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Impact of partner phubbing on negative emotions: a daily diary study of mitigating factors

Michal Frackowiak[1,3] · **Peter Hilpert**[1] · **Pascale Sophie Russell**[2]

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Abstract
Interactions between romantic partners may be disturbed by a co-present mobile phone use when a partner ignores their interaction partner in favor of a smartphone. This common practice, called *phubbing*, promotes social rejection and exclusion, hence the partner who gets phubbed may report negative emotional experiences. However, these experiences may be buffered by a cognitive perception mechanism, when the partner's behavior is still perceived as responsive (i.e., understanding or validating). Thus, we hypothesize that feeling understood or validated moderate the link between phubbing intensity and negative emotions. To test our hypotheses, we conducted a daily diary study over seven days, using a sample of $N = 133$ participants living with their partner. Multilevel modeling was applied, to examine between- and within-person processes. The findings indicate that perception of the partner as understanding and validating, despite the co-present mobile phone use, reduces the negative emotional experiences during phubbing, and the interaction effects indicate nuances between phubbing and understanding and validation by partner, which extend our theoretical comprehension and distinguish between the two as separate relationship-related constructs. Our research provides a unique insight into how mechanisms related to couple interactions may reduce negative experiences, a finding that may be useful in future interventions and couples' therapy.

Keywords Partner phubbing · Understanding · Validation · Negative emotions · Daily diary · Dyadic interactions

Introduction

Research has found that partner phone snubbing in dyadic interactions (hereafter called phubbing) has a negative impact on intimate relationships, including lower intimacy (Halpern & Katz, 2017), and higher negative affect (Guazzini et al., 2021). However, the theoretical understanding of the association between perception of partner phubbing and experiencing negative emotions is limited. It is also important to investigate what psychological mechanisms may mitigate the consequences of phubbing and the experience of negative emotions. The current research examines phubbing in a daily diary study; exploring links between being phubbed by a partner and experiencing feelings of sadness, upset, loneliness, and anger. Additionally, we test empirically if appraisals of understanding and validation by a partner can buffer the negative impact of phubbing on experienced negative emotions.

Phubbing in interactions between intimate partners

Frequent face-to-face interactions between romantic partners aid establishment and maintenance of intimacy which ensures that the needs of both partners are met (Mills & Clark, 1982). Partners may use the interactions with their significant others to seek understanding and acceptance (Venaglia & Lemay, 2017), which are important to healthy functioning of the self and relationships. Such interactions may be disturbed by phubbing, which involves partner A ignoring partner B by engaging with a mobile phone (Vanden Abeele, 2020). The partner using the mobile phone becomes a *phubber*, which makes the receiver a *phubbee*. Phubbing has recently become common due to the widespread use of mobile devices. Being phubbed

✉ Michal Frackowiak
michal.frackowiak@unil.ch

Peter Hilpert
peter.hilpert@unil.ch

Pascale Sophie Russell
p.s.russell@surrey.ac.uk

[1] Institute of Psychology, University of Lausanne, Lausanne, Switzerland

[2] School of Psychology, Univerrsity of Surrey, Guildford, UK

[3] imec-mict-ugent, Ghent University, Ghent, Belgium

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violates participants' expectations of their partner's behavior in an intimate setting (Vanden Abeele et al., 2016), as it may abuse symmetrical patterns of dyadic interactions (Sullaway & Christensen, 1983). Phubbing by a partner has been found to produce negative relationship outcomes, such as lower relationship satisfaction (McDaniel et al., 2020; Przybylski & Weinstein, 2013), lower trust (Roberts & David, 2016), and lower intimacy (Halpern & Katz, 2017). Cunningham et al. (1997) proposed that negative emotional reactions may arise during repetitive events occurring in daily interactions, especially when the behavior is viewed as intentional and personally directed (Roberts & David, 2022). We argue that repetitive exposure to such behavior, i.e., phubbing, from a partner may be associated with negative emotional experiences.

Escalation of negative emotional experiences during interactions with phubbing

Emotions play a central role in interpersonal relationships (Shaver et al., 1987). Studies report that the experience of being snubbed due to a mobile phone may be associated with a heightened negative emotional state, for instance, in the customer service setting (Fellesson & Salomonson, 2020). Ochs and Sauer (2022) found that participants experienced a sense of loss of human contact due to the interference of mobile devices. Intense phubbing, that is, when the partner feels the most ignored by their counterpart, has been found to reduce their feelings of belongingness (Chotpitayasunondh & Douglas, 2018). Relationship science has reported few findings related to experienced emotions. For instance, Krasnova et al. (2016) open-coded participants' responses, showing that a percentage of participants expressed feeling annoyed and angry with a partner's use of mobile phone during the interaction. In a recent daily diary study, Thomas et al. (2022) found that on days when daily partner phubbing was high, phubbees reported higher anger/frustration. Although several empirical studies show links between perceived partner phubbing and negative emotions, the studies do not allow for a broader theoretical understanding of the association between phubbing and discrete emotions.

Conception of a theoretical link between perception of partner phubbing and discrete emotions can be bolstered by a theoretical concept of a *social allergen* (Cunningham et al., 1997). The concept refers to relatively minor unpleasant behaviors to which individuals may develop sensitivity, and repetition-sensitized response in emotional reactions following partner's undesired and intrusive behaviors, e.g., when they do not provide time or attention. Partner phubbing, as a social allergen, may be an emotion-arousing behavior or a situation seen as unpleasant, but not necessarily unbearably aversive (Cunningham et al., 2005). The negative emotions may arise in case of partner B phubbing partner A, due to the partner A having a pre-existing mind association with their partner, where their engagement with the mobile phone is associated with lack of responsiveness, non-reciprocity, intrusion, or a norm violation. The framework is also supported by the notion that phubbing may be seen as an example of asymmetrical and dysfunctional interaction patterns in couples (Sullaway & Christensen, 1983), that is, a communication sequence between partners where the roles assumed by each of the partners are not similar. For example, a situation in which partner A's desire for partner B's attention is met with the withdrawal and disengagement of the latter (because of the mobile phone use), may elicit an emotional response.

Building upon the evidence and Cunningham et al.'s (1997, 2005) theory of a social allergen as an emotion-arousing behavior, we propose that being phubbed by a partner may lead to elevated negative emotional experiences. Based on the theoretical framework and existing evidence, partner phubbing may be perceived by the phubbee as an unwanted behavior and an act of being inconsiderate. Because the co-present engagement with the mobile device promotes withdrawal from the interaction and exclusion of the interaction partner, perception of such behavior may result in various negative emotional experiences and jeopardize the relationship's intimacy (Davis & Perkowitz, 1979; Miller et al., 1983). Appraisal literature suggests that different emotions may be elicited or resurfaced because of the same event (Arnold, 1960; Lazarus, 1966), thus, we propose four discrete emotions that may be considered products of being phubbed: sadness, feeling upset, loneliness, and anger.

Sadness

Sadness is a basic emotion and experiencing it may reflect an underlying concern for one's intimate relationship (Sanford, 2007). Experiences of sadness are associated with feeling alone and may be indicative of scarce desired qualities in the relationship (Greenberg & Goldman, 2008). A partner may feel sad when they get phubbed, when their affection is not returned, and it may be expected due to partner B's distractibility while using the phone. Phubbing has been associated with averted eye gaze and lack of immediacy behaviors promoting closeness (Mehrabian, 1972; Vanden Abeele, 2020), which may be perceived as a threat to the basic need of belonging (Wirth et al., 2010). Exposure to such type of ostracism in a relationship has been argued to prompt feeling hurt, and promoting a surge in basic emotions, e.g., sadness and anger (Ren et al., 2018), especially in close relationships (e.g., Clark et al., 1996; Leary & Springer, 2001; Sanford, 2007), given that a fundamental human need for belonging is endangered.

Feeling upset

Emotional upset has been mainly studied in the framework of a dual process model (Bodie et al., 2011), showing that people may feel upset when they do not receive emotional support from their partner, especially in everyday situations and interactions (Burleson, 2008, 2009). The literature indicates that even when a partner is perceived to attempt to provide support, but it fails to come through or is perceived as cold, it may also result in stronger emotional upset (Holmstrom et al., 2005). This entails insensitive attempts of a partner to provide emotional support, despite potential good intentions behind them. Due to its multitasking and task-switching nature, phubbing may be associated with a jeopardized attempt of partner B trying to offer responsiveness and support to partner A, despite being simultaneously engaged with the content on the mobile phone screen. Such an approach may result in a rather distracted attention and impersonal responses, moderate in *person centeredness*, i.e., the extent to which a partner's messages explicitly acknowledge and contextualize the other partner's feeling and perspective (Burleson, 1994). Phubbing has also been associated with partner withdrawal and body language that promotes disengagement from a dyadic interaction (Vanden Abeele, 2020). Physical distancing from the partner and lower affection in interactions has also been found to be a predictor of psychological upset and distress (Burleson et al., 2022).

