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How "phubbing" becomes the norm: The antecedents and consequences of snubbing via smartphone

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A B S T R A C T

Smartphones allow people to connect with others from almost anywhere at any time. However, there is growing concern that smartphones may actually sometimes detract, rather than complement, social interactions. The term "phubbing" represents the act of snubbing someone in a social setting by concentrating on one's phone instead of talking to the person directly. The current study was designed to examine some of the psychological antecedents and consequences of phubbing behavior. We examined the contributing roles of Internet addiction, fear of missing out, self-control, and smartphone addiction, and how the frequency of phubbing behavior and of being phubbed may both lead to the perception that phubbing is normative. The results revealed that Internet addiction, fear of missing out, and self-control predicted smartphone addiction, which in turn predicted the extent to which people phub. This path also predicted the extent to which people feel that phubbing is normative, both via (a) the extent to which people are phubbed themselves, and (b) independently. Further, gender moderated the relationship between the extent to which people are phubbed and their perception that phubbing is normative. The present findings suggest that phubbing is an important factor in modern communication that warrants further investigation.

1. Introduction

Recent years have seen an explosion in communication technology, creating devices and systems that support one-to-one, one-to-many, and many-to-many human interactions (Gummesson, 2004; Huang, Lee, & Hwang, 2009; Tews, Sukhatme, & Matarić, 2002). Sales of *smartphones* (cellular phones that function much like computers) dominate the global share of communication devices, and it is projected that more than 50% of active communication handsets in use worldwide will be smartphones by mid-2016 (Kemp, 2015). People tend to prefer smartphones to computers when going online (Ofcom, 2015), and smartphones have become an integral part of peoples' daily lives (Jones, 2014; Oulasvirta, Rattenbury, Ma, & Raita, 2012; Roberts, Yaya, & Manolis, 2014). They provide opportunities for users to connect with friends, family, colleagues and absent others (Andreassen & Pallesen, 2014; Do & Gatica-Perez, 2013; Echeburua & de Corral, 2010; Kuss & Griffiths, 2011; Park, Kee & Valenzuela, 2009), to play games (Cheok, Sreekumar, Lei, & Thang, 2006), for entertainment (Zhang, Chen, & Lee, 2014), for education (Cummiskey, 2011), and for research (Raento, Oulasvirta, & Eagle, 2009).

However, despite the obvious benefits of smartphones, in recent years researchers have become increasingly concerned about their potential adverse effects on mental and physical health, and the quality of social interactions (Baron & Campbell, 2012; Campbell & Kwak, 2010; Choliz, 2010; Ha, Chin, Park, Ryu, & Yu, 2008; Khan, 2008; Lee, Chang, Lin, & Cheng, 2014). Like many people have become addicted to the Internet, more and more people are becoming problematic smartphone users, causing concern about the potential consequences of smartphone overuse (e.g., Beranuy, Oberst, Carbonell, & Chamarro, 2009). In particular, the concept of "phubbing", defined as the act of snubbing others in social interactions and instead focusing on one's smartphone (Haigh, 2015), appears to have negative consequences for communication between partners, detrimentally affecting relationship satisfaction and feelings of personal wellbeing (Roberts & David, 2016). However, little is known about what causes phubbing behavior, and how it has become an acceptable or normative feature of modern communication. In the current study, we develop and test a model explaining these factors.

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2. Background

2.1. Smartphone addiction

Researchers have focused on the effects of excessive smartphone use on mental and physical health (Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2007). Findings suggest that smartphone users who show a tendency to be addicted to their phones appear more likely to experience health problems, in a similar way to how those who show a tendency toward Internet addiction (Beranuy et al., 2009) and game addiction (Lee, Ko, & Chou, 2015) experience health problems. In addition, smartphone addiction and Internet addiction have been found to be associated with depression (Beranuy et al., 2009; Thomee, Harenstam, & Hagberg, 2011) and anxiety (Cheever, Rosen, Carrier, & Chavez, 2014; Dalbudak et al., 2013; Lepp, Barkley, & Karpinski, 2014). Finally, aggression and a lack of attention have been found to be associated with Internet and smartphone addiction in children (Davey & Davey, 2014; Park & Park, 2014). Therefore, there appears to be reason for concern about the consequences of smartphone overuse for the individual.

The consequences of smartphone use for the quality of social interactions between individuals have also caused concern. Specifically, Habuchi (2005) argued that mobile phones can diminish the quality of interpersonal interactions, producing a "tele-cocooning" effect, where people are diverted from face-to-face exchanges with others and therefore lose the art of face-to-face interaction (Habuchi, 2005). In other research, conversations where smartphones were present reported lower levels of empathic concern compared to those in the absence of a smartphone on the table (Misra, Cheng, Genevie, & Yuan, 2014). Other researchers have found lower levels of perceived relationship quality, partner trust, and perceived empathy in the presence of mobile phones (Przybylski & Weinstein, 2013; Roberts & David, 2016). Many recent media reports have also commented on the intended and unintended disconnection among people that occurs when people use smartphones (Barford, 2013; Kelly, 2015; Mount, 2015).

