Exploring the impact of social networking usage on attachment styles and mental health: A study among college students in Vietnam

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Abstract This study aimed to explore how attachment styles, fear of missing out symptoms, social networking usage, social connectedness, and time spent on social networking relate to each other. This study involved 310 randomly selected college students in Vietnam between March and April 2023. Participants completed an online questionnaire, providing demographic information and responses from three scales: The Fear of Missing Out Scale (FOMOs), Experiences in Close Relationships - Revised - General Short Form (ECR-R-GRF), The Social Connectedness Scale, and The Social Networking Time Use Scale (SONTUS). The research sought to examine how attachment style, fear of missing out, social networking time use, social connection, and time spent on social networking interact. The study found that (a) fear of missing out significantly and positively influences attachment styles, (b) time spent on social networking sites positively impacts attachment style, and (c) social networking time use affects attachment style by serving as a mediator through fear of missing out. Additionally, the time individuals spend on social networking platforms influences the relationship between fear of missing out and attachment styles. This study contributes to the understanding of how social network usage affects mental health, clarifies social network attachment demand theory, and offers guidance for families, schools, and psychological organizations to promote social integration and well-being among students.

Keywords: social networking usage, attachment styles, fear of missing out, college students

1. Introduction

The construct of attachment, as introduced by Bowlby (1969), provides a foundational framework for understanding the formation of emotional bonds between newborns and their primary caregivers, as well as the manifestation of these bonds in later interpersonal interactions (Ainsworth et al., 2015; Bowlby, 1969). The initial bond between infants and caregivers is crucial, as it may contribute to the development of an internal working model that influences the child’s cognitive and behavioral patterns, subsequently affecting future relationships (Weimer et al., 2004). These bonds extend beyond romantic and social relationships to encompass various facets of attachment throughout one’s life (Cho et al., 2015; Grinstein & Nisan, 2009; Kleine et al., 1995; Shin & Park, 2014).

Brennan et al. (1998) delineated two primary styles of attachment: avoidance and anxiety. Avoidant attachment characterizes individuals’ general perceptions of others, ranging from positive to negative, while attachment anxiety relates to individuals' self-perceptions, also on a continuum from positive to negative. Those with an avoidant attachment style tend to demonstrate self-reliance, a reluctance to depend on others, distrust in partners, and a preference for emotional and cognitive distance in relationships (Brennan et al., 1998; Collins & Read, 1990; Hazan, 1990). Avoidantly attached individuals often display a pronounced desire for independence and autonomy, eschewing close relationships and exhibiting skepticism toward the trustworthiness and reliability of relationship partners (Brennan et al., 1998). Conversely, attachment anxiety encompasses concerns over partner availability and fears of rejection (Brennan et al., 1998; Hazan, 1990), with anxiously attached individuals frequently doubting their worthiness of love and affection (Mikulincer & Shaver, 2013). They are keenly attuned to their environment, searching for clear indications of their partner’s commitment while remaining highly responsive to ambiguous cues (Collins, 1996). Moreover, these individuals may engage in heightened efforts to manage their self-presentation, adjust their behaviors to strengthen social ties and seek affirmation through adherence to societal expectations and support networks (Mikulincer & Shaver, 2013).
Przybylski et al. (2013) reported that the concept of fear of missing out (FOMO) emerged as a relatively recent development. FOMO is a psychological condition characterized by an intense desire to maintain social connections and an all-encompassing worry that others may have enjoyable experiences during one’s absence (Przybylski et al., 2013). Zhang et al. (2020) described FOMO as a feeling of anxiety experienced by individuals when they are denied access to valuable experiences. Regardless of the context, experiences have the potential to either reinforce or weaken an individual’s self-perception, thus posing a risk to their psychological well-being. The FOMO relates to the concern that one will miss out on opportunities being seized by others. Self-compassion arises when individuals engage in self-comparisons and are unable to interact with peers or obtain essential information, both in person and via digital platforms (Alt, 2015; Hayran & Anik, 2021; Hayran et al., 2020; Riordan et al., 2015). Furthermore, several empirical studies have established a correlation between feelings of loneliness and FOMO among individuals who extensively use social media platforms (Alt, 2015; Barry & Wong, 2020; Blackwell et al., 2017; Van Huynh et al., 2022).