Loneliness

Loneliness is an unpleasant sentiment and experience produced due to insufficient social relations or intimacy in existing social relationships (DiTomasso & Spinner, 1997; Peplau & Perlman, 1982). Clinical research has demonstrated that partners may experience loneliness when their significant one is not available for an interaction or to provide support, and the studies have drawn parallels between experiences of loneliness and sadness (Dykstra & Fokkema, 2007; Leary, 2015). Theoretical frameworks indicate that loneliness is not a temporary state invoked by a momentary stimulus, unlike anger, but rather stable and continuous in its nature (Knoke et al., 2010). The experience of loneliness has been studied in the context of intimate relationships, and it has been found that the absence of intimate interactions between partners may be a cause of loneliness (Wheeler et al., 1983). Since phubbing in an interaction is associated with partner's psychological absence (Fortunati, 2002; Gergen, 2002), lower levels of intimacy (Halpern & Katz, 2017) and lower quality of social interactions (Vanden Abeele et al., 2016), we assume that being phubbed by one's partner in an intimate setting may lead to experiences of loneliness.

Anger

Anger commonly occurs in negative social interactions, and is often related to negative appraisals of another person's intentions (Frijda et al., 1989). Anger has been argued to be an intensive short-term emotional state produced as a response to an unwanted stimulus (Kubany et al., 1995). In the context of intimate relationships, anger has been associated with aversive events entailing partner blame. It tends to be brief and rather momentary, aimed at the partner because of a negative outcome and heightened perception of blame in an intimate setting (Fischer & Roseman 2007). Just like sadness, anger may also be experienced during rejection episodes (Leary, 2015), but it can also be associated with perception of a norm being violated. Participants have reported that they would be angry and annoyed if the standards expected from their partners were not fulfilled in a specific situation (Vangelisti & Alexander, 2002). Previously, phubbing has been linked to a negative moral judgment of a partner's behavior (Frackowiak et al., 2022), which predicts higher levels of anger (Fischer & Roseman, 2007). Based on the assumption that anger is provoked as a response to an undesirable outcome caused by someone else in an intimate setting, we assume that one's perception of a partner phubbing them, may be associated with heightened anger in the partner.

Perceived partner responsiveness: understanding and validation

To comprehend what could buffer the negative emotional experiences during partner phubbing, we draw from the model of the intimacy process (Reis & Shaver, 1988). We assume that the link between partner phubbing and negative emotional experiences might be altered if the partner is still seen as responsive (Reis, 1994) even though they are engaging in co-present mobile phone use. This nuanced mechanism relies on the partner's ability to multitask and stay on their mobile phone device whilst attempting to remain attentive and has been scarcely explored in the literature. Vanden Abeele (2020), however, has highlighted the importance of the belief whether the interaction partner is responsive or not during the mobile phone use, because perception of lower partner responsiveness may not be a direct product of the co-present mobile phone use. Perceived partner responsiveness (PPR) defines how partners listen and are responsive to each other's needs (Reis, 2012) and it comprises two aspects: *understanding* and *validation*.

Understanding refers to the ability to accurately recognize a partner's point of view and their needs. It entails a perception that a partner correctly understands one's feelings and is cognizant of their experiences (Reis et al., 2017). Participants tend to report positive emotions when they perceive that their partner

understands them (Collins & Feeney, 2000), and understanding has also been found to counteract the impact of conflict in couples (Gordon & Chen, 2016). *Validation* entails showing acceptance of a partner's point of view and conveying support for their needs (Maisel & Gable, 2009; Reis & Patrick, 1996; Reis et al., 2004). People feel the need to have their views of themselves and the world confirmed by their partner (Schlenker & Leary, 1985). Gottman (1979) has argued that validation by a partner may raise an individual's self-esteem and confidence, which promotes reduction in negative emotions (e.g., Ikiz & Cakar, 2010; Szcześniak et al., 2020).

Whilst *understanding* and *validation* both contribute to PPR (Reis & Clark, 2013), it has been emphasized that the beliefs of the partner being understanding of one's experiences *and* validating one's perception of them, do not necessarily co-occur (Reis & Patrick, 1996). Despite the tendency for the two variables to correlate strongly, they can be theoretically differentiated as distinct. For instance, partner A might understand partner B's situation but completely disagree and invalidate partner B's position. Additionally, several theorists have argued the *understanding* by a partner to be a precursor of *validation* (e.g., Derlega, 1984; Reis & Shaver, 1988). Pioneering theoretical perspectives on intimacy in relationships have looked at understanding and validation as separate constructs (Rogers, 1961; Sullivan, 1953). Feeling understood involves a cognition that the partner knows one's thoughts and needs, although the Reis and Shaver (1988) intimacy model demonstrates that feeling validated may occur without understanding by partner, or, by contrast, be associated with perception of complete misunderstanding by partner (Reis, 2006). Furthermore, a partner may be seen as understanding but not validating as they may exploit personal vulnerabilities (e.g., Reis, 2006). The subtle differences between the two concepts prompt us to study them separately, to aid exploration of theoretical nuances, as to how these concepts buffer against negative emotions that can be triggered by phubbing.

Feeling understood and validated by a partner has been found to contribute to positive affect (Collins and Feeney, 2000) and buffer the impact of negative interactions (Gordon & Chen, 2016). Research shows that appropriate, that is, expected responses enhance feelings of connectedness (Kurth, 1970) and decrease levels of negativity after feeling hurt (Murray et al., 2003). Scholars argue that both verbal and non-verbal variety of behaviors may boost one's perception that the partner understands and validates them (eye contact, proximity, etc., Argyle & Dean, 1965). Although PPR has been found to be predicted negatively by phubbing (Frackowiak et al., 2022; Schokkenbroek et al., 2022), we suggest that understanding and validation may prevent phubbing's negative impact on emotions during the interaction. Arguably, individuals may differ in how responsive they can be while using a mobile device while interacting with the partner. Hence, we argue that whilst the perception of a partner using their mobile phone in an interaction may contribute to an increase in negative emotionality, the simultaneous perception of them providing an understanding and validation despite the mobile phone use, may buffer the effect of phubbing intensity on negative emotions.

Between- and within-person differences

Research has hardly studied the phubbing phenomenon in the daily couple setting. However, ignoring how repeated phubbing situations unfold limit our ability to establish causal links between phubbing and the perception and consequences of being phubbed. Dyadic interactions occur regularly between intimate partners, therefore we ought to study phubbing-related processes in the context of daily processes. To extend the theoretical knowledge on how those processes may vary daily, we apply the "within-person" paradigm (Hamaker, 2012), to complement the between-person perspective. The framework informs the following interpretative framework in case of statistically significant findings: on *between-person level*, participants *who* tend to report more intense phubbing may report stronger negative emotions but understanding and validation may promote their reduction. This level of analysis will be indicative of interpersonal differences. On the *within-person level*, indicative of intrapersonal processes, we speculate that *on days* with phubbing by their partner, people would report stronger negative emotions, but on such days, perceiving the phubbing partner as understanding and validating would reduce these effects. Testing those speculations would allow us to acknowledge the mechanisms that prevent negative emotional experiences associated with partner phubbing.

The current study

To explore if emotional experiences are linked to partner phubbing and how to buffer them on the between- and within-person level, we use a daily diary (seven days) to capture day-to-day processes (Bolger & Laurenceau, 2013). Existing findings show that phubbing by a partner in intimate interactions may have a negative impact on intimacy (Halpern & Katz, 2017) and increase negative affect (Guazzini et al., 2021) in the *phubbee*. Furthermore, because partners are likely to experience negative emotions when partner's repetitive behavior is seen as aversive (Cunningham et al., 1997, 2005), we hypothesize that on days they are phubbed by their partner, participants would report higher negative emotional experiences (sadness, upset, loneliness, and anger) compared to days without phubbing (H1).

