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Research Article

Not My Fault to Phub Friends! Individual, Social, and Technological Influences on Phubbing and Its Consequences

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Fphubbing (friend phubbing) indicates snubbing friends by checking and/or using one's smartphone. This study examined three approaches to provide more detailed insights and comprehensive views of phubbing: individual differences, social influences, and technological influences on Fphubbing. In addition, this study explored the outcomes of Fphubbing and further examined the mediating role of Fphubbing between proposed predictors and consequences in this study. A sample of 266 college students (aged between 18 and 38, $M_{age} = 20.02$) also revealed that (a) smartphone dependence was positively associated with Fphubbing, while self-control had a negative association with Fphubbing; (b) social norms were positively related to Fphubbing; and (c) technology overload and interruptive notifications were positively associated with Fphubbing. We also found that Fphubbing was negatively associated with friendship commitment and satisfaction, respectively. Further, Fphubbing served as a mediator in the proposed model.

1. Introduction

The new term *phubbing* is phone and snubbing. It indicates adverse behavior that occurs in face-to-face interactions when people use and focus on their smartphones in the presence of others [1]. With the prevalence of smartphone use, this phubbing behavior has become common in our interpersonal interactions. Indeed, almost every American adult (approximately 90%) said that they had experienced using their phones during their recent social gathering situations [2].

The literature has studied individual differences to understand why people phub others. For instance, problematic smartphone use (e.g., excessive and compulsive phone use) is one of the strongest predictors of phubbing [1, 3–5]. In addition, as a core and stable characteristic, personality traits (e.g., neuroticism, unconscientiousness, and disagreeableness) are significantly associated with phubbing [6–8]. Social anxiety, fear of missing out, depression, and narcissism are also positively related to phubbing behavior [8–10].

However, research investigating how social-level factors are related to phubbing behavior is relatively scarce compared to individual-level factors. To our knowledge, two studies have empirically demonstrated the role of social influences on phubbing. For example, Schneider and Hitzfeld [11] studied phubbing in terms of a social normative approach. They examined how injunctive social norms with smartphone usage in social contexts predicted phubbing. They found social norms of mobile phone use to be a significant factor in predicting phubbing, indicating that the stronger people adhere to injunctive social norms (e.g., using the phone in the presence of others is not acceptable), the less they phubbed. Similarly, Liu et al. [12] focused on subjective norms that are developed by social surroundings (e.g., friends, parents, and significant others). They demonstrated that subjective social norms played essential roles in understanding phubbing behavior.

Beyond these individual and social-related factors, it is necessary to study technological perspectives. According to Garrido et al. [13] who reviewed the phubbing literature published between 2012 and 2020, predictors of phubbing

can be classified into five broad factors: *psychological*, *technological*, *communicational*, *social*, and *cultural*. However, very little empirical evidence examines the relationship between technological influences and phubbing behavior. This lack of knowledge draws our attention to research the association between them. Further, not limited to this, the current study also examined individual (or psychological) and social factors that have not been examined in previous studies.

To be specific, this study is aimed at exploring three different approaches—individual, social, and technological factors—to provide more detailed insights and comprehensive views of phubbing within a theoretical foundation, namely, the interaction of the person-affect-cognition-execution (I-PACE) model by Brand et al. [14]. This study specifically applied this framework because it has been regarded as a comprehensive theoretical framework in previous studies (e.g., [15, 16]) by explaining the development processes of problematic behaviors using technologies or Internet activities.

In addition, this study focuses on friend phubbing (hereafter *Fphubbing*; phubbing behavior in the context of friendships) as friendships are an essential factor in one's life, bringing happiness and well-being [17, 18]. Ironically, however, people tend to show phubbing behavior more often in the presence of friends [9]. However, little has been studied on Fphubbing so far. Therefore, the present study investigated the relational consequences of phubbing in friendships.

The present study established and tested a mediated model using a sample of young adults. They are specifically targeted in the present study as their smartphone ownership is the highest (96%) compared to other age groups [19]. This proposed model examines the potential mediator role of Fphubbing between possible predictors and outcomes. To be specific, this study examined the relationships between individual differences (i.e., smartphone dependence and self-control), social influences (i.e., perceived social norms of phubbing), technological influences (i.e., interruptive notifications and technology overload), Fphubbing, friendship commitment, and friendship satisfaction.

The current study is the first to explore those broad categories based on the model of I-PACE and thus contribute to expanding the phubbing literature, especially in understanding what drives individuals to phub others. Further, the findings of this study would contribute to understanding a wide range of adverse outcomes of phubbing.

2. Individual Predictors of Fphubbing

Each one has different inherited (i.e., genetic) and acquired characteristics (i.e., learned) [20, 21]. People behave and react differently despite being in the same situations due to their different personality traits and motivations. In psychology, individual differences (e.g., personality, cognitive abilities, temperament, motivations, and personal interests) have been considered critical factors in determining our behaviors [22]. In this regard, we can predict that individual characteristics play a significant role in phubbing as it is one of our behaviors relevant to smartphone use in face-to-face interactions with others.

