Relationship Between Attachment Anxiety and Attachment Avoidance, Mentalization Ability, and Various Digital Addictions: A Cross-Sectional Study Among University Students

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Abstract

Background: The increasing prevalence of digital media has led to a rise in behavioral addictions, such as smartphone and social media addiction. Previous research suggests that insecure attachment styles (attachment anxiety and attachment avoidance) play a role in the development of these addictions. However, the significance of mentalization ability, the capacity to recognize and interpret one's own and others' mental states, has not yet been thoroughly explored.

Objective: This study examines the relationship between attachment anxiety, attachment avoidance, mentalization ability, and digital addictions among students in Germany and Austria. Specifically, it analyzes whether mentalization ability moderates the relationship between attachment insecurities and digital addictions.

Methods: A cross-sectional study was conducted with N = 324 students from Germany and Austria. Participants completed questionnaires assessing their attachment style (ECR-RD), mentalization ability (MZQ-6), and forms of digital addiction (smartphone, social media). Multiple regression analyses were used to explore the relationships between these variables

Results: The results show that attachment anxiety is a significant predictor of digital addiction, particularly social media addiction. Attachment avoidance also showed significant, albeit weaker, associations. Mentalization ability was found to moderate the relationship between attachment avoidance and social media addiction, indicating a complex interaction.

Conclusions: This study enhances the understanding of digital addictions by highlighting the role of mentalization ability. The findings underscore the importance of considering both attachment styles and mentalization skills in prevention and treatment strategies. Future research should explore therapies that integrate attachment and mentalization-based approaches to treat digital addictions in a more targeted way.

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Relationship Between Attachment Anxiety and Attachment Avoidance, Mentalization Ability, and Various Digital Addictions: A Cross-Sectional Study Among University Students

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Abstract

Background

The increasing prevalence of digital media has led to a rise in behavioral addictions, such as smartphone and social media addiction. Previous research suggests that insecure attachment styles (attachment anxiety and attachment avoidance) play a role in the development of these addictions. However, the significance of mentalization ability, the capacity to recognize and interpret one's own and others' mental states, has not yet been thoroughly explored.

Research Question

This study examines the relationship between attachment anxiety, attachment avoidance, mentalization ability, and digital addictions among students in Germany and Austria. Specifically, it analyzes whether mentalization ability moderates the relationship between attachment insecurities and digital addictions.

Methods

A cross-sectional study was conducted with N = 324 students from Germany and Austria. Participants completed questionnaires assessing their attachment style (ECR-RD), mentalization ability (MZQ-6), and forms of digital addiction (smartphone, social media). Multiple regression analyses were used to explore the relationships between these variables.

Results

The results show that attachment anxiety is a significant predictor of digital addiction, particularly social media addiction. Attachment avoidance also showed significant, albeit weaker, associations. Mentalization ability was found to moderate the relationship between attachment avoidance and social media addiction, indicating a complex interaction.

Discussion

This study enhances the understanding of digital addictions by highlighting the role of mentalization ability. The findings underscore the importance of considering both attachment styles and mentalization skills in prevention and treatment strategies. Future research should explore therapies that integrate attachment and mentalization-based approaches to treat digital addictions in a more targeted way.

Keywords: digital addiction, attachment, mentalization ability, social media addiction, smartphone addiction

Introduction

The Rise of Digital Media and Its Problematic Impact on Daily Life

The pervasive integration of digital media into everyday life has not only transformed social and communication practices but has also raised significant concerns about its mental impact. The intensive use of digital media has led to the emergence of behavioral addictions, such as social media and smartphone addictions (Gonçalves, Nardi & King, 2023; Small et al., 2020). These conditions are increasingly recognized as substantial psychological disorders (Bottel et al., 2023; Zubair, Khan

& Albashari, 2023). While the study of addictive behaviors related to social media and smartphones is still relatively nascent, clinical understanding of these newer digital addictions remains limited, and they have yet to be officially classified as distinct clinical entities in major diagnostic systems like the DSM V or ICD-11 (Eichenberg & Schneider, 2023).

Prevalence of Digital Addictions Among Young Adults

The prevalence rates of digital addictions increase with rising usage. A recent meta-analysis included 495 articles with 504 studies covering 2,123,762 individuals from 64 countries. Global pooled prevalence estimates were 26.99% (95% CI, 22.73-31.73) for smartphone addiction and 17.42% (95% CI, 12.42-23.89) for social media addiction, making these the digital addictions with the highest prevalence. In contrast, cybersex addiction and gaming addiction had lower prevalence rates, with 8.23% (95% CI, 5.75-11.66) and 6.04% (95% CI, 4.80-7.57), respectively. An increasing trend of digital addiction has been observed over the past two decades, which dramatically worsened during the COVID-19 pandemic (Meng et al., 2022).

