

Attachment Styles, Adverse Childhood Experiences and Gender Differences in Adolescents' Problematic Technological Behaviors: A Narrative Review

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Abstract

The present narrative review aims to explore the relationship between attachment styles, adverse childhood experiences (ACEs) and problematic technological behaviors (PTBs) among adolescents aged between 12 to 18 years old, with a specific focus on gender differences.

PTBs, which include problematic gaming, binge-watching, cyberbullying and dysfunctional Internet and social media use, manifest as difficulties in emotional regulation and interpersonal relationships.

According to recent research, insecure attachment styles and ACEs represent key risk factors, influenced by contextual variables such as gender. Insecure attachment and ACEs contribute to PTBs by impairing emotional regulation and interpersonal relationships. However, protective factors such as social support can buffer these negative effects, promoting healthier digital behaviors.

Furthermore, gender may influence these behaviors: generally, girls are more prone to social media overuse and emotional distress, while boys favor gaming as a coping tool.

Effective interventions should integrate these factors, emphasizing emotional regulation, resilience and digital awareness, with future research exploring cultural and contextual influences.

Keywords: problematic technological behaviors, attachment styles, adverse childhood experiences, gender differences, adolescents

Introduction

Attachment styles and adverse childhood experiences (ACEs) are fundamental determinants of an individual's psychophysical development and health across the lifespan. Attachment theory, formulated by Bowlby (1978), offers a comprehensive framework for understanding how early caregiver interactions influence relational patterns, emotional regulation, and psychological resilience later in life.

Within this framework, Bowlby identified three primary attachment styles: secure, anxious, and avoidant. A secure attachment style promotes a healthy balance between intimacy and independence, allowing individuals to establish stable, supportive relationships and to navigate social interactions effectively, even in digital environments. Instead, anxious and avoidant attachment styles, both classified as insecure, are associated with impaired emotional regulation and difficulties in forming and maintaining close, meaningful relationships. Adolescents with an anxious attachment style often crave intimacy but struggle with persistent fears of rejection, making it challenging for them to create genuine connections. On the other hand, those with an avoidant attachment style tend to distance themselves from intimacy, feeling uncomfortable with close relationships and finding it difficult to express emotions openly.

ACEs refer to traumatic and stressful events during childhood, including abuse, neglect, domestic dysfunction, and other forms of adverse childhood experiences. These experiences have been consistently linked to a broad spectrum of negative health outcomes that persist into adulthood. Physically, ACEs are associated with an increased risk of conditions such as cardiovascular disease, obesity, diabetes, and autoimmune disorders (Dube et al., 2009; Heerman et al., 2016; Suglia et al., 2018). Psychologically, ACEs contribute to mental health disorders, such as depression, anxiety, and psychosis (Varese et al., 2012).

In a meta-analysis conducted by Hughes et al. (2017), there's compelling evidence that ACEs disrupt the normal functioning of the nervous, endocrine, and immune systems, highlighting the profound physiological and psychological impacts of these early experiences. Furthermore, research consistently reveals a dose-response relationship, in which the likelihood of adverse health outcomes increases with the number of ACEs experienced (Bethell et al., 2014; Heerman et al., 2016).

The interaction between ACEs and attachment styles plays a crucial role in shaping developmental trajectories and health outcomes. Children and adolescents exposed to ACEs are significantly more likely to exhibit insecure attachment styles, which exacerbate

emotional dysregulation and hinder relational stability. In this context, Verrastro et al. (2024) emphasize how early trauma increases the likelihood of maladaptive coping strategies, such as problematic technology use. This insight is consistent with further findings, which indicate that approximately 80% of children and adolescents with mental health disorders demonstrate insecure attachment styles, compared to only 20% who have a secure attachment (Stefini et al., 2013). Attachment disruptions, in fact, often manifest in behavioral problems, emotional instability, and impaired relational competencies. For instance, Derin et al. (2022) observed a higher prevalence of social anxiety disorder among adolescents with a history of ACEs. Similarly, Amendola et al. (2020) found out that childhood mistreatment is linked to emotional dysregulation in adulthood, often manifesting through maladaptive coping strategies, including excessive and problematic use of technology.

