twenge JM, Haidt J, Blake AB, McAllister C, Lemon H, Le Roy A. Worldwide increases in adolescent loneliness. J Adolesc. 2021 Dec;93:257-269.
Twenge JM, Martin GN, Campbell WK. Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology. Emotion. 2018 Sep;18(6):765-780.
Twenge JM. Increases in Depression, Self-Harm, and Suicide Among U.S. Adolescents After 2012 and Links to Technology Use: Possible Mechanisms. Psychiatr Res Clin Pract. 2020 Sep 9;2(1):19-25.
Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. Journal of Abnormal Psychology, 128(3), 185–199.
Twenge, J. M., Haidt, J., Joiner, T. E., & Campbell, W. K. (2020). Underestimating digital media harm. Nature Human Behaviour, 4(4), 346–348. https://doi.org/10.1038/s41562-020-0839-4
Twomey C, O'Reilly G. Associations of Self-Presentation on Facebook with Mental Health and Personality Variables: A Systematic Review. Cyberpsychol Behav Soc Netw. 2017 Oct;20(10):587-595.
U.S. Centers for Disease Control and Prevention. (2024, August 8). About Mental Health. Mental Health. https://www.cdc.gov/mental-health/about/index.html
U.S. Centers for Disease Control and Prevention. (2025, February 12). Youth Risk Behavior Surveillance System (YRBSS). Youth Risk Behavior Surveillance System (YRBSS). https://www.cdc.gov/yrbs/index.html
U.S. Department of Health and Human Services. The Teen Brain: 6 Things To Know. The National Institute of Mental Health. Pub. No. OM 16-4307.
U.S. Department of Health and Human Services. The Teen Brain: Still Under Construction. The National Institute of Mental Health. Pub. No. 11-429. 2011.

Cite
U.S. Surgeon General. Confronting Health Misinformation. The U.S. Surgeon General's Advisory on Building a Healthy Information Environment. The Office of the U.S. Surgeon General. 2021.
U.S. Surgeon General. Protecting Youth Mental Health: The U.S. Surgeon General's Advisory. Office of the U.S. Surgeon General. 2021.
U.S. Surgeon General. Social Media and Youth Mental Health. The U.S. Surgeon General's Advisory. Office of the U.S. Surgeon General. 2023.
US Centers for Disease Control and Prevention. (2025, February 18). About Mental Health. CDC. https://www.cdc.gov/mental-health/about/index.html
Vahedi Z, Zannella L. The association between self-reported depressive symptoms and the use of social networking sites (SNS): A meta-analysis. Current Psychology. 40. 2021.
Vahedi Z, Zannella L. The association between self-reported depressive symptoms and the use of social networking sites (SNS): A meta-analysis. Current Psychology. 40. 2021.
Valentino-DeVries J, Keller M. The Men Who Use Instagram to Groom Child Influencers. The New York Times. 2024 Dec. 30. https://www.nytimes.com/2024/12/30/us/child-influencers-photographers-abuse.html?smid=nytcore-ios-share&referringSource=articleShare&tgrp=ctr&pvid=416767F3-1755-4FD7-82D8-429398D7E351
Valkenburg P, Peter J. Social Consequences of the Internet for Adolescents: A Decade of Research. Current Directions in Psychological Science. 18. 1-5. 2009.
Valkenburg PM, Beyens I, van Driel I, Keijsers L. How to Assess Variation in the Association Between Social Media Use and Well-Being: A Reply to Johannes, Masur, Vuorre, & Przybylski (2021). Dept. of Psychol., Edu., & Child Studies. 2021.
Valkenburg PM, Meier A, Beyens I. Social media use and its impact on adolescent mental health: An umbrella review of the evidence. Curr Opin Psychol. 2022 Apr;44:58-68.
Valkenburg PM, Meier A, Beyens I. Social media use and its impact on adolescent mental health: An umbrella review of the evidence. Curr Opin Psychol. 2022 Apr;44:58-68.
Valkenburg PM. Social media use and well-being: What we know and what we need to know. Curr Opin Psychol. 2022 Jun;45:101294. doi: 10.1016/j.copsyc.2021.12.006. Epub 2021 Dec 20. PMID: 35016087.