Young adults, who spend a significant portion of their time online for both leisure and academic purposes, are particularly vulnerable to digital addictions (Kuss et al., 2021; Nazari, Hosseinnia & Torkian, 2023; Okasha et al., 2021; Wacks & Weinstein, 2021). Smartphone addiction is rising among young adults, with Jeong and Lee (2015) noting an annual increase. Prevalence rates vary due to different tools and cultural contexts (Alotaibi et al., 2022; Tangmunkongvorakul et al., 2020; Zhong et al., 2022). A meta-analysis found the highest rates in China, Saudi Arabia, and Malaysia, and the lowest in Switzerland, Germany, and France (Olson et al., 2020). For young adults, studies report rates from 36.8% in Nepal (Karki et al., 2020) to 64.7% in India (Shakya et al., 2023), with lower rates in Serbia (21.7%; Nikolic et al., 2023) and Austria (15.1%; Eichenberg, Schott & Schroiff, 2021).

Social media addiction also shows significant variation across different populations. Salari et al. (2023) reported that, after analyzing 51 studies with a combined sample size of 35,520 students, the pooled global prevalence of social network addiction among university students was 18.4% (95% CI: 14.7–22.6%). The highest prevalence was observed in studies conducted in Asia, at 22.8% (95% CI: 18.5–27.6%).

The increasing prevalence of digital addictions, particularly among young adults, is also being linked to a range of comorbidities, including mental health disorders and behavioral issues.

Mental Health Comorbidities Linked to Digital Addictions in Young Adults

The rise of digital addictions, especially among young adults, highlights the need to understand their associated comorbidities, which are significant in this demographic. These addictions are closely linked to mental health issues like depression, mood disorders, and impulsivity, particularly in young males, and contribute to sleep disturbances and aggressiveness (Gao et al., 2020; Diotaiuti et al., 2022; Marin et al., 2020). Smartphone addiction, common among university students, is associated with anxiety, depression, stress, and in severe cases, suicidal thoughts (Zhong et al., 2022; Boumosleh & Jaalouk, 2017; Sohn et al., 2019; Okasha et al., 2021). It also correlates with reduced gray matter volume in the brain, raising concerns about its impact (Horvath et al., 2020). Social media addiction is prevalent and linked to depression, anxiety, and substance use, with personality traits like loneliness increasing susceptibility (Alfaya et al., 2023; Szczygieł & Podwalski, 2020; Esfahani et al., 2019). These comorbidities underscore the need for targeted research into the correlations and interventions for young adults.

Attachment Theory and Its Implications for Digital Media Addiction

The smartphone, as initially described, has evolved into a steadfast companion for many, providing users with support, security, and comfort, often acting as a substitute for real relationships by functioning as a pseudo-attachment object (Strittmatter et al., 2015). This relationship between users and their smartphones is marked by trust and continuous engagement, with proximity to the device being linked to stress management (Carolus et al., 2018). The smartphone's portability, personal nature, and tactile satisfaction allow it to serve as a kind of "adult pacifier" (Melumad & Pham,

2020). Given these characteristics, it seems plausible that attachment theory, along with the attachment styles derived from it, could help explain the emergence of digital media addiction. Indeed, previous research has established that insecure attachment styles are associated with non-substance-related dependencies (Estévez et al., 2017). A systematic review of 32 studies published between 2000 and 2018 found that insecure attachment styles (both anxious and avoidant) are significantly linked to increased social media addiction, as individuals often turn to these platforms to compensate for the lack of affection from family and peers (D'Arienzo, Boursier & Griffiths, 2019). An insecure attachment style may thus represent a particular vulnerability, predisposing individuals not only to mental disorders in general but also specifically to digital addictions (Eichenberg, Schott & Schroiff, 2021; Eichenberg & Schneider, 2023). These insights suggest that addressing addiction through the lens of attachment theory could potentially lead to more effective outcomes in therapeutic treatment (Coffey, 2018).

Attachment theory, developed by Bowlby (1969) and Ainsworth & Bell (1970), is a foundational concept in developmental psychology, describing the emotional bonds formed between children and their caregivers. These early relationships lead to the development of different attachment types, which reflect the need for closeness and security—needs that are evolutionarily ingrained and serve both survival and emotional stability (Ehrenthal et al., 2009). The attachment systems established in childhood influence the formation of internal working models, which serve as prototypes for later relationships (De Sanctis & Mesurado, 2022). While attachment styles formed in childhood tend to remain relatively stable, they can be modified by later experiences (Ehrenthal et al., 2009).

Insecure attachment styles, such as insecure-ambivalent, insecure-avoidant, and insecure-disorganized, are associated with an increased risk of addictive social media-related behaviors. Individuals with an insecure-ambivalent attachment style often use the anonymity of social media to create a new self-representation, compensating for their acceptance issues (Eichenberg & Schneider, 2023). This group frequently exhibits hyperactivation of the attachment system during stressful situations, reflecting a heightened need for closeness and social support, which simultaneously impairs their ability to mentalize (Nolte et al., 2011). Insecurely attached individuals often cite anonymity and social support as key motives for their excessive social media use, which is linked to increased risks of suicidality, low self-esteem, emotion regulation problems, and social challenges (Miniati et al., 2017). Additionally, there is a clear association between insecure attachment styles, social anxiety, and problematic social media use (Schuhler et al., 2009).

