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# Investigating the impact of partner phubbing on romantic jealousy and relationship satisfaction: The moderating role of attachment anxiety

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## Abstract

The ubiquitous and omnipresent smartphone has dramatically altered how people communicate. The present research investigates how partner phubbing (phone snubbing) among romantic partners impacts relationship satisfaction. Study 1 experimentally manipulates partner phubbing and finds it drives romantic jealousy and relationship satisfaction. Study 2 uses an alternative manipulation of partner phubbing and explores the moderating role of interpersonal attachment anxiety in the relationship between partner phubbing, romantic jealousy, and relationship satisfaction. Study 2 finds that partner phubbing and attachment anxiety have an interactive effect on jealousy, which then leads to relationship satisfaction. Study 3 employs a survey and finds that partner phubbing has downstream negative effects on well-being through romantic jealousy, but only among anxiously attached individuals. The heavy use of technology, especially smartphones, in the presence of one's romantic partner, and the negative outcomes associated with partner phubbing, establishes the importance of research in this area. Directions for future research and study limitations are discussed.

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The wide-spread use of smartphones has become a potentially complicating factor undermining romantic relationships. Partner Phubbing (phone snubbing) is best understood as the perceived extent to which your romantic partner uses or is distracted by his/her smartphone while in your presence (Roberts & David, 2016). Partner phubbing (Pphubbing) is ubiquitous (Chotpitayasunondh & Douglas, 2018a) and has been found to undermine relationship satisfaction amongst romantic partners (Chotpitayasunondh & Douglas, 2018b; Cizmeci, 2017a, 2017b; Krasnova et al., 2016; Roberts & David, 2016; Vanden Abeele et al., 2016). Research on the impact of a broader array of technological devices (lap-tops, computers, iPads, television, and smartphones) labelled, "technoference," has also found that such interference can undermine relationship satisfaction (c.f., McDaniel & Coyne, 2016; McDaniel & Drouin, 2019; McDaniel et al., 2020).

The negative relationship between phubbing and relationship satisfaction, however, may not hold for all individuals and situations. Research by Miller-Ott and Kelly (2015), and Kelly et al. (2017, 2019) found that smartphone use while with one's romantic partner is expected in some situations (e.g., "hanging out" with your partner) and may not negatively impact relationships.

The present study investigates the impact of partner phubbing on relationship satisfaction. The potential mediating impact of romantic jealousy and the moderating role of interpersonal attachment anxiety are also examined.

## *Study contributions*

The present study makes several important contributions to the literature. To begin, a model is created and tested that explains one potential path as to how partner phubbing impacts relationship satisfaction. Given the growing use of social media on smartphones (Salim, 2019), it is increasingly likely that ignoring one's romantic partner to scroll social media may foster jealousy in the phubbed partner (Elphinston et al., 2011; Miller-Ott & Kelly, 2015; Utz et al., 2015). Two aspects of the present model are noteworthy. The inclusion of romantic jealousy as a mediator between Pphubbing and relationship satisfaction is an important contribution of the present research. It would be naïve, however, to believe that all romantic partners would react the same to being phubbed by their partner (Crowley et al., 2018; Kelly et al., 2019; Misra et al., 2016).

A second contribution of this research is the inclusion of attachment anxiety as a moderator of the Pphubbing–romantic jealousy relationship. Individuals with high levels of interpersonal attachment anxiety, compared to those with less anxious, more secure attachment styles, will likely respond to being phubbed with increased levels of reported jealousy (Roberts & David, 2016). In turn, higher levels of jealousy will likely lower overall levels of relationship satisfaction.

A third contribution of the present study is that it tests two manipulations of partner phubbing to experimentally assess the causal direction of the proposed relationship

between partner phubbing and relationship satisfaction. A small but growing body of research has experimentally manipulated or studied longitudinally the impact of partner phubbing on relationship quality (c.f., Chotpitayasunondh & Douglas, 2018a; Dwyer et al., 2018; McDaniel & Drouin, 2019; McDaniel et al., 2020). Additional causal and/or longitudinal studies in this area of research are needed. One potential explanation for the relationship between partner phubbing and relationship satisfaction could be that less satisfied partners may turn to their phones to cope with an unsatisfying relationship. The present study's experiments provide a possible answer to this conundrum.

## Literature review and research hypotheses

*Partner phubbing and relationship satisfaction.* Relationship satisfaction is best understood as the extent to which a romantic partner perceives that his or her partner meets their needs and desire (Peleg, 2008). Healthy romantic relationships, marriage or otherwise, are critically important to our well-being. Individuals in satisfying romantic relationships report higher levels of both psychological and physical well-being (Leggett & Rossouw, 2014). How romantic partners communicate has been identified as a key antecedent to relationship satisfaction (Ahlstrom et al., 2012). Given the marked increase in the use of smartphones to communicate (Marin-Diaz et al., 2020; McDaniel, 2015), research that studies their rise in romantic relationships is well-warranted.

Vanden Abeele (2020) identifies three "socio-cognitive" mechanisms to explain how phubbing impacts romantic relationships. All three theories appear to have face validity and empirical support. First, romantic partners have certain expectations of each other when spending time together. Roberts and David (2016) found that partner phubbing's impact on relationship satisfaction was mediated by cell phone related conflict. This conflict may be explained by Expectancy Violations Theory as demonstrated by Vanden Abeele (2020). Being phubbed by your romantic partner while spending time together may violate what many people expect from their romantic partners. When a partner violates what is expected from him or her, the phubbed partner is aroused. Individuals will try to cope with such arousal by attempting to determine the motive and meaning of such a violation, which could lead to feelings of jealousy.