However, emotional intelligence has been identified as a significant moderator in the relationship between ACEs and attachment styles. Dewi (2022) emphasizes the role of emotional intelligence in reducing the negative effects of early adversities, pointing out the capacity of targeted interventions to enhance resilience in affected individuals.

In conclusion, the extensive evidence linking ACEs to insecure attachment styles and future adverse health outcomes highlight the critical need for early interventions and comprehensive support systems. As Kalmakis and Chandler (2014) suggest, a holistic framework that integrates psychological, physiological, and social dimensions is essential. This approach should not only address the long-term consequences of ACEs but also promote protective factors to effectively mitigate their impact. This is particularly crucial for adolescents, as effective intervention strategies may help reducing problematic technology use and other maladaptive behaviors by addressing the underlying emotional regulation and attachment challenges stemming from early adversity.

Materials and Methods

This narrative review was conducted through a systematic search of peer-reviewed literature in PubMed, APA PsycNet, and ScienceDirect. The search focused on the interaction between attachment styles, adverse childhood experiences (ACEs), and problematic technology behaviors (PTBs) in adolescents aged 12–18 years, with particular attention to gender differences. Studies were identified using relevant keywords and selected based on the following inclusion criteria: articles published in English, full-text availability,

publication within the last 20 years, and a focus on adolescent populations. Empirical research, including both quantitative and qualitative studies, as well as systematic reviews, were considered. Research on adult populations or non-psychological aspects of technology use was excluded. The selected studies were analyzed thematically to identify key trends, risk factors, and protective factors influencing PTBs, with a focus on the moderating role of gender and the impact of emotion regulation difficulties.

Results

Problematic Technological Behaviors (PTBs)

PTBs refer to the excessive and maladaptive use of technology that disrupts proper psychosocial functioning. Specifically, the literature identifies various PTBs, including problematic Internet use (PIU), problematic social media use, gaming disorder, binge-watching, and cyberbullying. These behaviors are often characterized by excessive involvement in online platforms, resulting in impaired daily functioning, mental health, and social relationships. Research indicates that addictive use of social media and online gaming can present symptoms resembling those of psychiatric disorders, including anxiety and depression, suggesting a complex interaction between these behaviors and mental health

outcomes (Andreassen et al., 2016; González-Bueso et al., 2018). In this context, Saladino et al. (2024b) provide a crucial perspective by linking problematic social media use to emotional regulation deficits. They argue that individuals with difficulties in managing emotional responses are more prone to engage maladaptive digital behaviors, particularly when online activities serve as a compensatory mechanism for unfulfilled psychological needs. Specifically, the study identifies fear of missing out (FoMO) as a pivotal factor that amplifies the risk of developing dependency on social media platforms (Ibid).

Online gaming disorder is characterized by a loss of control over gaming activities, leading to significant impairment in personal, social, and academic functioning. Symptoms of this disorder may include neglect of personal responsibilities, social withdrawal, and adverse physical health effects such as sleep disturbances and poor nutrition (Columb et al., 2022). The prevalence of online gaming disorder has been associated to various psychological factors, including underlying mental health issues such as anxiety and depression, which can both contribute to and result from excessive gaming behaviors (Andreassen et al., 2016; González-Bueso et al., 2018). In addition, the recognition of Gaming Disorder as a diagnosable mental disorder by the World Health Organization (WHO) in the 11th revision

sion of the International Classification of Diseases (ICD-11) in 2018, and the inclusion of Internet Gaming Disorder (IGD) in the research appendix of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) by the American Psychiatric Association (APA) in 2013, highlights the growing concerns regarding problematic gaming behaviors.

Furthermore, cyberbullying, an offense derived from problematic Internet use, involves the use of digital platforms to harass, threaten, or humiliate individuals who cannot easily defend themselves. Although similar to traditional bullying, cyberbullying has its own psychological characteristics. A key difference is that physical bullying occurs in settings such as schools and ceases when the victim is away from the bullies, whereas in cyberbullying the victim can potentially be reached anywhere, anytime via the Internet, increasing feelings of insecurity and vulnerability (Sourander et al., 2010). Studies have shown that victims of cyberbullying often experience heightened emotional sensitivity and psychological distress, which can negatively affect their performance in various areas, including work and education. Normalizing such behaviors through repeated exposure can perpetuate a cycle of victimization and aggression, further complicating social dynamics within online environments (Barlett et al., 2017).