In 2012, a campaign by the Macquarie Dictionary resulted in the creation of a word to represent this problematic behavior (Pathak, 2013). Specifically, the term "phubbing" (a portmanteau of the words "phone" and "snubbing") describes the act of snubbing someone in a social setting by using one's phone instead of talking to the person directly in one's company (Haigh, 2015). In other words, phubbing involves using a smartphone in a social setting of two or more people, and interacting with the smartphone rather than the person or people present. For the purposes of the present research, a "phubber" may be defined as a person who starts snubbing someone in a social situation by paying attention to his/her smartphone instead, and a "phubbee" may be defined as a person who is ignored by his/her companion(s) in a social situation because his/her companion(s) uses or check their smartphones instead. Although researchers have begun to consider some of the consequences of problematic smartphone use like phubbing, such as negative consequences for relationship satisfaction and personal wellbeing (Roberts & David, 2016), very little is known about what causes phubbing, and how it has become a pervasive feature of modern communication. We draw upon existing findings in other domains of communication (specifically Internet communication) to understand the factors that predict smartphone addiction and phubbing behavior, and also to understand how phubbing has become a strong norm of communication.

2.2. Possible predictors of smartphone addiction and phubbing

First, *Internet addiction* has been defined as a "maladaptive pattern of Internet use leading to clinically significant impairment or distress" (Goldberg, 1996, p.1). Some researchers argue that problematic smartphone behavior is closely related to Internet addition and may have some similar consequences. Specifically, researchers investigating *smartphone addiction* have shown that like Internet addiction, problematic smartphone use is associated with withdrawal, intolerance, compulsive behavior and functional impairment (Lin et al., 2014; Mok et al., 2014; Takao, Takahashi, & Kitamura, 2009). Excessive smartphone use and compulsive smartphone checking is also associated with interpersonal relationship problems such as inhibition of interpersonal closeness and trust development (Przybylski & Weinstein, 2013), interference of other social activities (Walsh, White, & Young, 2008), and insecurity in romantic relationships (Kuss & Griffiths, 2011). Moreover, in a recent study, Internet addiction was positively related to phubbing behavior (Karadağ et al., 2015). It is therefore reasonable to suggest that problematic Internet use would be associated with problematic smartphone use, which in turn may predict phubbing behavior.

Second, we investigate the predictive value of *fear of missing out* (FoMO), which is described as "the fears, worries, and anxieties people may have in relation to being in (or out of) touch with the events, experiences, and conversations happening across their extended social circles" (Przybylski, Murayama, DeHaan, & Gladwell, 2013, p.1842). FoMO debilitates people by arousing their insecurities and has been found to be associated with persistent mobile phone overuse (Carbonell, Oberst, & Beranuy, 2013). This anxiety about being left out of the information circuit also plays a crucial role in seeking out social networking services, need satisfaction, life satisfaction, and mood (Przybylski et al., 2013), which have all been connected to levels of smartphone addiction (Davey & Davey, 2014; Kwon et al., 2013; Salehan & Negahban, 2013). Recent research has found FoMO to be associated with problematic mobile phone use (Cheever et al., 2014; Hong, Chiu & Huang, 2012; Lepp et al., 2014). It is therefore plausible to suggest that FoMO would predict mobile phone addition, which in turn may predict phubbing behavior. The fear of missing important information on social media, for example, may be associated with problematic phone use, meaning that people then turn to their phones rather than interacting with the people in their presence.

Third, several studies have shown that *self-control* is closely related to addictive behavior (Kim, Namkoong, Ku, & Kim, 2008; Malouf et al., 2014; Mehroof & Griffiths, 2010; Perry & Carroll, 2008; Tangney, Baumeister, & Boone, 2004) and has also been linked to problematic smartphone use (Billieux, Van der Linden, d'Acremont, Ceschi, & Zermatten, 2007). It is argued that, similar to substance-dependence related symptoms, people with high urgency or high level of difficulty controlling their impulses may be unable to moderate their mobile phone use (Billieux, Van der Linden, & Rochat, 2008). Meanwhile, lack of perseverance can disturb task focusing and increase the incidence of irrelevant cognitions (Bechara & Van Der Linden, 2005), which may also enhance the frequency of mobile phone use (Billieux et al., 2008). It is therefore reasonable to suggest that self-control, in predicting smartphone addiction, may in turn predict problematic smartphone behavior in the form of phubbing.

Therefore, smartphone addiction itself should be a proximal predictor of phubbing behavior. Phubbing and smartphone addiction may share the same properties because they are both related to inappropriate smartphone uses and behaviors. It seems inevitable that people who are addicted to their smartphones will use their

device uncontrollably even it is discourteous or a prohibited time and place to do so (Bianchi & Phillips, 2005; Billieux et al., 2014; Jones, 2014; Walsh, White, Hyde, & Watson, 2008).

2.3. How has phubbing become the norm?

Phubbing behavior, phubbers and phubbees can be commonly seen everywhere in today's modern society (Haigh, 2015). Another question is therefore how this behavior has become acceptable or normative. Understanding the relationship between the extent to which people phub and the extent to which they are phubbed is an important part of answering this question. The concept of reciprocity in social psychology plays a key role for understanding human interaction and social exchanges (Berg, Dickhaut, & McCabe, 1995; Cialdini, 1993; Falk & Fischbacher, 2006). Reciprocity occurs when someone returns a social action that has positive consequences for another (Pelaprat & Brown, 2012) or retaliates with an action, resulting in negative consequences (Keysar, Converse, Wang, & Epley, 2008). In terms of phubbing, ignoring companions via smartphone may cause such behaviors to be reciprocated intentionally or unintentionally. In turn, and with repeated reciprocity of phubbing behavior, this may influence the extent to which phubbing is perceived to be normative or acceptable. In the past, social norms often took decades or centuries to be developed or recalibrated (Axelrod, 1986; Miller & Prentice, 1996; Sherif, 1936). However, societies have always experienced dramatic shifts in new social norms and people tend to adopt these norms rapidly (Sunstein, 1996). Norms are also derived from observable and personal behavior (Miller & Prentice, 1996). It is therefore possible to gauge the extent to which observable behavior (being phubbed) and personal behavior (phubbing) can predict the extent to which people view phubbing as normative.