What people expect of their romantic partners regarding smartphone use, however, can be somewhat nuanced. Smartphone use while spending time with one's romantic partner is taken for granted by most college students and young adults (Kelly et al., 2017; Miller-Ott & Kelly, 2015). Expectations regarding smartphone use are likely context-specific and somewhat fluid when on a date or spending time alone with a romantic partner. Smartphone use in these circumstances is frowned upon, but exceptions exist. In less formal settings ("Just Hanging Out"), smartphone use is expected. Smartphone use during these more informal times does not appear to negatively impact relationship satisfaction among college students if the use is not "excessive" (Miller-Ott & Kelly, 2015, p. 262).

A second potential explanation for phubbing's negative impact on relationship satisfaction could be what Vanden Abeele (2020) labels attentional conflict (Attentional Conflict Theory). As mentioned earlier, the mere presence of a smartphone when two people are interacting leads to lower levels of perceived closeness, connection and

conversation quality (Przybylski & Weinstein, 2013). In their study of 100 conversational dyads in Seattle coffee shops, Misra et al. (2016) found that, when no smartphone was present, ratings of conversation partner empathy and conversation quality increased. Crowley et al. (2018), however, in their attempt to replicate Przybylski and Weinstein's (2013) results, failed to find that the mere presence of a smartphone undermined perceived relationship quality. The authors conclude that the norms regarding smartphone use during conversations may have changed. Kelly et al. (2017) argue that smartphone use while spending time with one's romantic partner is expected.

Based on a series of 10 focus groups with college students, Miller-Ott and Kelly (2015) conclude that different levels of attentiveness are expected across different contexts. Focus group participants stated that dates and intimate moments at home spent together called for undivided attention (no, or limited smartphone use) while "Hanging out together" did not require their undivided attention, and smartphone use was not considered a negative intrusion on time spent together. Research by Chotpitayasunondh and Douglas (2018a) found that perceived conversation quality decreased when conversation partners used their smartphones "most of the time" compared with only "part of the time." Likewise, Vanden Abeele et al. (2019) found that conversation partners reported higher levels of distraction and less intimacy when phubbing was more frequent.

Several longitudinal studies using daily diary data and follow-up surveys investigated the impact of technoference on relationship quality. Results of these studies found that as technoference increased, romantic partners reported lower levels of relationship satisfaction, higher levels of technology-related conflict, and worse moods (McDaniel & Drouin, 2019; McDaniel et al., 2020).

For a relationship to be mutually satisfying, both participants must be present at some level for each other. To be present for one's romantic partner individuals must remain open and focused on that partner, without external or internal distraction (Leggett & Rossouw, 2014). Phone use while with your romantic partner provides both external (handling one's smartphone) and internal distraction (processing the information on one's phone).

Based upon the theories and empirical results discussed above, we hypothesize that partner phubbing will lead to lower levels of relationship satisfaction:

H1: As partner phubbing increases, lower levels of relationship satisfaction will be reported.

*The mediating impact of romantic jealousy.* We posit that romantic jealousy will mediate the relationship between partner phubbing and relationship satisfaction. Given that much of the time spent on smartphones is on social media (David et al., 2018), it is reasonable to argue that as levels of partner phubbing increase so will levels of romantic jealousy. Romantic jealousy may best be understood as a perceived threat (real or imagined) to one's romantic relationship. Cognitive jealousy entails the frequency in which someone worries or suspects that the other person in the relationship is romantically involved at some level with another person. Jealousy is considered to exist on a continuum from normal to pathological (Elphinston et al., 2011).

A primary driver of romantic jealousy is the loss of exclusive attention of one's romantic partner (Krasnova et al., 2016; Miller-Ott & Kelly, 2015). Jealousy's role as a proposed mediator between partner phubbing and relationship satisfaction can best be explained by two somewhat over-lapping theories: Social Exclusion Theory (SET) and Attentional Conflict Theory (ACT) (Vanden Abeele, 2020). Phubbed individuals may feel ostracized. Elsewhere, the present authors have argued that Williams' (2009) need-threat model provides strong conceptual support in explaining how partner phubbing can undermine relationship satisfaction (David & Roberts, 2017, 2020). Ostracism is best understood as the perception of being ignored and/or excluded by individuals or groups (Williams, 2009). When a romantic partner ignores his or her partner while attending to their smartphone it is likely to engender a sense of exclusion in the phubbed partner. Such a sense of exclusion would likely stimulate feelings of romantic jealousy. That is, phubbed individuals likely feel ignored or excluded when their significant other loses focus on them and instead tends to interactions on his/her phone; such feelings are likely to lead to romantic jealousy concerns (Krasnova et al., 2016).

Attentional Conflict Theory's usefulness as it pertains to phubbing is straightforward. Phubbing, or even the mere presence of a smartphone, can act as a "sign of disengagement" (Vanden Abeele, 2020, p. 11) and engender feelings of exclusion. As discussed in the next section of this manuscript, in relationships where one or more partner is anxiously attached, partner phubbing is particularly likely to lead to increased feelings of jealousy. The outcomes of jealousy are primarily negative including conflict between the romantic partners as well as increased dissatisfaction with the relationship itself (Roberts & David, 2016).