Secondly, based on the evidence that perceived understanding and validation by partner boost positive affect (Collins and Feeney, 2000) and counteract the impact of negative interaction (Gordon & Chen, 2016), we propose that on days with phubbing, the intensity of phubbing experience predicts positively

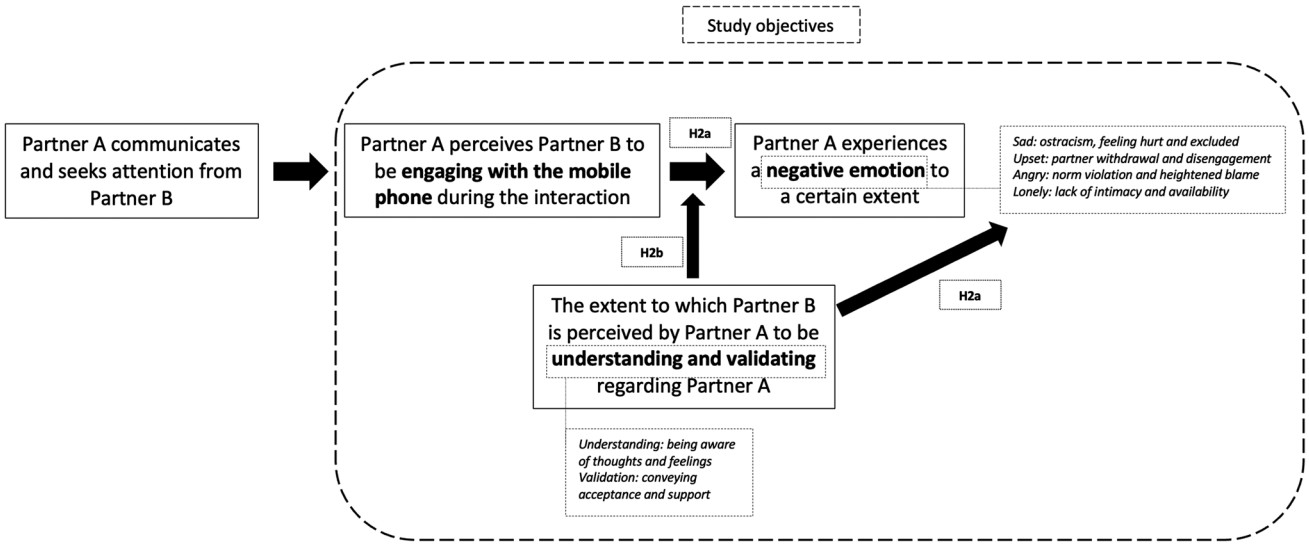


Fig. 1 A conceptual model supporting our study hypotheses. Note the boxes and directionality of arrows, where the H2a boxes indicate the main effects, whilst the H2b box indicates the interaction effects

anger and loneliness, but understanding and validation reduce them (H2). We distinguish between the main effects (H2a) and interactions between each level of PPR with negative emotions (i.e., sadness, upset, anger or loneliness) on a within-person level, to check if understanding and validation moderate the impact of phubbing on negative emotional experiences (H2b). We offer a theoretical model to facilitate the comprehension of the process we are trying to capture (Fig. 1). No exclusive interactions between phubbing and PPR variables are assumed as this analysis is exploratory. The current study uses part of the data from our previous study (Frackowiak et al., 2022), therefore certain variables have been excluded from analyses.

Method

Participants

The sample size was based on suggestions for multilevel model analyses (MLM) with repeated measures nested within a person (Maas & Hox, 2005). Upon examination of publications (Gallaty & Zimmer-Gembeck, 2008), we aimed to recruit at least 100 participants. Finally, 133 participants were recruited via Prolific (www.prolific.co), a crowdsourcing platform, reputable in recruiting for studies with repeated measures due to data quality and retention rate (Kothe & Ling, 2019). The recruitment followed the inclusion criteria: being in a committed heterosexual relationship (two years minimum), living and spending time with their partner every day, no children. The minimum relationship duration of two years has been argued to indicate stability of the relationship, when obsessive thinking about a partner decreases (Aron et al., 2005), and relationship maturity develops (Rözer et al., 2015). Lack of children and heterosexuality were included as inclusion criteria in order to aid the sample homogeneity. Moreover, partners who have children spend less time with each other (Roxburgh, 2006), thus, may be differently impacted by phubbing. The participants were compensated with £3.40 ($4.20 in 2021) for a total of 30 minutes' study run over seven days.

Response rate throughout the seven days of the study was high, nonetheless, we observed a drop-out rate that was kept low throughout the study, with the highest drop-out observed on day 1 (28 did not participate). The attrition was moderate to high throughout the study, during which most participants filled out the survey every day. Certain participants observed a relapse, i.e., temporary drop-out followed by a return to the study. The participants included 69 females (51.9%) and 64 males (48.1%). Average age of participants was similar for females ($M = 33.7$, $SD = 10.39$) and males ($M = 31.06$, $SD = 10.35$), but female participants reported longer relationship duration ($M = 10.26$, $SD = 8.8$) than male participants ($M = 6.77$, $SD = 7.7$). 60 female participants identified as heterosexual, 9 as bisexual. Only one male participant reported bisexual orientation.

Procedure

The data was collected in March 2021 using Qualtrics. Participants who signed up to participate in the baseline questionnaire were enrolled in the study and invited to the following seven short daily questionnaires. The notifications were sent out via Prolific in the evening, for participants to spend time with their partners and later report it. Daily questionnaires comprised questions about interactions with partner, perceived phubbing intensity, understanding and validation, and how sad, upset, angry, and lonely participants felt during the phubbing. If the participants reported no partner phubbing

on a particular day, they were allocated a block of questions that enquired about emotions and partner responsiveness in daily partner interactions in general. To respond to the second hypothesis (H2a-b) we only used data from days when participants reported being phubbed by a partner.

Measures

Each daily questionnaire contained a question concerning whether and how much phubbing by partner the participants experienced. First, participants were asked if they were phubbed by their partner that day (*yes/no*), and then, if they reported experiencing phubbing on that day (*yes*), they were asked about phubbing intensity. Since participants were not expected to be familiar with the term "phubbing", the questionnaire phrasing enquired about *partner using their mobile phone while spending time with me*, measured on a scale from 1 (*not intense at all*) to 5 (*very intense*). Following that, they were asked about constructs relevant to the hypotheses of this study.[1] To address the study hypotheses, we adapted and shortened the following scales to facilitate the use of a daily diary (Cranford et al., 2006):

Perceived Partner Responsiveness Scale (PPRS) (Reis et al., 2017). A self-report scale that measures people's perception of how responsive to their needs their partner is. Two items from each, understanding and validation subscales, were adapted and adjusted to the timeframe and context, i.e. *Today, when my partner was using his/her mobile phone while spending time with me, he/she...*, followed by the scale item. An example item from the understanding subscale is *...was aware of what I was thinking and feeling*, whereas an example of the validation subscale is *...respected me*. We measured PPRS on a 5-point Likert scale (1 = *disagree a lot*, 5 = *agree a lot*). Higher mean score in this scale is indicative of high understanding or validation. The reliability of the understanding items was high within (R_c = .81) and between participants (R_{KF} = .95), as for validation: within (R_c = .78) and between participants (R_{KF} = .94) (Cranford et al., 2006).

Discrete Emotions Questionnaire (DEQ) (Harmon-Jones et al., 2016). A modified version of this scale was used to measure experiences of sadness, feeling upset, anger, and loneliness. Participants were asked: *Today, when my partner's use of mobile phone was the most intense, I felt…*, followed by items from the scales. Each construct was measured by two items each: sadness: *sad, unhappy*; upset: *upset, distressed*; anger: *angry*, *frustrated*; loneliness: *lonely*, *abandoned*. The items were measured on a 5-point Likert scale (1 = *not at all*, 5 = *a lot*). The reliability of the anger and loneliness items was high within (R_c = .79) and between participants (R_{KF} = .96), for loneliness: high within (R_c = .78) and between participants (R_{KF} = .98) (Cranford et al., 2006), for sadness high within (R_c = .88) and between participants (R_{KF} = .98), and for upset high/low within (R_c = .77) and high/low between participants (R_{KF} = .96).

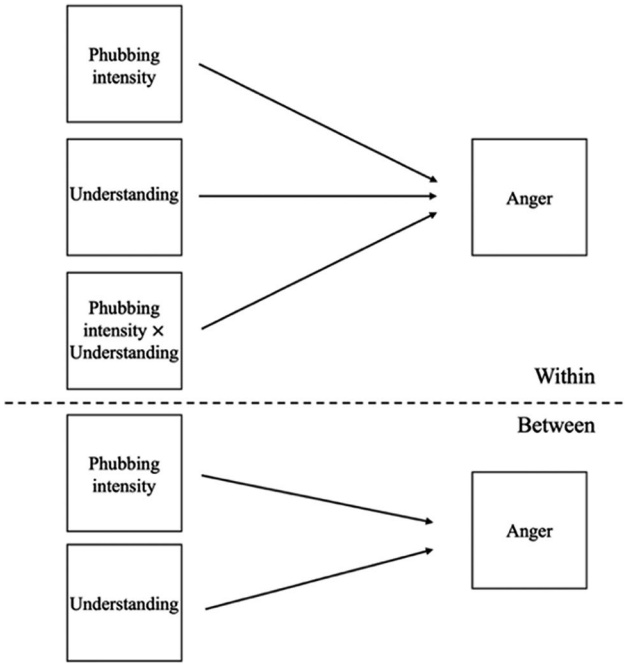


Fig 2. An Example Model Testing H2a-b

Data analysis strategy

In this study, the predictors of phubbing intensity and perceived understanding and validation by partner are disaggregated into between- and within-person level variables. To investigate repeated measures nested within a person, we applied multilevel modeling (MLM, Bolger & Laurenceau, 2013). We analyzed the data using R version 4.1.2 (R Core Team, 2018), using the "lmer" package (Bates et al., 2015).