Binge-watching refers to the consumption of multiple episodes of television series or video content in a single sitting. The design features of streaming platforms often encourage binge-watching by automatically playing back subsequent episodes, which can exacerbate the compulsive nature of this behavior (Flayelle et al., 2020; Saladino et al., 2024a). Research indicates that excessive binge-watching can have a negative impact on psychological well-being, particularly among adolescents, who may struggle to maintain a balance between online and offline life (George & Odgers, 2015). In addition, binge-watching has been linked to symptoms of anxiety and depression, especially when used as a coping method to manage stress and negative emotions. Individuals who watch TV series continuously, often find themselves trapped in a vicious cycle of addiction similar to other behavioral addictions, with a tendency to spend more time watching TV series than initially planned (Panda & Pandey, 2017).

In conclusion, problematic Internet and social media use, which includes cyberbullying, binge-watching, and online gaming disorder, presents significant challenges to mental health and social functioning, especially among young people. For this reason, researchers and professionals should understand these behaviors through a clinical lens

to develop effective strategies of prevention and treatment.

Attachment theory and ACEs as precursors of PTBs in adolescents

Contemporary research has shown a significant correlation between insecure attachment styles, characterized by anxiety or avoidance, and the development of maladaptive behaviors related to the use of digital technologies. Lancaster et al. (2019) demonstrated how avoidant attachment significantly increases vulnerability to negative outcomes in technology-mediated relationships, affecting the link between cyber abuse and the quality of interpersonal connections. This correlation is manifested through specific behavioral patterns, including excessive social media use, compulsive gaming, and various forms of dysfunctional online behaviors.

Adverse childhood experiences emerge as a crucial vulnerability factor in exacerbating these behavioral patterns. These vulnerabilities result in an increased propensity to develop behavioral addictions and difficulties in technology-mediated interpersonal relationships. Eichenberg et al. (2024) highlighted how anxious attachment, marked by fear of rejection, can lead to problematic Internet and social media use, aimed at seeking emotional validation.

Social media platforms have also been identified as potential triggers for problematic behaviors. The nature of these platforms, often encouraging continuous engagement through notifications and algorithm-driven content, can lead to addictive patterns of use. Research has indicated that short-form video watching, a prevalent activity among adolescents, can be particularly addictive due to features like auto-scrolling and personalized content delivery (Yang et al., 2024). These mechanisms contribute to a cycle of reinforcement that can intensify problematic usage patterns.

An in-depth analysis of problematic technological behaviors has revealed specific mechanisms through which insecure attachment contributes to the development of gaming disorder. These mechanisms include using gaming as a strategy to avoid confronting negative emotions, pursuing immediate gratification, and efforts to establish a sense of competence and control within the virtual environment. Individuals with insecure or avoidant attachment styles, as documented by Lim et al. (2019), often tend to refuge in gaming as a strategy to avoid emotional intimacy, using immersion in gaming as a mechanism to dissociate from painful emotional experiences and perceived threatening interpersonal relationships.

These patterns of avoidance highlight how insecure attachment contributes to the vulnerability of adolescents in developing gaming disorders, compounding the challenges already posed by their developmental stage.

The phenomenon of cyberbullying also emerges as a particularly complex manifestation of the interplay between insecure attachment and problematic technological behaviors. Mishna et al. (2020) pointed out that this behavior is perceived by young people primarily as a relational issue, rooted in attachment dynamics and emotional regulation difficulties. Adolescents with anxious or avoidant attachment styles show greater difficulties in establishing empathic relationships, increasing their vulnerability as both perpetrators and victims of cyberbullying. These individuals tend to exhibit higher online aggression, use cyberbullying as a maladaptive strategy to manage feelings of inadequacy, anger, and frustration.

Additionally, binge-watching emerges as another problematic behavior that is significantly influenced by attachment styles. Estévez et al. (2017) conducted extensive studies showing that adolescents with insecure attachment tend to use maladaptive coping strategies, increasing their risk of developing compulsive digital content viewing behaviors. This tendency manifests itself through specific patterns of media consumption, charac-

terized by prolonged viewing sessions, difficulty controlling time spent in front of the screen, and using compulsive viewing as an avoidance strategy for negative emotions. Research has identified specific mechanisms through which insecure attachment contributes to the development of binge-watching, including the tendency to use media content as a form of emotional self-medication and as a substitute for meaningful interpersonal relationships.

