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Research Article

Smartphone Attachment and Self-Regulation Mediate the Influence of Avoidant Attachment Style on Phubbing

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This study examines the nature of phubbing (i.e., smartphone snubbing) within an attachment theory perspective to empirically demonstrate both direct and indirect associations between attachment avoidance, smartphone attachment, self-regulation, and phubbing within a sample of 440 young adults. The study provides empirical evidence indicating smartphone attachment and self-regulation mediate the relationship between avoidant attachment and phubbing. Six hypotheses are posited, and a confirmatory factor analysis (CFA) controlling for age, gender, and time spent per day on smartphones was performed to test the hypothesized relationships. The CFA model was confirmed, and all six hypotheses were supported revealing the joint-mediated effect of smartphone attachment and self-regulation on the relationship between avoidant attachment style and phubbing.

1. Introduction

Nowadays, we cannot live without smartphones in our daily lives. The rate of smartphone ownership has steadily increased over the past decade such that the majority of American adults (85%) have one [1]. With portability and instant accessibility to the Internet, text messaging, and social media embedded in a single device, more and more people have become heavy smartphone users with ever greater levels of smartphone dependency. Indeed, over half of all Americans (57%) over age 18 years spend 5 hours or more per day—not including work-related use—on their phone [2]. As overuse and overdependence on smartphones have become more and more common, another problematic phenomenon known as *phubbing* (literally, "phone snubbing") has emerged, whereby people attend to their smartphones regardless of interpersonal, relational, or social context.

More precisely, phubbing refers to the act of openly ignoring the physical presence of others during face-to-face interactions by using one's smartphone instead of interpersonally engaging with them [3]. This phubbing behavior is noticeable and important to focus on as it occurs frequently at any interaction context and time (e.g., meetings, meals, and social gatherings with others). Indeed, Al-Saggaf and MacCulloch [4] found that more than half of individuals (62%) participants phub others in their daily lives. It is also important to understand phubbing behavior among young individuals as phubbing is more likely to happen among young age groups [5] as they adopt smartphones more quickly than other age groups.

Additionally, this phubbing behavior matters in that it can have negative effects on others and relationships. In order to address the influences of phubbing empirically, Knausenberger et al. [6] demonstrated that phubbees (i.e., individuals who are phubbed) tended to experience high levels of ostracism by triggering negative mood and threatening their basic human needs (e.g., belongingness, self-esteem, control, and meaningful existence). Phubbing is toxic to phubbers (i.e., people who phub others) as well as phubbees. As phubbers pay more attention to their smartphones than their conversation partners with less nonverbal communicative exchanges between them (e.g., less eye contact), phubbers also have low levels of relationship

satisfaction [7] which may in turn lead to relationship termination. Therefore, in this study, we attempt to illuminate why individuals phub others, especially among young people, as they do, although such behavior can produce detrimental effects on one's partner, interactions, and further relationships.

Previous research has examined a range of predictors and demonstrated their significance empirically in predicting phubbing behavior. Specifically, one's personality traits (e.g., neuroticism and disagreeableness), psychological factors (e.g., fear of missing out, social anxiety, and depression), and problematic smartphone use, including smartphone addiction to be significantly associated with phubbing in interpersonal relationships [7–9]. Other predictors of phubbing behavior have examined various reasons related to how people perceive, regard, and manage their interpersonal relationships across a range of social contexts that may be influenced by patterns of attachment style [10]. Indeed, some researchers [11–13] have examined phubbing within an attachment theory framework and demonstrated how phubbing may be significantly associated with attachment orientation, which is the focus of this study. More specifically, the research reported here examines the relationship between insecure—and particularly avoidant—attachment styles and phubbing.

As Keefer et al. [14] and Sun and Miller [13] have demonstrated, insecurely attached people often have a tendency to form attachments to nonhuman resources such as animals, places, and various objects of interest as a means of compensating for their unfulfilled relational security needs. Recently, among these many objects, problematic smartphone use has become more prevalent as more and more people have developed stronger and deeper attachments to their smartphones. In the United States, eight in ten people who have accidentally left their smartphone at home will go back and retrieve them [15].