Several extant studies provide empirical support for the proposed relationship between partner phubbing and romantic jealousy. Muise et al. (2009) found that increased Facebook use was positively associated with Facebook-related jealousy concerning their romantic partner. Elphinston et al. (2011) also found that Facebook intrusion invokes jealousy and ultimately relationship satisfaction through cognitive and behavioral jealousy. Utz et al. (2015) found that not all social media are created equal in engendering feelings of jealousy. Snapchat was found to invoke more feelings of jealousy than Facebook. The motives behind why people use the two social media sites makes it clear why Snapchat fosters higher levels of jealousy. Young adults reported that Snapchat is used to flirt and find prospective love interests while Facebook is used more to keep up with friends and family. Miller-Ott and Kelly (2015) found that focus group participants felt that smartphone use during intimate moments is a signal that their partner was interested in someone else or being pursued by someone else. Using both qualitative interviews and survey data, Krasnova et al. (2016) found that partner phubbing was positively associated with feelings of jealousy, which in turn, was inversely associated with a measure of relational cohesion that is a close approximate for relationship satisfaction.

Given the theory and empirical results discussed above, we predict that being phubbed by your romantic partner will invoke feelings of jealousy that will lead to lower levels of reported relationship satisfaction:

H2: The relationship between partner phubbing and relationship satisfaction will be mediated by romantic jealousy.

*The moderating role of attachment anxiety.* Vanden Abeele (2020) states that several factors exist that may affect the impact of partner phubbing on the recipient of such behavior. Under the category of dispositional factors, she argues that personality factors likely influence the impact phubbing has on the affected individual. Roberts and David (2016) found that one's interpersonal attachment style moderated the relationship between perceived partner phubbing and cell phone conflict. Those with more anxious attachment styles reported higher levels of cell phone related conflict compared to those individuals with more secure (less anxious) attachment styles. Several studies support the notion that an individual's attachment style influences how he or she processes everyday occurrences (David & Bearden, 2017; Gabriel et al., 2010; Johnson et al., 2012; Neff & Karney, 2009).

Attachment theory proposes that individuals' experiences in early relationships (e.g., availability and responsiveness of caregivers) shape their perceptions of and expectations of relationships, as well as how they behave in relationships (Ainsworth et al., 1978; Bowlby, 1969). Focusing upon the dispositions and propensities undertaken by individuals in their development of relationships, the theory suggests that individuals with different attachment styles are likely to construe the same relational-relevant events in different ways, as they are predisposed to interpret such events in ways that are consistent with their existing expectations and beliefs (Bowlby, 1969; Collins, 1996; Grossmann et al., 2005; Simpson & Rholes, 2010). Thus, it is likely that individuals' attachment styles affect their responses to interpersonal situations (Collins, 1996; Collins & Read, 1990; Kim et al., 2018; Vicary & Fraley, 2007), such as being phubbed by one's romantic partner.

Anxious attachment styles are held by individuals who, based on being cared for in an inconsistent manner, have a strong need for closeness and are preoccupied with attachment, while also worrying about relationships and fearing rejection (Hazan & Shaver, 1987; Mikulincer & Nachshon, 1991). Attachment research has repeatedly shown that attachment styles which are high in anxiety are characterized by dysfunctional perceptions in relationships (Collins & Feeney, 2004; Feeney, 2008; Shaver et al., 2005; Simpson & Rholes, 2010). For example, individuals who are high in attachment anxiety are less likely to experience positive emotions in personal interactions, as they are predisposed to construe relational events in a more negative light compared to their less anxious, more securely attached counterparts (Collins, 1996; Simpson, 1990; Vicary & Fraley, 2007).

When faced with unknowns in an interpersonal relationship, insecure, or highly anxiously attached individuals are more likely than securely attached counterparts to infer that their relationship partners are unreliable and untrustworthy (Collins & Read, 1990; Kim et al., 2018; Vicary & Fraley, 2007). These findings are consistent with Mikulincer and Shaver's (2003) threat-activation model, which explains that when a potential threat is detected, people with different attachment styles use different strategies to regulate their emotions when faced with a potential threat.

Similarly, the literature on attachment styles consistently shows that anxiously attached individuals use *hyperactivating strategies*, in which they are highly sensitized to detecting any possible threat-related cues (Shaver et al., 2005). For example, Huelsnitz et al. (2018) predicted and found that that individuals with highly anxious attachment styles, who have chronic concerns about interpersonal rejection and display a hypervigilant response pattern, are particularly sensitive to any possible cues regarding relational threats. It might be assumed that one's romantic partner is pursuing other romantic interests when they are on their phone (Miller-Ott & Kelly, 2015). A highly anxious partner is more likely to interpret phubbing behavior as a sign of infidelity compared to an individual with a more secure interpersonal attachment style. Given the above, we offer the following hypothesis:

H3: Interpersonal attachment anxiety will moderate the relationship between partner phubbing and romantic jealousy.

## Methods

Hypotheses 1–3 layout a process through which Pphubbing impacts relationship satisfaction. We posit that Pphubbing's impact on relationship satisfaction is mediated by romantic jealousy. And, that the relationship between Pphubbing and romantic jealousy is moderated by attachment anxiety. Next, we present three studies designed to test these predictions.