A growing body of research suggests a complex relationship between social networking usage and mental health outcomes. Twenge and Campbell (2018) highlighted an association between increased screen time, including social networking site usage, and heightened levels of anxiety and depression among adolescents. However, the directionality of this relationship remains a subject of debate, with some researchers proposing that individuals with pre-existing mental health concerns may be more inclined to extensive social media use as a form of escapism (Primack et al., 2017). Although potential negative impacts of SNSS on mental health have been documented, these platforms also offer avenues for enhancing social connectedness, which can have protective effects on mental health. Manago et al. (2012) found that young adults use social media for social bonding and to maintain existing relationships, which can increase their sense of belonging and well-being. Nonetheless, the quality of online interactions and their authenticity play critical roles in determining whether social media usage enhances or diminishes feelings of social connectedness (Lee & Pisto, 2015).

This study aims to explore the interrelationships among attachment styles, the FOMO, time spent on social networking, social connectedness, and the extent of engagement in social networking activities, with a particular focus on their implications for mental health and the role of digital networking. It seeks to identify effective strategies to enhance digital social connections and promote mental well-being. Accordingly, the research posits the following question: How does the behaviour of using social networks influence our mental health and attachment?

2. Literature Review

The relationship between individuals’ attachment styles and fear of missing out (FOMO) was highlighted in recent research (D’Arienzo et al., 2019; Holte, 2020). FOMO, defined by Boustead and Flack (2021) and Holte (2020), refers to the psychological urge of individuals to establish social connections with their peers through the use of social media. Current research has investigated the phenomenon of FOMO within the framework of attachment theory (Boustead & Flack, 2021; Holte, 2020). According to Boustead and Flack (2021), those who are more likely to experience FOMO were prone to bonding insecurity, which arises from emotions of relational deficit or autonomy threats. This finding establishes a clear connection between FOMO and the vulnerability of attachment patterns. Specifically, FOMO is strongly correlated with anxious and avoidant attachment patterns, wherein individuals belonging to these categories frequently resort to social media platforms to replace or enhance their genuine connections with loved ones and acquaintances (Boustead & Flack, 2021). According to Blackwell et al. (2017), there was a strong association between FOMO and anxious attachment styles, as opposed to avoidant attachment styles. Furthermore, individuals belonging to this particular group tend to exploit technology as a means of alleviating distress (Blackwell et al., 2017). According to Holte (2020), the findings of the study suggested that those who harbor concerns over the potential loss of significant relationships may encounter elevated levels of FOMO. These data establish a correlation between FOMO and attachment insecurity, highlighting the strong association between these two characteristics (Holte, 2020). According to Parent et al. (2021), FOMO could serve as a distinct component of parallel bonding motivation, independent of attachment insecurity. Moreover, the interplay between FOMO and secure attachment styles offered a complex picture. Securely attached individuals, characterized by comfort with intimacy and independence, might be less vulnerable to the adverse effects of FOMO due to their positive view of self and others and their generally lower levels of social media engagement for validation purposes (Beyens et al., 2016). These findings demonstrate that mental health significantly influences attachment styles.

Hypothesis 1: FOMO influences attachment styles.
Hypothesis 2: Social connectedness influences attachment styles.

Recent research has yielded significant findings regarding the correlation between the duration of social media usage and attachment theory, with a specific focus on platforms like Facebook. Previous studies have explored the relationship between social skills and Facebook behavior (Oldmeadow et al., 2013). Individuals with secure attachment styles tend to view Facebook as a valuable tool for maintaining and enriching social connections. They utilize the platform’s ability to establish and expand meaningful interactive support networks (Chen, 2019). Conversely, individuals with anxious attachment styles use Facebook as a means to seek validation and reassurance through likes and comments, thus addressing unmet emotional needs (Feeney & Collins, 2019).
Similarly, those with avoidant attachment styles adopt a more cautious approach to Facebook usage, prioritizing the maintenance of superficial connections and avoiding deep emotional interactions (Chang, 2019; Lin, 2015). Individuals with insecure attachment styles often turn to social media platforms to fulfill their emotional connection needs. Anxious individuals frequently seek online feedback to alleviate their concerns, while avoidant individuals find comfort in browsing others’ profiles, thus avoiding direct engagement in intimate interactions (Oldmeadow et al., 2013). This observation emphasizes the complex interplay between online behavior and individual attachment orientations in understanding the relationship between social media usage duration and attachment theory.

Hypothesis 3: Social networking time influences attachment styles.