Research on protective factors has provided valuable insights into mechanisms that promote resilience and mitigate the impact of adverse experiences. Reflective functioning has emerged as a significant protective resource. Borelli et al. (2014) demonstrated that enhanced reflective functioning can buffer the negative effects of adverse childhood experiences (ACEs) and insecure attachment on problematic behaviors. This mechanism operates by fostering mentalization, a capacity that enables individuals to develop a nuanced understanding of their own mental states and those of others, thus supporting emotional and relational stability. Secure interpersonal relationships also play a crucial role in promoting adaptive outcomes. For instance, Murphy et al. (2017) highlighted the importance of secure peer relationships in reducing aggressive behaviors and enhancing emotional regulation. These positive interac-

tions contribute to the development of effective coping strategies, offering a foundation for long-term psychological well-being.

Furthermore, evidence underscores the role of secure attachment to caregivers as a key protective factor. Studies have shown a negative correlation between secure parental attachment and the emergence of problematic behaviors, such as video game addiction, suggesting that a secure attachment bond can act as a safeguard against maladaptive outcomes (Estévez et al., 2017). However, it is important to point out that some research argues that the relationship between ACEs, insecure attachment styles, and PTBs is particularly complex and nonlinear. Widom et al. (2018) conducted extensive research highlighting that not all adverse experiences necessarily lead to negative outcomes, emphasizing the protective role of adaptive coping strategies and a supportive social environment. These findings suggest the importance of considering specific moderating factors and mediators to understand the relationship between early traumatic experiences and the development of problematic technological behaviors. Understanding these complex interactions is critical to the development of effective interventions. Lim et al. (2019) have emphasized the importance of therapeutic and educational programs aimed at promoting emotional regulation and enhancing indi-

vidual and social resources. These interventions must necessarily consider the multifactorial nature of problematic technology behaviors, integrating approaches that address both attachment-related vulnerabilities and the consequences of early traumatic experiences.

The literature thus highlights how insecure attachment styles and adverse childhood experiences represent significant risk factors for the development of problematic technology behaviors, operating through specific mechanisms that include difficulties in emotional regulation, dysfunctional relational patterns, and maladaptive coping strategies. (Grady et al., 2018). However, the identification of protective factors and the development of targeted interventions offer promising prospects for preventing and treating these behaviors. This in-depth understanding of the underlying dynamics of PTBS suggests the importance of integrated approaches that consider the complexity of interactions between risk factors and protective resources in the context of problematic use of digital technologies.

Gender differences in PTBs

The scientific literature suggests that gender differences in technology use are more complex than commonly believed and reflect not only sociocultural influences, but they are also deeper psychological and relational dynamics. Although girls are often described as more likely to use social media to maintain relationships and seek social approval, evidence suggests that boys may also be influenced by similar dynamics, though they manifest these in different ways. For example, girls tend to use social media as a means of social confrontation, a behavior associated with depressive symptoms (Nesi & Prinstein, 2015); boys, although less prone to direct confrontation, may also use humor or aloof attitudes to cope with insecurities, reflecting gender norms that discourage vulnerability. However, gender identity is not limited to the traditional binary categories. Transgender and non-binary adolescents also display specific patterns of technology use influenced by their unique social experiences. Research indicates that transgender and non-binary adolescents face heightened risks associated with digital interactions, particularly due to experiences of social rejection, discrimination, and victimization (McInroy et al., 2019; Selkie et al., 2020). These challenges contribute to an increased likelihood of using technology as a coping mechanism, often leading to problematic behaviors such as excessive

