Mental Health and the Role of Technology in Children and Adolescents 1

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Abstract: Mental health has become a central issue in contemporary society, particularly among children and adolescents, whose psychological development is strongly influenced by rapid technological change. This paper explores the dual role of technology as both a risk factor and a potential resource for supporting mental well-being. On one hand, excessive screen time, social media exposure, and digital dependency are associated with anxiety, depression, and reduced self-esteem. On the other hand, technology can foster positive outcomes by enabling access to mental health resources, online counseling, peer support networks, and educational platforms that promote resilience. The study emphasizes the need for a balanced approach in integrating technology into the daily lives of young people, while also addressing ethical concerns, parental guidance, and digital literacy. The findings underline that technology, if managed responsibly, can serve as a powerful tool for enhancing mental health rather than undermining it.

Keywords: Mental health, Children and adolescents, Technology, Social media, Digital well-being

Introduction

In recent decades, mental health has emerged as a critical area of concern, particularly for children and adolescents who are navigating sensitive developmental stages. Rapid technological advancement has transformed the environment in which young people grow, learn, and interact. Smartphones, social media platforms, online games, and digital learning tools have become integral parts of their everyday lives. While these technologies offer significant opportunities for education, creativity, and social connection, they also pose considerable risks related to overuse, cyberbullying, addiction, and negative self-comparison.

The relationship between mental health and technology is therefore complex and multifaceted. For many young people, digital platforms act as spaces for identity formation, self-expression, and peer support. However, they may simultaneously serve as sources of stress, anxiety, and diminished well-being. Scholars and practitioners increasingly emphasize the importance of digital literacy, parental involvement, and policy regulations to maximize the benefits of technology while minimizing its psychological risks.

This paper examines the dual role of technology in shaping mental health among children and adolescents. It investigates the potential harms of excessive digital exposure, highlights the positive applications of technology in mental health support, and discusses strategies for fostering a balanced and safe digital environment. Ultimately, the goal is to provide insights into how technology can be used as a resource for promoting psychological resilience rather than as a factor contributing to vulnerability.

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Mental health has become one of the most significant challenges of contemporary society, with children and adolescents representing particularly vulnerable groups. The period of childhood and adolescence is characterized by rapid physical, cognitive, and emotional development, during which young individuals are highly sensitive to environmental influences. In recent years, digital technologies have become an inseparable part of daily life, shaping the ways in which young people communicate, learn, and construct their identities. This dynamic creates a complex interplay between technological use and psychological well-being, which requires systematic academic analysis.

Technology provides multiple opportunities for positive development. Digital tools facilitate access to information, enhance learning experiences, and support creativity and innovation. Social media platforms and online communities enable peer connection and can reduce feelings of isolation, particularly for young people who face barriers in offline environments. Furthermore, recent research highlights the potential of technology-based interventions such as mental health applications, online counseling services, and digital platforms for promoting resilience and providing early support to children and adolescents at risk. These technological innovations hold the promise of democratizing access to psychological care, especially in contexts where traditional services are limited.

At the same time, technology poses significant risks that cannot be overlooked. Excessive screen time has been associated with reduced physical activity, sleep disturbances, and increased exposure to harmful content. Social media environments, while offering opportunities for self-expression, also expose young people to cyberbullying, social comparison, and pressure to conform to unrealistic standards. These factors are linked to higher levels of anxiety, depression, and lowered self-esteem. In addition, the addictive potential of certain digital platforms and games may hinder social development, academic performance, and emotional regulation.

The relationship between technology and mental health among children and adolescents is therefore ambivalent and highly contextual. It is mediated by variables such as age, gender, socioeconomic background, family environment, and the extent of digital literacy. Research indicates that parental monitoring, the cultivation of critical digital skills, and the establishment of healthy online habits are crucial for minimizing risks. Moreover, educational institutions and policymakers bear responsibility for promoting balanced technology use and for integrating digital well-being into broader mental health strategies.

In conclusion, technology exerts a dual role in the mental health of children and adolescents. It can serve as a tool for learning, empowerment, and psychological support, but it can equally function as a source of stress, dependency, and vulnerability. The challenge for contemporary society lies not in rejecting technological advancement but in managing it responsibly, ensuring that it contributes to the psychological resilience and overall well-being of future generations.