The influence of insecure attachment styles is also evident in smartphone usage. Studies indicate that problematic smartphone use is positively correlated with insecure attachment styles (Eichenberg, Schrott & Schroiff, 2019). For instance, attachment anxiety in university students is associated with smartphone addiction, often mediated by feelings of loneliness and depression (Kim, Cho, Kim, 2017). Similarly, avoidant attachment in students can lead to low self-esteem and anxiety, contributing to smartphone addiction (Kim & Koh, 2018). Conversely, strong attachment to parents and peers can mitigate problematic smartphone use and improve attitudes toward online communication in adolescents by fostering self-efficacy and prosocial thinking (López-Mora et al., 2021). Young adults with higher attachment anxiety are more likely to use their smartphones as attachment objects, which increases the risk of problematic smartphone use (Parent, Bond & Shapka, 2021).

In the context of social media, insecure attachment styles, particularly attachment anxiety and avoidance, are significantly associated with social networking site addiction, as individuals often use these platforms to compensate for missing affection from family and peers (D'Arienzo, Boursier & Griffiths, 2019; Liu & Ma, 2019; Chen, 2019). Attachment anxiety increases the risk of addiction by fulfilling needs for relatedness and self-presentation, while attachment avoidance satisfies needs for autonomy (Chen, 2019). Poor emotion regulation further heightens this susceptibility (Liu & Ma, 2019). Anxious attachment is especially linked to social media addiction, driven by a need to belong, low self-esteem, and the pursuit of romantic relationships (Stănculescu & Griffiths, 2021). These

findings highlight the importance of attachment theory in understanding social media addiction.

In summary, the attachment style developed in childhood has a lasting influence on behavior in the digital realm, shaping interactions throughout life (D'Arienzo, Boursier & Griffiths, 2019). The relationship between attachment styles and digital addictions underscores the importance of incorporating these aspects into therapeutic approaches to effectively address problematic behaviors.

Mentalizing Ability: Its Potential Influence on Digital Addictions

In relation to attachment style, the psychological concept of mentalizing ability is also of great significance. Mentalizing ability refers to the capacity to recognize and respond to the cognitive and emotional states of oneself and others. This ability, acquired in childhood, influences later relationships and is strongly dependent on the quality of early attachment experiences (Schwarzer et al., 2022; Fonagy et al., 1991; Fonagy & Allison, 2014). Attachment style is closely linked to mentalizing ability, as a secure attachment fosters the development of a strong capacity to recognize and respond to one's own and others' emotional states (Fonagy et al., 2002). Impaired mentalizing ability can contribute to the development of mental disorders. Particularly relevant is "robust mentalizing," which is associated with a secure attachment style and enables better adaptation to stressful situations (Mikulincer & Shaver, 2007). Intensive media consumption in children can impair the development of this ability (van Loh, 2023).

Since mentalizing ability is profoundly shaped by early attachment experiences, it plays a crucial role in shaping later interpersonal relationships and could also play a significant role in the development of digital addictions (van Loh, 2023). Mentalizing processes involve key brain regions, such as the medial prefrontal cortex, the precuneus, and the right temporoparietal junction, which undergo early specialization during childhood and adolescence (Fehlbaum et al., 2021). These processes also involve the mirror neuron system, perspective-taking, and the unique ability to represent mental states of oneself and others, facilitating the communication of ideas (Frith & Frith, 2006). Findings show that the aforementioned brain areas also play a role in the development of addiction, including digital addictions and particularly smartphone addiction (Goldstein & Volkow, 2011; Dong et al., 2020; Schmitgen et al., 2020; Ding et al., 2024).

Thus, impaired mentalizing ability can contribute not only to the development of mental disorders but also to the risk of problematic digital behavior. Therefore, it makes sense to include mentalizing ability as a complementary concept in the analysis of digital addictions.

Based on previous research that has demonstrated a connection between insecure attachment styles and various psychological disorders as well as substance and behavioral addictions (Dozier, Stovall-McClough, & Albus, 2008; Mikulincer & Shaver, 2017; Schindler, 2019), this study examines how attachment anxiety, attachment avoidance, and mentalization abilities are related to digital addictions. While the links between insecure attachment and digital addictions have been explored, the role of mentalization abilities has not yet been thoroughly considered. Research suggests that mentalization abilities—defined as the capacity to understand one's own and others' mental states—are closely linked to attachment styles. Individuals with insecure attachment often exhibit impaired mentalization abilities, as their early attachment experiences may have hindered the development of a stable and coherent sense of self and others (Fonagy et al., 1991,2002; Fonagy & Allison, 2014).

Given the known relationships, it is plausible that poor mentalization abilities could exacerbate the impact of insecure attachment on digital addictions. The following hypotheses and research questions guide this study:

1. **Relationship between insecure attachment and digital addiction**: It is expected that higher levels of attachment anxiety and avoidance are associated with a greater propensity for smartphone and social media addiction. These digital addictions were chosen due to their high prevalence (Meng et al., 2022).
2. **Influence of mentalization abilities and attachment patterns on digital addiction**: It is hypothesized that poorer mentalization abilities will strengthen the relationship between insecure attachment and digital addiction. Students with digital addictions are expected to

exhibit significantly lower mentalization abilities and higher levels of attachment anxiety and avoidance compared to non-addicted students. These impaired mentalization abilities may lead to difficulties in understanding and managing interpersonal relationships, causing individuals to increasingly rely on digital platforms as a coping mechanism.