H1 was tested using an MLM with a binary variable *phubbing* as a predictor to test our assumption, based on whether phubbing happened on a day or not. Participants were used as a nesting variable. To test H2, after excluding the days without phubbing, the analysis included a variable perceived intensity of partner phubbing on days it occurred. The between-person component was calculated based on an overall grand mean of the person's average score of each predictor variable: intensity of partner phubbing ($Pphubbing_{between}$), understanding ($understanding_{between}$), and validation ($validation_{between}$). For

[1] The data set in this study has been used for a prior publication. The object of the publication was to test the relevance of cognitive mechanisms related to phubbing intensity (moral judgment and general perceived partner responsiveness) and whether those mechanisms predict the end-of-day relationship quality (Frackowiak et al., 2022). The current manuscript focuses on testing the relationship between phubbing intensity and negative emotional experiences, and the mechanisms buffering them.

Table 1. Descriptive Statistics and Between-Person and Within-Person Correlations in the Study Variables Across Days with Phubbing

Variable			Between person (n = 133)							Within person (n = 423)							ICC
	M	*SD*	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
1. Phubbing intensity	2.65	0.89	-	**-.26**	-.23	.17	.14	.23	.00	-	**-.31**	**-.34**	**.32**	**.25**	**.29**	**.25**	-
2. Understanding	3.52	1.04		-	**.91**	**-.40**	**-.34**	**-.41**	-.21		-	**.85**	**-.54**	**-.52**	**-.55**	**-.46**	-
3. Validation	3.45	1.05			-	**-.30**	**-.26**	**-.33**	-.14			-	**-.52**	**-.52**	**-.54**	**-.46**	-
4. Anger	1.80	1.04				-	**.69**	**.85**	**.84**				-	**.70**	**.78**	**.82**	.47
5. Loneliness	1.93	1.04					-	**.89**	**.81**					-	**.86**	**.79**	.58
6. Sadness	1.91	1.15						-	**.85**						-	**.82**	.38
7. Feeling upset	1.74	0.96							-							-	.37

the within-person component, we subtracted the between-person component from the uncentered individual score of each participant from the daily values of the variables: intensity of partner phubbing ($\text{Pphubbing}_{\text{within}}$), understanding ($\text{understanding}_{\text{within}}$), and validation ($\text{validation}_{\text{within}}$).

To test H2a-b, eight models were run, in which we used sadness, feeling upset, anger, or loneliness as predicted variables, and phubbing intensity with either understanding or validation as predictors, each predictor included between- and within-person components. Each model included an interaction item between two predictors on a within-person level, to aid exploration of within-person processes. An example model with item anger as a predicted variable, and with phubbing intensity and understanding as predictors, is demonstrated as the following equation, illustrated by Fig. 2:

$$
\begin{aligned}
Anger_{it} &= \gamma_{01}(Pphubbing_{between}) + \gamma_{02}(understanding_{between}) + \gamma_{10}(Pphubbing_{within}) \\
&\quad + \gamma_{20}(understanding_{within}) \\
&\quad + \gamma_{30}(Pphubbing_{within} \times understanding_{within}) \\
&\quad + u_{0i} + u_{1i}(Pphubbing_{within}) \\
&\quad + u_{2i}(understanding_{within}) + \varepsilon_{it}
\end{aligned}
$$

In the model, i refers to individuals and t refers to a day in the study, whilst γ_{01} and γ_{02} index partner phubbing and understanding on a between-person level, respectively. γ_{10} and γ_{20} describe both model variables on a within-person level. γ_{30} contains an interaction item between partner phubbing and understanding on a within-person level. u_{0i} represents the random intercept, and u_{1i} the random slope for partner phubbing, u_{2i} represents the random slope for understanding, and ε_{it} stands for the regression residual for participant i on day t.

Results

Descriptive statistics

Table 1 presents descriptive statistics, between- and within-person correlations between the study variables, and between-person intraclass correlations of the dependent variables: anger and loneliness. The rates of perceived intensity of phubbing by partner was moderate over seven days of the study run (M = 2.65, SD = 0.89). Understanding (M = 3.52, SD = 1.04) and validation (M = 3.45, SD = 1.05) were moderate to high. Finally, participants reported below mid-point levels of negative emotional experiences during partner phubbing: sadness (M = 1.91, SD = 1.15), feeling upset (M = 1.74, SD = 0.96), anger (M = 1.80, SD = 1.04), and loneliness (M = 1.93, SD = 1.04). In terms of the correlations, on the between-person level, bivariate correlations show significant associations between most of the study variables, but on the within-person level those correlations were significant and mostly stronger between all the variables. Most notably, however, variables *understanding* and *validation* correlated strongly on both levels.

Negative emotional experiences on days with vs without phubbing

To explore the association between daily partner phubbing and negative emotional experiences (H1), the MLM nested within participants included a binary variable phubbing as a predictor. Results indicate that levels of anger are significantly higher ($p < .001$) on days with phubbing (M = 1.80, SD = 1.04) than on days without (M = 1.31, SD = .68). Levels of loneliness are also significantly higher ($p < .001$) on days with phubbing (M = 1.93, SD = 1.14) compared to days when no phubbing was reported (M = 1.24, SD = .65). The same applies to experiences of sadness ($p < .001$; M = 1.91, SD = 1.15 on days with phubbing, and M = 1.35, SD = .72 on days without), and feeling upset ($p < .001$; M = 1.74, SD = 0.94 on days with phubbing, and M = 1.28, SD = .64 on days without). We therefore accept H1.

Negative emotional experiences vs understanding and validation

In H2, we test the association between perceived phubbing intensity, understanding or validation, and rates of anger or loneliness. For each of the 4 DV, two models were run, one

including phubbing, understanding, and the interaction between the two as predictors, the other including validation instead of understanding. The results are reported in Tables 2-3.[2]

Sadness (Models 1-2)

Model 1 (phubbing × understanding) shows that phubbing intensity predicts emotion sad positively on both levels, between- and within-person ($\gamma_{between} = .27$, $p = .041$; $\gamma_{within} = .18$, $p = .031$). For the former, participants who reported higher intensity of phubbing also reported stronger experiences of sadness, compared to those who reported lower intensity of partner phubbing. For the latter, on days when participants perceived the intensity of phubbing to be high, reported stronger experiences of sadness than on days when phubbing intensity was low. Understanding, on the other hand, was associated with lower sadness on both levels ($\gamma_{between} = -.56$, $p < .001$; $\gamma_{within} = -.45$, $p < .001$). The interaction between phubbing intensity and understanding is not significant ($p = .31$). Model 2 (phubbing × validation) follows a similar pattern: phubbing intensity predicts emotion sad positively on both levels ($\gamma_{between} = .34$, $p = .010$; $\gamma_{within} = .20$, $p = .046$), whilst validation is a negative predictor ($\gamma_{between} = -.50$, $p < .001$; $\gamma_{within} = -.42$, $p < .001$). The interaction term between phubbing intensity and validation is not significant ($p = .11$).

Feeling upset (Models 3-4)

Model 3 (phubbing × understanding) reveals that phubbing intensity predicts feeling upset positively on a within-person level only ($\gamma_{within} = .23$, $p = .010$), whereas understanding predicts feeling upset negatively on both levels ($\gamma_{between} = -.37$, $p < .001$; $\gamma_{within} = -.36$, $p < .001$). Interaction between phubbing intensity and understanding is not significant, although it approaches statistical significance ($p = .056$). Finally, Model 4 (phubbing × validation) shows that phubbing intensity again predicts feeling upset positively on a within-person level only ($\gamma_{within} = .21$, $p = .027$). Validation, on the other hand, predicts feeling upset negatively on both levels ($\gamma_{between} = -.34$, $p < .001$; $\gamma_{within} = -.36$, $p < .001$). The interaction (Fig. 3) between phubbing intensity and validation is also significant ($\gamma_{within \times within} = -.18$, $p = .008$). The simple slopes show a significant effect of the moderator validation on the *-1SD* (Est = .33, *SE* = .10, $p = .002$) and *Mean* levels (Est = .21, *SE* = .09, $p = .028$), suggesting that feeling upset is at its highest when phubbing intensity is high, and perceived validation by partner is at its average or lowest level.

Anger (Models 5-6)

Model 5 (phubbing × understanding) shows that phubbing intensity predicts anger positively on a within-person level only ($\gamma_{within} = .24$, $p = .004$), whereas understanding predicts anger negatively on both levels ($\gamma_{between} = -.49$, $p < .001$; $\gamma_{within} = -.37$, $p < .001$). The interaction (Fig. 4) between phubbing intensity and understanding also significantly predicts anger ($\gamma_{within \times within} = -.14$, $p = .027$). The simple slopes show that understanding moderates the impact of phubbing intensity on anger on a *mean* (Est = 0.24, *SE* = 0.08, $p = .004$) and *-1SD* level (Est = 0.35, *SE* = 0.10, $p < .001$) of the variable, suggesting that when phubbing intensity is high and understanding low or average, it may result in stronger experiences of anger. The *+1SD* level of the understanding did not moderate the link between the IV and DV. In Model 6, the findings show that phubbing is a positive predictor of anger on a within-person level only ($\gamma_{within} = .26$, $p = .006$), which suggests that on days when phubbing by partner was perceived as more intense, participants report feeling angrier. Validation, however, predicts anger negatively on both, within- ($\gamma_{within} = -33$, $p < .001$) and between-person level ($\gamma_{between} = -.46$, $p < .001$). However, phubbing intensity and validation do not interact ($p = .214$).