A framework of problematic mobile phone use (PMPU) by Billieux et al. [23] proposed three different pathways leading to problematic phone use behavior: (a) excessive reassurance pathway, (b) impulsive pathway, and (c) extraversion pathway. All these pathways derive from specific individual vulnerable characteristics such as personality traits (e.g., neuroticism and extraversion), sociodemographic factors, and related psychological factors (e.g., social anxiety, ADHD, low levels of self-esteem, and self-control).

As an extension of the PMPU model, Brand et al. [14] suggested the interaction of the person-affect-cognition-execution (I-PACE) model. Along with internal factors (e.g., a person's core characteristics), they added external triggers (e.g., subjective perceptions of situations and affective and cognitive responses). They examined interactions between internal and external factors, thereby providing a process for the development and maintenance of addictive behaviors through the use of specific Internet activities (e.g., online gaming, online shopping, social media, and Internet gambling). In this process, the model postulates that personal characteristics act as significant predisposing factors for problematic or addictive uses of one application by affecting a person's cognitive/affective and executive functions. In more detail, individuals with specific personality traits (e.g., impulsivity and low conscientiousness) and psychopathological factors (e.g., depression, social anxiety, and ADHD) are more likely to develop specific Internet use disorders.

In terms of phubbing, as discussed earlier, individual differences (e.g., personality traits—neuroticism and disagreeableness, and other psychological factors—social anxiety and fear of missing out) have been found to predict phubbing [3, 4, 8, 10]. Based on those frameworks and previous studies, this study examined how individual differences are related to phubbing in the presence of friends.

2.1. Smartphone Dependency. Similar to substance dependence (e.g., drugs and alcohol), *smartphone dependence* (also known as *mobile phone dependence*) refers to a constant desire to use one's phone [23]. This tendency is similar to the *nomophobia* phenomenon (i.e., fear of detachment from one's smartphone) [23, 24]. Individuals with heavy smartphone dependency tend to regard their devices as inseparable objects that provide comfort and security. Further, these people may develop an attachment to the devices. However, they may grow anxious and fearful if their dependent and attachment figure is gone or they cannot access it. Consequently, they might develop stronger attachments and greater dependence on their devices by always keeping them close and constantly using them in any situation.

This argument can be supported by the third pathway of the PMPU model [23] (i.e., excessive reassurance pathway). It assumes the form of dependence-related symptoms, and these symptoms derive from a strong impulsion to stay constantly connected with others through their phones. As a result, these individuals are susceptible to developing risky and problematic phone usage behaviors, such as using the phone while driving [23]. Concerning phubbing, not very

much has been known about the relationship between smartphone dependence and phubbing.

However, as the excessive reassurance pathway of the PMPU model indicates, phubbing can be viewed as one of the risky mobile phone usage behaviors (e.g., mobile phone use while driving) that occurs in interpersonal contexts such as face-to-face interactions. In addition, individuals who experience dependence on their smartphones may phub others more often because strong desires or attachments toward their smartphones may be developed. It is thus plausible to suggest that smartphone dependence would be positively related to Fphubbing.

2.2. Self-Control. Self-control, which indicates a person's capacity to manage inner desires and resist external temptations [25], is another significant factor in predicting one's behavior [26]. According to the self-control theory by Gottfredson and Hirschi [27], self-control regulates individuals' cognitions, emotions, and behaviors in response to impulsive stimuli. Indeed, individuals with impaired self-control are likely to show various problematic behaviors, such as substance abuse and addictive behaviors [28, 29].

This particular individual trait also plays a role as a significant predictor of problematic behavior when using mobile devices. For example, individuals with poor self-control are more likely to use their mobile phones problematically [30]. The PMPU framework—especially the impulse pathway—helps explain the tendency. According to the framework, individuals whose problematic behavior in using a mobile phone is caused by poor impulse control have low self-control, assuming that individuals with less self-control have difficulties managing and repressing their impulses to use their phones [23]. This tendency gives rise to antisocial usage patterns, such as using their phones in inappropriate contexts.

Given that phubbing is inappropriate behavior happening in social interactions where people may generally expect to pay attention to each other by constantly exchanging verbal and nonverbal messages instead of being distracted by something else like their phones, phubbing can also be explained by the PMPU framework, supposing that self-control would be related to such behavior. Benvenuti et al. [31] found that self-control was negatively associated with phubbing, indicating that young adults with low levels of self-control were likely to phub others more often. Based on the self-control theory, the PMPU framework, and the recent study, we hypothesize the following:

Hypothesis 1. There are significant individual differences in Fphubbing, such that (a) smartphone dependency is positively associated with Fphubbing, while (b) self-control is negatively associated with Fphubbing.