2.4. Gender

Gender has been found to play a crucial role in influencing many smartphone-associated behaviors such as preference for online activities (Ha & Hwang, 2014), mobile phone addiction (Baron & Campbell, 2012; Geser, 2006), internet addiction (Geser, 2006; Jang & Ji, 2012), self-control (Nakhaie, Silverman, & LaGrange, 2000), and communication etiquette (Forgays, Hyman, & Schreiber, 2014). However, very little is currently known about how phubbing behavior, being phubbed, and perceived social norms of phubbing differ between males and females. Meanwhile, gender has a moderating effect on the relationship between social norms and many aspects of human consumption behavior (Kolyesnikova, Dodd, & Wilcox, 2009) such as alcohol consumption (Lewis & Neighbors, 2004), internet banking (Karjaluoto, Riquelme, & Rios, 2010), and online purchasing (Dittmar, Long, & Meek, 2004). Recently, it was found that gender plays a moderating role on the relationship between phubbing behavior and both mobile phone and Internet addiction (Karadağ et al., 2015). It is therefore reasonable to propose that gender plays an important role in determining phubbing behavior, is associated with the antecedents of phubbing, and influences the extent to which phubbing is perceived as normative.

2.5. The present study

Although phubbing has become a growing area of interest in recent years, research on the social antecedents and effects of phubbing is extremely limited. Further, research on the perceived normativity of phubbing is, to our knowledge, non-existent. Knowing more about these factors will extend our understanding of social behavior within an environment of rapidly shifting communication technologies. The main aim of our study is therefore to examine the factors that predict phubbing behavior, and explore the ways in which people redefine social communication norms as their own behavior, and the behavior of those around them, changes. In particular, we studied the contributing roles of Internet addiction, fear of missing out, and self-control in predicting smartphone addiction, and how smartphone addiction may lead to phubbing behavior. Moreover, we also examined the potential effects of gender. Participants participated in an online study where they completed scales to measure each of the above variables.

2.6. Research model and hypotheses

Drawing on our literature review, we have developed a research model to explicate the key determinants of phubbing behavior and the perceived social norms of phubbing. The predicted model is depicted conceptually in Fig. 1. We hypothesized that Internet addition and FoMO would positively predict smartphone addiction, and that self-control would negatively predict smartphone addiction. Next, we predicted that smartphone addiction would positively predict phubbing behavior. Further, we hypothesized that phubbing behavior would positively predict the extent to which people are phubbed. We also predicted that both phubbing and being phubbed would positively predict the extent to which people perceive phubbing as normative. Finally, we predicted that gender would moderate the relationships between each determinant in our proposed model.

3. Method

3.1. Participants

After giving their informed consent, participants completed an online questionnaire designed via Qualtrics software. Two hundred and seventy-six participants (102 men and 174 women) ranging in age from 18 to 66 ($M = 28.09$, $SD = 9.64$) consisted of 88 undergraduate students at the University of Kent (who participated for course credit), 88 participants from Amazon's Mechanical Turk (MTurk), and 100 volunteers from personal contacts on social networking sites. Eight participants (2.90%) who chose *"No, I do not use a smartphone"* as a response in any questions within this study, were excluded. Then, we removed 17 participants (6.16%) who did not finish the questionnaire. In total, 251 participants (93 men and 158 women) ranging in age from 18 to 66 ($M = 27.70$, $SD = 9.59$) remained in the study. The demographics of the sample are presented in Table 1.

3.2. Materials and procedure

The phubbing questionnaire, Smartphone Addiction Scale — Short Version (SAS-SV), Internet Addiction Test (IAT), Fear of Missing Out Scale (FoMOs), and Brief Self-Control Scale (BSCS) were employed in this study.

Phubbing questionnaire. Initially, phubbing frequency and frequency of being phubbed were measured using items scored (1) *never*, (2) *less often*, (3) *once weekly*, (4) *2 times or more per week*, (5) *once daily*, (6) *2–3 times per day*, (7) *4–5 times per day*, (8) *6–9 times per day*, (9) *10 times or more per day*. Regarding the small numbers of participants in some response categories, the nine categories for phubbing and being phubbed were collapsed into four (less often, less than once daily, 1–3 times per day, and 4 times or more per day). Meanwhile, phubbing duration and duration of being phubbed (per day) were measured using items scored (1) *less than 15 min*, (2) *15–30 min*, (3) *30–60 min*, (4) *60–90 min*, (5)
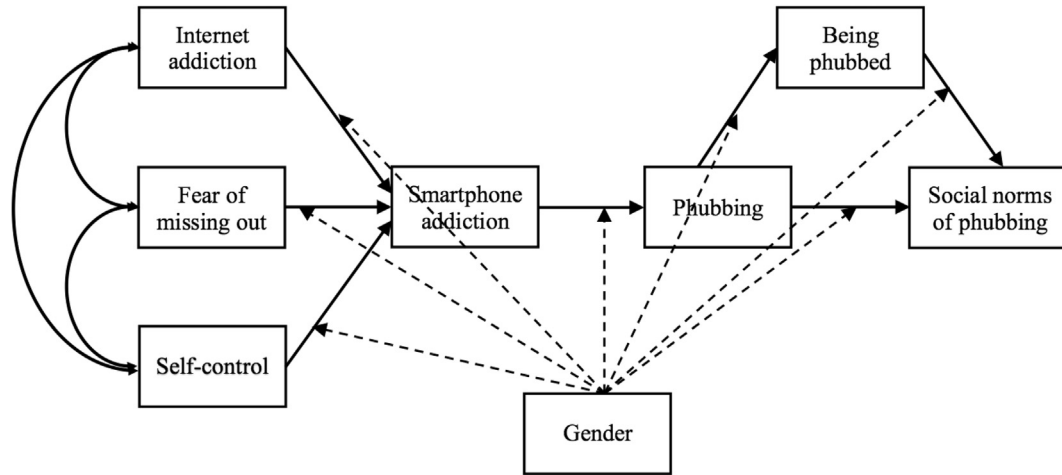
Fig. 1. Proposed conceptual phubbing model using path analysis.