Within the framework of the contemporary digital era, the correlation between the duration of social media usage and the phenomenon known as the FOMO offers novel perspectives on the ways in which individuals actively pursue and sustain relationships with their surrounding environment (Oldmeadow et al., 2013). Previous research has primarily characterized FOMO as a persistent desire for updates, highlighting its significant correlation with social media usage frequency (Alutaybi et al., 2020; Perna, 2020; Scheinfeld & Voorhees, 2022) and problematic behaviors on social media (Akat et al., 2022; Ergin & Karataş, 2022; Shen et al., 2022). Nevertheless, a divergent viewpoint has emerged from a study conducted by Hamutoglu et al. (2020), demonstrating that regular engagement on social media does not substantially impact the occurrence of FOMO. Additionally, the findings suggest that excessive social media use, particularly in the presence of negative emotions, can lead to detrimental outcomes, such as the development of addictive tendencies. It is essential to consider concerns about being evaluated on Facebook (Oldmeadow et al., 2013).

Hypothesis 4: Social networking time use influences the FOMO.

Several studies among the Vietnamese population, focusing on social media usage duration (Alutaybi et al., 2020; Perna, 2020; Scheinfeld & Voorhees, 2022) and problematic behaviors on social media (Akat et al., 2022; Ergin & Karataş, 2022; Shen et al., 2022). Nevertheless, a divergent viewpoint has emerged from a study conducted by Hamutoglu et al. (2020), demonstrating that regular engagement on social media does not substantially impact the occurrence of FOMO. Additionally, the findings suggest that excessive social media use, particularly in the presence of negative emotions, can lead to detrimental outcomes, such as the development of addictive tendencies. It is essential to consider concerns about being evaluated on Facebook (Oldmeadow et al., 2013).

Hypothesis 5: Social networking time use influences attachment through the mediating role of FOMO.

Hypothesis 6: Time spent using social networking moderates the interaction effect and would influence FOMO and attachment styles

2. Materials and Methods

3.1. Research design

A cross-sectional correlational design was employed in our study. Participants completed online surveys, providing demographic information, informed consent, details of their social media usage patterns, attachment style, and symptoms of fear of missing out. The survey was administered in two ways: in person in the participants’ classrooms and via an online survey using Google Forms. Data collection occurred from March 28 to June 4, 2023. Prior to the survey, participants were provided with informed consent forms, and the terms of anonymity and confidentiality were thoroughly explained. Participants were informed of their rights, including the ability to withdraw from the study at any point. The survey, which included questions about the research objectives and socio-demographic information such as gender, grade, academic achievement, and social media usage, took approximately 20 minutes to complete. Participants were encouraged to contact the research team via the provided email or phone number if they required any clarification during the survey process.

Initially, with the authors’ permission, we translated the scales for use in our study. A bilingual individual, who was fluent in both English and Vietnamese, performed the translation of the English and Vietnamese versions. The research team then reviewed the content for accuracy and potential discrepancies between the original and translated versions.

3.2. Research population

The participants in this prospective study, which was conducted from March 2023 to March 2024, included 310 Vietnamese college students in Ho Chi Minh City, Hue, and other provinces in Vietnam, of which 78 were men and 232 were women. The survey was administered via an online application, specifically a Google Form created and distributed by Google, Inc. The participants, hailing from four different institutions in Vietnam, completed the surveys, resulting in a return rate of 100%. This significantly exceeded the 30% response rate typically required for analysis (Dillman, 2000).
Upon analyzing the data regarding the amount of time spent on social media, the most common responses were “more than 90 minutes” (63.2%) and “60 minutes” (15.5%). When categorized by academic year, the participants comprised of 40% freshmen, 24.5% were sophomores, 15.2% were seniors, and 10.3% were juniors. The details are shown in Table 1.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Category</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>78 (25.2)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>232 (74.8)</td>
</tr>
<tr>
<td>Academic year</td>
<td>1</td>
<td>124 (40)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>107 (24.5)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>47 (15.2)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>32 (10.3)</td>
</tr>
<tr>
<td>Major</td>
<td>Nature science</td>
<td>130 (41.9)</td>
</tr>
<tr>
<td></td>
<td>Social science</td>
<td>180 (58.1)</td>
</tr>
<tr>
<td>Cohabitant</td>
<td>Family</td>
<td>228 (73.5)</td>
</tr>
<tr>
<td></td>
<td>Friends</td>
<td>66 (17.7)</td>
</tr>
<tr>
<td></td>
<td>Alone</td>
<td>27 (8.7)</td>
</tr>
<tr>
<td>Status</td>
<td>Single</td>
<td>226 (72.9)</td>
</tr>
<tr>
<td></td>
<td>Chat up</td>
<td>17 (5.5)</td>
</tr>
<tr>
<td></td>
<td>Lover</td>
<td>67 (21.6)</td>
</tr>
<tr>
<td>Time spent using social networking</td>
<td>30 minutes</td>
<td>19 (6.1)</td>
</tr>
<tr>
<td></td>
<td>60 minutes</td>
<td>48 (15.5)</td>
</tr>
<tr>
<td></td>
<td>90 minutes</td>
<td>47 (15.2)</td>
</tr>
<tr>
<td></td>
<td>More than 90 minutes</td>
<td>196 (63.2)</td>
</tr>
<tr>
<td>Social networking apps</td>
<td>Facebook</td>
<td>183 (59)</td>
</tr>
<tr>
<td></td>
<td>Tik Tok</td>
<td>57 (18.4)</td>
</tr>
<tr>
<td></td>
<td>Youtube</td>
<td>39 (12.6)</td>
</tr>
<tr>
<td></td>
<td>Other (Instagram, Tinder, Mocha, Twitter)</td>
<td>31 (10)</td>
</tr>
</tbody>
</table>