### *Study 1*

Adult participants from Amazon's Mechanical Turk (MTurk) participated in study 1. Consistent with commonly used criteria in psychological research, only participants who met the following criteria were allowed to complete the study: live in the US, at least 18 years of age, have at least a 95% MTurk approval rating, and have completed at least 1,000 approved studies on MTurk (Kumar, 2013; Necka et al., 2016; Staffelbach et al., 2014). The sample consisted of 191 adults in the US (50% male, $M_{age} = 39$, Range = 19, 71). The majority of participants were Caucasian (81%), followed by African American (8%), Asian (7%), and Hispanic (4%). Nine percent of participants had a high school diploma, 36% had some college, 46% had a college degree, and 9% had a masters/doctoral degree. The average income among participants was $62,920 (range = $0–$225,000). Eighty-three percent of participants were currently in a romantic relationship; the remaining participants were asked to think of their most recent romantic relationship when responding to survey questions related to their romantic partner.

Study 1 manipulated partner phubbing. Specifically, participants were randomly assigned to the partner phubbing condition or a control condition. Participants in the partner phubbing condition (n = 94) were shown the following:

Think of a prior experience when you were spending time with your relationship partner and he/she seemed preoccupied with his/her phone. Specifically, think of a time spent when your significant other snubbed you by using and engaging with their smartphone rather than

> interacting with you. Please take a moment to relive the event in your mind. Once you have a vivid recall of it, use the space below to write several sentences describing the experience.

Participants in the control condition (n = 97) were shown the following:

> Think of a prior experience when you were spending time in person with your relationship partner. The time spent with your significant could be an instance where you and your partner were running errands together, watching a movie, or on a date, etc. Please take a moment to relive the event in your mind. Once you have a vivid recall of it, use the space below to write several sentences describing the experience.

After completing the partner phubbing prime, participants advanced to the next section of the study in which romantic jealousy ($\alpha = .90$) was assessed using an established measure. Specifically, participants responded to the cognitive dimension of the short-form jealousy scale by Elphinston et al. (2011) which was developed based on Pfeiffer and Wong's (1989) original MJS. Example items include "I suspect that my partner may be attracted to someone else," and "I think my partner is secretly developing an intimate relationship with someone of the opposite sex." Participants responded to the items using a 7-point response scale (never–all the time). Participants' relationship satisfaction ($\alpha = .94$) was assessed using an established 4-item measure (Murray et al., 2015). Specifically, participants indicated their agreement with the 4 items using a 7-point scale (where 1 = Strongly disagree and 7 = Strongly agree). An example item is "I am satisfied with my relationship." Before submitting the study, participants responded to a manipulation check in which they indicated which of the following two options best describes what they thought about in the scenario they were presented with at the beginning of the study: (1) a time when their partner snubbed them by using his/her phone rather than paying attention to them or (2) any particular time they have spent time with their relationship partner.

*Results.* A Chi-square test confirms that the manipulation worked as expected; specifically, participants in the partner phubbing (vs. control) condition correctly indicated that the scenario they were presented with at the beginning of the study made them think about a time when their relationship partner snubbed them by using his/her phone rather than paying attention to them ($X_{(191)} = 168.06$, $p < .01$).

The Preacher and Hayes (2008) PROCESS model 4 was used to test the predictions in H1 and H2 that phubbing is negatively associated with relationship satisfaction and that romantic jealousy mediates this relationship. First, the model tests phubbing as a predictor of romantic jealousy ($F_{(1, 189)} = 4.10$, $p < .05$, $R^2 = .02$). The main effect of partner phubbing was significant ($b = .30$, $p < .05$); phubbing by one's partner resulted in greater feelings of romantic jealousy ($M_{PartnerPhubbing} = 3.20$, $M_{Control} = 2.90$, $p < .05$). Next, the model tests the impact of partner phubbing and romantic jealousy on relationship satisfaction ($F_{(2, 188)} = 29.42$, $p < .05$, $R^2 = .24$). The main effect of partner phubbing ($b = -.51$, $p < .05$) was significant and negative, thus providing support for H1. That is, participants in the partner phubbing (vs. control) condition reported lower satisfaction with their relationship ($M_{PartnerPhubbing} = 5.23$, $M_{Control} = 5.99$, $p < .05$). The main effect

of romantic jealousy ($b = -.56$, $p < .05$) was significant and negative. In support of H2, the results show that the relationship between partner phubbing and relationship satisfaction is mediated by romantic jealousy ($b = -.17$, SE = .09, 95% CI [−.343, −.003], $p < .05$).

## Study 2

Study 2 consisted of 120 adults in the US (53% male, $M_{age} = 40$, Range = 20–73) who were recruited through MTurk using the same criteria for inclusion as in study 1. Most participants were Caucasian (83%), followed by African American (8%), Asian (6%), and Hispanic (2%). Thirteen percent of participants had a high school diploma, 20% had some college, 46% had a college degree, and 20% had a masters/doctoral degree. The average annual household income among participants was $60,959 (range = $0–$272,000). Eighty percent of participants were currently in a romantic relationship; the remaining participants were asked to think of their most recent romantic relationship when responding to survey questions related to their relationship partner.