What is more, almost all smartphone users (99%) feel some level of anxiety upon becoming separated from their smartphones [16], and this phenomenon, called *nomophobia* (i.e., no mobile phone phobia), in its extreme can generate significant levels of fear and trepidation. Within this literature, using Bowlby's [10] attachment theory, Konok et al. [12] examined how insecurely attached people may develop an attachment to their smartphones and demonstrated how those with an anxious attachment style are more likely to develop particularly strong attachments to their phone. However, Konok et al. did not find this effect for those with an avoidant attachment style.

According to Bandura's [17] social cognitive theory of self-regulation, people consciously control their behaviors and reactions so as to achieve their own specific goals, and more particularly, people with low self-regulation tend to have difficulty controlling their impulses, feelings, and actions. In terms of smartphone use, the role of self-regulation is especially important. Previous studies have empirically demonstrated how individuals who have difficulty regulating their emotions and behaviors (i.e., low self-regulators) tend to be at greater risk of problematic behaviors such as compulsive smartphone usage [18, 19], and this tendency may often result in phubbing [8].

Although recent studies have investigated phubbing behavior with diversity of relevant factors, scant research on the specific relationship between attachment style, self-regulation, smartphone use, and phubbing is available. Therefore, the aim of this study is to examine how avoidant attachment style, smartphone attachment, and individual self-regulation may predict phubbing behavior among young adults. To this end, a hypothesized structural equation model (SEM) was developed to test the mediating roles of smartphone attachment and self-regulation upon avoidant attachment style and phubbing.

1.1. Avoidant Attachment and Phubbing. According to attachment theory [10, 20], infants have an inborn attachment system that drives them to develop emotional and physical bonds with their primary caregivers. They develop such attachments to survive and protect themselves from possible external dangers by receiving physical and emotional resources from their parents. In this way, parents or caregivers are crucial for their children to develop attachments. Infants who receive constant support and protection from their parents develop a secure attachment, whereas infants form an insecure attachment when they experience insensitive and inconsistent responses or rejection of their needs from their caregiver. These attachment styles developed during early childhood are important in that they impact a wide range of individual outcomes such as psychological and personality traits with consequences in adulthood relationships [20–22].

As one dimension of the insecure attachment orientations, an avoidant attachment style is described as being uncomfortable with intimacy and dependence and instead preferring independence and self-reliance [23]. To be specific, avoidantly attached individuals (avoidants) feel discomfort with being engaged in close relationships, thereby keeping their emotional distance from others [22, 24, 25]. In addition, they are more likely to regard their interpersonal interactions and communication as unattractive, unrewarding, and less worthwhile experiences and thus avoid such situations when possible. On the other hand, securely attached individuals tend to perceive their relationships in more positive ways [26].

For avoidants, smartphones us may offer one of the best means for evading many such uncomfortable social interactions. That is, phubbing for avoidant individuals may provide a particularly good strategy for distancing themselves from others, escaping social interactions, and thereby reducing closeness. This may be the reason why Bröning and Wartberg [11] found a positive correlation between attachment avoidance and phubbing in long-term romantic relationships. Compared to direct face-to-face interactions that provoke negative emotions such as anxiety and discomfort, avoidant individuals may feel safer when using their smartphones so that they can avoid such offline interactions. It is therefore probable that individuals with an avoidant attachment who are reluctant to engage in direct conversations with others would be more likely to snub them.

Hypothesis 1. An avoidant attachment style is directly and positively associated with phubbing.

1.2. Smartphone Attachment. In the absence of available attachment figures, people will seek to find alternative attachments with which to meet their needs for psychological security [10, 27] because nonhuman objects may serve as a compensatory attachment when their attachment security is threatened [14, 28]. Winnicott [29] introduced the term *transitional object* to explain this phenomenon as people develop attachments to physical objects, pointing out that the inanimate objects (e.g., a doll, blanket, and toy) young children frequently use provide security and emotional stability when their caregivers are not available. In this way, such attachment targets may play significant roles in reducing children's feelings of stress and anxiety when they are separated from their parents.