Table 1
General characteristics of participants by gender.

Characteristics	Male $N = 93$% (n)	Female $N = 158$% (n)	Total $N = 251$% (n)
Age (years)			
Mean ± SD	30.30 ± 10.18	26.17 ± 8.90	27.70 ± 9.59
Occupation			
Attending university Full-time	30.11 (28)	48.73 (77)	41.83 (105)
Working Full-time	47.31 (44)	30.38 (48)	36.65 (92)
Attending university Part-time	7.53 (7)	11.39 (18)	9.96 (25)
Working Part-time	8.60 (8)	3.80 (6)	5.58 (14)
Currently unemployed	6.45 (6)	5.70 (9)	5.98 (15)
Education			
No formal education	1.08 (1)	0.63 (1)	0.80 (2)
Primary level education	1.08 (1)	0.63 (1)	0.80 (2)
Secondary level education	25.81 (27)	43.67 (69)	38.25 (96)
College education (Bachelor's)	40.86 (38)	34.81 (55)	37.05 (93)
College education (Graduate)	27.96 (26)	20.25 (32)	23.11 (58)
Ethnicity			
White/Caucasian	58.06 (54)	56.96 (90)	57.37 (144)
Black British Caribbean	0.00 (0)	0.63 (1)	0.40 (1)
Black British African	1.08 (1)	7.59 (12)	5.18 (13)
Other Black background	0.00 (0)	1.27 (2)	0.80 (2)
Asian British Indian	0.00 (0)	1.27 (2)	0.80 (2)
Asian British Pakistani	0.00 (0)	1.90 (3)	1.20 (3)
Chinese	8.60 (8)	8.23 (13)	8.37 (21)
Other Asian background	24.73 (23)	14.57 (23)	18.33 (46)
African American	2.15 (2)	1.27 (2)	1.59 (4)
Hispanic	1.08 (1)	1.27 (2)	0.40 (1)
Other (including mixed ethnicity)	2.15 (2)	5.06 (8)	3.98 (10)
Rather not say	2.15 (2)	1.27 (2)	1.59 (4)

90–120 min, (6) *2–3 h*, (7) *4–6 h*, (8) *more than 6 h*. Again, because of low frequency of some choices, we collapsed duration categories into four (less than 15 min, less than an hour, 1–2 h, and more than 2 h). Phubbing frequency and phubbing duration were summed to create one score for overall phubbing behavior. Further, scores for the frequency and duration of being phubbed were summed to create an overall score of being phubbed. To assess familiarity with the term "phubbing", participants were asked "Do you know what the term "phubbing" means?" (yes or no).

Last, we measured perceived social norms of phubbing. Three items measured descriptive norms which are based on observations of others' behavior (Borsari & Carey, 2003). Items were: "Are you familiar with this type of situation?", "Do you think that people recognize phubbing behavior?", and "Do you think that phubbing behavior typical amongst people around you?" (1 = *not at all*, 2 = *a little*, 3 = *somewhat*, 4 = *quite a bit*, 5 = *very much*; M = 10.99,

SD = 2.36). Two items measured injunctive norms, which are related to the inference of others' approval of phubbing (Borsari & Carey, 2003). These were: "Do you think that phubbing behavior is appropriate?" and "Do you think that other people view phubbing behavior as appropriate?" using the same response categories as the previous set of questions (M = 4.06, SD = 1.38). Although both were included in the study, we expected no differences in relationships associated with descriptive and injunctive norms and so in our predicted model, they were combined to a general measure of perceived social norms of phubbing.

Smartphone Addiction Scale - Short Version (SAS-SV). This scale was developed from the original 33-item Smartphone Addiction Scale (SAS). This involved participants rating their agreement with 10 items (1 = *strongly disagree*; 6 = *strongly agree*; α = 0.91, M = 27.00, SD = 10.11) such as "Missing planned work due to smartphone use", "Won't be able to stand not having a

smartphone", and "The people around me tell me that I use my smartphone too much" (Kwon, Kim, Cho, & Yang, 2013). In this study, 32.3% of female and 29% of male participants scored over the cut-off value of smartphone addiction (higher than 31 for men and 33 for women).