3. Social Influences on Fphubbing

Along with personal levels (e.g., psychological and personal characteristics), our behaviors can be determined by macro-level factors (e.g., social and environmental elements). According to the social influence theory by Kelman [32], the society people belong to shapes their attitudes, beliefs, and behaviors. In particular, social norms guide and restrict our behaviors, and they are generally understood in two different aspects: descriptive and injunctive norms [33]. Descriptive norms are the perceptions of behaviors typically performed by others (e.g., how often and how much others around us behave in a certain way). In contrast, injunctive norms indicate perceived approval of a specific behavior (e.g., whether such behavior is acceptable or unacceptable by peer groups) [33]. In other words, descriptive norms are about prevalence, while injunctive norms are related to approval.

With the prevalence of the phubbing phenomenon, it can be questionable in terms of social norms whether people phub others because they think such behavior is socially appropriate and acceptable. Regarding this question, Schneider and Hitzfeld [11] examined how injunctive norms about the use of mobile phones were associated with phubbing and found that people tended to show phubbing less frequently when strongly adhering to mobile phone norms. Similarly, Leuppert and Geber [34] studied the association between social norms related to phubbing and their actual phubbing in dyadic and small-group interactions. They demonstrated the positive association that phubbing occurred more frequently when they perceived that phubbing is prevalent with high levels of descriptive phubbing norms than with perceived injunctive norms in both dyadic and small group situations. These previous studies suggest that perceived social norms of phubbing are a significant factor in actual phubbing behavior. Thus, we also assume the following:

Hypothesis 2. There are significant social influences on Fphubbing, such that the stronger people perceive phubbing as prevalent (descriptive) and acceptable (injunctive), the more they phub their friends.

4. Technological Influences on Fphubbing

According to the technological determinism theory by McLuhan [35, 36], technology greatly impacts our society and culture. In other words, technology determines our attitudes, cognitions, behaviors, and how we manage our interpersonal relationships [37]. As one type of technology, smartphones have changed our behaviors. Indeed, for social and information needs, we use smartphones to fulfill these motivations [38]. In this regard, it is necessary to examine technological influences to understand our behavior by assuming that our behaviors are susceptible to specific characteristics of technologies.

4.1. Technology Overload. As technologies evolve quickly, various new media are out, and we choose certain ones according to our specific needs. Paradoxically, there are too many technologies. Indeed, a recent report by Statista [39] revealed that the average number of connected devices Americans have was 10.37, and people in the United States are repeatedly exposed to approximately ten technologies (e.g., smartphones, computers, smart televisions, tablets,

and smartwatches) daily. This amount of exposure may overwhelm someone, leading to technology overload.

Technology overload occurs when people are exposed to more technologies than they can handle at the same time [40]. It happens because humans have limited capacities to process information or many things at once [41]. Technology overload can lead to negative and problematic consequences, although people expect only positive outcomes (e.g., enjoyment and relief of negative emotions). Indeed, individuals who experience technology overload show more problematic social media use (i.e., social media addiction) [42] and decrease workers' productivity [40]. In addition, they experience a lack of attention and low control because of prolonged exposure to too many technologies [42]. As technology overload reduces attention and control levels, it can be expected that those who are exposed to many different technologies are more likely to use their phones in the presence of others. That is, technology overload may lead to phubbing.

4.2. Interruptive Notifications. A notification indicates a pop-up message that a smart device displays on its screen to alert a user that something new has happened so he does not miss anything [43]. These pop-up notifications are interruptive because they divert the user's attention, especially when doing other activities [43]. Involuntary nervous reactions in our brains can explain this. Our brain reacts to external aural and visual stimuli, which seize our attention [44]. Regarding smartphone use, stimulants such as ringing, vibrating, and flashing lights on the screen with new notifications stimulate our brains. Consequently, we may pause ongoing activities (e.g., conversations and tasks) and start taking care of our phones.

In addition, notifications can promote the secretion of dopamine in our brain (i.e., the "reward" neurotransmitter), which makes us engage in the dopamine reward loop [45, 46]. According to these studies, when picking up our phones to check for new notifications, our brain releases dopamine because our need to be social is inherent in our brain, making us happy and rewarded. In this regard, as soon as notifications pop up on our smartphone screens, we may be attracted to check them, although we are engaged in other tasks such as social interactions. Based on the studies above, we propose the following:

Hypothesis 3. There are significant technological influences on Fphubbing, such that (a) technology overload and (b) interruptive notifications are positively associated with Fphubbing, respectively.

5. Consequences of Fphubbing

5.1. Friendship Commitment and Satisfaction. Relationship qualities are essential throughout a person's overall life [47]. Relationship commitment and satisfaction are significant aspects of intimate relationships [48]. Relationship commitment is an intention to persist in ongoing relationships over time [49]. Relationship satisfaction is a subjective evaluation of a person's current relationships [50].