Participants were randomly assigned to either a partner phubbing condition or a control condition. Participants in the partner phubbing condition (n = 61) were told that before they began the main study, we wanted to share a news clip with them related to how people often snub their significant others during time spent together by using their cell phone instead of paying attention to their partner. The news clip used as the phubbing prime was selected based on its use in extant research which showed that the phubbing prime activated specific thoughts regarding the extent to which people that they spend time with in person are distracted by their smartphones (David & Roberts, 2017). Participants in the control condition (n = 59) were shown a similar news clip, but one that reported on the use of different language/words used in verbal exchanges between partners. Consistent with extant research (David & Roberts, 2017), participants were shown the respective prime/news clip for 30 seconds during which time they were asked to consider how the behaviors described are related to those that they may experience while spending time with their significant other.

After completing the manipulation, participants advanced to the next part of the study. Here, participants' romantic jealousy ($\alpha = .87$) and relationship satisfaction ($\alpha = .94$) were assessed using the same scales as in study 1. In addition, attachment anxiety ($\alpha = .90$) was measured using the 5-item measure by Johnson et al., (2012). This measure has been used in previous work related to smartphone use, personal relationships, and well-being (e.g., Roberts & David, 2016). Specifically, participants indicated how much they disagree/agree (on a 7-point scale) with the 5 items. An example item includes: "I worry that the people I have relationships with will not care about me as much as I care about them." The study measures were rotated in order and each measure was separated by a short filler task. At the end of the study, participants responded to demographic questions and a manipulation check item which asked participants to consider the news report they were presented with at the beginning of the study and to indicate which of the following best describes what the situation made them think about: (1) their partner's use of a smartphone during time spent with him/her or (2) their partner's language and specific words used when talking to him/her.

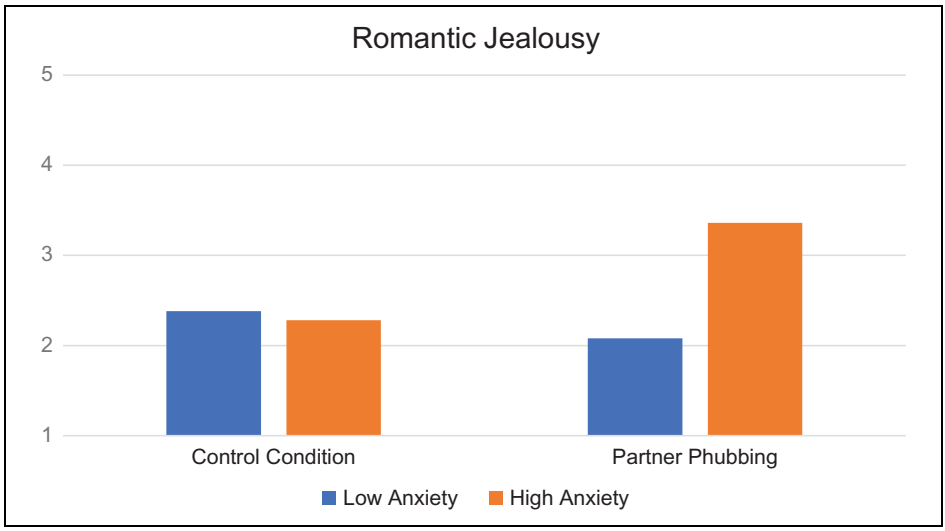


**Figure 1.** Study 2 results for romantic jealousy.

*Results.* A Chi-square test confirms that the manipulation worked as expected; specifically, participants in the partner phubbing (vs. control) condition correctly indicated that the news report and situation they were asked to consider at the beginning of the study made them think about their partner's use of a smartphone during time spent with him/her (vs. their partner's language and specific words use when talking to him/her) ($X_{(120)} = 78.89$, $p < .01$).

The Preacher and Hayes (2008) PROCESS Model 7 was used to test the moderated mediation prediction that partner phubbing, attachment anxiety, and the interaction of these two variables drive romantic jealousy which in turn has a negative effect on relationship satisfaction. First, a regression ($F_{(5,\ 114)} = 7.62$, $p < .05$, $R^2 = .25$) with partner phubbing, attachment anxiety, and the interaction of these variables as the predictors and romantic jealousy as the dependent variable revealed a significant interactive effect of partner phubbing and attachment anxiety ($b = .38$, $p < .05$). The main effects of partner phubbing and attachment anxiety were non-significant. In support of H3, the results show that the conditional effect of partner phubbing on romantic jealousy is significant among anxiously attached individuals ($b = .90$, SE = .28, 95% CI [.32, 1.47], $p < .05$), but non-significant among individuals who are low in attachment anxiety ($p > .05$).

Post hoc tests at one standard deviation above and below the mean score of attachment anxiety revealed, as shown in Figure 1, that partner phubbing resulted in greater romantic jealousy among anxiously attached individuals than among their less anxious counterparts ($M_{LowAnxiety} = 2.08$, $M_{HighAnxiet} = 3.36$, $p < .05$). Similarly, among highly anxiously attached individuals, phubbing resulted in greater romantic jealousy ($M_{PartnerPhubbing} = 3.36$, $M_{Control} = 2.28$, $p < .05$).