3. **Comparison of attachment patterns and addiction types**: The study investigates whether students with multiple digital addictions are more likely to exhibit specific attachment patterns characterized by high attachment anxiety and/or avoidance, compared to their non-addicted peers, and whether there are differences in mentalization ability, attachment anxiety, and attachment avoidance between individuals with a single digital addiction and those with multiple digital addictions.

Methodology

Study Design

The present study was designed as a cross-sectional study to analyze the relationship between attachment anxiety and avoidance, mentalization skills, and digital addictions in students. The cross-sectional design allowed for a comprehensive assessment of the prevalence of digital media addictions and the associated psychological constructs, specifically attachment-related insecurities and mentalization abilities, within the target group at a specific point in time.

Sample Recruitment

Participants were recruited from the student body of the Sigmund Freud Private University in Linz, Vienna (Austria), and Berlin (Germany). University students were chosen due to their high prevalence rates of digital media usage and addiction, making them a particularly relevant and accessible population for this study. A multi-channel recruitment strategy was used to maximize reach and participation:

- **E-mail distribution list:** An invitation to participate in the study was sent out via the university e-mail distribution list in order to reach a broad base of students.
- **Flyers:** Flyers with information about the study and a QR code for direct access to the online questionnaire were distributed at the university locations.
- **Presentations in courses:** The study was presented in various lectures and seminars in order to increase interest and willingness to participate.
- **On-site recruitment:** In addition, participants were approached directly at the university locations to send a personal invitation to participate.

The data collection took place between December 2023 and March 2024. The study was conducted as an online survey using the platform SoSci Survey (https://www.soscisurvey.de/). Potential participants were informed about the voluntary nature of their participation, the anonymity of their responses, and the option to withdraw from the study at any time without giving reasons.

Ethics Approval

This study was approved by the Ethics Commission of the Faculty of Psychotherapy Science and the Faculty of Psychology at Sigmund Freud University Vienna (Check digit: YCWYLY3XBVXKX290500).

Survey Instruments

The following survey instruments were used to ensure a comprehensive understanding of the phenomena investigated:

1. **Socio-demographic data:** A specially developed sociodemographic query collected basic information such as age, gender, relationship status and stage of study in order to characterize the sample and identify possible demographic influences on the study results.
2. **Usage behavior:** Questions on digital media usage behavior were asked in order to obtain a detailed picture of the participants' digital habits. This included the frequency and intensity of use of various internet platforms as well as the underlying motives for use.

Questionnaires:

- **Mentalization Questionnaire - Short Scale** (MZQ-6; Riedl et al., 2022) was utilized to assess participants' mentalization ability, which refers to the capacity to understand and interpret one's own and others' mental states. The MZQ-6 is a concise, 6-item version of the original 15-item Mentalization Questionnaire (Hausberg et al., 2012). The six items are rated on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). A higher sum score (ranging from 6 to 30) indicates poorer mentalization ability.

  The MZQ-6 has been validated in a German-speaking cohort and demonstrates good internal consistency (ω = 0.88). The discriminatory power of the items is acceptable, with values ranging between 0.34 and 0.64. These psychometric properties confirm the MZQ-6 as a reliable and valid tool for assessing mentalization ability (Riedl et al., 2022).
- **Experiences in Close Relationships - Revised** (ECR-RD; Ehrenthal et al., 2009) was used to assess the attachment styles of participants. This 36-item self-report questionnaire, specifically adapted for German contexts, measures the dimensions of "attachment anxiety" and "attachment avoidance" using a 7-point Likert scale. Participants rate each item from 1 ("strongly disagree") to 7 ("strongly agree"). The ECR-RD advises respondents to reflect on their general relationship experiences rather than focusing on a specific current relationship, making it applicable even for individuals who have not yet had romantic relationship experiences. The psychometric properties of the ECR-RD are strong, with Cronbach's α values of 0.91 for attachment anxiety and 0.92 for attachment avoidance, indicating high reliability (Ehrenthal et al., 2009).
- **Smartphone Addiction Scale** (SPAS; Bian & Leung, 2014) assesses five key symptoms: ignoring harmful consequences, excessive preoccupation with smartphone use, inability to control the urge to use, loss of productivity, and anxiety. The questionnaire consists of 19 items, each rated on a five-point Likert scale, and includes three inventories: the Mobile Phone Problematic Use Scale (MPPUS), the Internet Addiction Test, and the Television Addiction Scale, with the option to use the inventories separately depending on the focus (Bian & Leung, 2014). For this study, only the eight items directly assessing problematic smartphone use were utilized, as the focus was solely on distinguishing participants with and without problematic smartphone use. Consequently, items related to internet or television addiction were excluded, resulting in a total score ranging from zero to eight points, with a cut-off score of five.

  Regarding psychometric properties, the authors report an internal consistency of Cronbach's α = .70, indicating acceptable reliability. The SPAS provides a focused measure for assessing primary symptoms of problematic smartphone use, making it a suitable tool for this research context (Bian & Leung, 2014).
- **Bergen Social Media Addiction Scale** (BSMAS; Andreassen et al., 2016) was used in this study to diagnose social media addiction and helps categorize usage behavior as either dependent or non-dependent. This scale is based on six diagnostic criteria commonly used in measurement instruments (Monacis et al., 2017): mood modification through social media use, salience, withdrawal symptoms when access to social networks is restricted, relapse after abstinence, tolerance development, as well as interpersonal and intrapsychic conflicts arising from pathological use. All items of the BSMAS refer to individual experiences with social media use within a 12-month period. The BSMAS is a self-report questionnaire consisting of six items, each rated on a five-point Likert scale from 1 ("Never") to 5 ("Very often"). The total score ranges from 6 to 30, with higher scores indicating a greater degree of social

media addiction. A cut-off score of 19 suggests a higher likelihood of addiction.
The internal consistency of the BSMAS, as indicated by Cronbach's α = .88, is considered good, supporting the scale's reliability in assessing social media addiction (Andreassen et al., 2016).