Phubbing is deleterious to both phubbers (who phub others) and phubbees (who are phubbed) and further damages their relationship qualities such as increasing conflicts and reducing relationship satisfaction [8, 51]. This is because phubbing is a low-immediacy behavior that signals disinterest and low attention, implying relational disengagement [52]. People expect their partners to have a close distance and frequent eye contact as their relationship gets closer because such nonverbal cues imply their attention and interest [53]. However, phubbing violates such nonverbal expectancy.

As phubbers lean and pay more attention to their phones instead of their partner (i.e., phubbee), the exchange of nonverbal cues between phubber and phubbee is less likely to occur. Consequently, it is challenging to develop and maintain healthy relationships. In addition, both phubber and phubbee may feel disconnected from each other. Eventually, they may start to rethink the value of their relationship with low levels of relationship commitment and satisfaction. Thus, we hypothesize the following:

Hypothesis 4. Fphubbing leads to negative consequences such as decreasing (a) friendship commitment and (b) friendship satisfaction.

6. The Mediating Role of Fphubbing

Even though little research has investigated the mediating effect of Fphubbing between the study variables, it is plausible to argue such relationships with a mediating role of Fphubbing based on the literature review mentioned above. Therefore, this study posits the following:

Hypothesis 5. There are indirect effects of individual, social, and technological influences on (a) friendship commitment and (b) friendship satisfaction through Fphubbing.

Taken together, based on the literature and hypotheses suggested above, we proposed the hypothesized model investigating the associations between individual influences (i.e., smartphone dependence and self-control), social influences (i.e., perceived social norms of phubbing), technological influences (i.e., technology overload and interruptive notifications), Fphubbing, friendship commitment, and friendship satisfaction (see Figure 1).

7. Methods

7.1. Participants and Procedure. A self-reported online survey was conducted for this study. Participants were recruited from a departmental research pool at a large southern university in the United States. Two hundred and eighty-nine undergraduate students who were smartphone users and over 18 participated in this study. Of them, 22 cases were incomplete and excluded from the data. Therefore, the final sample size became $n = 266$. The sample consisted of 179 females (67.3%), 82 males (30.8%), and 5 nonbinary (1.9%). The participants' age ranged between 18 and 37 years ($M = 20.02$, $SD = 2.17$). The majority identified

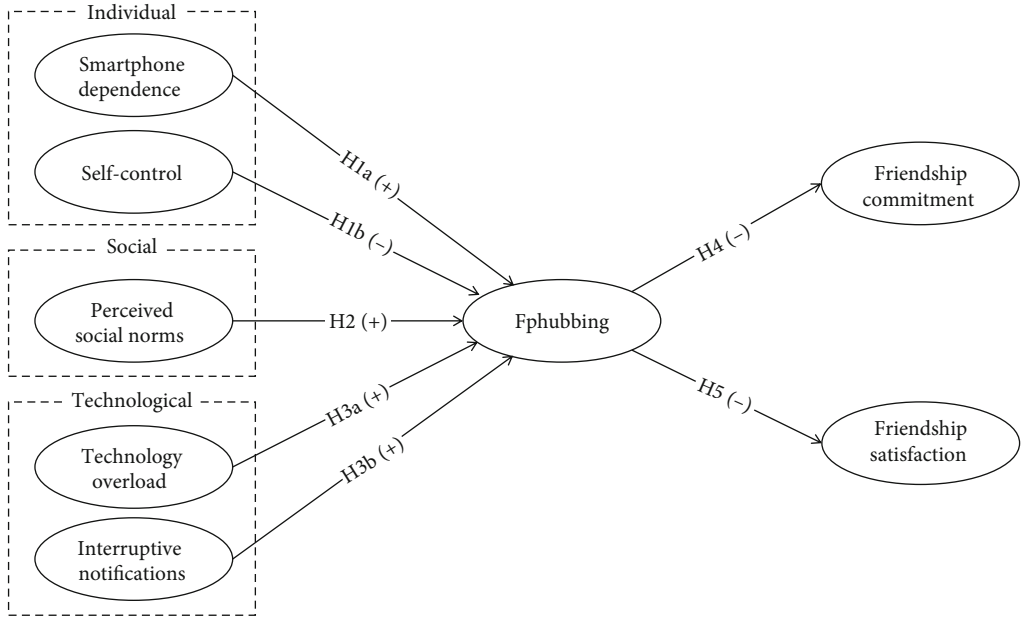

Figure 1: Hypothesized model of this study.

themselves as White (76.7%, $n = 204$), with some self-identifying as Hispanic (7.5%, $n = 20$), Asian (4.9%, $n = 13$), African American (4.5%, $n = 12$), multiracial (3.8%, $n = 10$), Native American (1.5%, $n = 4$), and other (1.1%, $n = 3$). There were 79 first-year university students (29.7%), 71 (26.7%) second-year university students, 63 juniors (23.7%), and 53 seniors (19.9%).