Valkenburg, P. M., Driel, I. I. van, & Beyens, I. (2021). The associations of active and passive social media use with well-being: A critical scoping review. OSF. https://doi.org/10.31234/osf.io/j6xqz
Valkenburg, P. M., van Driel, I. I., & Beyens, I. (2022). The associations of active and passive social media use with well-being: A critical scoping review. New Media & Society, 24(2), 530-549.
Van den Eijnden R, Lemmens J, Valkenburg P. The Social Media Disorder Scale: Validity and psychometric properties. Computers in Human Behavior. 61. 478-487. 2016.
van den Eijnden RJJM, Lemmens JS, Valkenburg PM. The Social Media Disorder Scale: Validity and psychometric properties. Computers in Human Behavior. 2016 Aug. 61(3):478-487
van den Oord EJCG, Pickles A, Waldman ID. Normal variation and abnormality: An empirical study of the liability distributions underlying depression and delinquency. Journal of Child Psychology and Psychiatry. 2003 44(2), 180–192.

Literature

Cite
van Wezel MMC, Abrahamse EL, Vanden Abeele MMP. Does a 7-day restriction on the use of social media improve cognitive functioning and emotional well-being? Results from a randomized controlled trial. Addict Behav Rep. 2021 Jun 15;14:100365.
Vannucci A, McCauley Ohannessian C. Social Media Use Subgroups Differentially Predict Psychosocial Well-Being During Early Adolescence. J Youth Adolesc. 2019 Aug;48(8):1469-1493.
Vannucci A, Ohannessian C, Gagnon S. Use of Multiple Social Media Platforms in Relation to Psychological Functioning in Emerging Adults. Emerging Adulthood, 7(6), 501–506. 2019.
Vannucci A, Simpson EG, Gagnon S, Ohannessian CM. Social media use and risky behaviors in adolescents: A meta-analysis. J Adolesc. 2020 Feb;79:258-274.
Vannucci A, Simpson EG, Gagnon S, Ohannessian CM. Social media use and risky behaviors in adolescents: A meta-analysis. J Adolesc. 2020 Feb;79:258-274.
Varona MN, Muela A, Machimbarrena JM. Problematic use or addiction? A scoping review on conceptual and operational definitions of negative social networking sites use in adolescents. Addict Behav. 2022 Nov;134:107400. doi: 10.1016/j.addbeh.2022.107400. Epub 2022 Jun 9. PMID: 35820296.
Vaterlaus J, Barnett K, Roche C, Young J. "Snapchat is more personal": An exploratory study on Snapchat behaviors and young adult interpersonal relationships. Computers in Human Behavior, 62, 594–601.2016.
Vendemia MA, Fox J. How social media images of sexualized young women elicit appearance commentary from their peers and reinforce objectification. Body Image. 2024 Jun;49:101683.
Vendemia, M. A., & Fox, J. (2024). How social media images of sexualized young women elicit appearance commentary from their peers and reinforce objectification. Body Image, 49, 101683.
Venticinque, J. S., Chahal, R., Beard, S. J., Schriber, R. A., Hastings, P. D., & Guyer, A. E. (2021). Neural responses to implicit forms of peer influence in young adults. Social Neuroscience, 16(3), 331–344.
Verbeij, T., Pouwels, J. L., Beyens, I., & Valkenburg, P. M. (2021). The accuracy and validity of self-reported social media use measures among adolescents. Computers in Human Behavior Reports, 3, 100090.
Verduyn P, Ybarra O, Resibois M, Jonides J, Kross E. Do Social Network Sites Enhance or Undermine Subjective Well-Being? A Critical Review. Social Issues and Policy Review, vol 11, iss 1, pp274-302. 2017 Jan.
Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., Ybarra, O., Jonides, J., & Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. Journal of experimental psychology. General, 144(2), 480–488. https://doi.org/10.1037/xge0000057
Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do Social Network Sites Enhance or Undermine Subjective Well-Being? A Critical Review. Social Issues and Policy Review, 11(1), 274–302. https://doi.org/10.1111/sipr.12033
Verharen JPH, Zhu Y, Lammel S. Aversion hot spots in the dopamine system. Curr Opin Neurobiol. 2020 Oct;64:46-52.
Vernon L, Modecki KL, Barber BL. Tracking Effects of Problematic Social Networking on Adolescent Psychopathology: The Mediating Role of Sleep Disruptions. J Clin Child Adolesc Psychol. 2017 Mar-Apr;46(2):269-283.