Internet Addiction Test (IAT). This scale contains 20 items consisting of eight items based on the DSM-IV criteria (Diagnostic and Statistical Manual of Mental Disorders, 4th Edition) for pathological gambling and alcoholism such as "How often do you find that you stay online longer than you intended?" and "How often do your grades or school work suffer because of the amount of time you spend online?", along with 12 new items such as "How often do you form new relationships with fellow online users?" and "How often do you lose sleep due to late-night log-ins?" (Young, 1998). Participants responded on a 5-point scale (1 = *rarely*; 5 = *always*; α = 0.89; Frangos, Frangos & Sotiropoulos, 2012) to measure mild, moderate, and severe Internet addictive behavior. The scores can range from 20 to 100; the higher the score, the greater the problems that the Internet causes. Young (2009) suggested that a score ranging from 20 to 49 points is an average online user who has no problem in controlling over their Internet usage. A score ranging from 50 to 79 indicates experiencing in occasional or frequent problems due to Internet usage, and a score ranging from 80 to 100 signifies significant impacts on a person's life directly caused by Internet usage. In this study, the mean IAT score was 33.05 (*SD* = 14.79). The majority of participants (*n* = 217, 86.5%) were categorized as average users. Thirty-three participants (13.1%) were problematic users and only one male participant was categorized as an addictive user.

Fear of Missing Out Scale (FoMOs). The Fear of Missing Out scale (FoMOs), developed by Przybylski et al. (2013) contains 10 items to assess fear of missing out phenomena such as "I fear others have more rewarding experiences than me", "I fear my friends have more rewarding experiences than me", and "I get worried when I find out my friends are having fun without me". Participants responded on a 5-point scale (1 = *not at all true for me*, 5 = *extremely true of me*; α = 0.90, *M* = 2.19, *SD* = 0.79).

Brief Self-Control Scale (BSCS). The Brief Self-Control Scale (Tangney et al., 2004) is a 13-item questionnaire asking participants to rate how well statements (e.g., "I am good at resisting temptation", "I have a hard time breaking bad habits", and "I never allow my self to lose control") describe them on a 5-point scale (1 = *not like me at all*; 5 = *very much like me*, α = 0.85, *M* = 40.48, *SD* = 8.23).

4. Results

All statistical tests were performed using SPSS Statistics version 23.0 and AMOS version 23.0 for Windows. Participants' reported frequency and duration of phubbing and being phubbed are shown in Table 2.

4.1. Predictors of phubbing behavior

As shown in Table 3, a Spearman's rank-order correlation was computed to assess the relationships among variables. All correlations between variables in this study were statistically significant in the expected directions. Self-control negatively predicted smartphone addiction, whereas Internet addiction and FoMO positively predicted smartphone addition. Further, there was a positive correlation between smartphone addiction and phubbing behavior, and between phubbing behavior and being phubbed. Moreover, both phubbing behavior and being phubbed positively correlated with the extent to which people perceived phubbing as normative.

4.2. Testing the predicted model

Missing data were removed before computing the path analysis in accordance with requirements set by AMOS. The following hypothesized paths were tested as shown conceptually in Fig. 1: (1) Internet addiction, fear of missing out, and self-control predict smartphone addiction (2) smartphone addiction predicts phubbing behavior (3) phubbing behavior predicts the experience of being phubbed, and (4) phubbing behavior and experience of being phubbed predict descriptive and injunctive norms of phubbing.

As seen in Fig. 2 and Table 4, being phubbed significantly predicted the perceived social norms of phubbing ($\beta = 0.15$, $p = 0.047$). Phubbing behavior also significantly predicted and had a divergent effect on both the social norms of phubbing ($\beta = 0.19$, $p = 0.011$) and being phubbed ($\beta = 0.58$, $p < 0.001$).

It was found that smartphone addiction significantly predicted phubbing behavior ($\beta = 0.45$, $p < 0.001$). Further, when the effect on smartphone addiction from each variable was calculated, it was revealed that Internet addiction ($\beta = 0.41$, $p < 0.001$) and fear of missing out ($\beta = 0.33$, $p < 0.001$) were positive predictors of smartphone addiction, whereas self-control negatively predicted smartphone addiction ($\beta = -0.12$, $p = 0.016$).

4.3. Moderating effect of gender

Differences in frequency and duration of phubbing and being phubbed according to gender were determined by running A Mann-Whitney *U* test as seen in Table 5. Results indicated that the frequency of phubbing for females (mean rank = 142.03) was significantly higher than for males (mean rank = 98.76), *U* = 9880.00, *z* = 4.73, *p* < 0.001. The result also showed that the duration of phubbing was significantly greater for females (mean rank = 137.67) than for males (mean rank = 106.17), *U* = 9191.50, *z* = 3.86, *p* < 0.001.

A Mann-Whitney *U* test was also run to determine if there were differences in frequency and duration of being phubbed according to gender. Frequency of being phubbed for females (mean rank = 142.68) was significantly greater than for males (mean rank = 97.67), *U* = 9982.00, *z* = 4.91, *p* < 0.001. The results also indicated that the duration of phubbing was significant higher for females (mean rank = 136.47) than for males (mean rank = 108.22), *U* = 11,043.00, *z* = 3.629, *p* = 0.001. In conclusion, the results revealed that women (mean rank = 143.67) phubbed their companions more than men (mean rank = 95.98; (*U* = 10,138.50, *z* = 5.14, *p* < 0.001), and women (mean rank = 142.40) were phubbed by their companions more than men (mean rank = 98.14) (*U* = 9938.00, *z* = 4.75, *p* < 0.001).

Further, a Mann-Whitney *U* test was run to determine if there were differences in the IAT score, SAS-SV score, and FoMOs score, which were not normally distributed for both males and females, as assessed by Shapiro-Wilk's test (*p* < 0.05). Meanwhile, regarding a normally distributed BSCS score, an independent sample *t*-test was run to assess BSCS score. The SAS-SV score for females (mean rank = 137.67) was significantly higher than for males (mean rank = 106.18), *U* = 9190.50, *z* = 3.21, *p* = 0.001, as seen in Table 6.1. On the other hand, the BSCS score, computed with independent sample *t*-test as in Table 6.2, was greater in males (*M* = 42.77, *SD* = 8.51) than female participants (*M* = 39.13, *SD* = 7.77), *M* = 3.65, 95% CI [1.58, 5.72], *t*(249) = 3.47, *p* = 0.001. A Mann-Whitney *U* test showed no significant difference between Gender and IAT score and FoMOs score in our study.