3.3. Research instrument

3.3.1. The Experiences in Close Relationships — Revised — General Short Form (ECR-R-GSF)

The respondents rated each item on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scale scores were computed by averaging the responses to relevant items. The reliability of the Anxiety and Avoidance scales, as delineated in the Experiences in Close Relationships Revised-General Short Form (ECR-R-GSF), was assessed using Cronbach’s alpha coefficient. The Anxiety scale demonstrated high internal consistency, with a Cronbach’s alpha coefficient of 0.883, indicating strong reliability. Similarly, the Avoidance scale exhibited robust reliability, with a Cronbach’s alpha coefficient of 0.884 (Wilkinson, 2011). Furthermore, a positive correlation of 0.393 was observed between the Anxiety scale, suggesting some degree of interrelatedness between these constructs. This measure was also used for Australian university students in Hao’s (2019) study, with reliable Cronbach’s alpha (α = 0.90 for anxiety and .86 for avoidance). In Vietnam, Le (2020) showed that the original subscales of the ECR-R-GSF provided a good Cronbach’s alpha for the subscale but not for the Avoidance (α = 0.861 for anxiety and 0.643 for avoidance). Additionally, in our study, the overall scale, encompassing both anxiety and avoidance items, demonstrated excellent internal consistency, with a Cronbach’s alpha coefficient of 0.85, underscoring its reliability in assessing attachment styles within the study population.

3.3.2. Social Networking Time Use Scale (SONTUS)

The amount of time spent on social media was measured utilizing the Social Networking Time Use Scale (SONTUS), developed by Olufadi (2016), specifically for this purpose. This scale comprises 29 self-reported items designed to capture various aspects of individuals’ social media usage patterns (Olufadi, 2016). The scale encompasses five components: (1) relaxation and free periods; (2) academic-related periods; (3) public-place-related use; (4) stress-related periods; and (5) motives for use. The respondents rated their agreement with each item on an 11-point Likert scale ranging from 1 (not applicable to me during the past week) to 11 (I used it more than 3 times during the past week but spent more than 30 minutes each time). Olufadi (2016) reported high internal consistency for the SONTUS, with a Cronbach’s alpha value of 0.92, indicating strong reliability. Similarly, in the present study, the SONTUS exhibited excellent internal consistency, with a Cronbach’s alpha coefficient of 0.92.

3.3.3. Measuring Belongingness: The Social Connectedness and the Social Assurance Scales

The scale utilized in this study to assess social connectedness and belongingness is appropriately named to reflect the inverse relationship between the item content and the direction of the rating system (Lee & Robbins, 1995).
The respondents were asked to rate their agreement with each item on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree), where higher scores indicate a greater reported sense of social connectedness and belongingness. The Social Connectedness Scale yielded a mean score of 38.85 (SD = 8.09), with a potential range of 8 to 48. Lee and Robbins (1995) reported high internal consistency for the scale, with a Cronbach's alpha coefficient of 0.91. Additionally, test-retest correlations, conducted on a separate sample over a 2-week interval, yielded a coefficient of 0.96, indicating strong temporal stability (Lee & Robbins, 1995). In the present study, the Cronbach’s alpha coefficient for the Social Connectedness Scale was found to be 0.85, further confirming its reliability in measuring social connectedness among participants.