Cite
Vesal, M., & Rahimi, C. (2021). The effect of social media use on depression in adolescents: A systematic review and meta-analysis. | EBSCOhost.
Vetter C, Steinkopf R, Bergner K, Ornigotti M, Nolte S, Gross H, Szameit A. Realization of Free-Space Long-Distance Self-Healing Bessel Beams. Laser & Photonics Reviews. 13. 1900103. 2019.
Vetter TR. Systematic Review and Meta-analysis: Sometimes Bigger Is Indeed Better. Anesth Analg. 2019 Mar;128(3):575-583. doi: 10.1213/ANE.0000000000004014. PMID: 30649072.
Vidal C, Lhaksampa T, Miller L, Platt R. Social media use and depression in adolescents: a scoping review. Int Rev Psychiatry. 2020 May;32(3):235-253.
Vieira C, Kuss DJ, Griffiths MD. Early maladaptive schemas and behavioural addictions: A systematic literature review. Clin Psychol Rev. 2023 Nov;105:102340.
Viner, R. M., Gireesh, A., Stiglic, N., Hudson, L. D., Goddings, A. L., Ward, J. L., & Nicholls, D. E. (2019). Roles of cyberbullying, sleep, and physical activity in mediating the effects of social media use on mental health and wellbeing among young people in England: a secondary analysis of longitudinal data. The Lancet. Child & adolescent health, 3(10), 685–696. https://doi.org/10.1016/S2352-4642(19)30186-5
Vink JM, van Beijsterveldt TC, Huppertz C, Bartels M, Boomsma DI. Heritability of compulsive Internet use in adolescents. Addict Biol. 2016 Mar;21(2):460-8.
Vogels E, Gelles-Watnick R, Massarat N. Teens, Social Media and Technology 2022. Pew Research Center. Report. 2022 Aug. 10, https://www.pewresearch.org/internet/2022/08/10/teens-social-media-and-technology-2022/
Vogels EA, Gelles-Watnick R, Massart N. Teens, Social Media and Technology 2022. Pew Research Center. 2022
Volkow ND, Koob GF, McLellan AT. Neurobiologic Advances from the Brain Disease Model of Addiction. N Engl J Med. 2016 Jan 28;374(4):363-71.
Vossen, H.G.M., van den Eijnden, R.J.J.M., Visser, I. et al. Parenting and Problematic Social Media Use: A Systematic Review. Curr Addict Rep 11, 511–527 (2024).
Vuorre M, Orben A, Przybylski AK. There is no evidence that associations between adolescents' digital technology engagement and mental health problems have increased. Clin Psychol Sci. 2021 Sep;9(5):823-835.
Vuorre M, Przybylski A. Global Well-Being and Mental Health in the Internet Age. Clinical Psychological Science, 0(0). 2023.
Vuorre M, Przybylski AK. Estimating the association between Facebook adoption and well-being in 72 countries. R Soc Open Sci. 2023 Aug 9;10(8):221451.
Wadsley M, Ihssen N. A Systematic Review of Structural and Functional MRI Studies Investigating Social Networking Site Use. Brain Sci. 2023 May 11;13(5):787. doi: 10.3390/brainsci13050787. Erratum in: Brain Sci. 2023 Jul 17;13(7):1079. doi: 10.3390/brainsci13071079. PMID: 37239257; PMCID: PMC10216498.
Wadsley M, Ihssen N. Restricting social networking site use for one week produces varied effects on mood but does not increase explicit or implicit desires to use SNSs: Findings from an ecological momentary assessment study. PLoS One. 2023 Nov 8;18(11):e0293467.

Cite
Wagner C, Aguirre E, Sumner E. The relationship between Instagram selfies and body image in young adult women. First Monday, 21(9). 2016.
Walhovd KB, Krogsrud SK, Amlien IK, Bartsch H, Bjørnerud A, Due-Tønnessen P, Grydeland H, Hagler DJ Jr, Håberg AK, Kremen WS, Ferschmann L, Nyberg L, Panizzon MS, Rohani DA, Skranes J, Storsve AB, Sølsnes AE, Tamnes CK, Thompson WK, Reuter C, Dale AM, Fjell AM. Neurodevelopmental origins of lifespan changes in brain and cognition. Proc Natl Acad Sci U S A. 2016 Aug 16;113(33):9357-62. doi: 10.1073/pnas.1524259113. Epub 2016 Jul 18. PMID: 27432992; PMCID: PMC4995982.