As we found significant gender differences among many variables, we checked the model fit for both men and women before conducting multi-group analysis in AMOS. Our proposed model had acceptable goodness of fit for both male participants

Table 2
General characteristics of phubbing behavior and being phubbed as a function of gender.

Characteristics	Male $N = 93\%$ (n)	Female $N = 158\%$ (n)	Total $N = 251\%$ (n)
Phubbing frequency			
Less often	46.2 (43)	21.5 (34)	30.7 (77)
Less than once daily	25.8 (24)	25.3 (40)	25.5 (64)
2−3 times per day	21.5 (20)	29.7 (47)	26.7 (67)
4 times per day or more	6.5 (6)	23.4 (37)	17.1 (43)
Phubbing duration			
Less than 15 min per day	77.4 (72)	52.5 (83)	61.8 (155)
Less than an hour per day	17.2 (16)	36.7 (58)	29.5 (74)
1−2 h per day	5.4 (5)	4.4 (7)	4.8 (12)
More than 2 h per day	0.0 (0)	6.3 (10)	4.0 (10)
Frequency of being phubbed			
Less often	32.3 (30)	15.2 (24)	21.5 (54)
Less than once daily	31.2 (29)	17.7 (28)	22.7 (57)
2−3 times per day	25.8 (24)	35.4 (56)	31.9 (80)
4 times per day or more	10.8 (10)	31.6 (50)	23.9 (60)
Frequency of being phubbed			
Less than 15 min per day	67.7 (63)	44.9 (71)	53.4 (134)
Less than an hour per day	24.7 (23)	43.0 (68)	36.3 (91)
1−2 h per day	6.5 (6)	10.8 (17)	9.2 (23)
More than 2 h per day	1.1 (1)	1.3 (2)	1.2 (3)

Table 3
Descriptive statistics and spearman correlations among study variables.

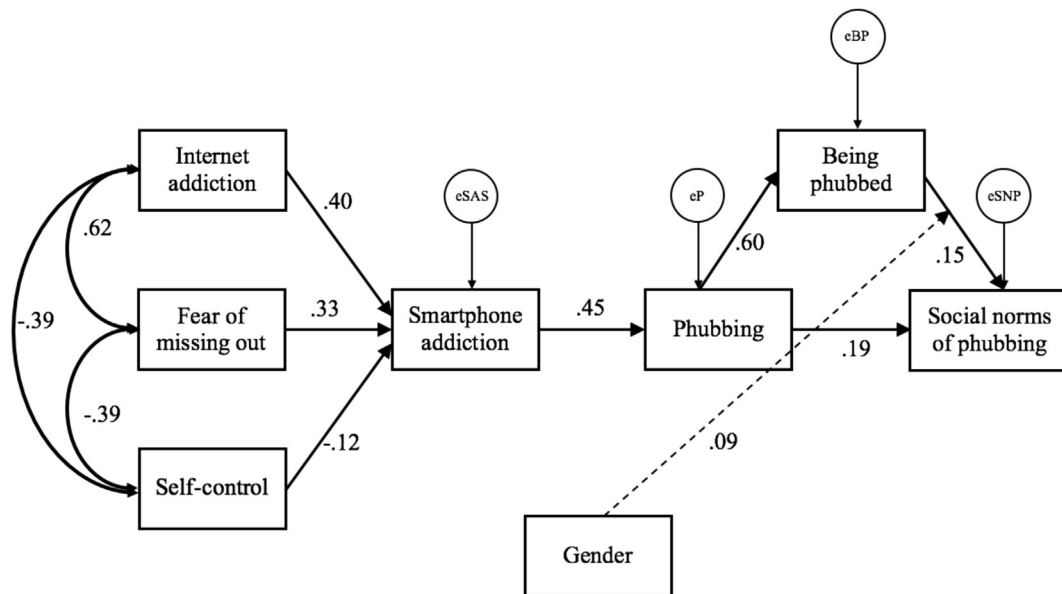| Variables	1	2	3	4	5	6	7	M	SD
1 SAS-SV	−	0.66**	0.61**	−0.39**	0.49**	0.29**	0.23**	27.00	10.11
2 IAT		−	0.58**	−0.40**	0.39**	0.28**	0.26**	33.05	14.79
3 FoMOs			−	−0.39**	0.33**	0.22**	0.15*	21.90	7.89
4 BSCS				−	−0.31**	−0.20**	−0.21**	40.48	8.23
5 Phubbing					−	0.59**	0.28**	3.81	1.61
6 Being phubbed						−	0.28**	4.16	1.58
7 Social Norms of phubbing							−	15.04	2.94

*$p < 0.05$, **$p < 0.01$.

Fig. 2. Phubbing model with standardized coefficients.

($\chi^2(93) = 6.87$, $p = 0.810$, CFI = 1.00, RMSEA = 0.00) and female participants ($\chi^2(158) = 19.54$, $p = 0.052$, CFI = 0.98, RMSEA = 0.07). We compared an original unconstrained model to alternative constrained models, which imposed gender equality constraint of each path in the model. Standardized estimates, constrained χ^2, $\Delta\chi^2$, and its p-value in the nested model were explored to compare gender effects in each path of the model.