Loneliness (Models 7-8)

Results of Model 7 (phubbing × understanding) show that phubbing intensity is not a significant predictor of loneliness on either level, although it approaches statistical significance on a within-person level ($p = .059$). We can therefore reject the assumption that phubbing intensity predicts more intense experiences of loneliness. Understanding during the phubbing, on the contrary, is a significant negative predictor of loneliness on both levels ($\gamma_{between} = -.54$, $p < .001$; $\gamma_{within} = -38$, $p < .001$). The interaction between phubbing intensity and understanding is not significant ($p = .504$). Finally, Model 8 (phubbing × validation) shows again that phubbing intensity does not predict higher experiences of loneliness. Validation by partner during the phubbing, nonetheless, is a significant predictor on both levels ($\gamma_{between} = -.48$, $p < .001$; $\gamma_{within} = -39$, $p < .001$). The interaction (Fig. 5) between phubbing intensity and validation significantly predicts the experience of loneliness ($\gamma_{within \times within} = -.14$, $p = .037$). Simple effects suggest a significant effect of the moderator validation on the *-1SD* level only (Est = 0.26, *SE* = 0.11, $p = .018$), indicating that when phubbing intensity is at its highest, perception of partner as less validating is associated with stronger feelings of loneliness.

Discussion

Experiencing partner phubbing during interactions is associated with increased negative affect and poor relational outcomes (Guazzini et al., 2021; Krasnova et al., 2016). However, research has not explored the theoretical associations between partner

[2] To compute main effects, all models were first computed without interaction terms. In addition, we computed the same models but included the interactions terms. As the main effects are not different in comparison to the conditional main effects in the model including the interaction, we present here only the models with the interactions (models without interactions are reported in Appendices A-B).

Table 2. Parameter Estimates for Multilevel Models of Sadness and Feeling upset as Functions of Phubbing Intensity with Understanding or Validation

	Predicted: Sadness												Predicted: Feeling upset											
	Model 1: phubbing × understanding						Model 2: phubbing × validation						Model 3: phubbing × understanding						Model 4: phubbing × validation					
Fixed effects (intercepts, slopes)	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL
Intercept	**1.90**	.08	1.90	<.001	1.76	2.06	**1.90**	.08	1.90	<.001	1.75	2.05	**1.72**	.07	1.72	<.001	1.59	1.85	**1.71**	.07	1.71	<.001	1.58	1.84
Level 1 (within-person)																								
Phubbing	**0.18**	.08	0.12	.032	0.02	0.34	**0.20**	.10	0.13	.046	0.00	0.37	**0.23**	.09	0.15	.010	0.06	0.39	**0.21**	.09	0.14	.028	0.02	0.39
Understanding	**-0.45**	.07	-0.31	<.001	-0.59	-0.30	-	-	-	-	-	-	**-0.36**	.06	-0.25	<.001	-0.47	-0.26	-	-	-	-	-	-
Validation	-	-	-	-	-	-	**-0.42**	.07	-0.29	<.001	-0.54	-0.28	-	-	-	-	-	-	**-0.36**	.06	-0.26	<.001	-0.49	-0.26
Phubbing × understanding	-0.07	.07	-0.07	.310	-0.21	0.06	-	-	-	-	-	-	-0.12	.06	-0.12	.056	-0.24	0.00	-	-	-	-	-	-
Phubbing × validation	-	-	-	-	-	-	-0.12	.07	-0.12	.113	-0.26	0.04	-	-	-	-	-	-	**-0.18**	.07	-0.18	.008	-0.30	-0.04
Level 2 (between-person)																								
Phubbing	**0.27**	.13	0.16	.042	-0.01	0.53	0.34	.13	0.21	.010	0.09	0.59	0.12	.12	0.07	.328	-0.10	0.35	0.10	.12	0.06	.390	-0.11	0.35
Understanding	**-0.56**	.10	-0.43	<.001	-0.75	-0.34	-	-	-	-	-	-	-0.37	.09	-0.29	<.001	-0.57	-0.19	-	-	-	-	-	-
Validation	-	-	-	-	-	-	-0.50	.10	-0.39	<.001	-0.69	-0.32	-	-	-	-	-	-	-0.34	.09	-0.26	<.001	-0.50	-0.16
Random effects																								
Level 1 (within-person)																								
Residual	0.25	.50	0.25	-	0.44	0.54	0.26	.51	0.26	-	0.45	0.56	0.20	.45	0.20	-	0.40	0.50	0.21	.46	0.21	-	0.41	0.50
Level 2 (between-person)																								
Intercept	0.53	.73	0.53	-	0.62	0.85	0.53	.73	0.53	-	0.62	0.85	0.41	.64	0.41	-	0.54	0.75	0.41	.64	0.41	-	0.54	0.74
Phubbing	0.23	.48	0.23	-	0.31	0.63	0.35	.59	0.35	-	0.40	0.78	0.30	.54	0.30	-	0.38	0.70	0.32	.57	0.32	-	0.39	0.75
Understanding	0.18	.43	0.18	-	0.26	0.57	-	-	-	-	-	-	0.10	.32	0.10	-	0.18	0.45	-	-	-	-	-	-
Validation	-	-	-	-	-	-	0.16	.40	0.16	-	0.24	0.54	-	-	-	-	-	-	0.10	.31	0.10	-	0.15	0.43

B = unstandardized estimates; *SE* = standard error for unstandardized estimates; *β* = standardized estimates; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed)

Table 3. Parameter Estimates for Multilevel Models of Anger and Loneliness as Functions of Phubbing Intensity with Understanding or Validation.

	Predicted: Anger												Predicted: Loneliness											
	Model 5: phubbing × understanding						Model 6: phubbing × validation						Model 7: phubbing × understanding						Model 8: phubbing × validation					
Fixed effects (intercepts, slopes)	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL
Intercept	**1.77**	.07	1.77	<.001	1.62	1.90	**1.78**	.07	1.78	<.001	1.64	1.92	**1.91**	.08	1.91	<.001	1.77	2.07	**1.90**	.08	1.90	<.001	1.75	2.08
Level 1 (within-person)																								
Phubbing	**0.24**	.08	0.08	.004	0.07	0.41	**0.26**	.09	0.17	.006	0.10	0.42	0.15	.08	0.10	.059	-0.00	0.30	0.16	.09	0.11	.095	-0.05	0.35
Understanding	**-0.37**	.07	-0.26	<.001	-0.50	-0.24	-	-	-	-	-	-	**-0.38**	.07	-0.27	<.001	-0.51	-0.25	-	-	-	-	-	-
Validation	-	-	-	-	-	-	**-0.33**	.06	-0.23	<.001	-0.46	-0.20	-	-	-	-	-	-	**-0.39**	.07	-0.27	<.001	-0.51	-0.26
Phubbing × understanding	**-0.14**	.07	-0.14	.027	-0.27	-0.02	**-**	-	-	-	-	-	-0.04	.06	-0.04	.504	-0.17	0.09	-	-	-	-	-	-
Phubbing × validation	-	-	-	-	-	-	-0.09	.07	-0.09	.214	-0.25	0.06	-	-	-	-	-	-	**-0.14**	.07	-0.14	.037	-0.26	-0.00
Level 2 (between-person)																								
Phubbing	0.13	.12	0.08	.270	-0.11	0.35	0.17	.12	0.10	.178	-0.09	0.42	0.16	.14	0.10	.250	-0.10	0.42	0.17	.13	0.11	.195	-0.08	0.45
Understanding	**-0.49**	.09	-0.38	<.001	-0.67	-0.33	-	-	-	-	-	-	**-0.54**	.11	-0.42	<.001	-0.77	-0.34	-	-	-	-	-	-
Validation	-	-	-	-	-	-	**-0.46**	.09	-0.36	<.001	-0.64	-0.27	-	-	-	-	-	-	**-0.48**	.10	-0.37	<.001	-0.68	-0.29
Random effects																								
Level 1 (within-person)																								
Residual	0.22	.47	0.22	-	0.42	0.52	0.28	.53	0.28	-	0.48	0.58	0.20	.45	0.20	-	0.40	0.49	0.18	.43	0.18	-	0.38	0.47
Level 2 (between-person)																								
Intercept	0.44	.66	0.44	-	0.57	0.77	0.43	.66	0.43	-	0.54	0.76	0.60	.78	0.60	-	0.66	0.90	0.62	.79	0.62	-	0.67	0.91
Phubbing	0.21	.46	0.21	-	0.30	0.60	0.26	.51	0.26	-	0.34	0.67	0.20	.45	0.20	-	0.30	0.60	0.39	.62	0.39	-	0.45	0.78
Understanding	0.16	.40	0.16	-	0.26	0.53	-	-	-	-	-	-	0.17	.41	0.17	-	0.30	0.54	-	-	-	-	-	-
Validation	-	-	-	-	-	-	0.07	.26	0.07	-	0.10	0.40	-	-	-	-	-	-	0.18	.42	0.18	-	0.30	0.55

B = unstandardized estimates; *SE* = standard error for unstandardized estimates; *β* = standardized estimates; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed).