The Preacher and Hayes (2008) PROCESS Model 7 next tests the impact of partner phubbing, attachment anxiety, and jealousy on relationship satisfaction

($F_{(4, 115)} = 21.92$, $p < .05$, $R^2 = .43$). As predicted, jealousy has a significant effect on relationship satisfaction ($b = -.68$, $p < .05$). The main effect of partner phubbing was not significant. Importantly, the results show that the conditional indirect effect of partner phubbing on relationship satisfaction via romantic jealously is significant among anxiously attached individuals ($b = -.61$, SE = .09, 95% CI [−1.05, −.18], $p < .05$), but non-significant among individuals who are low in attachment anxiety ($p > .05$). Of note, attachment avoidance and gender were included as covariates; additional analyses were conducted without the inclusion of these two variables and the results were consistent with those presented above.

## Study 3

Study 3 (n = 300, 50% male, $M_{age} = 35$, SD = 9.46) was a survey conducted using Amazon's MTurk with the same participant requirements as used in the previous studies (Kumar, 2013; Necka et al., 2016; Staffelbach et al., 2014). Nearly three-quarters of the participants were Caucasian (77%), followed by African American (12%), Hispanic (10%), and Asian (6%). Sixteen percent of participants had a high school diploma, 28% had some college, 44% had a college degree, and 11% had a masters/doctoral degree. Seventy-six percent of participants were currently in a romantic relationship; the remaining participants were asked to think of their most recent romantic relationship when responding to the survey questions about their relationship partner.

Partner Phubbing ($M = 2.95$; $SD = .96$; $\alpha = .93$) was assessed using the 9-item measure by Roberts and David (2016). Example items include "During a typical mealtime that my partner and I spend together, my partner pulls out and checks his/her phone," and "My partner keeps his/her cellphone where he/she can see it when we are together." A 5-point response scale was used for the nine partner phubbing items (ranging from never to all of the time).

Romantic jealousy ($M = 3.29$; $SD = 1.22$; $\alpha = .85$) was assessed using the same measure as in study 1 (Elphinston et al., 2011; Peiffer & Wong, 1989). Attachment anxiety ($M = 3.31$; $SD = 1.69$; $\alpha = .90$) was measured using the same 5-item scale as in study 2 (Johnson et al., 2012). Well-being ($M = 2.39$; $SD = 1.10$; $\alpha = .86$) was assessed using the 4 items from the Kroenke et al. (2009) PHQ-4 measure of anxiety and depression. This measure has been used in related work by Roberts and David (2016). The order of these measures was rotated. The final section of the study included demographic items.

*Results.* The Preacher and Hayes (2008) PROCESS Model 7 was used to test the prediction that partner phubbing, attachment anxiety, and the interaction of these two variables drive romantic jealousy which in turn has a negative effect on well-being. First, a regression ($F_{(5, 294)} = 47.11$, $p < .05$, $R^2 = .45$) with partner phubbing, attachment anxiety, and the interaction of these variables as the predictors and romantic jealousy as the dependent variable revealed a significant interactive effect of partner phubbing and attachment anxiety ($b = .13$, $p < .05$). The main effects of phubbing and attachment anxiety were positive and significant. In addition, the results support H3; specifically, the

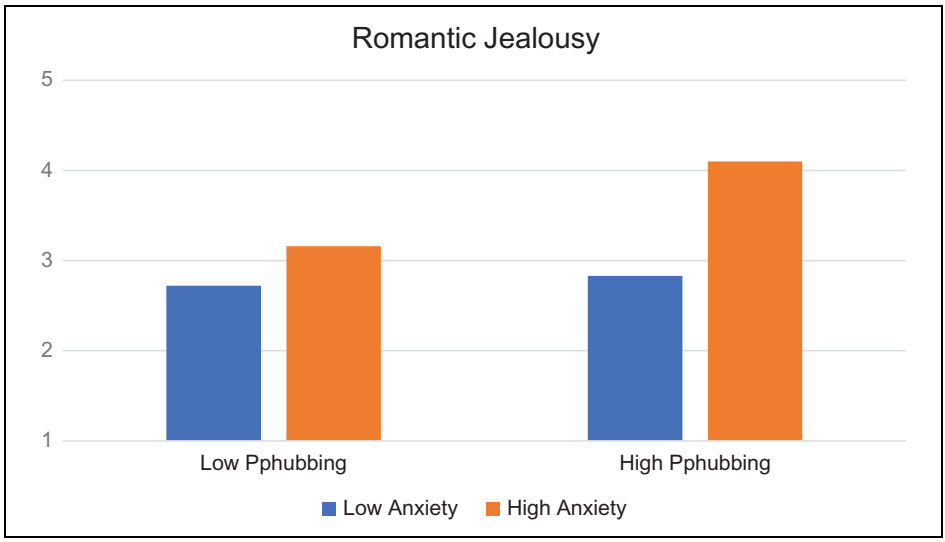


**Figure 2.** Study 3 results for romantic jealousy.

conditional effect of partner phubbing on romantic jealousy is significant among anxiously attached individuals ($b = .49$, SE $= .09$, 95% CI [.32, .66], $p < .05$), but non-significant among individuals who are low in attachment anxiety ($p > .05$). Post hoc tests at one standard deviation above and below the mean anxiety score, as shown in Figure 2, indicate that partner phubbing results in greater romantic jealousy among anxiously attached individuals than among their less anxious counterparts ($M_{LowAnxiety} = 2.83$, $M_{HighAnxiety} = 4.10$, $p < .05$). Similarly, among highly anxiously attached individuals, phubbing resulted in greater romantic jealousy ($M_{HighPhubbing} = 4.10$, $M_{LowPhubbing} = 3.16$, $p < .05$).