We provided informed consent with detailed information about this study to the participants. Those who agreed to participate in this study were asked to complete an online questionnaire developed through *Qualtrics*. This questionnaire consisted of the following sections: demographic information; smartphone usage patterns; research measurements, including individual, social, and technology-related factors (e.g., mobile phone dependency, perceived social norms, and technology overload); Fphubbing; and consequences of Fphubbing (e.g., friendship commitment and satisfaction). This survey took approximately 20-30 minutes, and the participants were given course credit for their completion.

8. Measures

We employed existing scales that scholars had developed. All the measurements were rated using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We calculated the average value of each construct to examine the relationships between the study variables.

8.1. Individual-Related Factors

8.1.1. Smartphone Dependency. The tendency toward smartphone dependency was assessed by adapting the Mobile Phone Dependency Scale developed by Seo et al. [54]. This scale contained 7 items (e.g., "The amount of time I spend using my smartphone is increasing" and "I feel anxious when I don't have my smartphone with me"). Higher scores indicate higher levels of smartphone dependency.

8.1.2. Self-Control. The Brief Self-Control Scale (BSCS; [25]) was used to assess the participants' self-control level. This scale included 13 items (e.g., "I am good at resisting temptation" and "I refuse things that are bad for me"). Of them, 9 items were reversed and thus recoded. The higher the score, the greater their self-control in their behaviors.

8.2. Social-Related Factor

8.2.1. Perceived Social Norms. To measure the perceived social norms toward friend phubbing, a 5-item scale developed by Borsari and Carey [55] was used. This scale consisted of two subconstructs: descriptive (i.e., the perceptions of the behavior of others—how friends frequently show phubbing) and injunctive norms (i.e., the social norms of ought—the perceived approval of phubbing behavior) [33]. Examples of the scale were "Do you think that your friends recognize that they use their smartphones during face-to-face interactions?" (descriptive norms) and "Do you think that such behavior is appropriate?" (injunctive norms). Individuals with higher scores on this scale indicated they perceived phubbing as being normative.

8.3. Technology-Related Factors

8.3.1. Technology Overload. Technology overload was measured by adapting a scale developed by Tarafdar et al. [56]. This scale included 5 items (e.g., "Technologies force me to work much faster" and "I check my digital devices first thing in the morning"). Higher scores represented higher levels of technology overload.

8.3.2. Interruptive Notifications and Disruptions. Based on the items proposed by Kahneman et al. [57] and Elhai et al. [58], we listed 20 various activities and works (e.g., relaxing, eating, exercising, and shopping) to measure how often the participants stop their daily activities when receiving pop-up notifications on their smartphones. Higher scores on this scale represented greater tendencies to be distracted by the pop-up notifications on their smartphones while doing their daily activities.

8.4. Mediator

8.4.1. Fphubbing. Friend phubbing was measured using the Phubbing Scale (PS) developed by Karadağ et al. [1]. This scale initially consisted of 10 items with two subdimensions: communication disturbance (5 items) and phone obsession (5 items). With the aim of this study, this study only employed the construct of communication disturbance and modified the five items by replacing words of the items such as (*others* to *friends* and *phone* to *smartphone*). Some items were as follows: "My eyes start wandering on my phone when I am together with friends" and "I am always busy with my smartphone when I am with my friends." Higher scores indicated a higher likelihood to phub their friends.

8.5. Dependent Variables

8.5.1. Friendship Commitment. Friendship commitment was measured using the Investment Model Scale developed by Rusbult et al. [59]. This scale included four dimensions—commitment level and three bases of dependence (e.g., satisfaction level and investment size). According to the purpose of this study, the commitment level subconstruct was only used, and it included 8 items (e.g., "I am committed to maintaining my friendships" and "I feel very attached to my friendships"). Moreover, we specified the items by replacing the words from friendship relationships. Higher scores indicated higher levels of friendship commitment.

8.5.2. Friendship Satisfaction. Friendship satisfaction was measured by adapting the Relationship Assessment Scale (RAS) by Hendrick [60]. We modified the scale to measure friendships by replacing two words: *partner* and *relationship* with *friends* and *friendships*. The revised scale contained 7 items with two reverse items included. Some of the items on this scale were "How well do your friends meet your need?" and "To what extent has your friendship met your original expectations?" Higher scores represented that individuals were more satisfied with their friendships.

9. Statistical Analysis

We conducted descriptive statistics, correlation analysis, confirmatory factor analysis (CFA), and structural equation modeling (SEM). This study used SPSS 28.0 and AMOS 24.0 software for the data analyses. Specifically, Pearson's correlation analysis was first analyzed to explore relationships between variables in this study and check for multicollinearity issues ($r < .90$; [61]). Next, Cronbach's alpha (α) was examined to estimate the quality of each measurement instrument for reliability, and the measurement was ensured if Cronbach's alpha was larger than .70 [62]. To test the validity of our instrument (e.g., convergent and discriminant validity), composite reliability (CR) and average variance extracted (AVE) were examined, and it was ensured that the values of CR and AVE were greater than .70 and .50, respectively [63].