social media use or online gaming (Kaltiala et al., 2023). Such gender differences in technology use are closely related to socialization processes. Gender socialization, which shapes roles and expectations from childhood onward, encourages children to exhibit strength and control, repressing emotions such as sadness or vulnerability. This often leads to externalization of distress, expressed through aggressive or competitive behaviors, which may manifest in online games or competition on social media (Maschi et al., 2008). Girls, on the other hand, tend to internalize distress, developing problems such as anxiety, low self-esteem and depression. For transgender and non-binary adolescents, socialization pressures can be particularly complex. Many experience difficulties in finding safe spaces for self-expression, and digital platforms often serve as both a refuge and a source of stress. While social media can offer a sense of community and validation, it also exposes them to heightened risks of cyberbullying and online harassment, which negatively impact their mental health (Taliaferro et al., 2018). Moreover, attachment insecurity—more common in transgender and non-binary youth due to familial rejection—has been linked to greater vulnerability to problematic technology use (Kaltiala et al., 2023). This vulnerability is amplified by social media dynamics, where the pressure to conform to aesthetic and relational standards can intensify

personal insecurities and make adolescent girls more susceptible to a phenomenon such as cyberbullying (Marciano et al., 2020). Although often victims of online aggression, girls may also resort to relational forms of aggression, such as indirect cyberbullying, to manage personal conflicts or respond to social pressures. This cycle of victimization and perpetration reflects a complex interplay between emotional vulnerabilities and problematic coping strategies. Similarly, transgender and non-binary adolescents report significantly higher rates of online victimization compared to their cisgender peers, further exacerbating mental health challenges (Arcelus et al., 2016; Amendola et al., 2020). However, digital platforms also provide opportunities for resilience. Peer support, particularly through online communities, has been identified as a key protective factor that mitigates the effects of discrimination and psychological distress (Schimmel and Bristow et al., 2018). Regardless, gender differences in technological behaviors are not rigid or universal but they vary based on cultural and social factors. For example, while boys are often drawn to online games for reasons related to competition and intense sensation seeking, girls may participate in online games for reasons of socialization, challenging the stereotype that gaming is a male prerogative (Micallef et al., 2021; López-Fernández et al.,

2019). Similarly, social media, although primarily used by girls to maintain relationships, can also be a means of exploring and affirming their identities, sometimes leading to problematic usage (Savcı et al., 2019). For transgender and non-binary adolescents, video games may serve as a tool for escapism, assisting them in navigating gender dysphoria and external stressors. However, they also face risks such as exclusion from gaming communities or exposure to gender-based harassment (Cho et al., 2013). In this context, insecure attachment styles emerge as a cross-cutting factor influencing problematic technology use in both sexes. For adolescents, online gaming can serve as a coping strategy for unmet emotional needs, providing a sense of control and an escape from distress. For girls, social media becomes a tool for coping with social anxiety, but overuse of these platforms often proves counterproductive, contributing to increased mental health issues such as anxiety and depression (Shek & Yu, 2016; Estévez et al., 2017). In transgender and non-binary youth, the intersection of insecure attachment and digital behavior is particularly evident. Many turn to social media and online platforms to seek validation and connection in ways that their offline environments may not provide. While this can foster resilience and community-building, excessive reliance on digital spaces

can also lead to social isolation and difficulties in forming real-world relationships (Rimes et al., 2017). The link between personal insecurities, social pressure and problem behaviors is particularly evident in adolescents with insecure attachment styles, who use social networks to navigate complex interpersonal dynamics. The connection between intensive use of digital platforms and negative experiences such as cyberbullying underscores the need for targeted interventions. Adolescent girls who experience or perpetrate acts of online aggression often report significant emotional symptoms, highlighting the urgency of promoting greater awareness of the risks of cyberbullying and encouraging the healthier use of technologies (D'Arienzo et al., 2019). Similarly, interventions aimed at transgender and non-binary adolescents should focus on fostering digital literacy, resilience, and supportive online spaces while minimizing the risks of cyberbullying and digital harassment. Parent training programs and awareness campaigns can enhance family acceptance, thereby reducing attachment insecurity and lowering the likelihood of problematic technology use (Meanley et al., 2021). Creating safe digital environments and educational strategies tailored to non-binary and transgender adolescents can promote healthier interactions with technology while supporting mental well-being (Giordano et al., 2021).