Walker D, Bourne L, Shelley A. Influence, stakeholder mapping and visualization. Construction Management & Economics. 26. 645-658. 2008.
Walker E, Hernandez AV, Kattan MW. Meta-analysis: Its strengths and limitations. Cleve Clin J Med. 2008 Jun;75(6):431-9. doi: 10.3949/ccjm.75.6.431. PMID: 18595551.
Wallace-Wells D. Are Smartphones Driving Our Teens to Depression? The New York Times. Opinion. 2024 May 1, https://www.nytimes.com/2024/05/01/opinion/smartphones-social-media-mental-health-teens.html?smid=nytcore-ios-share&referringSource=articleShare&sgrp=c-cb
Walsh D, McCartney G, Smith M, et alRelationship between childhood socioeconomic position and adverse childhood experiences (ACEs): a systematic reviewJ Epidemiol Community Health 2019;73:1087-1093.
Walsh JJ, Barnes JD, Cameron JD, Goldfield GS, Chaput JP, Gunnell KE, Ledoux AA, Zemek RL, Tremblay MS. Associations between 24 hour movement behaviours and global cognition in US children: a cross-sectional observational study. Lancet Child Adolesc Health. 2018 Nov;2(11):783-791. doi: 10.1016/S2352-4642(18)30278-5. Epub 2018 Sep 27. PMID: 30268792; PMCID: PMC6298223.
Walsh, J. J., Barnes, J. D., Tremblay, M. S., & Chaput, J.-P. (2020). Associations between duration and type of electronic screen use and cognition in US children. Computers in Human Behavior, 108, 106312. https://doi.org/10.1016/j.chb.2020.106312
Wang JL, Wang HZ, Gaskin J, Hawk S. The Mediating Roles of Upward Social Comparison and Self-esteem and the Moderating Role of Social Comparison Orientation in the Association between Social Networking Site Usage and Subjective Well-Being. Frontiers in Psychology. 2017.
Wang Y, Tang J, Li J, Li B, Wan Y, Clayton Mellina, Neil O'Hare, and Yi Chang. 2017. Understanding and Discovering Deliberate Self-harm Content in Social Media. In Proceedings of the 26th International Conference on World Wide Web (WWW '17). International World Wide Web Conferences Steering Committee, Republic and Canton of Geneva, CHE, 93–102.
Wang Y, Tang J, Li J, Li B, Wan Y, Clayton Mellina, Neil O'Hare, and Yi Chang. 2017. Understanding and Discovering Deliberate Self-harm Content in Social Media. In Proceedings of the 26th International Conference on World Wide Web (WWW '17). International World Wide Web Conferences Steering Committee, Republic and Canton of Geneva, CHE, 93–10
Wang YH, Shi ZT, Luo QY (2017) Association of depressive symptoms and suicidal ideation among university students in China: a systematic review and meta-analysis. Medicine 96:e6467.
Ward JL, Vázquez-Vázquez A, Phillips K, Settle K, Pilvar H, Cornaglia F, Gibson F, Nicholls D, Roland D, Mathews G, Roberts H, Viner RM, Hudson LD. Admission to acute medical wards for mental health concerns among children and young people in England from 2012 to 2022: a cohort study. Lancet Child Adolesc Health. 2025 Feb;9(2):112-120. doi: 10.1016/S2352-4642(24)00333-X. PMID: 39855751.

Cite
Wegmann E, Müller S, Turel O, Brand M. Interactions of impulsivity, general executive functions, and specific inhibitory control explain symptoms of social-networks-use disorder: An experimental study. Scientific Reports. 10. 2020.
Wegmann E, Müller S, Turel O, Brand M. Interactions of impulsivity, general executive functions, and specific inhibitory control explain symptoms of social-networks-use disorder: An experimental study. Scientific Reports. 10. 2020.
Weinstein E, James C. Behind Their Screens: What Teens Are Facing (and Adults Are Missing). 2022.
Weinstein E. Adolescents' differential responses to social media browsing: Exploring causes and consequences for intervention. Computers in Human Behavior, 76, 396–405. 2017.
Weiser EB. #Me: Narcissism and its facets as predictors of selfie-posting frequency. Personality and Individual Differences, 86, 477–481. 2015.