After exploring the reliability and validity of each construct, CFA and SEM were conducted to test this study's hypothesized model and hypotheses. The following goodness of fit indices were used [64]: $\chi^2/\text{df} < 3$, comparative fit index (CFI) and Tucker-Lewis index > .90, the root mean square error of approximation (RMSEA) < .06, and the standardized root mean squared residual (SRMR) < .08. For mediation analysis, we adopted a bootstrapping method (2000 bootstrap samples) with a bias-corrected 95% confidence interval.

Once there were problematic items, we modified the model by dropping them from the data. To be specific, if items explained their relevant latent variable less than 40% (i.e., factor loadings of .40 or lower), there was larger error covariance between items (e.g., overlapping between the items or they did not covary with the relevant latent factor), or the items did not fit into one factor, modifications were implemented [65]. We excluded them from the data and conducted reliability and validity tests again until all the values met the thresholds.

10. Results

10.1. Preliminary Analyses. Table 1 shows the reliability and validity of the study constructs. After several modifications, all constructs with validity and reliable items only fulfilled the required criteria to conduct CFA and SEM to test the proposed study model and the hypotheses of this study.

Descriptive and Pearson's correlation analyses were conducted with reliable and valid items. As shown in Table 2, all the variables in this study were significantly correlated. Specifically, Fphubbing was positively correlated with smartphone dependence ($r = .48$), perceived social norms toward phubbing ($r = .36$), technology overload ($r = .38$), and interruptive notification ($r = .41$). On the other hand, Fphubbing was negatively correlated to self-control ($r = -.42$), friendship commitment ($r = -.26$), and friendship satisfaction ($r = -.23$). These significant correlations were able to proceed to the testing of the hypothesized model and the hypotheses.

11. Testing the Hypothesized Model

As indicated in Figure 2, according to the results of CFA, our proposed model had an excellent model fit satisfying all the criteria of fit indices as follows: $\chi^2(344) = 531.74$, $p < .001$, $\chi^2/\text{df} = 1.55$, CFI = .93, TLI = .92, RMSEA = .05, and SRMR = .06. Hence, we concluded that the model fits the collected data well and can be used to explain the hypotheses of this study.

Table 1: Factor loadings, reliability, and validity results of all the study variables.

	Items	Factor loading	α	CR	AVE
Smartphone dependence	SD5	.587	.729	.745	.504
	SD6	.899			
	SD7	.600			
Self-control	SC3	.695	.724	.725	.502
	SC7	.639			
	SC9	.716			
Social norms	SN1	.455	.701	.705	.501
	SN2	.511			
	SN3	.694			
	SN4	.533			
	SN5	.666			
Technology overload	TO2	.720	.808	.814	.596
	TO3	.891			
	TO4	.689			
Interruptive notifications	IN1	.788	.710	.717	.511
	IN2	.672			
	IN4	.560			
Fphubbing	PHUB1	.722	.831	.834	.562
	PHUB2	.860			
	PHUB3	.585			
	PHUB4	.802			
Friendship commitment	FC5	.760	.871	.874	.700
	FC6	.924			
	FC7	.817			
Friendship satisfaction	FS1	.790	.871	.873	.697
	FS2	.917			
	FS3	.791			

12. Testing the Hypotheses

We tested the hypothesized associations between the latent variables of this study to confirm the hypotheses after confirming the overall proposed model fit using SEM. As shown in Figure 2, all the hypotheses of this study were supported.

Specifically, there were significant individual influences on phubbing in the presence of friends. That is, the findings revealed that smartphone dependence was positively and significantly related to Fphubbing ($\beta = .28$, $p < .05$), while self-control was negatively and significantly associated with Fphubbing ($\beta = -.20$, $p < .05$). In terms of social influences on Fphubbing, perceived social norms of phubbing were positively associated with Fphubbing ($\beta = .17$, $p < .05$). Also, the proposed relationships between technology overload and Fphubbing ($\beta = .18$, $p < .05$) and between interruptive notifications and Fphubbing ($\beta = .24$, $p < .05$) were significant and positive. We found that Fphubbing had negative consequences. In particular, Fphubbing was negatively and significantly associated with friendship commitment ($\beta = -.28$, $p < .05$) and friendship satisfaction ($\beta = -.27$, $p < .05$), respectively.

We further hypothesized that Fphubbing mediated the relationships between predictors and outcomes in this study. As indicated in Table 3, our results showed significant indirect effects of smartphone dependence, self-control, perceived social norms of phubbing, technology overload, and interruptive notifications on friendship commitment. Similarly, these predictors were significantly and indirectly associated with friendship satisfaction through Fphubbing. As such, we demonstrated that Fphubbing as a mediator can play a considerable role in understanding the mechanism explaining phubbing's development and outcome in friendships.