Over the past half-decade, research on youth, mental health, and technology has grown rapidly and diversified across risks (e.g., cyberbullying, sleep disruption, privacy), benefits (e.g., access to support, scalable interventions), and heterogeneous effects shaped by context and individual differences. Evidence on social media exposure and internalizing symptoms remains mixed, with effect sizes often small on average but larger for vulnerable subgroups (e.g., youth exposed to harassment or heavy night-time use). A 2025 umbrella review synthesizing 47 meta-analyses concluded that **cyberbullying** is robustly associated with worse mental health outcomes (depression, anxiety, suicidality), underscoring the salience of online peer dynamics relative to mere screen time quantity.

Mechanistically, **sleep** emerges repeatedly as a mediator: evening device use and algorithmically engaging feeds can delay sleep onset and reduce duration, which in turn predicts mood and anxiety symptoms. U.S. public-health guidance has highlighted sleep, harassment exposure, and developmental stage as key levers—urging families and platforms to mitigate harms while preserving benefits.

On the benefit side, **digital mental-health interventions (DMHIs)** for youth have shifted from feasibility pilots to larger randomized trials. Two recent RCTs illustrate this move from promise to impact: a fully automated **app-based CBT-I** for 708 youths with insomnia prevented subsequent depression at symptom and disorder levels, with insomnia reduction mediating effects; and a CBT-based smartphone program for adolescent depression

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showed efficacy versus controls in a preregistered trial. Together they signal that targeted, mechanism-driven DMHIs (sleep, emotion regulation, cognitive skills) can yield clinically meaningful outcomes when carefully designed and evaluated.

At the same time, **exposure to self-harm content** remains a concern. A large PLOS One synthesis linked online self-harm/suicide content to higher self-harm risk, bolstering calls for stronger content moderation and safety-by-design without stigmatizing help-seeking communities that many adolescents value.

Policy and guidance have evolved accordingly. The U.S. **Surgeon General's 2023 Advisory** cautions that platforms should reduce risks (e.g., harassment, exposure to harmful content, data practices) and that caregivers and schools should emphasize sleep, media literacy, and developmentally appropriate use; importantly, it also notes potential benefits such as connection and identity exploration for some youth.

Two cross-cutting patterns recur across this literature. First, **individual differences** matter: effects vary by age, gender, baseline symptoms, neurodiversity, offline context, and what adolescents actually do online (content and interactions), not simply by hours online. Second, **design and timing** matter: night-time engagement, persuasive-design features, and lack of moderation amplify risks; conversely, structured, evidence-based digital programs (often brief, focused, and asynchronous) can expand access, especially where in-person care is scarce.

Limitations and gaps. Many studies are cross-sectional; causal inference is improving but still developing. Measurement remains inconsistent (e.g., lumping heterogeneous "screen time"), and platform environments evolve faster than study cycles. Under-represented groups (low- and middle-income settings, rural youth) and long-term trajectories are still insufficiently studied. Finally, implementation science—how to integrate DMHIs into schools, pediatrics, and family routines at scale while safeguarding privacy—is only beginning to mature.

Practice and policy implications. Prioritize sleep-protective habits and timing; reduce cyberbullying via platform design and school policies; use evidence-based, mechanism-targeted DMHIs (e.g., sleep, CBT skills) as **adjuncts** to—not replacements for—clinical care; and adopt safety-by-design standards (age-appropriate design, data minimization, robust moderation). Collectively, the field is moving beyond "how much screen time" toward **which digital experiences, for whom, and under what conditions** best support youth mental health.

Table 1. Comparative Overview of Methods in Recent Research on Youth, Technology, and Mental Health

Study / Source	Methodology	Sample	Focus	Strengths	Limitations
Orben et al. (2025, umbrella review on cyberbullying)	Umbrella review of 47 meta-analyses	Aggregated evidence across ~hundreds of thousands of adolescents	Links between cyberbullying, depression, anxiety, suicidality	High-level synthesis, identifies robust patterns across contexts	Limited by quality of included studies, heterogeneity of definitions
Marchant et al. (2020, PLOS ONE)	Systematic review of empirical studies	Cross-national studies, mostly adolescents 12–19	Online self-harm & suicide-related content	Captures diverse global evidence, highlights risks	Mostly cross-sectional studies, limited causality
Chen et al. (2025, PLOS Medicine, CBT-I app trial)	Randomized controlled trial (RCT)	N = 708 youths with insomnia, 12–18 years	Effect of app-based CBT-I on insomnia & prevention of depression	Strong causal inference, large sample, mediation tested	Digital-only design may not generalize to all youth (e.g., without smartphones)
Werner-Seidler et al. (2024, ClearlyMe®	RCT, preregistered	Adolescents with depressive symptoms	Effectiveness of CBT-based app on depression	Rigorous design, controlled	Preliminary (preprint), generalizability still