3.3.4. Fear of Missing Out Scale (FOMOs)

The Fear of Missing Out Scale (FOMOs), developed by Przybylski et al. (2013), consists of 10 items aimed at assessing individuals’ fear of missing out on social experiences. This scale has been adapted and validated for use in various cultural contexts, including Turkish (Gokler et al., 2016), Arabic (Al-Menayes, 2016), and Spanish (Gil et al., 2015). These adaptations have demonstrated the scale's cross-cultural applicability and reliability. For instance, the Arabic version of the FOMOs revealed a two-factor structure with Cronbach's alpha values of 0.82 and 0.72, while the Turkish and Spanish versions supported the original one-factor structure with Cronbach's alpha values of 0.81, 0.85, and 0.93, respectively. In the present study, the Cronbach’s alpha coefficient for the FOMOs was determined to be 0.86, indicating strong internal consistency and reliability in measuring the fear of missing out among participants.

4. Statistics

The analysis of the data involved the application of both descriptive statistics and inferential statistical techniques. The investigation began by utilizing Statistical Product and Services Solutions (SPSS), version 25.0, to perform initial descriptive statistical evaluations. Later, SmartPLS 4 software was used for sophisticated inferential analysis. The primary stage of inferential analysis entailed evaluating the data measurement model, encompassing assessments of indicator reliability, construct reliability, convergent validity, and discriminant validity, to ascertain the reliability of the constructs being measured.

After conducting an evaluation of the measurement model, the structural equation model was examined for potential multicollinearity concerns using the variance inflation factor (VIF). Additionally, the degree of model fit was evaluated using the standardized root mean square residual (SRMR). The explanatory capacity of the model was tested using the coefficient of determination ($R^2$), while the predictive relevance was evaluated by cross-validated redundancy ($Q^2$). The amplitude of the correlations among variables was determined by calculating the effect sizes ($f^2$).

To examine the study's hypotheses and investigate the impacts of mediation, we employed partial least squares structural equation modeling (PLS-SEM). We utilized 5000 bootstrap samples to validate the hypotheses and thoroughly analyzed the influence of the independent factors on the dependent variables. The extensive statistical methodology enabled a thorough analysis of the fundamental connections within the theoretical framework of the study.

4. Results

4.1. Measurement Model

4.1.1. Indicator Reliability (Outer loadings)

The loadings of all items in the initial and updated measurement models are the outer loadings. Hair et al. (2021) reported that the remaining items exhibited loading factors within the permissible range of 0.4 to 0.9 (Hair et al., 2021). Except for attachment (ECR), fear of missing out (FOMO), social connectedness (SOC), and social networking time use (SONTUS), the removal of these indicators did not result in any substantial improvement in composite reliability (CR) and average variance extracted (AVE). Following the elimination of specific items, the model conducted a reanalysis.

4.1.2. Construct Reliability and Convergent Validity (CA; CR; AVE)

The convergent validity of measurements is commonly evaluated by assessing the reliability of the concept using Cronbach’s Alpha (CA), composite reliability (CR), and average variance extracted (AVE) (Hair et al., 2011). Table 2 displays the CA, CR, and AVE values. All scales exhibited AVE values that were below 0.5. When the AVE was less than 0.5 but the confidence ratio (CR) was greater than 0.6, the convergent validity remained satisfactory (Fornell & Larcker, 1981). The findings of the study revealed that the reliability and validity were acceptable.

4.1.3. Discriminant Validity (HTMT)

Bootstrap confidence intervals are a statistical method that can be employed to assess the significance of the HTMT between 1.0 (Henseler et al., 2015) and a lower threshold value, such as 0.9 or 0.85 (Hair, 2017). Table 3 displays the HTMT ratio values, indicating that all the constructs were below the threshold of 0.85.
Table 2 Reliability and validity statistics.