Sample Characteristics

The study included 324 students from the Sigmund Freud Private University, ranging in age from 18 to 72 years (*M* = 25.27, *SD* = 7.03). Of the participants, 259 identified themselves as female (79.9%), *n* = 56 as male (17.3%), and *n* = 9 as diverse (2.8%). The average time spent online for leisure was 160.61 minutes per day (*SD* = 91.50), while the average time spent online for work or university was 126.75 minutes per day (*SD* = 105.58). Overall, students spent an average of approximately 4.79 hours per day online.

Regarding the stage of study, 59.9% (*n* = 194) of the participants were enrolled in a Bachelor's program, 38.9% (*n* = 126) were in a Master's program, and 1.2% (*n* = 4) were pursuing a doctoral degree. In terms of geographic distribution, 11.4% (*n* = 37) of the students were studying in Germany, while the remaining 88.6% (*n* = 287) were studying in Austria.

In terms of relationship status, 33.3% (*n* = 108) of the participants reported being single without a partner, 57.4% (*n* = 186) were in a relationship, 6.2% (*n* = 20) were married, 0.3% (*n* = 1) were widowed, and 1.2% (*n* = 4) chose "Other" as their relationship status.

Data Analysis

The data analysis proceeded in several steps to examine the relationships between attachment anxiety, attachment avoidance, mentalizing ability, and digital addictions (social media, smartphone addiction). Data preprocessing included the removal of missing values, outlier checks, and ensuring normal distribution, with only complete data sets used in the final analysis, resulting in full data sets.

Statistical Evaluation

Following data preparation, a descriptive statistical analysis was conducted to gain a basic understanding of the sample characteristics and distribution of the main variables. This included measures of central tendency (mean) and variability (standard deviation), as well as the creation of frequency distributions for categorical variables. For the inferential statistical analysis, bivariate Pearson correlations were first calculated between the main variables to gain initial insights into possible correlations.

Multiple regression analyses were then conducted to investigate the influence of attachment anxiety, attachment avoidance, and mentalization skills on the various forms of digital addiction. Potential confounding variables, such as age and gender, were included in the models as control variables. To explore whether mentalization ability acts as a moderator between attachment styles and digital addictions, interaction terms were included in the regression models and analyzed using multiple regression analyses.

Additionally, ANOVAs were performed to examine gender-specific differences in digital addictions, attachment styles, and mentalization skills. Group comparisons using t-tests for independent samples were conducted to assess differences between various groups, including individuals with single versus multiple digital addictions, as well as those with only one specific addiction (e.g., smartphone addiction) compared to those with additional addictions. Mann-Whitney U-tests were employed when the data did not meet the assumptions of normality.

All statistical analyses were performed using SPSS (IBM, version 29.0.0.0). The selection of specific tests and models was based on the characteristics of the data and the specific research questions.

Results

Usage Behavior, Motives and Addiction Prevalence

Usage behaviour of digital media in the sample reveals that WhatsApp is the most frequently used application, with 71.6% of participants reporting that they use the platform "very often." Instagram follows with 44.8% regular usage, while YouTube is "very often" used by 21.9% of respondents. Platforms like TikTok, Snapchat, and Pinterest are used less frequently, with X (formerly Twitter) being the least utilized platform, as 84.0% of respondents indicated they "never" use it.

Regarding daily online time during leisure, 53.4% of respondents reported spending between 120 and 240 minutes online, while 41.7% spend less than 60 minutes online daily for work or study. On average, participants spend a total of about five hours online daily, with approximately 160 minutes dedicated to leisure activities and 125 minutes to work or study.

The main motives for internet use include entertainment (59.3% "strongly agree") and interaction and communication (64.5%). A passive use of social media platforms is preferred by 44.8% of respondents, while only 4.6% actively engage. This suggests a predominantly consumptive behavior, with relatively low active participation in social networks. These findings provide important insights into the preferences and habits of internet usage within the sample.

Attachment Anxiety and Attachment Avoidance:

For attachment avoidance, the mean score was 2.43 (*SD* = .10), with a range from 1.00 to 6.28. For attachment anxiety, the mean score was 2.77 (*SD* = 1.21), with scores ranging from 1.00 to 6.39. These results place the sample within the normative range, as the normative sample had mean scores of 2.92 (*SD* = 1.19) for avoidance and 3.56 (*SD* = 1.12) for anxiety (Ehrenthal et al., 2009).

Mentalization Ability:

The sample had a mean score of 15.56 (*SD* = 4.88), with scores ranging from 6.00 to 29.00. Compared to a normative sample with a mean score of 13.2 (*SD* = 4.66), the present sample scored slightly higher, indicating poorer mentalization abilities, as higher scores reflect worse performance in this area (Riedl et al., 2022).