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Study / Source	Methodology	Sample	Focus	Strengths	Limitations
CBT app)				conditions	to be tested
U.S. Surgeon General's Advisory (2023)	Policy advisory informed by mixed methods (surveys, epidemiological data, consultations)	Nationally representative youth data	Social media & youth mental health (risks & opportunities)	Broad scope, integrates science with policy	Non-experimental, not hypothesis-testing
Sleep-focused studies (various, 2020–2023)	Longitudinal surveys + digital tracking	Adolescent cohorts, often >1,000	Device use, sleep, mood	Identifies mediators (sleep disruption)	Reliance on self-reports, device logs limited

Analysis of Methods

Recent research on technology and youth mental health employs diverse methodological approaches, each with distinct strengths and limitations. Meta-analyses and umbrella reviews (e.g., Orben, 2025; Marchant, 2020) map broad evidence patterns, consistently linking cyberbullying with adverse outcomes. Their strength lies in synthesizing large datasets, but they are limited by inconsistencies in how "screen time" or exposure are measured. Randomized controlled trials (e.g., Chen, 2025; Werner-Seidler, 2024) represent the gold standard for testing digital interventions, such as app-based CBT for insomnia or depression. They establish causality and mechanisms but are resource-intensive and often lack representative samples. Longitudinal observational studies provide insights into developmental trajectories, such as how device use disrupts sleep and subsequently increases depression risk. While these studies improve on cross-sectional designs by testing directionality, they remain vulnerable to confounding and self-report bias. Policy and mixed-method syntheses (e.g., the U.S. Surgeon General's Advisory) integrate survey data with stakeholder input, offering practice-oriented insights, though they cannot establish causality.

Comparatively, randomized trials provide the strongest causal evidence for protective digital interventions, while systematic reviews and longitudinal surveys best capture population-level risks, including harmful content and sleep disruption. Policy syntheses bridge these strands by highlighting actionable recommendations. Together, these approaches are complementary: reviews identify risks, longitudinal studies clarify mechanisms, RCTs test targeted solutions, and policy advisories translate evidence into practice.

Bulgarian Studies

Title / Source	What it is / What it examines	Relation to mental health + technology
"Evaluation of the screen time children spend daily for using digital technology" by E. Popova, T. Varbanova, N. Netov (2023)	Master's thesis, Social Entrepreneurship department, American University in Bulgaria / Sofia University	Surveys children's screen time, how much time is spent on electronic devices; correlates with formal education system entrance. stumejournals.com
"Contextualising the link between adolescents' use of digital technology and their mental health: a multi-country study" (Global Kids Online)	Multi-country comparative study including Bulgaria (n ≈ 1000 children 9-17); measures internet usage and life satisfaction. eprints.lse.ac.uk	
UNICEF Bulgaria / "Психичното здраве на децата и младите хора – що е то?" (translated: What is children's and young people's mental health?)	Public report / educational material by UNICEF Bulgaria	Outlines general mental health issues among children and youth; mentions factors affecting mental health but not deeply about technology. UNICEF

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An analysis of existing research in Bulgaria demonstrates that the topic of technology's role in the mental health of children and adolescents remains underexplored. The study by Popova et al. (2023) is directly relevant, as it examines children's screen time within the Bulgarian context. While it provides valuable baseline information about time-use and digital exposure, it does not address key psychological outcomes such as anxiety, depression, or well-being, nor does it test potential interventions. Similarly, the Global Kids Online study includes data from Bulgaria, showing that online activity correlates only weakly with life satisfaction. This finding suggests that exposure to digital media in itself may not strongly predict mental health outcomes, highlighting the importance of mediating factors such as the quality of social relationships and the nature of digital engagement. In contrast, the UNICEF Bulgaria materials provide broader data on the prevalence of mental health problems among young people but do not examine in detail how digital technology interacts with these issues, nor do they explore technology-based solutions.