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s α</th>
<th>Composite reliability (CR)</th>
<th>Composite reliability (ρ_c)</th>
<th>Average variance extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR</td>
<td>0.857</td>
<td>0.886</td>
<td>0.878</td>
<td>0.285</td>
</tr>
<tr>
<td>FOMO</td>
<td>0.864</td>
<td>0.874</td>
<td>0.888</td>
<td>0.446</td>
</tr>
<tr>
<td>SOC</td>
<td>0.859</td>
<td>0.909</td>
<td>0.897</td>
<td>0.553</td>
</tr>
<tr>
<td>SONTUS</td>
<td>0.923</td>
<td>0.927</td>
<td>0.930</td>
<td>0.319</td>
</tr>
</tbody>
</table>

**Abbreviations:** FOMO, fear of missing out; ECR, attachment; SOC, social connectedness; SONTUS, social networking time use; Time_use, time using social networking.

Table 3 Discriminant validity assessment using the HTMT criterion.

<table>
<thead>
<tr>
<th></th>
<th>ECR</th>
<th>FOMO</th>
<th>SOC</th>
<th>SONTUS</th>
<th>TIME_USE</th>
<th>TIME_USE x FOMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR</td>
<td>0.469</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOMO</td>
<td></td>
<td>0.488</td>
<td>0.728</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC</td>
<td>0.488</td>
<td>0.413</td>
<td>0.387</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIME_USE</td>
<td>0.116</td>
<td>0.072</td>
<td>0.046</td>
<td>0.263</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIME_USE x FOMO</td>
<td>0.179</td>
<td>0.050</td>
<td>0.045</td>
<td>0.053</td>
<td>0.054</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:** FOMO, fear of missing out; ECR, attachment; SOC, social connectedness; SONTUS, social networking time use; Time_use, time using social networking.

4.2. Structural Model

4.2.1. Collinearity statistics (VIFs)

The Variance Inflation Factor (VIF) should be approximately 3 or lower, indicating the absence of collinearity (Hair et al., 2019). The constructs in the investigation had VIF values below 3. Hence, the presence of collinearity among latent variables did not pose a significant issue.

4.2.2. Model fit (SRMR)

A value less than 0.09 or 0.08 is considered a good fit (Hair et al., 2018). The SRMR in this study was less than 0.09, indicating that the model was a good fit (shown in Table 4).

4.2.3. Coefficient of determination ($R^2$)

According to Hair et al. (2011), $R^2$ values of 0.75, 0.50, or 0.25 for endogenous latent variables in the structural model can be characterized as considerable, moderate, or weak, respectively (Hair et al., 2011). The $R^2$ value of 0.34 in our study indicates that FOMO and SOC independently explained 34% of the variance in ECR, as shown in Table 4.

4.2.4. Cross-validated redundancy ($Q^2$)

A positive value of $Q^2$ indicates that the PLS-SEM accurately predicts the specified endogenous variable. The current investigation demonstrated that the $Q^2$ values were greater than zero, suggesting the predictive validity of the model employed in the present study (Taylor & Geldenhuys, 2019) (as presented in Table 4).

4.2.5. The effect size ($f^2$)

According to Hair (2017), the $f^2$ values for affect sizes categorized as weak, moderate, and strong are 0.02, 0.15, and 0.35, respectively. The effect size of $f^2$ indicated a moderate impact of SONTUS on FOMO (0.176), while the impacts of SONTUS on ECR (0.11) and SOC (0.149) were small.

Table 4 Structural model estimates.

<table>
<thead>
<tr>
<th></th>
<th>R-square</th>
<th>$Q^2$predict</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR</td>
<td>0.340</td>
<td>0.164</td>
<td></td>
</tr>
<tr>
<td>FOMO</td>
<td>0.149</td>
<td>0.132</td>
<td>0.09</td>
</tr>
<tr>
<td>SOC</td>
<td>0.129</td>
<td>0.113</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:** FOMO, fear of missing out; ECR, attachment; SOC, social connectedness; SONTUS, social networking time use; Time_use, time using social networking.

4.3. Results of PLS-SEM analysis

Figure 1 and Table 5 show the final PLS model. We discovered that SONTUS, FOMO, and SOC explained 34% of the variance in the ECR.
PLS showed that 14.9% of the variance in FOMO could be explained by the regression on SONTUS, while 12.9% of the variance could be explained by the SOC.