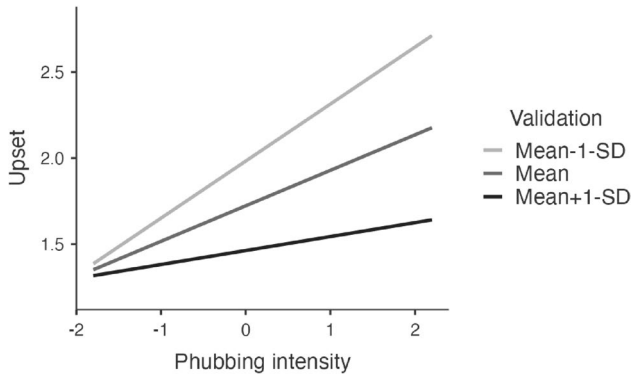


Fig 3. Validation Moderates the Effect of Partner Phubbing Intensity on Feeling Upset

phubbing and specific negative emotions and what mechanisms reduce these associations. In this study, we used a daily diary to test the relationship between daily partner phubbing and discrete negative emotional experiences, and whether perceiving one's partner to be understanding and validating during the phubbing promotes the reduction of negative emotions. The results show that participants reported stronger negative emotional experiences on days when they reported being phubbed by partner, compared to days when they did not. Furthermore, this was the case for all four emotions studied: sadness, upset, anger and loneliness. The model composites (*within-* and *between-person*) further aid a comprehension of theoretical nuances between the negative emotional experiences.

Negative experiences and phubbing (H1)

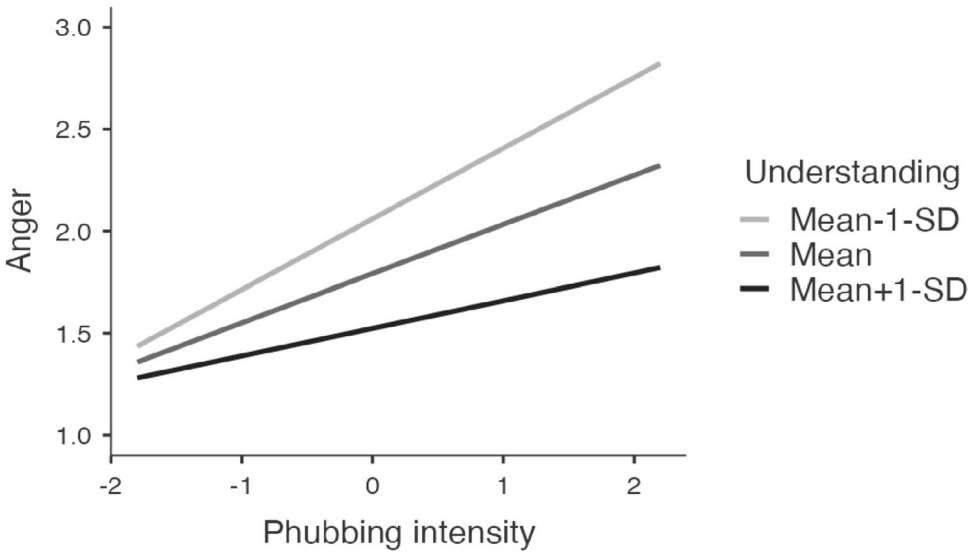
The initial analysis entailed a comparison of days when participants reported being phubbed by their partner to the days that they did not. On days when they did experience phubbing, they also reported elevated experiences of the emotions: sadness, feeling upset, anger, and loneliness, supporting the first hypothesis. This finding is supported by the theoretical and empirical literature that negative emotions may arise in negative social interactions when people have negative appraisals of another person's intentions (e.g., Fischer & Roseman, 2007), when their relationship standards are violated (Abeele, 2020; Vangelisti & Alexander, 2002), and when they cannot prevent the event (Lench & Carpenter, 2018).

Our findings complement the qualitative evidence that has linked negative affective experiences with partner phubbing (Krasnova et al., 2016). The use of MLM enriches and adds novelty to research, which is explained by the differentiation of processes between-persons and those nested within-persons. It also supports the literature indicating that the conversation dynamics, undermined because of mobile phone use, may be linked to negative affect in an individual (Guazzini et al., 2021). The finding may be interpreted in the context of the social allergen framework that when partner's daily behavior is seen as unwanted or aversive, negative emotions may arise (Cunningham et al., 1997, 2005), and that they may be experienced when partner's behavior is seen as jeopardizing the relationship's affectionate bond. Based on the results we can argue that partner phubbing can be perceived simply as unpleasant, or even a threat to the relationship's functioning, and provoke negative sentiments.

Phubbing intensity with understanding and validation (H2a-b)

The second hypothesis was tested using the days when phubbing was reported. We investigated if the intensity of phubbing increases experiences of negative emotions (i.e., sadness, upset, anger and loneliness), and whether understanding and validation may reduce them. The results of the multilevel models add to our theoretical understanding of how perception of partner phubbing can be associated with negative emotional

Fig 4. Understanding Moderates the Effect of Partner Phubbing Intensity on Experiences of Anger



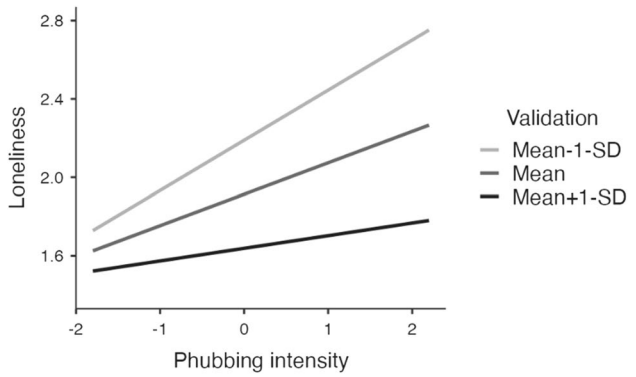


Fig 5. Validation Moderates the Effect of Partner Phubbing Intensity on Experiences of Loneliness

experiences. This understanding is facilitated by the *between-* and *within-person* composites.

Sadness

In the first two models, sadness was significantly predicted by perceived phubbing intensity on both, *between-* and *within-person* levels. Phubbing has been associated with inevitable rejection and ostracism behaviors (Chotpitayasunondh & Douglas, 2018; McDaniel & Wesselmann, 2021), which exclude the phubbee from a symbolic interaction between the phubber and the mobile phone. Partner's use of a mobile phone in interactions is also related to their psychological absence (Fortunati, 2002; Gergen, 2002), The theoretical perspectives have argued that such exclusions may result in an increased perception of threat of the basic needs, e.g., for belonging and affection, which may promote negative experiences, for instance, of sadness (Clark et al., 1996; Leary & Springer, 2001; Sanford, 2007; Wirth et al., 2010). The significant effects on both levels of the analyses make it the only emotion item in our study that can be interpreted in the realm of interpersonal differences and intrapersonal processes. Therefore, we can argue that our participants are prone to experiences of sadness *when* they perceive phubbing to be particularly intense, but also *if* they experience more intense phubbing than others.

Feeling upset

Emotional upset was positively predicted by phubbing on a *within-person level exclusively*, indicating that on days when partner phubbing was perceived to be intense, the participants reported higher levels of feeling upset. This finding supports the theoretical perspectives which highlight the importance of everyday interactions (Burleson, 1994, 2008; Burleson et al., 2022; Holmstrom et al., 2005) in understanding emotional upset experiences. Given the framework, partners may feel upset when they perceive their partner to respond in a rather distracted and impersonal manner, as they try to maintain the conversation with the mobile phone in hand. This is not a surprising finding, especially as phubbing behavior has been argued to be associated with disengagement and withdrawal from the dyadic interaction, which may be conveyed in the disconnected body language and posture, averted eye gaze and discontinued and inconsistent responses communicating distraction (Abeele, 2020). Nonetheless, the unique within-person effect highlights the temporary nature of the emotional upset, that translates to the exceptionally intense individual experiences of partner phubbing, but does not define interpersonal differences (Hamaker, 2012).