The Preacher and Hayes (2008) PROCESS Model 7 next tests the impact of partner phubbing, attachment anxiety, and jealousy on negative well-being ($F_{(4, 295)} = 49.61$, $p < .05$, $R^2 = .40$). Jealousy has a significant effect on well-being ($b = .30$, $p < .05$); the main effect of partner phubbing was not significant. Importantly, the conditional indirect effect of partner phubbing on well-being via romantic jealously is significant among anxiously attached individuals ($b = .15$, SE $= .06$, 95% CI [.05, .26], $p < .05$), but non-significant among individuals who are low in attachment anxiety ($p > .05$). Of note, attachment avoidance and gender were included as covariates; additional analyses were conducted without the inclusion of these two variables and the results were similar to those presented above.

Overall, the results of studies 1–3 show support for our conceptual model and the predictions in H1–H3. Studies 1 and 2 manipulated partner phubbing, while study 3 used an established measure of partner phubbing. Rather than focusing only on relational outcomes of partner phubbing, study 3 included a measure of well-being as a dependent variable and as an ultimate outcome of the impact that partner phubbing and attachment anxiety have on individuals.

## Discussion

As previous research has shown, many people are addicted to their smartphones (Bjornsen, 2018; Lopez-Fernandez et al., 2015; Roberts et al., 2014). Smartphones often wrest attention away from current conversation partners, especially romantic partners. We interrupt time with our romantic partners to attend to our smartphones or altogether ignore them to (over) use our constant digital companions. Using smartphones in the presence of our romantic partners has become the new norm (Chotpitayasunondh & Douglas, 2016). It appears many individuals choose to interact with their smartphones at the expense of human interaction (Griffiths, 2000; Roberts & David, 2016; Roberts & Pirog, 2013).

To maintain healthy romantic relationships, partners must be free of internal and external distractions and be fully present for each other. The present study finds that partner phubbing increases romantic jealously and ultimately, reduces relationship satisfaction. It appears, however, that the negative outcomes of partner phubbing are contingent upon the attachment style of the offended partner, such that interpersonal attachment anxiety bolsters the negative impact of partner phubbing on romantic jealousy.

An important contribution of the present research is the inclusion and use of two manipulations of partner phubbing. The present study contributes to a small but growing body of research which has experimentally manipulated phubbing to assess its impact on several outcome variables (Chotpitayasunondh & Douglas, 2018a; David & Roberts, 2017; Dwyer et al., 2018; McDaniel & Drouin, 2019; McDaniel et al., 2020; Przybylski & Weinstein, 2013; Vanden Abeele et al., 2016). Importantly, much of this research has used behavioral manipulations of technoference or phubbing related behaviors (Dwyer et al., 2018; Przybylski & Weinstein, 2013; Sprecher et al., 2016; Vanden Abeele et al., 2016); whereas the current research used cognitive manipulations of phubbing. The results presented herein provide evidence that suggests that cognitive manipulations of phubbing (such as in Study 1 and Study 2 herein) may be as useful as behavioral manipulations of phubbing and are likely to result in similar effects, at least in terms of meaning. While the two manipulations of phubbing used in the present studies contribute to experimental research which has studied outcomes of phubbing, it also hints at areas for future research related to the exploration of potential differences in meaning or relative effect sizes between cognitive manipulations (such as in Study 1 and Study 2 herein) and behavioral manipulations of phubbing in relationships. We discuss this further in the section below on future research.

The present study hypothesized and found that partner phubbing has an inverse relationship with relationship satisfaction, and that this relationship is mediated by romantic jealousy (Study 1). Study 2 shows that the impact of partner phubbing on romantic jealousy is moderated by interpersonal attachment anxiety. The act of partner phubbing appears to be the catalyst but having a partner with a highly anxious attachment style exacerbates the harmfulness of this behavior, heightening the level of jealousy experienced and thus reducing one's relationship satisfaction.

A second contribution of the present study is that it offers a model of one potential path as to how partner phubbing may impact relationship satisfaction. Romantic jealousy

was found to mediate the impact of partner phubbing on relationship satisfaction. It appears that using one's smartphone in the presence of one's romantic partner can stimulate romantic jealousy. A more robust test of the present model would include a host of additional relational factors in assessing the impact of partner phubbing including the length of the relationship, intimacy of the relationship, time spent together, age of the partners, and the gender of one or both partners. It might be that attachment anxiety as used in the present research captures much of the impact such variables would have on romantic jealousy and relationship satisfaction.

As a post hoc test, study 3 presented herein found that partner phubbing is associated with lower well-being. Such outcomes support the importance of research that examines the impact of technology use, especially smartphones, on human well-being. New technologies are usually embraced with little thought of their long-term implications. Smartphones have been no exception. A sharp increase in research interest in this area is a good barometer that people are rethinking the role that technologies like smartphones play in our lives. Given the importance of relationships with others to our long-term happiness, anything that interferes in establishing such relationships must be given heightened scrutiny.