Due to the significant chi-square difference ($\Delta\chi^2_{(1)} = 6.38$, $p < 0.05$) as seen in Table 7, gender had a moderating effect on the relationship between being phubbed and the social norms of phubbing, which was stronger in men ($\gamma = 0.36$, $p < 0.01$) compared to the same relationship in women ($\gamma = 0.00$, $p > 0.05$).

Table 4
Results of standardized structural path estimates.

Dependent Variable	Independent Variable	B	SE	β	t-value	p	R Square
Social norms of phubbing	Phubbing	0.35	0.14	0.19	2.54	0.012	0.09
	Being phubbed	0.28	0.14	0.15	1.98	0.049	
Being phubbed	Phubbing	0.58	0.05	0.60	11.74	0.000	0.36
Phubbing	Smartphone addiction	0.07	0.01	0.45	7.90	0.000	0.20
Smartphone addiction	Internet addiction	0.28	0.04	0.41	7.08	0.000	0.52
	Fear of missing out	0.42	0.07	0.33	5.79	0.000	
	Self-control	−0.14	0.06	−0.12	−2.40	0.017	

B, unstandardized coefficients; SE, standard error; β, standardized coefficients.

Table 5
Non-parametric test of the gender difference in scores of phubbing and being phubbed.

	Male (n = 93)		Female (n = 158)		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
	Mdn	Mean rank	Mdn	Mean rank				
Phubbing frequency	2.00	98.76	3.00	142.03	9880.00	22,441.00	4.73	<0.001
Phubbing duration	1.00	106.17	1.00	137.67	9191.50	21,752.50	3.86	<0.001
Phubbing sum score	3.00	95.98	4.00	143.67	10,138.50	22,699.50	5.14	<0.001
Being phubbed frequency	2.00	97.67	3.00	142.68	9982.00	22,543.00	4.91	<0.001
Duration of being phubbed	1.00	108.22	2.00	136.47	9000.50	21,561.50	3.33	0.001
Sum score of being phubbed	3.00	98.14	5.00	142.40	9938.00	22,499.00	4.75	<0.001

As such, a hierarchical multiple regression was run to confirm the increase in variation. Gender moderated only the effect of being phubbed on perceived social norms of phubbing, as evidenced by a statistically significant increase in total variation explained of 2.4%, $F(1, 245) = 6.568$, $p < 0.05$ and the coefficient of the interaction term ($b = 0.753$, $SE = 0.294$) which was statistically significant ($p < 0.05$). We also went on to compare and found no significant moderating role of gender on the path between internet addiction and smartphone addiction, fear of missing our and smartphone addiction, self-control and smartphone addiction, smartphone addiction and phubbing, phubbing and being phubbed, and phubbing and social norms of phubbing.

In conclusion, the hypothesis suggesting that gender has a moderating effect was confirmed, but only for the relationship between being phubbed and the extent to which phubbing feels like normative behavior for people (see Fig. 2). Overall however, the predicted model found good support in the current data.

5. Discussion

To our knowledge, this study represents the first examination of both the antecedents and consequences of phubbing behavior. We found that Internet addiction, fear of missing out, and self-control predicted smartphone addiction, which in turn predicted phubbing behavior and the extent to which people are phubbed. Further, phubbing behavior and the experience of being phubbed predicted the extent to which phubbing was perceived to be normative. Finally, gender moderated the effect of being phubbed on the perceived social norms of phubbing.

5.1. Theoretical contributions

First, these results suggest that the key predictors of problematic Internet use — derived from theoretical perspectives and empirical research on Internet addition — also predict problematic smartphone use (Billieux et al., 2014; Lee et al., 2014, 2014; Lin et al., 2014), and this in turn predicts a behavior that is likely to be detrimental to everyday social interactions. Indeed, smartphones have a wider variety of functions and applications than ordinary cell phones that have less technological capability (Falaki et al., 2010). This multi-functional improvement may therefore alter the definition of smartphone addiction from previous conceptualizations (Takao et al., 2009). In particular, it is now more important to focus on Internet-based activities rather than on normal cell phone uses when taking into account the behaviors that people engage in when using mobile phone technology (Kwon et al., 2013). Ongoing theoretical developments explaining Internet behavior are also therefore likely to explain changes in smartphone behavior.

However, this study goes further to develop a theoretical account of why phubbing has become normative. Specifically, our study suggests that phubbing may have become the norm as a result of both observed and personal behavior. People are phubbed, but they are also phubbers. In an environment where people are constantly switching from being the protagonists and recipients of this behavior, our data suggests that phubbing becomes seen as the norm. This may in part occur because personal behaviors, beliefs, and attitudes can often lead to false-consensus effects such that individuals assume that others think and do the same as themselves (Berkowitz, 2005; Marks & Miller, 1987; Ross, Greene, &

Table 6.1
Comparison of psychometric measurements (IAT, SAS-SV, and FoMOs) between genders.

	Male (n = 93)		Female (n = 158)		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
	Mdn	Mean rank	Mdn	Mean rank				
Internet addiction								
IAT score	31.00	121.92	33.00	128.40	7726.00	20,287.00	0.68	0.495
Smartphone addiction								
SAS-SV score	24.00	106.18	29.00	137.67	9190.50	21,751.50	3.32	0.001
Fear of missing out								
FoMOs score	20.00	118.43	21.00	130.46	8051.00	20,612.00	1.27	0.205

Table 6.2
Comparison of psychometric measurement (BSCS) between genders.