Smartphone Addiction:

The mean score for smartphone addiction was 3.20 (*SD* = 1.97). Within the sample, 13.6% (*n* = 44) were identified as dependent smartphone users, while 86.1% (*n* = 279) were categorized as non-dependent.

Social Media Addiction:

The mean score for social media addiction was 13.80 (*SD* = 5.02). The analysis identified 17.6% (*n* = 57) of participants as having an addictive use of social media, with the remaining 82.1% (*n* = 266) classified as non-addictive users.

Attachment Style and Digital Addictions

The results showed that higher scores in attachment anxiety and avoidance were associated with an increased risk of digital addiction. In particular, attachment anxiety showed a strong positive correlation with social media addiction ($r = .46$, $p < .001$) and smartphone addiction ($r = .34$, $p < .001$). Avoidance of attachment also correlated positively with digital addictions, albeit to a lesser extent (smartphone addiction: $r = .14$, $p < .05$ and social media addiction: $r = .24$, $p < .001$).

Mentalization Ability and Digital Addictions

A lower ability to mentalize correlates positively with the digital addictions investigated, meaning that as mentalization ability decreases, the severity of digital addictions increases. Significant negative correlations were found with smartphone addiction ($r = .29$, $p < .001$) and social media addiction ($r = .39$, $p < .001$).

Gender-specific Differences

There were gender-specific differences in relation to smartphone addiction, $F(2, 320) = 5.10$, $p = .007$, and social media addiction, $F(2, 320) = 13.41$, $p < .001$. Women had higher scores in both

addiction categories than men, while diverse persons did not significantly differ from male or female participants in either category.

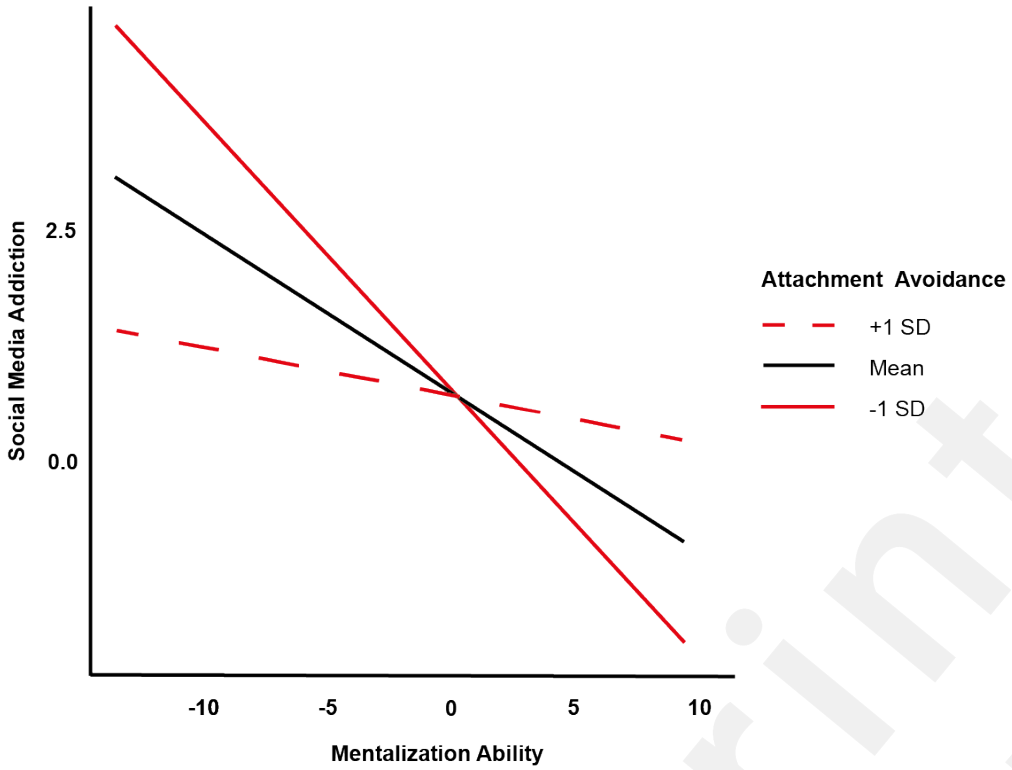
Regression Analyses

In the study presented here, two separate regression analyses were conducted to examine the relationship between attachment anxiety, attachment avoidance, mentalization ability, and various forms of digital addiction. The results are presented in detail below.

With regard to **social media addiction**, the regression analysis revealed significant main effects for gender (β = -1.74, p < .001), age (β = -.12, p = .002), attachment anxiety (β = 1.50, p < .001), and mentalization ability (β = -.18, p = .002). The significant interaction effect between mentalization ability and attachment avoidance (β = .12, p = .031) shows that although social media addiction generally decreases with increasing mentalization ability, this decrease is flatter in people with high attachment avoidance compared to people with lower attachment avoidance (see Figure 1). This indicates a differentiated relationship between these variables, with mentalization ability having a less pronounced mitigating effect on social media addiction with greater attachment avoidance. The interaction between mentalization ability and attachment anxiety (β = .01, p = .773) was not significant. The regression model was statistically significant overall (F(7, 315) = 20.343, p < .001, R^2 *adjusted* = .297).