Individuals with insecure attachment will often perceive these attachment objects as reliable because the sources, lacking agency, are always physically there for them [28]. Stagg and Li [30] examined the relationship between insecure attachment and the intensity of attachment to objects among children and found empirical evidence that, relative to securely attached children, the insecurely attached were more likely to develop a more intense attachment to transitional objects. Based on the theoretical and empirical evidence mentioned above, it is reasonable to expect individuals with an insecure attachment style, such as those higher in attachment avoidance, to develop stronger attachments toward nonhuman objects.

As smartphones have become one of the most prevalent, if not the most prevalent object across the world [1], it should be no surprise that many people show high degrees of psychological reliance and attachment to their smartphones [12], especially young people [31–33]. Relative to those with secure attachments, previous research has demonstrated a significant positive relationship between insecure attachments and smartphone use. For instance, in examining interpersonal relationships, Konok et al. [12] found individuals with insecure attachment styles had significantly higher levels of attachment to their smartphones, in part because their smartphones serve as a compensatory target for security and attachment.

Although numerous studies have demonstrated a direct association between anxious attachment and attachment to smartphones [12], results concerning avoidant attachment styles have been less clearly established. However, it is reasonable to expect individuals with high avoidant attachment styles to nonetheless show at least an indirect attachment to their smartphones. For example, Arpaci et al. [34] explored the relationship between attachment styles and nomophobia (i.e., fear of being detached from mobile phone connectivity) and found college students higher in avoidant attachment to be more likely to feel fear and/or anxiety when their smartphones were unavailable. As one of the significant predictors of nomophobia, Han et al. [32, 33] demonstrated a significant association between smartphone attachment and nomophobia, indicating attachment to smartphones leads to increased nomophobia. Based on these findings, we posit that

Hypothesis 2. An avoidant attachment style is positively associated with smartphone attachment.

The stronger attachment people develop to inanimate objects, the more likely they are to show problematic behaviors toward such objects, as well as feel higher levels of anxiety when they are not available [35]. Although attachment to smartphones may help relieve negative emotions and satisfy attachment needs [12], strong or overattachment to smartphones may cause negative consequences, such as problematic or addictive smartphone use. Parent et al. [36] proposed a theoretical model exploring the relationship between anxious and avoidant attachments, problematic smartphone use, and individuals' degree of attachment to their smartphones and empirically demonstrated how people with higher degree in smartphone attachment engage in more problematic smartphone use behaviors.

Based on attachment theory predictions regarding those who are insecurely attached and previous research examining the nature of attachment to transitional objects, it seems likely that smartphone attachment should lead to phubbing. In support of this notion, David and Roberts [37] demonstrated a positive relationship between social media attachment and phubbing, suggesting that as people become obsessed with engaging with social media with smartphones, they are prone to phub others leading to even greater attachment to their smartphones in cyclical relationship. We thus predict

Hypothesis 3. Smartphone attachment is positively associated with phubbing.

1.3. Self-Regulation. Generally developed in childhood, self-regulation is defined as the ability to control one's behaviors in response to impulses [38]. According to parenting theory [39] and studies examining the role of parents in the development of self-regulation [40, 41], children tend to have higher levels of self-regulation when they receive positive and healthy parenting, such as warmth and sensitive responses from their parents. On the other hand, excessive control or inconsistent parenting responses hinder the proper development of self-regulation skills in children.

According to Bowlby's [10] attachment theory and studies demonstrating the relationship between attachment styles and parenting [42], parents of securely attached children tend to have positive parenting styles such as having constant physical contact with their children, while quickly responding to their needs, and being more responsive to their children. However, when parents provide less physical touch and are inconsistent and unresponsive, children are prone to develop insecure attachments and are thus likely to be hindered in the development of healthy self-regulation. Indeed, Ching and Tak [43] provided evidence that anxious, avoidant, and fearful attachment styles are negatively correlated with self-regulation and concluded that people with secure attachments possess higher self-regulation skills along with higher impulse control. Given how anxious, avoidant, and fearful attachments are correlated with poor self-regulation and considering how previous research examining avoidant attachment styles has produced equivocal results, this study mainly focuses on avoidant attachments, and in so doing, we predict

Hypothesis 4. An avoidant attachment style is negatively associated with self-regulation.