Despite these contributions, several research gaps are evident. First, there is a lack of longitudinal or experimental studies that could reveal how prolonged technology use—whether through screen time, social media, online games, or apps—affects children's and adolescents' mental health outcomes over time, including anxiety, depression, self-esteem, and sleep quality. Second, digital interventions such as mental health apps, online counseling platforms, or preventive programs delivered through technology remain largely untested within the Bulgarian context. Third, qualitative studies are scarce; little is known about how Bulgarian youth themselves perceive and experience digital technologies, what kinds of content they consume, and how they cope with associated pressures. Finally, existing research often emphasizes the quantity of exposure to technology rather than its quality, failing to account for the context, purpose, and relational aspects of digital use.

Table 2: Comparative Analysis of Methods in Research on Technology and Youth Mental Health

Method	Examples	Strengths	Weaknesses
Meta-analyses & Umbrella Reviews	Orben (2025); Marchant (2020)	Synthesize large datasets; map consistent patterns (e.g., cyberbullying → poor outcomes).	Depend on prior studies; lack of standardized measures of screen time/exposure.
Randomized Controlled Trials (RCTs)	Chen (2025); Werner-Seidler (2024)	Gold standard for causal testing; reveal mechanisms (e.g., CBT-I improves sleep, prevents depression).	Resource-intensive; limited generalizability (SES, rural, LMIC youth often underrepresented).
Longitudinal Observational Studies	Sleep disruption surveys; device-use tracking	Test developmental trajectories and directionality (e.g., device use → sleep disruption → depression).	Vulnerable to confounding; self-report and recall biases.
Policy & Mixed-Method Syntheses	U.S. Surgeon General's Advisory	Policy relevance; integrate survey data, consultations, and public health framing.	Not designed to establish causality; often broad and descriptive.

Insight:
The methods are complementary. Reviews identify broad risks, longitudinal studies clarify mechanisms, RCTs test targeted solutions, and policy syntheses transform findings into practical recommendations.

Summary and Analysis of Hypotheses

The first hypothesis proposed that "users perceive AI-generated advertisements as less trustworthy compared to human-generated advertisements." This was confirmed by the correlation analysis. Low perceived trustworthiness was significantly associated with heightened concerns about data privacy and online tracking (Items 8 and 9), perceptions of manipulative intent (Item 8), and limited willingness to rely on fully automated advertising content (Item 11). These results indicate that distrust toward AI in advertising is strongly tied to ethical concerns and transparency issues.

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The second hypothesis, predicting a positive relationship between age and attitudes toward AI in advertising, received partial support. Across groups, older respondents showed stronger demands for regulation and heightened concerns about surveillance and privacy, whereas younger groups tended to express greater skepticism toward trust and human replacement issues. The relationship between age and attitudes was therefore complex: while age predicted stronger regulatory and ethical concerns, trust in AI-driven advertisements varied inconsistently.

The third hypothesis, concerning digital literacy as a moderator of attitudes toward AI advertising, was supported. Respondents with work or educational experience in AI or advertising demonstrated more nuanced, moderate, and diverse views. They showed less generalized anxiety and more differentiated judgments, reflecting how familiarity with AI reduces polarized reactions.

The fourth hypothesis suggested that ethical concerns (e.g., privacy, manipulation) increase the likelihood of rejecting AI-generated advertisements. This was strongly supported. Correlations showed that participants who were worried about privacy violations and manipulative potential were significantly more likely to distrust AI advertising (Items 8, 9, 13, 16). This highlights ethical considerations as central determinants of acceptance.

Integrated Interpretation

Overall, the results suggest that trust and acceptance of AI advertising are not solely determined by age or exposure but are shaped by a combination of ethical concerns, digital literacy, and expectations for regulation. Distrust stems mainly from issues of manipulation and data privacy, while positive attitudes emerge when AI is framed as an effective tool for innovation and engagement. Importantly, digital literacy mitigates extreme positions, allowing for more balanced views, whereas ethical worries amplify rejection.

Conclusion

The analysis of the hypotheses demonstrates that while artificial intelligence in advertising is perceived with caution, the core issues influencing acceptance revolve around ethics, privacy, and trust. Age and digital literacy act as important modifiers: older participants express stronger calls for regulation, while digitally literate users evaluate AI advertising more critically yet with greater nuance. The overarching trend reveals that skepticism toward AI in advertising mirrors wider societal concerns about technological influence on well-being, autonomy, and manipulation. This aligns with broader research on the role of technology in youth mental health, where the quality and context of digital engagement—not simply exposure—determine outcomes. Thus, both in advertising and in child and adolescent development, the interplay between trust, ethics, and literacy defines the future role of technology in shaping human attitudes and behaviors.

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