Anger

In the analysis of main effects, we found that perceived phubbing intensity predicted anger positively on a within-person level only, just like emotional upset. Our finding parallels the results by Thomas et al. (2022) in that when phubbing intensity is perceived to be higher, it predicts higher experiences of anger. This finding has theoretical connotations because it seems that overall perception of partner phubbing intensity (between-person) during the study run had no association with anger, but the daily variability (within-person) did. It seems to confirm the theoretical foundation of anger as a state, short-term, and temporary emotion (Dutton, 2010; Kubany et al., 1995), because it is the days with the strongest intensity rather than the overall trend in phubbing intensity that predict anger, i.e., interpersonal differences cannot be inferred from this finding. However, we may argue that phubbing, being a common behavior, has been integrated into partners' daily behaviors that the general level of phubbing does not suffice to invoke feelings of anger, unless it is exceptionally intense. Experiences of anger may have arisen not necessarily due to the act on its own, but because of the notion that a partner's behavior violates a norm, a perception which is linked to the experiences of anger (Fischer & Roseman 2007; Smith & Lazarus, 1993).

Loneliness

When we predicted loneliness, we found the phubbing intensity not to be a significant predictor on either, between- or within-person level, which partially disconfirms our hypothesis (H2a). This result has certain theoretical connotations, which further demonstrates the distinction between anger as a state, and loneliness as a stable experience or a sentiment (Knoke et al., 2010). This finding may reflect participants' feelings about partner phubbing, that is, unlike anger, loneliness is not momentary, and therefore the intensity of phubbing does not directly translate to how lonely one feels on days when phubbing by partner is particularly intense, but rather when it happens in the first place (H1). We argue that the lack of effect may be associated with how participants feel about phubbing generally. For example, loneliness may arise due to feeling ostracized or rejected (Bekhet et al., 2008; Rokach, 1988), and feelings of low emotional intimacy (McWhirter, 1990; Rook, 1984), which phubbing is associated with (McDaniel & Wesselmann, 2021). Combined with the theoretical framework of phubbing, that its act may represent the immediate digital social

network easily accessible via smartphone (Darcin et al., 2015), we propose that those mechanisms related to phubbing that trigger feelings of loneliness are associated with the mere experience of phubbing (H1), its intensity remaining irrelevant.

Understanding and validation Both understanding and validation from the partner during phubbing were consistently found to be negative predictors of all four emotional experiences across all eight models. The effect was maintained on both, between- and within-person level. The effect sizes were comparable across the levels, but they did appear marginally stronger on the between-person level, implying slightly stronger interpersonal differences, i.e., participants who overall perceive their partners to be showing understanding and validation towards them, experience negative emotions less intensely during phubbing episodes. Those effects were consistently stronger than any of the effects of perceived phubbing intensity.

This supports our assumption that perceived partner responsiveness during the phubbing may buffer the negative impact of phubbing. It also further supports the existing evidence that perceiving one's partner as understanding our experiences and accepting our sense-making based on them, seems to protect partners from the impact of negative interactions where potential trigger, here phubbing, is present (Reis et al., 2017). The results ground perceived partner responsiveness as a main construct defining intimacy in a relationship (Reis et al., 2004), but also indicates that it is a relevant psychological mechanism that can buffer the negative perception of phubbing. Interestingly, phubbing has been found previously to affect perceived partner responsiveness negatively (Beukeboom & Pollmann, 2021; [blinded]; Schokkenbroek et al., 2022), but when a partner is perceived as understanding and validating even during the phubbing, it can counteract the negative emotional experiences.

Interestingly, however, based on the very strong correlation coefficients between the two variables, and very similar main effects in our analyses, the constructs *understanding* and *validation* do not seem to be as distinct as the theoretical literature argues them to be. Whilst there exists an abundance of literature that demonstrates separateness of the two constructs (e.g., Reis, 2006; Reis & Patrick, 1996; Reis & Shaver, 1988), the difference does not seem to emerge in our analyses. Arguably, the distinction between the two mechanisms may not be as visible daily, and participants may have perceived them as a general level of reactivity observed in their partner on a particular day. This may have also been associated with how the constructs have been measured, i.e., participants may not have picked up on the difference between the items measuring one construct and those measuring the other. However, this may indicate that those difference may be unpacked in a qualitative setting, where the measures are not imposed. And, as the literature highlights, the mechanisms *can* co-occur simultaneously (Reis & Clark, 2013). The only distinctions between the two constructs are revealed in the exploratory interaction effects, which demonstrates that there may be minor differences in the variances of the data.

Interaction effects

The exploratory moderation analyses have shown three specific interaction effects: the interaction between phubbing intensity and validation predicts feeling upset and loneliness, whereas the interaction between phubbing intensity and understanding predicts anger exclusively (Figs. 3-5). The interaction terms point out certain nuances that highlight the differences between understanding and validation.

The link between anger and perception of a partner being aware and "getting right" about how one feels and thinks (*understanding*), suggests that aversive partner behavior in an interaction may signal to the *phubbee* that partner is not aware or does not understand how they feel and what they think in the given moment. That may result in perception of blame and heightened anger, which can be magnified when the *phubbee* perceives the partner as misunderstanding their feelings. This particular link between perceived blame and heightened levels of anger has been previously addressed in moral psychological literature (e.g., Malle, 2021; Malle et al., 2014), most notably, when the behavior is perceived as beyond personal control and as intentional (Alicke, 2000; Cunningham et al., 1997). The mitigating effect of understanding is, thus, not surprising, because the phubbing behavior may be perceived as "permissible" if the connection between the partners is maintained.

The interaction between phubbing intensity and validation predicted emotional upset and loneliness. *Validation*, that is believing a partner to be respectful and interested in one's feelings and thoughts, may indicate that lack of value from the partner may contribute to experiences of loneliness, and low levels of perceived validation may increase those experiences. The link between validation and loneliness seems to be justified in the literature, as perceived validation by a partner is linked to elevated self-esteem, which is negatively linked to loneliness (Bekhet et al., 2008; Gottman, 1979). In terms of emotional upset, high validation by the partner indicates that the partner is believed to be engaged, cognizant and legitimizing the other's feelings and to provide comforting messages. These are characteristics of a *high person-centeredness* (Burleson, 2008), which have been evaluated as helpful and effective in reducing emotional upset in daily situations (Burleson et al., 2009).

It is worth commenting on several nuances that were revealed in the simple slopes analyses of the interaction terms. First, all the interactions followed similar trajectories, that is, understanding or validation only moderated the impact of phubbing on emotions on their *mean* or *below mean* (*-1SD*) level, which suggests that the impact of phubbing intensity on negative emotions was *amplified* when the partner was not viewed as understanding or validating. This finding complements the main effects' analyses and shows a theoretical subtlety. Second, the pattern for the interaction term predicting loneliness was identical to the one predicting feeling upset, implying that loneliness may be a by-product of loneliness or an effect of upset. This notion has not been tested in the

literature, although parallels between feeling upset and lonely have been drawn before (e.g., Burleson, 2008; Leary, 2015). Finally, neither of the interaction terms was significant when predicting sadness. This is somewhat surprising due to the strong significance of the main effects on a between- and within-person level. The lack of interaction effect implies that no specific level of either understanding or validation may buffer or amplify the impact of phubbing intensity on feeling sad. We may argue that since phubbing may serve as a threat to one's sense of belonging, which is a potential trigger of sadness, simply perceiving a partner as responsive (i.e., validating or understanding), may not be sufficient for recovery.

Limitations

One of the study's limitations concerns the conceptualization of understanding and validation, which does not reflect the partner's actual intentions to convey comprehension and acceptance towards the partner, but rather phubbee's perception of them. Moreover, we are not aware of the subject of interactions between partners; therefore, we do not know the cause of phubbing by partner. This would be relevant as the findings show that people may phub their partner due to high levels of anxiety and stress (Ergün et al., 2020), as a means of reducing their negative emotions (Elhai & Contractor, 2018). Additionally, whilst there exists a theoretical distinction between understanding and validation (Reis & Patrick, 1996), in our sample the two constructs were strongly correlated and their conditional main effects in multilevel models strongly overlapped, even if the interaction effects showed ambiguities.

Further critique concerns the assessment of the negative emotional experiences. Participants may have simply experienced higher negative affect on days they were phubbed, so they reported negative emotional experiences. Thus, the emotional experiences we measured in this study would constitute approximate labels of how participants felt on those days, rather than an accurate assessment of their experiences. The sample may have also been subject to bias and reported higher levels of negative affect simply because they reported being phubbed in an interaction the same day. Despite that, the general levels of negative experiences were low in our study, all the means being below the midpoint of the scales.

Theoretical and practical implications

This study makes a significant contribution to phubbing research in intimate relationships, by uncovering the importance of studying both, within- and between-person levels of analysis. Theoretical implications are related to the statistical predictions made in our models, which allowed for separate investigations of each emotional experience. The two levels of the analyses aided an exploration of the impact phubbing may have on the longevity of each of those experiences, for instance, feeling upset and anger were only higher on days with intense phubbing. Loneliness, on the other hand, was only higher on days with phubbing, but was not impacted by its intensity. As a by-product of our analyses, we also found the strong overlap between the constructs *understanding* and *validation*. Though previously argued in favor of studying them as separate psychological mechanisms, in our models they did not appear to have distinct effects, which were consistently identical across all the models. This finding challenges the extant theoretical difference that did not emerge in this study.