Self-regulation has been widely studied to understand its relevance to problematic smartphone use. For example, the framework of problematic smartphone use developed by Billieux [18] shows how impulsivity associated with low levels of self-regulation can lead to problematic smartphone behaviors; thus, it is reasonable to predict people having difficulties in regulating their impulses and behaviors are likely to frequently use their smartphones, regardless of the presence of others. It follows that individuals with lower self-regulation should be prone to engaging in phubbing more often than individuals higher in self-regulation. Moreover, a recent study by Li et al. [44] examining the role of individual control in mediating the association between perceived social norms and phubbing behavior found that individuals who were good at controlling their impulses were less likely to engage in phubbing. Based on this finding, we predict the following:

Hypothesis 5. Self-regulation is negatively associated with phubbing.

1.4. The Mediating Roles of Smartphone Attachment and Self-Regulation. No research on the mediating effects of smartphone attachment and self-regulation on the association between avoidant attachment and phubbing has been examined. However, our above review of the relevant literature suggests smartphone attachment and self-regulation should mediate the relationship between avoidant attachment and phubbing. Therefore, we predict the following:

Hypothesis 6. (a) Smartphone attachment and (b) self-regulation mediate the relationship between attachment avoidance and phubbing.

Taken together, the following hypothesized model is offered to explicate the nature of phubbing by examining how smartphone attachment and self-regulation mediate the relationship between avoidant attachment and phubbing (Figure 1).

2. Method

2.1. Participants. Participants from a communication departmental research pool at a large Southeastern university in the U.S. were recruited for this study. We consider this an appropriate population for this research given how university students are heavy smartphone users with the highest smartphone dependency relative to other age groups [1]. In addition to being smartphone users, eligibility required participants to be 18 or older. The data were collected during April and May 2020.

A total of 485 people participated in this study. Of them, there were missing values in 41 cases, and 4 outliers were encountered. For further analyses of this study, these 45 cases were excluded from the data by using listwise deletion and thus became $N = 440$ sample size. The participants' age was ranged from 18 to 37 years old ($M = 19.67$, SD $= 1.57$). The sample was roughly 72% female, 75% White, 8% Asian, 7% Hispanic, 5% Black, 3% Native American, and 2% self-reporting as a combination of these ethnicities. This racial profile is consistent with the overall makeup of the university. Participants were roughly 44% first-year/freshmen, 28% second-year/sophomores, 19% third-year/juniors, and 9% fourth-year/seniors.

2.2. Procedure. Participants who satisfied the eligibility conditions were provided access to the online questionnaire administered by Qualtrics that began with consent information. Those consenting were directed to provide information concerning demographics, smartphone usage patterns, attachment style, smartphone attachment, self-regulation, and phubbing behavior. Mean scores were computed to yield the composite score, and higher scores represent greater level of each measure. The materials took approximately 15-20 minutes to complete, and participants received course credits for their participation.

2.3. Measures

2.3.1. Attachment Style. The Experiences in Close Relationship-Revised (ECR-R) scale developed by Fraley et al. [45] was used to assess individual differences in attachment style. This scale originally contains 36 items assessing insecure attachment with anxiety and avoidance subscales. For this study, only the 18-item avoidance subscale was used in the analyses. The avoidance of close relationships scale measures the extent to which individuals tend to turn away from their intimate others. The 18 items (e.g., "I prefer not to show a partner how I feel deep down" and "I find it difficult to allow myself to depend on a partner") were assessed on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree), with 12 items reverse-coded before averaging participants' responses. Higher scores on the avoidance subscale indicated higher attachment avoidance in one's interpersonal relationships ($M = 3.16$, SD $= 1.33$).

2.3.2. Smartphone Attachment. The Mobile Attachment Questionnaire (MAQ) developed by Konok et al. [12] was used to measure the degree of participants' attachment to their smartphones. This scale consisted of 15 items (e.g., "In a tense situation, I take out my phone" and "I am nervous or tense when my phone runs out of battery") scored on a 5-point Likert-type scale ranging from 1 (not at all characteristic of me) to 5 (very characteristic of me), with three items reversed coded before computing mean scores, and higher scores indicating stronger smartphone attachment ($M = 3.25$, SD $= .99$).

