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Phubbing responses in real-time: rapid recovery from a single phub and declining affect with repeated phubs

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ABSTRACT

People tend to feel negatively when they are ignored by a conversation partner attending to their phone (i.e. 'phubbing'). We investigated how quickly people recover in an experiment where participants provided intensive real-time ratings of their mood during a simulated conversation with a partner who engaged in either no phubbing, a single phub, or repeated phubbing. Drawing on ostracism theories, we hypothesized and found that a single phub induces negative affect, $d \approx 0.40$, and people begin recovering immediately. However, repeated phubbing causes increasingly negative affect, $d \approx 1.20$, with a pattern of partial recovery between phubs. People quickly feel bad, but recover within seconds, unless repeated phubbing interrupts the recovery, and produces increasingly negative affect.

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People do not like to be ignored. With smartphones presenting continuous competition for other people's attention, it is now common to experience *phubbing*, where someone is ignored as their conversation partner attends to their phone. In the present research, we investigate reactions to this experience in real-time. We examine how long it takes for someone to recover from a single instance of phubbing, and the impact of repeated instances of phubbing across the course of an interaction.

Social exclusion and phubbing

Phubbing is the act of ignoring someone in a social setting, and instead engaging with one's mobile phone (Chotpitayasunondh & Douglas, 2018). This is an example of everyday ostracism: a form of social exclusion in which someone is ignored and excluded (David & Roberts, 2017; Wesselmann et al., 2016). According to the temporal need-threat model of ostracism (Williams, 2009), people are highly sensitive to even subtle cues of being ignored and excluded – we quickly detect such signals of ostracism (Wesselmann, Wirth, et al., 2012) and experience immediate negative affect and threats to basic psychological needs, such as self-esteem and control (Hales & Williams, 2021). These negative reflexive responses can be triggered by events as subtle as decreased eye-contact,

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conversational pauses, and unfamiliar cultural references (Iannone et al., 2018; Koudenburg et al., 2013; Wesselmann, Cardoso, et al., 2012; Wirth et al., 2010).

Being phubbed reliably activates the same negative outcomes caused by ostracism: negative affect and threats to basic psychological needs (e.g., Hales et al., 2018). Support for this finding is provided by studies with a wide variety of methods that converge on the same conclusion: It hurts to be phubbed.

Correlational studies find that people who are phubbed more often experience greater negative outcomes such as depression, lower life satisfaction, and feelings of disconnection (e.g., Pancani et al., 2021; Roberts & David, 2016). Experiments show that phubbing can cause negative affect and other related outcomes, based on people's recalled experiences of being phubbed, in-vivo experiences with a face-to-face conversation partner, and also immediate experiences by simulated video animations (Barrick et al., 2022; Chotpitayasunondh & Douglas, 2018; Hales et al., 2018; Knausenberger et al., 2022; McDaniel & Wesselmann, 2021; Vanden Abeele et al., 2016). Field studies have observed this effect beyond the lab: In real-life conversations, the presence and use of phones during conversations is associated with reduced conversation quality and intimacy (Misra et al., 2016; Vanden Abeele et al., 2019). Finally, daily diary studies show that on days when people report greater phubbing, they also report worse mood and related outcomes (Frackowiak et al., 2023; McDaniel & Drouin, 2019).

Given this research, and the need-threat model's prediction that people detect and respond to even minor forms of exclusion, we hypothesized that even a single instance of phubbing would be sufficient to induce negative affect, at least momentarily.

Recovery

Though phubbing is a clearly negative experience, presumably people do not stay upset forever, but instead recover from the negative effects with time. In fact, given the ubiquity of phubbing in modern life, and the degree to which it has come to be considered normal (e.g., Chotpitayasunondh & Douglas, 2016; Schneider & Hitzfeld, 2021), it would be surprising if people do not recover somewhat quickly in the moments following phubbing.

Existing theory and research support the possibility of speedy recovery from phubbing. According to the temporal need-threat model of ostracism (Williams, 2009), the negative responses triggered in the initial *reflexive stage*, quickly give way to a *reflective stage* in which people consider the ostracism episode, make attributions for the event, and begin to recover their basic needs and mood. This recovery is theorized to begin quickly, in the moments following exclusion (Williams, 2009). A meta-analysis of experiments indicates that ostracism's effects, which are initially very large, are substantially smaller after a delay, when people have had just a few minutes to recover (Hartgerink et al., 2015). Even when the two measures are administered at the same time, the effects of ostracism are greater when participants are asked specifically about their feelings *during the episode* versus their feelings *right now* (Garczynski & Brown, 2014), suggesting that recovery begins immediately. Research measuring second-by-second ratings of affect during an experience of being ostracized from a ball-throwing game found that affect levels began rebounding even before the brief episode had ended (Wesselmann, Wirth, et al., 2012), again suggesting a tendency toward quick recovery.

It appears then that, at least for relatively minor forms of daily exclusion, recovery begins very quickly. It is reasonable to expect the same to be true of responses to phubbing. This is especially likely in light of research showing that the effects of ostracism depend on whether social norms prescribe that type of ostracism (Rudert & Greifeneder, 2016). Perhaps in some contexts, phubbing is more acceptable, and phone presence might even be beneficial (e.g., Heyman & Human, 2024). Smartphones have become embedded in social life, so it may simply be more normal for people to phub, especially in moderation. According to the temporal need-threat model, such a brief episode of being ignored should still be sufficient to trigger reflexive negative affect. But, at least for a single and brief act of phubbing, the negative affect may well be fleeting. An aim of the current research is to measure just how fleeting these reactions can be.