![Figure 1 Results of structural modeling.](image)

<table>
<thead>
<tr>
<th>Relationship</th>
<th>β Coefficient</th>
<th>t value</th>
<th>95% Confidence Intervals</th>
<th>95% BC Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOMO → ECR</td>
<td>0.196</td>
<td>2.876***</td>
<td>[0.068; 0.333]</td>
<td>[0.045; 0.316]</td>
</tr>
<tr>
<td>SOC → ECR</td>
<td>0.211</td>
<td>3.038***</td>
<td>[0.070; 0.346]</td>
<td>[0.058; 0.333]</td>
</tr>
<tr>
<td>SONTUS → ECR</td>
<td>0.303</td>
<td>4.608***</td>
<td>[0.170; 0.426]</td>
<td>[0.166; 0.422]</td>
</tr>
<tr>
<td>SONTUS → FOMO</td>
<td>0.387</td>
<td>7.419***</td>
<td>[0.295; 0.501]</td>
<td>[0.268; 0.479]</td>
</tr>
<tr>
<td>SONTUS → SOC</td>
<td>0.360</td>
<td>7.182***</td>
<td>[0.270; 0.472]</td>
<td>[0.251; 0.442]</td>
</tr>
<tr>
<td>Time_use → ECR</td>
<td>-0.055</td>
<td>1.104</td>
<td>[-0.153; 0.044]</td>
<td>[-0.145; 0.052]</td>
</tr>
<tr>
<td>Time_use x FOMO → ECR</td>
<td>-0.141</td>
<td>3.283***</td>
<td>[-0.221; -0.054]</td>
<td>[-0.231; -0.065]</td>
</tr>
</tbody>
</table>

Note: ***p < 0.001

Abbreviations: FOMO, fear of missing out; ECR, attachment; SOC, social connectedness; SONTUS, social networking time use; Time_use, time using social networking.
In our investigation, we explored the direct relationships among key latent variables.

The analysis revealed that the inclination toward FOMO significantly and positively influenced ECR ($\beta = 0.196$, $t = 2.876$, $p < 0.001$). SOC significantly and positively influenced ECR ($\beta = 0.21$, $t = 3.038$, $p < 0.001$). SONTUS had a significant and positive effect on ECR ($\beta = 0.303$, $t = 4.608$, $p < 0.001$). SONTUS had a significant and positive effect on FOMO ($\beta = 0.387$, $t = 7.419$, $p < 0.001$). Thus, our analysis confirms the validity of hypothesis 1, 2, 3, and 4.

To comprehensively examine the dynamics within our model, we conducted moderation analyses. The time spent using social networks moderated the interaction effect, which was significant and negative between FOMO and ECR ($\beta = -0.141; t = 3.283; p < 0.001$). Thus, our analysis confirms the validity of H6.

To explore the intricate pathways among our latent variables, mediation analyses were conducted. Notably, SONTUS positively influences ECR through the mediating role of FOMO ($\beta = 0.076, p < 0.05$). Hypothesis 5 is retained based on the observed data. These mediated relationships shed light on the complex interdependencies among the studied constructs, which are presented in Table 5.

5. Discussion

The present study explored the intricate relationship between attachment styles and individuals' spending of time on social networking sites, as well as their perception of social connectedness and fear of missing out. The primary objective was to gain insight into the mediating influence of attachment style in this context.

The key findings suggest that fear of missing out (FOMO) significantly impacts attachment styles. It is suggested that increased FOMO can lead to changes in attachment patterns, similar to previous studies (Blackwell et al., 2017; D’Arienzo et al., 2019; Holte, 2020). The findings align with theoretical frameworks that consider FOMO to originate from underlying attachment-related anxieties, particularly fears of rejection or abandonment (Mikulincer & Shaver, 2013). However, it is important to acknowledge that there are still differences in the literature, likely due to variations in research methods and the different coping strategies individuals use (Liu & Ma, 2019; Przybylski et al., 2013). These results showed that attachment-based interventions have also been shown to be associated with changes in attachment patterns, providing evidence that attachment styles can indeed be influenced and modified (Huber et al., 2015).

Significantly, the study emphasized the influence of the amount of time spent on social networking sites on attachment style, thereby shedding light on the complex nature of online social activities and their psychological consequences. The impact of attachment styles on individuals' engagement with social media platforms, such as Facebook, has been noted in previous research (Chen, 2019; Oldmeadow et al., 2013). These findings suggest that different attachment orientations are associated with varied usage patterns on these platforms. Research has shown that individuals who have secure attachment styles tend to use social media to strengthen and sustain relationships through meaningful interactions. On the other hand, individuals with anxious attachment styles may seek validation, while avoidant individuals may prefer engagements that involve less emotional closeness (Chang, 2018; Lin, 2015; Marwick & boyd, 2014; Young et al., 2020).