2.3.3. Self-Regulation. The Self-Regulation Scale (SRS) developed by Diehl et al. [46] was used to measure participants' levels of self-regulation. There is a 9-item scale (e.g., "I can concentrate on one activity for a long time, if necessary" and "If I am distracted from an activity, I don't have any problem coming back to the topic quickly") assessed using a 4-point Likert-type scale from 1 (not at all true) to 4 (exactly true), with higher scores indicating higher levels of self-regulation ($M = 2.78$, SD $= .50$).
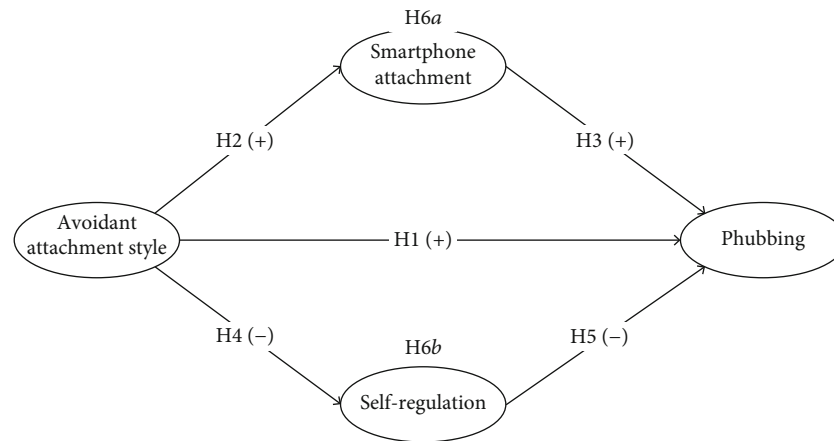
FIGURE 1: Hypothesized model of this study.

2.3.4. Phubbing. The Phubbing Scale (PS) developed by Karadağ et al. [3] was used to measure participants' phubbing behavior. This scale included 10 items (e.g., "My eyes start wandering on my phone when I'm together with others" and "People complain about me dealing with my mobile phone"), with response options assessed using a 5-point Likert-type scale, ranging from 1 (never) to 5 (always), with higher scores indicating higher levels of phubbing behavior ($M = 2.31$, SD = .63).

2.4. Statistical Analyses. The data were analyzed with SPSS 28.0 and AMOS 24.0 statistical software. Preliminary analyses confirmed normality (with absolute skewness values <2 and absolute kurtosis values <7, [47]), multicollinearity (the variance inflation factor or VIF <4, [47]), and provided descriptive and correlational statistics for all variables. Reliability and validity of each measurement were assessed with the following criteria [47, 48]: factor loading< .40, composite reliability (CR) >.70, Cronbach's alphas >.70, and the average variance extracted (AVE) >.50. To test the proposed hypothesized model examining the associations between avoidant attachment, smartphone attachment, self-regulation, and phubbing, along with the individual hypotheses, the following overall model fit indices [49] were used: CMIN/*df* <3, Comparative fit index (CFI), Tucker-Lewis index (TLI) >.90, the root mean square error of approximation (RMSEA) <.06, and the standardized root mean squared residual (SRMR) <.08. The mediation effects of this study were assessed by the bootstrapping procedure (2,000 samples) with bias-corrected 95% confidence intervals (CIs).

3. Results

3.1. Preliminary Analyses. Table 1 presents the results of descriptive and Pearson correlational analyses for all variables. As predicted, an avoidant attachment style was positively and significantly correlated with smartphone attachment ($r = .10$, $p < .05$) and phubbing ($r = .19$, $p < .01$), respectively, whereas it was negatively correlated with self-regulation ($r = -.13$, $p < .01$). In addition, phubbing was positively and significantly correlated with smartphone attachment ($r = .34$, $p < .01$) and

negatively correlated with self-regulation ($r = -.20$, $p < .01$). Of note, gender was significantly correlated with smartphone attachment, self-regulation, and phubbing, and age was negatively and significantly related to smartphone attachment. Time spent on smartphones per day was significantly associated with smartphone attachment and phubbing. These variables were thus included as covariates in further analyses (see Table 1).