In the regression analysis for **smartphone addiction**, gender (β = -.53, p = .012), age (β = -.06, p < .001), and attachment anxiety (β = .43, p < .001) proved to be significant predictors. Mentalizing ability showed no significant influence (β = -.04, p = .076). A trend emerged in the interaction between mentalization ability and attachment avoidance (β = .04, p = .066), suggesting that higher mentalization ability in combination with attachment avoidance could potentially influence the risk of smartphone addiction, although this effect was not statistically significant. The interaction between mentalizing ability and attachment anxiety (β = -.02, p = .436) was also not significant. The overall model was statistically significant (F(7, 315) = 11.504, p < .001, R^2 *adjusted* = .188).

Figure 1. Interaction Between Mentalization Ability and Attachment Avoidance in Predicting Social Media Addiction



Note. The solid black line represents the predicted social media addiction scores at the mean level of attachment avoidance. The solid red line represents predicted social media addiction scores at one standard deviation below the mean of attachment avoidance (low attachment avoidance), while the dashed red line represents predicted social media addiction scores at one standard deviation above the mean of attachment avoidance (high attachment avoidance). The x-axis represents mentalization ability, with higher scores indicating greater mentalization ability. The y-axis represents the predicted social media addiction scores. The interaction suggests that for individuals with low attachment avoidance, an increase in mentalization ability is associated with a sharper decrease in social media addiction. In contrast, for individuals with high attachment avoidance, mentalization ability has a less pronounced effect on reducing social media addiction.

Consistent patterns emerged in the regression analyses conducted to investigate the relationship between attachment characteristics, mentalization skills, and digital addictions. Significant predictors for both forms of digital addictions—smartphone addiction and social media addiction—included gender, age, and attachment anxiety, with mentalization ability being particularly significant for social media addiction. An interesting finding was the significant interaction effect between mentalization ability and attachment avoidance in social media addiction, indicating a complex dynamic between these variables. A similar trend in the interaction between mentalizing ability and attachment avoidance was observed for smartphone addiction, although this was not statistically significant. Overall, the results confirm the importance of attachment characteristics and mentalization skills in the context of digital addictions and emphasize the need to consider these factors in preventive and therapeutic approaches.

Discussion

This study investigated the relationship between attachment anxiety, attachment avoidance, mentalization ability, and digital addictions (smartphone and social media addiction). The prevalence of addiction in the present sample was 13.6% for smartphone addiction and 17.6% for social media addiction. Compared to global prevalence estimates reported by Meng et al. (2022)—which found 26.99% for smartphone addiction and 17.42% for social media addiction—the prevalence of smartphone addiction in this sample was lower. However, the prevalence of social media addiction was within the range of global estimates and largely consistent with findings from other studies.

The observed usage behaviors within the sample—such as the high frequency of WhatsApp and Instagram use and the significant daily online time—highlight the pervasive role of digital media in the participants' lives.

The results indicate that attachment anxiety is a strong predictor of digital addictions, particularly

with respect to social media addiction. These findings are consistent with previous research, which also identified a significant link between anxious attachment styles and problematic social media use (Chen et al., 2019; Santoro et al., 2024). A possible explanation for this could be that individuals with high attachment anxiety increasingly seek affection and closeness in online interactions, which elevates their risk for digital addictions (Kim & Koh, 2018).

Attachment avoidance was also found to be associated with digital addictions, although the effect sizes were smaller. This aligns with research by Field et al. (2017), who identified attachment avoidance as a relevant predictor of social media addiction. The findings of this study suggest that individuals with high attachment avoidance might use social media to feel connected without actively engaging in social interactions (Blackwell et al., 2017). However, the literature remains divided on the role of attachment avoidance in the development of digital addictions, highlighting the need for further research (Oldmeadow et al., 2013; Eroglu, 2015).

A significant relationship between poorer mentalization ability and digital addiction was particularly evident for social media addiction. This corroborates previous findings suggesting that a lower ability to mentalize may contribute to the use of digital media as a strategy for emotion regulation (Santoro et al., 2024). Interestingly, mentalization ability also serves as a moderator in the relationship between attachment avoidance and social media addiction, indicating that the capacity to mentalize might influence the propensity to use social media as a means of regulating emotions (Santoro et al., 2024).

Regarding gender differences, the study found that women are at a higher risk for smartphone and social media addiction, which is consistent with existing studies reporting higher prevalence rates of problematic social media use among women (Santoro et al., 2024). However, no gender differences were found concerning attachment anxiety and attachment avoidance, which contrasts with previous studies that identified higher levels of attachment anxiety among women and higher attachment security among men (Santoro et al., 2024). A potential explanation for these discrepancies could be the small sample size and gender distribution in the present study.

In conclusion, the findings of this study underscore the importance of attachment anxiety, attachment avoidance, and mentalization ability as relevant factors in the development of digital addictions. The role of mentalization ability as a moderator in these relationships particularly highlights the need to consider these factors in preventive and therapeutic approaches. Further research is needed to explore the complex interactions between attachment behavior, mentalization ability, and digital addictions.