	Male ($n = 93$)		Female ($n = 158$)		Independent sample t-test	df	Sig. (2-tailed)
	Mean	SD	Mean	SD			
Self-control							
BSCS score	42.77	8.51	39.13	7.78	$t = -3.47$	249	0.001

Table 7
Comparison of gender differences in the paths of model.

	Standardized estimates		Subgroup comparison (unconstrained $\chi^2_{(22)} = 26.39$)		Results
	Male ($n = 93$)	Female ($n = 158$)	Constrained $\chi^2_{(23)}$	$\Delta\chi^2_{(1)}$	
Internet addiction → smartphone addiction	0.41***	0.44***	26.41	0.02	NS
Fear of missing out → smartphone addiction	0.34***	0.32***	27.00	0.61	NS
Self-control → smartphone addiction	−0.06	−0.10	26.63	0.24	NS
Smartphone addiction → phubbing	0.36***	0.44***	28.76	2.37	NS
Phubbing → being phubbed	0.53***	0.57***	26.50	0.11	NS
Phubbing → social norms of phubbing	−0.01	0.30**	29.41	3.02	NS
Being phubbed → social norms of phubbing	0.36**	0.00	32.77	6.38*	M > F

M = Males, F = Females, NS = not significant.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

House, 1977). People may therefore assume that others phub in the same way that they do themselves, therefore perpetuating the behavior. Further, when people experience phubbing and notice the behavior occurring frequently around them, they may be likely to conclude that this behavior is socially acceptable (Ross, 1977). Our study shows a significant relationship between these two determinants, such that phubbing positively predicts the extent to which people are phubbed. Further, the rule of reciprocity can be assumed as a strong determining factor that turns a phubber into a phubbee. People, in response to discontented actions, tend to commit retaliatory behavior in response (Falk & Fischbacher, 2006; Keysar et al., 2008). Snubbing companions by smartphone may therefore cause phubbing behaviors to be reciprocated.

5.2. Gender as a moderator

Furthermore, we explored the moderating effect of gender on each part of our model. Unexpectedly, it was found that gender moderates only the relationship between being phubbed and the perceived social norms of phubbing. The relationship is stronger for males than females. Along with the gender-specific model comparison in Table 7, the extent to which males are phubbed tends to be the main predictor of perceived social norms of phubbing in men, whereas the extent to which females phub their companions tends to be the main predictor in women. This can perhaps be explained by subjective motivations and communication differences between women and men. Research suggests that males see smartphones as empowering devices with instrumental functions, while females use smartphones as facilitators of social interaction (Baron & Campbell, 2012; Geser, 2006). As a social activity, phubbing is perhaps therefore more predictive of perceived normative behavior for males because, since they engage in phubbing less than women, norms are more informed by observing others' behavior rather than their own.

5.3. Implications

By identifying the factors that predict smartphone addiction, this study can contribute to the assessment of problematic smartphone behavior and interventions to deal with this. More novel, however, is our finding that phubbing is a direct consequence of problematic smartphone use. By identifying phubbing as a key outcome, practitioners may use phubbing behavior as a measure of the success of interventions targeted at problematic smartphone use. The results of this study also allow us to better understand how problematic smartphone use has become acceptable or normative. Efforts to address problematic smartphone use may therefore benefit from considering the role of norm development and how norms can be both informed by, and at the same time fuel behavior. These findings also raise awareness about the etiquette associated with smartphone use compared to other domains and the how the expectations of communicators may change as technology develops further.

5.4. Limitations and future directions

Several limitations of this study need to be considered in future research. First, the number of participants was relatively small compared to other online surveys and the ratio of gender was not 1:1. Participants were predominately young females, and of White/Caucasian or Asian ethnic background. The unequal distribution of age, gender and ethnicity did not allow us to analyze the potential effects associated with these variables. In particular, further research is required to establish what smartphones and phubbing behavior may mean differently for women and men. Further, in a sample where gender was more equally distributed, we could have considered not only our proposed model but also gender-specific models of how phubbing becomes the norm for each gender.

Age differences are also likely to be important. Age differences are well established in other communication domains such as phone manner (Turner, Love, & Howell, 2008) and the use of mobile phones while driving (Lipscomb, Totten, Cook, & Lesch, 2007). In addition, older people tend to view others' smartphone behavior as more negative compared to their own (Hakoama & Hakoyama, 2012). Further studies should therefore consider the influence of age on the phenomena studied in the current research.

Another important extension of this work would be to investigate the real-life effects of phubbing behavior on the quality of

social interactions. Extending on the survey research of Roberts and David (2016), experimental work could shed light on the effects of different degrees of phubbing on factors such as relationship satisfaction and feelings of social inclusion. Furthermore, longitudinal studies in which the nature of phubbing behavior in routine communication is tracked over time would further inform researchers about the potential consequences of phubbing.

Further, respondents in the current study were sampled among adults who participated for course credit, were paid on MTurk, or were acquaintances of the researchers on social networking sites. Whilst this provided a diverse sample, it was not entirely random. Also, because all measures were self-reported, we cannot confirm responses with the exact frequency and duration of people's phubbing experiences. Finally, because there were no established scales of general phubbing behavior in the literature, we designed the measures ourselves. Validated tools need to be created to more fully understand this phenomenon and researchers need to pay careful attention to sampling and measurement issues in future research.

6. Conclusions

To the best of our knowledge, this study is the first to consider both the antecedents and consequences of phubbing behavior. It is also the first to consider how phubbing may have become such a pervasive norm in modern communication. A significant portion of the world's population use smartphones to conduct their everyday lives. Many people simply cannot live without them. It is therefore increasingly important for social scientists to consider the impact that they have on the quality of social life.

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