3.2. Proposed Model Test. Confirmatory factor analysis (CFA) was performed to test the hypothesized model examining associations between avoidant attachment style, smartphone attachment, self-regulation, and phubbing, controlling for age, gender, and time spent on smartphones per day. Results showed the model to have good to excellent fit with the obtained data: $\chi^2/df = 431/213 = 2.02$, CFI = .94, RMSEA = .05, and SRMR = .06, confirming the proposed model. In addition, the hypothesized model indicated 23.9% of the variance in phubbing was explained by avoidant attachment, smartphone attachment, and self-regulation.

3.3. Hypothesis Testing. Controlling for the covariates for age, gender, and duration of smartphone usage, a SEM analysis was conducted to test the hypothesized relationships, with significant results supporting all six hypotheses (see Figure 2). More specifically, avoidant attachment style was significantly and positively associated with phubbing ($b = .16$, $p < .01$) and smartphone attachment ($b = .11$, $p < .05$), providing support for Hypotheses 1 and 2, respectively. In support of Hypothesis 3, smartphone attachment was positively and significantly related to phubbing ($b = .35$, $p < .001$). As predicted, Hypotheses 4 and 5 were supported by negative and significant associations between avoidant attachment style and self-regulation ($b = -.15$, $p < .05$) and between self-regulation and phubbing ($b = -.16$, $p < .01$), respectively. In support of Hypothesis 6, results showed a significant indirect effect of avoidant attachment style on phubbing through smartphone attachment ($b = .04$, $p < .05$, and 95% CI (.00, .09)). Likewise, self-regulation was a significant mediator between avoidant attachment style and phubbing ($b = .03$, $p < .05$, 95% CI (.01, .08)). Interestingly, within the model, we found

Table 1: Descriptive statistics, correlation, reliability, and validity scores for all variables.

Variables	1	2	3	4	5	6
1 Avoidant attachment	—					
2 Smartphone attachment	.10*	—				
3 Self-regulation	-.13**	-.18**	—			
4 Phubbing	.19**	.34**	-20**	—		
5 Age	.05	-.15**	.03	-.04	—	
6 Gender	.02	.35**	-.14**	.11*	-.10*	—
7 Smartphone usage	.02	.26**	-.04	.20	-.19**	.22**
Skewness	.34	-.16	-.20	.41	—	—
Kurtosis	-.49	-.62	-.08	.12	—	—
Cronbach's α	.94	.89	.77	.72	—	—
CR	.94	.86	.76	.71	—	—
AVE	.57	.55	.51	.50	—	—

Note. Gender was dummy coded: 1 (males), 2 (females), and 3 (nonbinary). $^*p < .05$, $^{**}p < .01$.
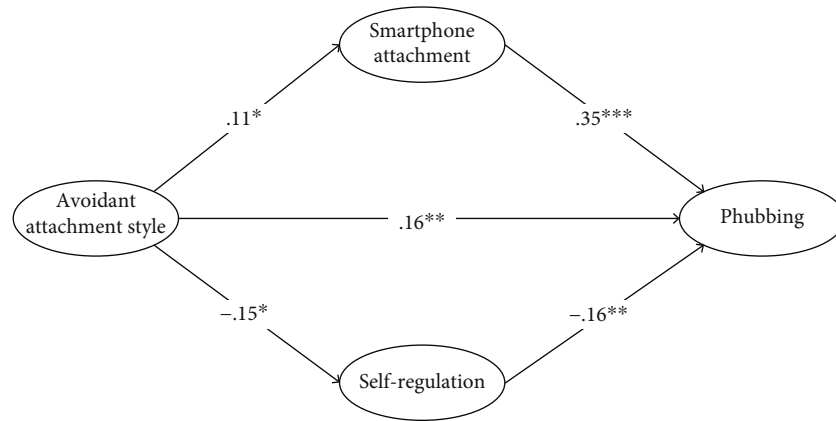

Figure 2: Results for the hypothesized model. Note. Standardized path coefficients are shown. Bold arrows indicate significant relationships. Circles represent latent variables. Covariates for age, gender, and time spent on smartphones per day, and error terms are included but omitted from the figure for simplicity. $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

the joint mediated effect of smartphone attachment and self-regulation to be simultaneously significant mediators between avoidant attachment style and phubbing ($b = .16$, $p < .01$, 95% CI (.02, .13)) (see Figure 2 and Table 2).