Discussion

This narrative review offers insights into the complex relationships between attachment styles, adverse childhood experiences (ACEs), gender differences, and technological problem behaviors (PTBs) among adolescents. The literature reviewed underscores that PTBs do not occur in isolation but rather arise from a dynamic interplay of psychological, relational, and contextual factors. Specifically, difficulties in emotional regulation and maladaptive coping strategies, insecure attachment patterns and peer relationships, as well as broader sociocultural influences - such as gender norms and exposure to adverse childhood experiences - collectively shape the emergence and manifestation of problematic technological behaviors. Insecure attachment styles emerge as significant predictors in the development of PTBs. Adolescents with anxious attachment tend to use social media compulsively, often to seek emotional validation and alleviate feelings of insecurity. Studies have clearly shown how obsessive monitoring of online interactions and emotional dependence on others' responses are typical manifestations of these individuals. On the other hand, avoidant attachment is associated with problematic gaming, where immersive gaming is used as a strategy to avoid intimacy and dissociate from

difficult emotional experiences. ACEs represent another key determinant of PTBs. Their influence operates through complex mechanisms, including alterations in emotional regulation and difficulties in building functional interpersonal relationships. However, the relationship between ACEs and PTBs is neither linear nor deterministic. As pointed out by Widom et al. (2018), protective factors such as social support and mentalization skills can significantly mitigate the impact of adverse experiences. Borelli et al. (2014) demonstrated that increased mental reflective capacity contributes to emotional and relational stability, reducing the risk of problematic behaviors. One particularly significant finding concerns the role of gender differences as moderators in PTBs. Girls are more vulnerable to dysfunctional use of social media, often driven by social comparison and the desire to maintain relationships. This exposes them to a higher risk of developing internalizing symptoms, such as anxiety and depression (Nesi & Prinstein, 2015; López-Fernández et al., 2019). Boys, on the other hand, show a greater predisposition toward problematic gaming, using it as a tool to cope with distress or seek intense experiences (Micallef et al., 2021). Binge-watching also exhibits differentiated dynamics: girls predominantly use it as a strategy to manage negative emotions, while boys perceive it to escape from

external pressures (Estévez et al., 2017). Finally, cyberbullying reflects specific gender dynamics, with girls often involved in relational forms of aggression and boys prone to display more direct aggression (Marciano et al., 2020).

The risk of cyberbullying itself can be influenced by gendered behaviors. For example, girls may be more susceptible to relational aggression online, such as exclusion or spreading rumors, due to social expectations surrounding female behavior. Boys, conversely, may experience more direct forms of aggression, such as threatening messages or physical intimidation, as their behavior is often shaped by societal norms that emphasize competition and dominance. Additionally, individuals who identify as transgender, non-binary, or gender non-conforming may face unique risks on digital spaces, often stemming from societal rejection or discrimination based on their gender identity. These individuals might experience both relational and direct forms of aggression, which can be compounded by prejudice and lack of understanding regarding gender diversity. These gendered and identity-based patterns of behavior underscore the importance of considering a broader range of gender experiences when addressing vulnerability to cyberbullying and its impact on digital interactions.

Implications for Clinical Practice and Future Directions

Preventive and therapeutic interventions should consider an integrated approach, simultaneously assessing the influence of attachment styles, ACEs, and gender differences.

Attachment theory provides a solid foundation for developing clinical programs focused on emotional regulation and relational resilience. Furthermore, the implementation of school programs aimed at promoting digital awareness and reducing problematic technology use could provide an important preventive tool.

From a research perspective, a crucial step will be to investigate the causal dynamics underlying these interactions through longitudinal studies exploring the evolution of PTBs over time and the effectiveness of targeted interventions. Particular attention must be paid to assessing cultural and contextual influences, as well as to understanding how social norms and specific environments affect the relationship between risk factors and problematic behaviors.

Author Contribution: M.S. conceived and wrote the article; V.V. supervised the final draft.

Funding: The article did not receive funding for publication.

Data Availability Statement: The data are stored privately and have not been made public.

Conflicts of Interest: There are no conflicts of interest to declare.

Citation: Sechi, M., Verrastro, V. (2025). Attachment Styles, Adverse Childhood Experiences and Gender Differences in Adolescents' Problematic Technological Behaviors: A Narrative Review. *Synapsis Journal*, 1(1). 1-17.

<https://doi.org/10.69127/synapsis.2025.01.01>

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