We also argue in favor of the study's implications for the couple therapy and counseling practices, and intervention designs. We have identified the mechanisms that are positively associated with reduction of negative emotions, their effect sizes being stronger than those of phubbing. This is a relevant finding because it suggests that in future interventions what should be targeted is not necessarily the mobile phone use itself, but the way the partners communicate and perceive each other's behaviors in dyadic interactions. Thanks to these results, therapy can aim for further comprehension of why minor daily behaviors of a partner may provoke certain negative reactions.

Future research

We postulate that future research on phubbing should explore phubber's perspective in interactions to test whether their intention to remain responsive may also protect from the negative impact of phubbing, compared to phubbee's perception. This would allow an examination of whether the buffering role of validation and understanding is similar or different from the perspective of the phubber. In line with our previous argument, this would facilitate enrichment of the perspective of the other partner, and to create potential links that would help us establish what causes phubbing in the first place, and how to counteract the negative impact that phubbing can have on relationships.

Conclusion

The present daily diary study addressed how partner phubbing during dyadic interactions may be associated with escalated negative emotional experiences and what cognitive mechanisms may counteract these negative outcomes. We have found significant effects of phubbing intensity on the experience of sadness, feeling upset, anger and loneliness, the results which were mitigated by perceiving the partner to be understanding and validating. The interaction effects on a within-person level have revealed theoretical nuances that serve as an addition to relationship and emotion literature. The practical implication of the study is that the results directly inform counseling practices about beneficial mechanisms ameliorating relationship's healthy functioning.

Appendix 1

Table 4. Parameter Estimates for Multilevel Models of Sadness and Feeling Upset as a Function of Phubbing Intensity with Understanding or with Validation (Without Interactions)

	Predicted: Sadness												Predicted: Feeling upset											
	Model 1: phubbing + understanding						Model 2: phubbing + validation						Model 3: phubbing + understanding						Model 4: phubbing + validation					
Fixed effects (intercepts, slopes)	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL
Intercept	**1.91**	.08	1.91	<.001	1.75	2.06	**1.92**	.08	1.92	<.001	1.78	2.07	**1.74**	.07	1.74	<.001	1.61	1.87	**1.74**	.07	1.74	<.001	1.60	1.87
Level 1 (within-person)																								
Phubbing	**0.18**	.08	0.12	.034	0.02	0.33	**0.19**	.09	0.13	.041	0.01	0.41	**0.23**	.09	0.15	.011	0.06	0.39	**0.21**	.09	0.14	.023	0.03	0.37
Understanding	**-0.45**	.07	-0.31	<.001	-0.59	-0.32	-	-	-	-	-	-	**-0.36**	.06	-0.25	<.001	-0.48	-0.25	-	-	-	-	-	-
Validation	-	-	-	-	-	-	**-0.41**	.07	-0.29	<.001	-0.55	-0.29	-	-	-	-	-	-	**-0.36**	.06	-0.25	<.001	-0.48	-0.24
Level 2 (between-person)																								
Phubbing	**0.28**	.13	0.17	.036	0.00	0.53	**0.35**	.13	0.21	.007	0.08	0.59	0.13	.12	0.08	.252	-0.12	0.36	0.12	.12	0.08	.283	-0.13	0.35
Understanding	**-0.57**	.10	-0.44	<.001	-0.79	-0.38	-	-	-	-	-	-	**-0.39**	.09	-0.30	<.001	-0.56	-0.21	-	-	-	-	-	-
Validation	-	-	-	-	-	-	**-0.51**	.09	-0.40	<.001	-0.72	-0.31	-	-	-	-	-	-	**-0.36**	.08	-0.28	<.001	-0.51	-0.20
Random effects																								
Level 1 (within-person)																								
Residual	0.25	.50	0.25	-	0.45	0.55	0.27	.52	0.27	-	0.45	0.57	0.21	.46	0.21	-	0.41	0.50	0.23	.48	0.23	-	0.42	0.52
Level 2 (between-person)																								
Intercept	0.53	.73	0.53	-	0.62	0.85	0.52	.72	0.52	-	0.60	0.84	0.41	.63	0.41	-	0.54	0.74	0.40	.63	0.40	-	0.54	0.72
Phubbing	0.23	.48	0.23	-	0.30	0.62	0.32	.56	0.32	-	0.39	0.75	0.29	.54	0.29	-	-0.19	0.48	0.29	.54	0.29	-	0.38	0.69
Understanding	0.18	.50	0.18	-	0.28	0.56	-	-	-	-	-	-	0.10	.31	0.10	-			-	-	-	-	-	-
Validation	-	-	-	-	-	-	0.15	.38	0.15	-	0.23	0.52	-	-	-	-	-	-	0.08	.29	0.08	-	0.14	0.42

B = unstandardized estimates; *β* = standardized estimates; *SE* = standard error for unstandardized estimates; *β* = standardized estimates; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed). For fixed effects, *SE* have been reported. For random effects, SD have been reported.

Appendix 2

Table 5. Parameter Estimates for Multilevel Models of Anger and Loneliness as a Function of Phubbing Intensity with Understanding or with Validation (Without Interactions)

	Predicted: Anger												Predicted: Loneliness											
	Model 5: phubbing + understanding						Model 6: phubbing + validation						Model 7: phubbing + understanding						Model 8: phubbing + validation					
Fixed effects (intercepts, slopes)	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE*	*β*	*p*	CI LL	CI UL	*B*	*SE/SD*	*β*	*p*	CI LL	CI UL	*B*	*SE/SD*	*β*	*p*	CI LL	CI UL
Intercept	1.79	.07	1.79	<.001	1.66	1.92	1.79	.07	1.79	<.001	1.65	1.94	1.92	.08	1.92	<.001	1.76	2.07	1.92	.08	1.92	<.001	1.78	2.07
Level 1 (within-person)																								
Phubbing	0.24	.08	0.16	.004	0.08	0.42	0.26	.09	0.17	.005	0.10	0.43	0.15	.08	0.10	.062	0.00	0.30	0.16	.09	0.10	.092	-0.02	0.34
Understanding	-0.37	.07	-0.26	<.001	-0.50	-0.22	-	-	-	-	-	-	-0.38	.07	-0.27	<.001	-0.53	-0.25	-	-	-	-	-	-
Validation	-	-	-	-	-	-	-0.32	.06	-0.23	<.001	-0.46	-0.21	-	-	-	-	-	-	-0.39	.07	-0.27	<.001	-0.52	-0.25
Level 2 (between-person)																								
Phubbing	0.16	.12	0.10	.182	-0.11	0.41	0.18	.12	0.11	.146	-0.06	0.43	0.17	.14	0.10	.231	-0.10	0.41	0.19	.13	0.12	.155	-0.07	0.44
Understanding	-0.50	.09	-0.38	<.001	-0.70	-0.31	-	-	-	-	-	-	-0.55	.11	-0.42	<.001	-0.75	-0.32	-	-	-	-	-	-
Validation	-	-	-	-	-	-	-0.47	.09	-0.36	<.001	-0.65	-0.28	-	-	-	-	-	-	-0.49	.10	-0.38	<.001	-0.67	-0.30
Random effects																								
Level 1 (within-person)																								
Residual	0.23	.47	0.23	-	0.42	0.52	0.28	.65	0.28	-	0.48	0.59	0.20	.45	0.20	-	0.39	0.49	0.19	.44	0.19	-	0.39	0.48
Level 2 (between-person)																								
Intercept	0.44	.67	0.44	-	0.56	0.77	0.43	.65	0.43	-	0.54	0.78	0.60	.78	0.60	-	0.65	0.91	0.62	.79	0.62	-	0.66	0.92
Phubbing	0.20	.45	0.20	-	0.27	0.60	0.25	.50	0.25	-	0.31	0.65	0.20	.44	0.20	-	0.30	0.59	0.37	.60	0.37	-	0.44	0.78
Understanding	0.16	.40	0.16	-	0.25	0.52	-	-	-	-	-	-	0.17	.41	0.17	-	0.27	0.54	-	-	-	-	-	-
Validation	-	-	-	-	-	-	0.07	.26	0.07	-	0.08	0.38	-	-	-	-	-	-	0.17	.41	0.17	-	0.28	0.52

B = unstandardized estimates; *β* = standardized estimates; *SE* = standard error for unstandardized estimates; *β* = standardized estimates; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed). For fixed effects, *SE* have been reported. For random effects, SD have been reported.

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Data availability The datasets generated during and/or analyzed during the current study are available in the Open Science Framework (OSF) repository, [https://osf.io/scxb4/?view_only=539bc1c7bddd4121a1a851e6e6ba9f34].

Declarations

Ethical approval The research study was submitted to the University [blinded] in February 2021 through a self-assessment application and received a favorable ethical opinion. Participants reported informed consent in each questionnaire.

Conflict of interest The Authors of this publication state no known conflict of interest.

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