4. Discussion

From an attachment theory framework [10], the present study is aimed at examining whether avoidant attachment style contributes to smartphone attachment, self-regulation, and phubbing and whether smartphone attachment and self-regulation mediate the relationships between avoidant attachment style and phubbing. Findings confirm the proposed model and all six of the hypothesized relationships providing support for the expectation that young adults with avoidant attachment in their interpersonal relationships are more likely to phub others in social interactions. Moreover, support was found for the prospect that young people who are emotionally attached to their smartphones and have

lower self-regulation levels will engage in significantly more phubbing behaviors relative to those with secure attachments and higher levels of self-regulation. Further, support was found for the expectation that smartphone attachment and self-regulation mediate the relationship between avoidant attachment style and phubbing in both parallel and sequential ways. These results are discussed in more detail below.

First, we found an avoidant attachment style to be directly associated with phubbing. This result may be interpreted as indicating that avoidant individuals, being wary of closeness along with having doubts about their relationships, will tend to use their smartphones to distance themselves from their relational partners and maintain their sense of independence, as suggested by previous research [22, 24]. Thus, they may be expected to be engaging in phubbing to lessen or avoid participating in interactions that are likely to boost closeness with others, such as engaging in self-disclosure and other forms of intimate communication [26, 50]. For those with an avoidant attachment style, phubbing

TABLE 2: The mediation effects of smartphone attachment and self-regulation.

Indirect effect paths	Estimate	p	95% bias-corrected CI	
			Lower	Upper
AA ⟶ SA ⟶ PHUB	.038	.037	.003	.085
AA ⟶ SR ⟶ PHUB	.030	.020	.005	.080
AA ⟶ SA/SR ⟶ PHUB	.063	.006	.017	.128

Note. AA = avoidant attachment (independent variable); SA = smartphone attachment (mediator); SR = self-regulation (mediator); PHUB = phubbing (dependent variable).

can be one of their distancing strategies to deal with discomfort emerging in social interactions [11], particularly if they are low in self-regulation. Phubbing may also allow them to sustain their independence in the presence of others within their interpersonal interactions [51]. In addition, avoidantly attached people may phub more frequently because a tendency toward more habitual and excessive smartphone use [52, 53].

Although previous cross-sectional evidence has failed to demonstrate a significant relationship between avoidant attachment and smartphone attachment empirically (e.g., [12, 36]), this study did find evidence that individuals with high attachment avoidance should be expected to develop a strong attachment relationship with their smartphones. It is likely that individuals with an avoidant attachment style perceive media use (e.g., social media, messaging, and email) through smartphones as a useful method for establishing and maintaining greater psychological distance while lowering their levels of discomfort and closeness when interacting with others [54].

Moreover, the results reported here appear to support the notion that people higher in attachment avoidance should feel more anxiety and fear of being separated from their phones and thus develop a relatively greater attachment to their smartphone. As mentioned, Arpaci et al. [34] demonstrated the positive direct effect of avoidant attachment on nomophobia, likely because, for avoidantly attached people, their smartphones become the target for an attachment capable of fulfilling needs left unsatisfied through engagements within their social networks (e.g., parents, friends, and romantic partner).

The present study also points to a link between an avoidant attachment style and lower self-regulation, a finding consistent with Bowlby's theoretical argument that insecure attachment experiences can exacerbate personality and psychological disorders associated with diminished emotional and behavioral regulation [25]. Several previous studies have found a negative association between attachment avoidance and self-regulation ([43, 55]), with a possible explanation being that avoidant individuals often feel negative emotions when interacting with others, creating a greater risk for internalizing and externalizing problems with their interpersonal relationships, causing them to lose control of their attention, impulses, and emotions, which in turn may lead to even lower levels of self-regulation.

In line with previous studies ([12, 36, 37]), the present study found smartphone attachment and phubbing to be positively correlated, indicating individuals with high smartphone attachment will tend to phub others more frequently.