Wells G, Horwitz J, Seetharaman D. Facebook knows Instagram Is Toxic for Teen Girls, Company Documents Show. The Wall Street Journal. 2021 Sep. 14.
Wells, G., Horwitz, J., & Seetharaman, D. (2021, September 14). Facebook knows Instagram is toxic for teen girls, company documents show. The Wall Street Journal
Werling AM, Kuzhippallil S, Emery S, Walitza S, Drechsler R. Problematic use of digital media in children and adolescents with a diagnosis of attention-deficit/hyperactivity disorder compared to controls. A meta-analysis. J Behav Addict. 2022 May 13;11(2):305–25. doi: 10.1556/2006.2022.00007. Epub ahead of print. PMID: 35567763; PMCID: PMC9295226.
Werling K, Bianco NA, Raitor M, Stingel J, Hicks JL, Collins SH, Delp SL, Liu CK. AddBiomechanics: Automating model scaling, inverse kinematics, and inverse dynamics from human motion data through sequential optimization. PLoS One. 2023 Nov 30;18(11):e0295152.
Whiteman H. School bullies have moved online. But is banning all under-16s from social media really the answer? CNN, Australia. 2024 Nov. 25. https://www.cnn.com/2024/11/23/australia/australia-debate-social-media-ban-intl-hnk-dst?cid=ios_app
Wiecha J, Sobol A, Peterson K, Gortmaker S. Household Television Access: Associations With Screen Time, Reading, and Homework Among Youth. Ambulatory pediatrics : the official journal of the Ambulatory Pediatric Association. 1. 244-51. 2001.
Wilksch SM, O'Shea A, Ho P, Byrne S, Wade TD. The relationship between social media use and disordered eating in young adolescents. Int J Eat Disord. 2020 Jan;53(1):96-106.
Wilson S, Dumornay NM. Rising Rates of Adolescent Depression in the United States: Challenges and Opportunities in the 2020s. J Adolesc Health. 2022 Mar;70(3):354-355.
Winstone, L., Mars, B., Haworth, C., & Kidger, J. (2022). Types of Social Media Use and Digital Stress in Early Adolescence.
Wong B, Bottorff C. Top Social Media Statistics And Trends of 2024. Forbes, Advisor, Business. 2023 May 18. https://www.forbes.com/advisor/business/social-media-statistics/
Woods HC, Scott H. #Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. J Adolesc. 2016 Aug;51:41-9.

Literature

Cite
WSJ Noted. How Instagram is Hurting Teen Girls. The Wall Street Journal, Culture. 2021 Sep. 29. https://www.wsj.com/articles/how-instagram-is-hurting-teen-girls-11632940937
Wu AM, Cheung VI, Ku L, Hung EP. Psychological risk factors of addiction to social networking sites among Chinese smartphone users. J Behav Addict. 2013 Sep;2(3):160-6.
Wu, H., Zhou, X., Chen, D., Zheng, Y., & You, J. (2024). Longitudinal association between social media exposure and nonsuicidal self-injury among adolescents: Investigating the directionality by within-person effects. Current Psychology, 43(11), 9744–9754. https://doi.org/10.1007/s12144-023-05128-5
Wu, P., Feng, R., & Zhang, J. (2024). The relationship between loneliness and problematic social media usage in Chinese university students: a longitudinal study. BMC psychology, 12(1), 13.
Wu, W., & Weaver, D. (1997). On-Line Democracy or On-Line Demagoguery?: Public Opinion “Polls” on the Internet. Harvard International Journal of Press/Politics, 2(4), 71–86. https://doi.org/10.1177/1081180X97002004006
Xanidis, N., & Brignell, C. M. (2016). The association between the use of social network sites, sleep quality and cognitive function during the day. Computers in Human Behavior, 55, 121–126. https://doi.org/10.1016/j.chb.2015.09.004
Yang Q, Feng Y. Relationships between social networking sites use and subjective well-being--- a meta-analysis and meta-analytic structural equation model. Heliyon. 2024 Jun 7;10(12):e32463.
Yang, C., & Smith, C. (2024). Digital social multitasking (DSMT) and Digital Stress Among Adolescents: A peer norm perspective. Heliyon, 10(10).