13. Discussion

The present study is aimed at replicating and extending the phubbing literature by examining both predictors and outcomes of phubbing and further testing the mediating role of friend phubbing, especially in friendships among young adults, with five hypotheses. To our knowledge, this study was the first to investigate different approaches from individual to technological influences in determining friend phubbing and simultaneously its impacts on the qualities of friendships with relationship commitment and satisfaction.

First, specific personal-level factors—smartphone dependence and self-control—are significant predictors of Fphubbing. Individuals tend to phub their friends when they are heavily dependent on their phones and have poorer self-control. The possible explanation for this finding is that similar to substance dependence symptoms, people with higher levels of smartphone dependence tend to feel uneasy and insecure in the absence of their phones [66] and have a stronger craving to use their phones [67]. Thus, in the presence of others in face-to-face interactions, they might divert their attention and use their phones instead of fully concentrating on their partner and interactions to relieve their negative emotions, such as fear and anxiety of being detached from smartphone connectivity. In terms of self-control, individuals who have poor self-control are susceptible to impulsiveness and are bad at regulating their behaviors, although their behaviors can violate social rules such as social norms and moral rules [68]. In this regard, these people might phub their friends more often than those with high self-control levels because they are unbearable to use their phones.

Second, people tend to phub their friends more frequently when they believe it is prevalent and acceptable. This finding can be explained by the social influence theory [32] and previous studies (e.g., [33]), which found that social norms predict our behaviors. The behavioral intention and actual behavior to use one's phone can be determined by sense and perception of social norms of phubbing [11]. This is because norms are internalized as social animals [69]. In addition, in line with the self-concept theory by Rogers [70], people want to protect their self-images as moral beings. When people observe that their friends use their phones in the presence of others, they may perceive such behavior as acceptable and approved within their society,

Table 2: Means, standard deviations, and correlations.

	Variables	1	2	3	4	5	6	7	8
1	Fphubbing	—							
2	Smartphone dependence	.48**	—						
3	Self-control	-.42**	-.33**	—					
4	Social norms	.36**	.22**	-.23**	—				
5	Technology overload	.38**	.27**	-.26**	.23**	—			
6	Interruptive notification	.41**	.40**	-.31**	.21**	.16**	—		
7	Friendship commitment	-.26**	-.08	.20**	-.02	-.08	-.13**	—	
8	Friendship satisfaction	-.23**	-.12	.22**	-.07	-.10	-.15**	.53**	—
	M	2.20	2.70	3.13	2.80	3.00	2.32	4.36	4.11
	(SD)	(.65)	(.91)	(.86)	(.67)	(.87)	(.83)	(.81)	(.78)

Note. $^{**}p < .01$.

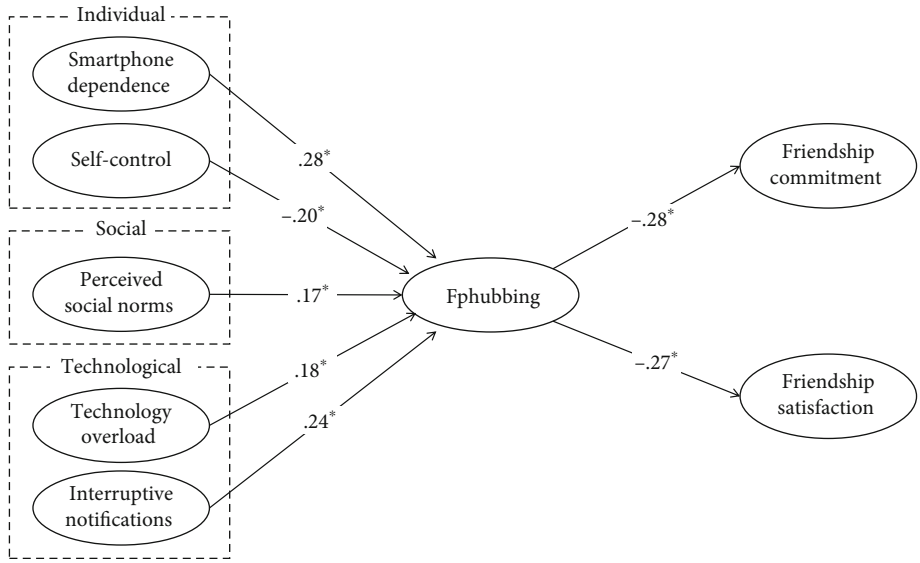

Figure 2: SEM results of the hypothesized model.

Table 3: The mediating effects of Fphubbing.