A third contribution of the present study was the use of attachment anxiety as a moderator of the Pphubbing–jealousy relationship. Only Roberts and David (2016) had previously modelled attachment anxiety as a possible moderator of this relationship. The present study's finding in this regard suggests that the act of phubbing your romantic partner is not, in and of itself, a negative act. It is how the phubbed individual sees him or herself via their romantic partner that dictates whether phubbing increases romantic jealousy or not. Those with different levels of attachment anxiety have different expectations in regard to interpersonal communications and behavior when spending time with their romantic partner. Those high in attachment anxiety are hypervigilant concerning any information regarding their relationships with others—particularly their romantic partners. Thus, unlike those with more secure attachment styles, when phubbed, highly anxious individuals are more likely to experience romantic jealousy as they worry that this behavior may be a signal that their partner is romantically interested in someone else.

## *Limitations and future research directions*

Although the present research uses two unique experimental manipulations of Pphubbing and a survey to establish its impact on jealousy, relationship satisfaction, and well-being, its results must be tempered by certain limitations. First, the present research used adult samples recruited via Amazon's MTurk. Although these samples provided a better test of the study's model than the use of college students, the samples were self-selected to a certain degree and thus may not be without limitations. To expand the generalizability of future studies, randomly selected samples of a cross-section of US adults is recommended.

A second possible limitation of the present research is its findings regarding the causal relationship between Pphubbing and relationship satisfaction. Although both of the present study's manipulations of Pphubbing found that it decreased relationship

satisfaction, this does not rule out the possibility that relationship satisfaction may drive Pphubbing.

Future research needs to address the possible bi-directional relationship between these two variables. Relatedly, future research should explore potential differences in meaning or relative effect sizes between cognitive manipulations (such as in Study 1 and Study 2 herein) and behavioral manipulations of phubbing in relationships. While results suggest that the effects of phubbing are likely similar across manipulation forms, smaller effect sizes are likely with non-behavioral manipulations of phubbing, as these manipulations are likely prone to memory biases, recall constraints, and issues related to psychological realism (Hales et al., 2018). Indeed, relatively small effect sizes were found in the present research; for example, the findings of study 1 showed a small effect size (partial eta-squared $= -.02$) of the phubbing manipulation on jealousy. Such small effect sizes were not unexpected given that our studies used cognitive (vs. behavioral) manipulations of phubbing and explored relatively simple models without considering numerous potential moderators (other than attachment style) that could impact jealously and relationship satisfaction. In addition, the sample size of the two experimental studies presented herein could also explain the small effect sizes observed, as these studies had relatively small cell sizes compared to what has been recommended in related research; Dwyer et al. (2018) suggest that future experiments similar to those conducted herein should have a minimum of 165 participants per cell.

A third possible limitation of the present study is that it did not include several of the "contingency factors" identified by Vanden Abeele (2020) that could affect the impact of phubbing on important outcomes. These contingency factors are grouped into four categories by Vanden Abeele (2020): behavioral, relational, cultural, and contextual. Although study 3 included a measure of phubbing (and thus indirectly gets at the intensity of phubbing), other behavioral factors not considered in the present research could include whether the phubbing is self-initiated or a response to an outside request for attention. The present study included one possible dispositional factor—interpersonal attachment anxiety. Future research should also consider relational factors such as the type of relationship (married, romantic partner, friends, colleagues, etc.).

## Conclusion

Smartphone (over) use is a prime example of the "Paradox of Technology" (Mick & Fournier, 1998). The use of smartphones can be both freeing and enslaving. A growing body of research shows that smartphone use is a common distraction amongst romantic partners. The present study investigated how Pphubbing (phone snubbing) can invoke romantic jealousy and undermine relationship satisfaction among romantic partners. Further, it was found that Pphubbing may indirectly engender negative well-being through its impact on romantic jealousy among anxiously attached individuals.

The present study makes several important contributions to the "Pphubbing" literature. First, Pphubbing was experimentally manipulated in two unique ways (Studies 1 and 2). These studies add to a growing body of literature that has attempted to establish the causal impact of Pphubbing on relationship satisfaction. A second contribution of the present study is the inclusion of romantic jealousy in the present model. Given the recent

sharp increase in social media use it is likely that a romantic partner's smartphone use while in the presence of their significant other could invoke romantic jealousy. The use of attachment anxiety as a moderator of the Pphubbing–romantic jealousy relationship is a third contribution of the present study. Study results suggest that the impact of Pphubbing on romantic jealousy, relationship satisfaction, and well-being is contingent upon the attachment style of the phubbed partner.

The creation and testing of a new model that explains one potential path as to how Pphubbing and attachment anxiety impact romantic jealousy, relationship satisfaction, and individual well-being is an important contribution of the present research.

Study 1 found that Pphubbing impacts relationship satisfaction and that this relationship is mediated by romantic jealousy. Study 2 used a second unique manipulation of Pphubbing and found its impact on romantic jealousy is moderated by attachment anxiety. Those with higher attachment anxiety were more likely to experience romantic jealousy when encountering Pphubbing than those with more secure attachment styles. Study 3 used a survey to assess Pphubbing's impact on jealously as well as individual well-being. The results of Study 3 indicate that Pphubbing has a conditional indirect effect on negative well-being via romantic jealousy for anxiously attached individuals, but not among individuals low in attachment anxiety. Given the increasingly digitized nature of modern living, and the importance of healthy romantic relationships to individual well-being, research that investigates technology use in the presence of others is of paramount importance.

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## Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This research was not pre-registered. The data used in the research cannot be publicly shared but are available upon request. The data can be obtained at jim_roberts@baylor.edu. The materials used in the research are available upon request. The materials can be obtained at jim_roberts@baylor.edu.

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