Yeung A, Ng E, Abi-Jaoude E. TikTok and Attention-Deficit/Hyperactivity Disorder: A Cross-Sectional Study of Social Media Content Quality. Can J Psychiatry. 2022 Dec;67(12):899-906.
Yeung, A., Ng, E., & Abi-Jaoude, E. (2022). TikTok and attention-deficit/hyperactivity disorder: A cross-sectional study of social media content quality. The Canadian Journal of Psychiatry, 67(12), 899–906.
Yigiter, Mahmut Sami & Demir, Seda & Doğan, Nuri. (2023). The Relationship Between Problematic Social Media Use and Depression: A Meta-Analysis Study. Current Psychology. 43. 1-16.
Yin X, De Vries D, Gentile D, Wang J. Cultural Background and Measurement of Usage Moderate the Association Between Social Networking Sites (SNSs) Usage and Mental Health: A Meta-Analysis. Social Science Computer Review, 37(5), 631–648. 2019.
Yin X, De Vries D, Gentile D, Wang J. Cultural Background and Measurement of Usage Moderate the Association Between Social Networking Sites (SNSs) Usage and Mental Health: A Meta-Analysis. Social Science Computer Review, 37(5), 631–648. 2019.
Yoon S, Kleinman M, Mertz J, Brannick M. Is social network site usage related to depression? A meta-analysis of Facebook-depression relations. J Affect Disord. 2019 Apr 1;248:65-72. doi: 10.1016/j.jad.2019.01.026. Epub 2019 Jan 27. PMID: 30711871.
Yoon S, Kleinman M, Mertz J, Brannick M. Is social network site usage related to depression? A meta-analysis of Facebook-depression relations. J Affect Disord. 2019 Apr 1;248:65-72.
Young, S. N. (2008). The neurobiology of human social behaviour: An important but neglected topic. Journal of Psychiatry & Neuroscience, 33(5), 391–392.
Zarate D, Hobson BA, March E, Griffiths MD, Stavropoulos V. Psychometric properties of the Bergen Social Media Addiction Scale: An analysis using item response theory. Addict Behav Rep. 2022 Dec 6;17:100473.

Cite
Zarate D, Hobson BA, March E, Griffiths MD, Stavropoulos V. Psychometric properties of the Bergen Social Media Addiction Scale: An analysis using item response theory. Addict Behav Rep. 2022 Dec 6;17:100473.
Zenone M, Kenworthy N, Maani N. The Social Media Industry as a Commercial Determinant of Health. Int J Health Policy Manag. 2023;12:6840.
Zenone M, Ow N, Barbic S. TikTok and public health: a proposed research agenda. BMJ Glob Health. 2021 Nov;6(11):e007648.
Zhang X, Rost D, Wang J, Reynolds K. Active and passive social networking sites usage and negative emotions: A reciprocal relationship? Journal of Social and Clinical Psychology, 39(3), 195–213. 2020.
Zhang, L., Li, C., Zhou, T., Li, Q., & Gu, C. (2022). Social networking site use and loneliness: A meta-analysis. The Journal of Psychology: Interdisciplinary and Applied, 156(7), 492–511.
Zhang, Y., Li, S., & Yu, G. (2021). The relationship between social media use and fear of missing out: A meta-analysis. Acta Psychologica Sinica, 53(3), 273–290.
Zhong R, Frenkel S. A Third of TikTok's U.S. Users May Be 14 or Under, Raising Safety Questions. The New York Times, Technology. 2020 Sep. 17.
Zhou X, Shen X. Unveiling the relationship between social anxiety, loneliness, motivations, and problematic smartphone use: A network approach. Comprehensive Psychiatry, 130, Article 152451. 2024.
Zhu Y, Deng L, Wan K. The association between parent-child relationship and problematic internet use among English- and Chinese-language studies: A meta-analysis. Front Psychol. 2022 Aug 29;13:885819.
Zhu, C., Jiang, Y., Lei, H., Wang, H. and Zhang, C. (2024). "The relationship between short-form video use and depression among Chinese adolescents: Examining the mediating roles of need gratification and short-form video addiction." Heliyon 10(9): e30346.
Ziapour, A., Malekzadeh, R., Darabi, F., Yıldırım, M., Montazeri, N., Kianipour, N., & Nejhaddadgar, N. (2024). The role of social media literacy in infodemic management: a systematic review. Frontiers in digital health, 6, 1277499.