	Indirect effect paths	Estimate	*p*	95% bias-corrected CI	
				Lower	Upper
Individual	SD → FPHUB → FC	-.080	.016	-.171	-.016
	SC → FPHUB → FC	.054	.043	.001	.156
Social	SN → FPHUB → FC	-.048	.024	-.123	-.005
Technological	TO → FPHUB → FC	-.051	.021	-.121	-.006
	IN → FPHUB → FC	-.066	.033	-.162	-.005
Individual	SD → FPHUB → FS	-.076	.008	-.166	-.021
	SC → FPHUB → FS	.053	.036	.002	.145
Social	SN → FPHUB → FS	-.046	.016	-.120	-.008
Technological	TO → FPHUB → FS	-.050	.011	-.122	-.008
	IN → FPHUB → FS	-.065	.022	-.160	-.007

Note. SD = smartphone dependence; SC = self-control; SN = social norms of phubbing; TO = technology overload; IN = interruptive notifications; FPHUB = Fphubbing; FC = friendship commitment; FS = friendship satisfaction.

thereby concluding that such behavior does not threaten their faces and self-images. Therefore, they might be more likely to phub their friends.

Moreover, technological influences play a significant role in predicting Fphubbing. Individuals who suffer from technology overload and are easily interrupted by notifications while doing other activities tend to phub their friends. In line with previous studies, technology overload and disruptive notifications can lead to problematic technology use, including smartphones (e.g., [42, 44, 45]). This may be because these people lack concentration and control when using technologies due to excessive exposure and brain nervous responses. Thus, if new notifications pop up and there is the mere presence of a phone, face-to-face interactions can be distracted by the device, and therefore, those people use them in copresent interactions with friends.

Unlike most previous phubbing studies examining individual factors as predictors, this study shows that microlevel factors are not the only predictors of phubbing. There can be social and technological aspects to predicting phubbing behavior. Furthermore, individuals who show phubbing behavior frequently in the presence of friends are less likely to commit to their friendships and be dissatisfied with them. This result aligns with immediacy behavior [52, 53]. Whether people phub intentionally or unconsciously, phubbing behavior implies that phubbers may not be interested in their partners and relationships. That is, they may use their phones in the presence of friends because they care less about their friendships. If they value their partner and relationships, they will pay more attention to their partner by actively engaging in interactions with frequent nonverbal behaviors. This can be explained by the fact that nonverbal cues help us maintain and reinforce relationships [71]. Also, they would try not to show deviant behaviors that can damage their relationships to show how much they care about their friends and friendships.

Interestingly, we found the mediating role of Fphubbing between five predictors and two outcomes, confirming that smartphone dependence, self-control, social norms of phubbing, technology overload, and interruptive notifications indirectly affected friendship commitment and friendship satisfaction through Fphubbing, respectively. Even though little is known about the mediating effect of Fphubbing between the proposed study variables limits interpretations, this result contributes to explaining the process of phubbing by exploring stressors, strain, and outcomes of phubbing.

14. Limitations, Strengths, and Implications

There are several limitations in this study. The first one is about the representativeness of the sample. Our sample was relatively not diverse. We used convenience sampling by collecting the data at one university and targeting young adults only. In addition, it consisted mainly of females and Caucasians. Since it did not reflect a variety of ethnicities/races, different countries, and other age groups, it may have restrictions on generalizing the findings of this study. Therefore, future researchers must duplicate this study in the context of different cultures/countries and older generations.

Second, as mentioned earlier, some people may phub others unconsciously. In this regard, a self-reported survey may not be ideal for capturing and recalling their phubbing behavior. Future studies could use different methods (e.g., observations, experiments, and interviews) to reflect their actual phubbing in social interactions. In addition, the cross-sectional design of this study could not confirm causal relationships between the study variables. Thus, it should be careful to read the causal relationships of this study. To overcome this limitation, future researchers need to conduct longitudinal and experimental studies to determine the causality of the study variables.

Finally, most of our findings have not been examined and demonstrated in previous studies. The literature has focused more on the relationship between our study variables and problematic mobile phone use, not in the context of phubbing. Further, research on phubbing in friendships (Fphubbing) and its mediating effect is scarce. Hence, studies need to examine Fphubbing for a more detailed understanding.

Despite its limitations, our study makes several contributions. From a theoretical perspective, our study contributes to extending the phubbing literature. We have taken various approaches that were descriptively reviewed by Garrido et al. [13] but have not been empirically studied. The results of our study also allow readers to find out why individuals phub friends. Additionally, our study tested a conceptual model of associations between smartphone dependence, self-control, perceived social norms, technology overload, interruptive notifications, friend phubbing, friendship commitment, and friendship satisfaction. These results provide insights into the causes and consequences of phubbing behavior and evidence of behavioral processes explaining how factors lead to one's behavior and how such behavior can impact relationships.

Data Availability

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

Disclosure

This research has previously been presented as a part of the conference (International Communication Association).

Conflicts of Interest

The authors declare that this research has no conflicts of interest.

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