Limitations

While this study provides valuable insights into the relationship between attachment anxiety, attachment avoidance, mentalization ability, and digital addictions among university students, several limitations must be acknowledged. First, the cross-sectional design of the study limits the ability to infer causality between the variables. Although significant associations were found, the directionality of these relationships cannot be conclusively determined, and it remains unclear whether attachment and mentalization issues lead to digital addictions or if these addictions exacerbate attachment and mentalization difficulties.

Second, the study relies on self-reported data, which is susceptible to biases such as social desirability and recall bias. Participants may have underreported or overreported their digital addiction levels or attachment-related behaviors, potentially affecting the accuracy of the findings.

Third, the sample is relatively homogenous, consisting predominantly of psychology students from a specific university in Austria and Germany. This limits the generalizability of the findings to other populations, particularly those from different cultural backgrounds or academic disciplines. The overrepresentation of female participants further constrains the applicability of the results across genders.

Moreover, the study does not account for other potential confounding variables, such as personality traits or existing mental health conditions, which could influence the relationships examined.

Finally, the study's focus on only two forms of digital addiction (smartphone and social media

addiction) may overlook other relevant digital behaviors or addictions, such as gaming or online gambling, which could also be linked to attachment and mentalization issues. Future research should aim to address these limitations by employing longitudinal designs, diversifying sample populations, and exploring additional digital behaviors and psychological factors.

Outlook and Implications

The findings of this study highlight the intricate relationships between attachment styles, mentalization ability, and digital addictions, underscoring the importance of these psychological constructs in understanding and addressing problematic digital behaviors. As digital media continues to permeate daily life, especially among younger populations, it is crucial to consider these factors in both preventative measures and therapeutic interventions. Future research should focus on longitudinal studies to explore the causal pathways between attachment insecurity, mentalization deficits, and digital addiction. Such studies could provide more definitive insights into how these relationships develop over time and inform the creation of targeted interventions.

The implications of this research extend beyond academia, offering practical guidance for mental health professionals, educators, and policymakers. Integrating attachment-focused therapy and mentalization-based interventions could enhance treatment outcomes for individuals struggling with digital addictions. Moreover, educational programs aimed at improving mentalization skills and fostering secure attachment relationships from an early age could serve as preventative strategies, reducing the risk of developing digital addictions later in life.

Conclusion

This study has provided important insights into the complex interplay between attachment anxiety, attachment avoidance, mentalization ability, and forms of digital addictions among university students. The findings suggest that attachment anxiety is a strong predictor of digital addictions, particularly social media addiction, while attachment avoidance shows a more nuanced relationship with these behaviors. Additionally, the study highlights the significant role of mentalization ability, particularly in moderating the relationship between attachment avoidance and social media addiction, suggesting that those with better mentalization skills may be better equipped to manage their digital media use.

Furthermore, the distinction between single and multiple addictions revealed that individuals with multiple digital addictions exhibit significantly higher levels of attachment anxiety, emphasizing the need for more targeted interventions for this group. The absence of differences in mentalization ability and attachment avoidance between single and multiple addictions suggests that these factors may influence digital addictions in more context-dependent ways, further underscoring the complexity of these relationships.

These results underscore the necessity of considering psychological factors such as attachment styles and mentalization abilities in understanding the development and persistence of digital addictions. They also point to the potential benefits of incorporating these factors into therapeutic interventions aimed at addressing problematic digital behaviors. However, the study's limitations, including its cross-sectional design, reliance on self-reported data, and the homogeneity of the sample, indicate the need for further research to confirm and extend these findings.

Conflicts of Interest

According to JMIR Publications, a conflict of interest is any relationship, financial or otherwise, that could be perceived to affect the impartiality or integrity of the research presented. In this study, no competing financial or personal interests exist that could have influenced the research. All authors declare no conflicts of interest in relation to this work.

Individual Contributions:

- *Laura Antonia Jasper*: Developed the study design with Christiane Eichenberg, conducted the literature review, set up the online survey and test battery, performed statistical analyses, and drafted the manuscript.
- *Henrik Bischoff*: Verified statistical analyses, finalized the manuscript, and prepared figures.
- *Christiane Eichenberg*: Supervised the study, reviewed, and critically revised the manuscript.

Abbreviations

- ECR-RD: Experiences in Close Relationships—Revised (Attachment Style Assessment)
- MZQ-6: Mentalization Questionnaire Short Scale
- SPAS: Smartphone Addiction Scale
- BSMAS: Bergen Social Media Addiction Scale

Data Availability

The data sets generated during and/or analyzed in the current study are available from the corresponding author on request. All data provided will be anonymized to maintain participant confidentiality in compliance with the ethics approval guidelines.

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Supplementary Files

Figures

The solid black line represents the predicted social media addiction scores at the mean level of attachment avoidance. The solid red line represents predicted social media addiction scores at one standard deviation below the mean of attachment avoidance (low attachment avoidance), while the dashed red line represents predicted social media addiction scores at one standard deviation above the mean of attachment avoidance (high attachment avoidance). The x-axis represents mentalization ability, with higher scores indicating greater mentalization ability. The y-axis represents the predicted social media addiction scores. The interaction suggests that for individuals with low attachment avoidance, an increase in mentalization ability is associated with a sharper decrease in social media addiction. In contrast, for individuals with high attachment avoidance, mentalization ability has a less pronounced effect on reducing social media addiction.