Additionally, a clear association was found between the amount of time individuals spent on social networking platforms and the phenomenon known as FOMO. Specifically, individuals who engaged in more online activities reported experiencing elevated levels of FOMO. The relationship between elevated scores on social networking time and increased levels of FOMO has been supported by several studies (Franchina et al., 2018; Wegmann et al., 2017). However, it is important to note that there are some inconsistencies in the literature that could be attributed to individual differences in social comparison tendencies and self-esteem (Marino et al., 2018; Wegmann et al., 2021).

Furthermore, the analysis revealed a correlation between social connectivity and attachment style, indicating that those with a strong inclination for social relationships are more likely to develop secure attachment types. This finding is consistent with prior research that established a connection between insecure attachment types, such as anxious or avoidant attachment, and excessive social connections (Elphinston & Noller, 2011; Schneider et al., 2001). This highlights the crucial significance of early attachment experiences in developing an individual’s ability to establish and sustain meaningful social relationships. This emphasizes the need to examine collective dynamics within attachment theory (Bartholomew & Horowitz, 1991; Bowlby, 1969).

Additionally, the research findings indicate that active participation on social networking platforms has a positive impact on attachment by acting as a mediator through the phenomenon of FOMO. This finding is consistent with previous studies that have established a connection between FOMO and increased usage of social media, which may result in negative psychological consequences such as stress and anxiety (Appel et al., 2016; Przybylski et al., 2013).

By examining the mediating role of FOMO, this study provides novel perspectives on the psychological effects of social media usage. This study provides valuable insights into the intricate connections between the amount of time individuals spend on social networking sites, FOMO, and their attachment types. Further research is needed to understand the mechanisms that cause these associations and to consider individual variations in vulnerability to FOMO when evaluating the psychological impacts of social media usage.

5.1. Limitations

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This study had several limitations that merit attention. The data were cross-sectional, which constrained the ability to investigate the relationships between each attachment style and other variables. Future research should utilize longitudinal and experimental designs to clarify the causality of these relationships. The focus of this study was exclusively on the relationships between attachment style, fear of missing out, social connectedness, and social networking time use. Consequently, future studies are encouraged to examine each attachment style and digital behavior within the context of psychology for mental health issues. Additionally, it is recommended that students be provided with academic information about professional assistance prior to survey administration to ensure a comprehensive understanding.

5.2. Implication

This study aimed to explore the influence of attachment style on the associations among fear of missing out (FOMO), time spent on social networking sites, and social connectedness, illuminating the complex relationships between these variables. The findings have several implications for understanding and addressing individuals' interactions with social media platforms:

The study revealed a significant association between FOMO and attachment styles, indicating that increased FOMO could lead to alterations in attachment patterns. Understanding this relationship provides insight into the psychological mechanisms underlying individuals' engagement with social media and their attachment-related concerns.

The study highlighted how individuals with different attachment styles utilize social networking sites to meet their emotional needs and manage interpersonal difficulties. Recognizing these patterns can inform interventions aimed at promoting healthier online behaviors and improving social support mechanisms.

This study underscores the importance of considering individuals' varying sensitivity to FOMO when investigating the psychological effects of social media use. Addressing FOMO and attachment-related concerns in therapeutic settings may help mitigate the negative impacts of excessive social media use on mental health.

Prior to survey administration, providing students with information about professional assistance can enhance their awareness of mental health resources and support services. This proactive approach ensures comprehensive understanding and promotes students' well-being.

6. Final considerations

This research illustrates that prolonged engagement with social networks can influence relationship quality by modifying an individual's attachment style and intensifying students' fear of missing out (FOMO). This study significantly contributes to the development of a theoretical framework that elucidates the effects of social network usage patterns on mental health. The overuse of social media may amplify feelings of FOMO and diminish the inclination for real-world social interactions. Moreover, individuals with a pronounced fear of missing out often exhibit a heightened need for attachment. Social connection plays a pivotal role in determining the required level of attachment. This research offers critical insights into the theoretical underpinnings of understanding attachment demands within the realm of social networks. It assists families, educational institutions, and psychological organizations in identifying strategies to foster social integration and promote activities that enhance well-being.

Acknowledgment

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Ethical considerations

The studies involving human participants were reviewed and approved by the Declaration of Helsinki and the ethical principles of the American Psychological Association (APA) regarding research involving human participants. The participants provided their written informed consent to participate in this study.

Conflict of Interest

The authors declare that they have no competing interests.

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