This may be because separations from attachment targets in all forms including people and objects cause increased anxiety and stress [12, 27]. As a result, individuals with a strong attachment to their smartphones may feel greater anxiety along with a stronger urge to check and use their devices when they find themselves separated from their smartphones, such as when responsiveness to their conversational partners cannot easily be avoided. Thus, they may subsequently develop even more obsessive phubbing behavior to relive the anxiety caused by those brief instances where they are otherwise unavoidably separated from their smartphones.

This study also demonstrates how people with low self-regulation should be more likely to phub others in many of their social interactions, a finding consistent with prior studies indicating significant relationships between self-regulation, control, and phubbing ([5, 56]). Beyond such direct associations, the findings reported her confirm the expectation that smartphone attachment and self-regulation mediate the effect of attachment avoidance on phubbing, providing more empirical evidence that insecurely attached individuals—especially those with an avoidant attachment style—will engage in more phubbing behavior through the development of greater smartphone attachment and low self-regulation, respectively. Likewise, it appears the effect of avoidant attachment on phubbing is simultaneously and sequentially mediated by smartphone attachment and self-regulation.

This study has several limitations that should be noted. First, considering the nature of the cross-sectional method and self-reported survey, it is not possible to conclude causal relationships, thus leaving open the possibility of bidirectional effects. Although we use a mediated model to examine the relationships between avoidant attachment and phubbing, causation cannot be conclusively modeled using measures of association within a cross-sectional design. However, logically, we can argue that it is implausible to suggest that phubbing should lead to attachment style rather than the reverse, and the same goes for self-regulation. The distinction is less clear as to whether phubbing follows from or leads to smartphone attachment; thus, ultimately, regardless of the temporal ordering of our measures, definitive causal claims cannot be made based upon the cross-sectional data collected.

Second, the self-report measure used could result in errors of estimation based on social desirability. Future research might partially mitigate this problem by examining the relationships between avoidant attachment, smartphone attachment, self-regulation, and phubbing with longitudinal design and other methods, such as qualitative or mixed methods including interviews along with independent

observation. Third, this study sampled young adults recruited in a single university with the majority of the participants being female undergraduate students; thus, the generalizability of the findings may not apply to different age groups and cultures. Future researchers might seek to replicate the findings reported here by using more representative samples, including those with diverse ages and backgrounds from other countries.

Despite these limitations, there are several important contributions and potential implications provided by this study. From theoretical perspectives, the results provide evidence to the association between avoidant attachment style and young adults' phubbing behavior. That is, one's avoidant attachment style can trigger smartphone-related behaviors negatively (e.g., phubbing) and influence their ability to regulate their behaviors. Additionally, our results suggest that avoidantly attached individuals find alternative objects to get vicarious satisfaction that was not fulfilled by their caregivers and/or close others. Second, to our knowledge, our study was the first to mainly focus on avoidant attachment style to understand individual phubbing behavior within an attachment theory perspective and empirically demonstrate associations between attachment avoidance, smartphone attachment, self-regulation, and phubbing. In this regard, our study can enrich the phubbing literature. Further, the present study provides an empirical framework by testing mediating effects of smartphone attachment and self-regulation in the development and maintenance of phubbing behavior. These results can provide a glimpse of the mechanisms underlying the nature of phubbing behavior.

With regard to practical implications, one's unhealthy attachment style (i.e., avoidant attachment style) can increase the risks for becoming heavy phubbers. Therefore, everyday interactions, bonds, and relationships between people should be well established from the early stage of one's life. Having secure attachment style can strengthen people's self-regulation ability and reduce the degree of attachment to their smartphones, thereby showing less phubbing behavior.

5. Conclusion

This study contributes to an understanding of the roles of smartphone attachment and self-regulation in the initiation and persistence of phubbing behavior in social interactions among avoidantly attached individuals. This is an important finding in that it is the first to empirically demonstrate the relationship between avoidant attachment and phubbing. The findings reported her provide evidence that attachment to smartphones and self-regulation have multiple mediating effects on the influence that an avoidant attachment style can have on phubbing. In sum, it appears clear that smartphone attachment and self-regulation mediate the association between attachment avoidance and phubbing in both parallel and serial ways.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

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