Repeated phubbing

A single instance of phubbing may be experienced as relatively trivial, causing measurable but momentary negative affect (as we hypothesize). However, if phubbing is persistent and repeated over the course of an interaction, it is likely to produce increasingly negative responses, even if people do recover quickly from a single episode. Social norms may forgive a single moment of phubbing, especially if the phubber has a good reason (McDaniel & Wesselmann, 2021). But persistent phubbing likely communicates greater devaluing of the relationship and greater disengagement: two factors that explain why phubbing, and ostracism more generally, are aversive (Hales et al., 2018; Kerr & Levine, 2008). Accordingly, experiments that vary the degree of phubbing (i.e., a little versus a lot) and measure people's feelings after the episode, find that more phubbing is generally worse for the target (Chotpitayasunondh & Douglas, 2018; Knausenberger et al., 2022). In the present investigation we build on this research by examining the time-course of these reactions with the high temporal-resolution provided by second-to-second measurements of reactions to phubbing.

We predicted that repeated phubbing across a single interaction would produce increasingly negative affect. More specifically, we expect that people would recover quickly and fully from a single instance of phubbing, but if the phubbing is repeated, people would feel increasingly worse over the interaction, with only partial recovery between phubs, and increasingly negative reactions to subsequent phubs (i.e., an overall downward trend, but with intermittent yet incomplete upticks between phubs).

Current research

This study uses intensive real-time ratings of affect during a simulated conversation to observe the time-course of recovery from a single instance of phubbing. It also investigates the responses to repetitive phubbing. Given the theory and reasoning outlined above, we hypothesize that 1) a single instance of phubbing will induce negative affect, 2) people will recover from a single phub quickly, and 3) repeated phubbing will cause increasingly negative affect, but with some visible recovery between phubs.

To investigate these hypotheses, participants engaged in a task where they imagined a conversation with another person, depicted in a two-minute video, and rated their mood continuously throughout the video. Participants were randomly assigned to one of three conditions: 1) control with no phubbing, 2) a single phub early in the video, or 3) repetitive phubbing with five phubs throughout the video. Results were analyzed with time-varying effects modeling (Tan et al., 2012).

Method

This study's hypotheses, analysis plan, and stopping rule were preregistered. The preregistration, survey materials, data, and analysis script are all openly available at: https://researchbox.org/2724.

Participants and design

Participants were recruited online through the survey platform Prolific Academic. Our target sample size was 675 total (or, 225 per condition). Anticipating exclusions, we collected a total sample of 750 U.S. adults. The study description indicated participants should only complete the survey on a non-mobile device and using a web browser and internet connection capable of streaming video.

A total of 805 participants began the survey (an additional 23 were unable to take the survey because they were on mobile devices). As preregistered, participants were excluded from analysis if 1) they discontinued the survey before getting to the main task ($n = 56$), 2) their ratings in the video were not recorded ($n = 34$; this occurred in cases where, contrary to instructions, they advanced to the next page before reaching the very end of the video), 3) they failed either of two attention checks ($n = 70$), or 4) indicated that they had trouble getting the video to play smoothly ($n = 37$).

This produced a final sample of 608 total responses ($M_{Age} = 37.29$, $SD_{Age} = 12.73$; 46% men, 52% women, 2% non-binary or not indicated; 65% White, 14% Asian, 10% Black, and 7% Hispanic, 1% Native American or Pacific Islander, remaining not indicated). Participants were randomly assigned to one of three conditions: control ($n = 209$), single phub ($n = 198$), or repeated phubbing ($n = 201$).

This sample size appears sufficient to yield informative results. While it is not clear how to calculate power for a time-varying effect model (TVEM Frequently Asked Questions, n.d..), as an approximation, we calculated that the final obtained sample size provides approximately 95% power to detect a between-condition effect size of $d = .36$ (a typical effect size in psychology; Lovakov & Agadullina, 2021).

Procedure

Instructions

Participants were informed that we are interested in how people mentally visualize conversations with others (similar to instructions used by Dvir et al., 2021). They were asked to imagine that the man who would appear in the video is a friend and that 'you are catching up and telling him about the things that are going on in your life.'

Prior to starting the video, participants were introduced to the affective rating scale. They were informed that during the video they were to indicate their mood continuously on a sliding scale that ranges from −50 = 'very bad' to 50 = 'very good,' with a score of 0 representing feeling neutral. They were asked to update their mood continuously, at least every 3 to 5 seconds, and informed that it is okay if they feel the same throughout the task. There was not a separate pretest training video prior to the main task – instead, this instruction page also included an active sliding scale so they could become accustomed to the measure, and an item asking 'Based on how you feel, *right now*, what is your current mood on this scale?', and they were informed that whatever number they entered is a good starting point to use when the video begins (which served to anchor their mood ratings at the start of the task).

Video task

The main video-rating task is depicted in Figure 1. In all conditions, the actor maintains neutral expressions and nods periodically (as shown on the left in Figure 1), except for moments where phubbing was occurring (as shown on the right).

In the control condition, the man in the video engages in no phubbing. In both the single and repeated conditions, the man phubs once early in the video, thereafter phubbing no more times (in the single condition) or four more times (in the repeated condition). In all conditions, the video is 2:05 long (125 seconds). Participants rated their mood continuously throughout the task, and ratings were recorded at 1-second intervals using Affective Sampling software (Andre, 2019).

Reflective measures

Immediately following the video, participants completed reflective measures of mood and basic needs, allowing an assessment of the degree to which they had recovered at the end of the episode. For each measure, they were asked to indicate agreement with statements 'based on how you are feeling right now' on a likert scale from 1 (*not at all*) to 7 (*completely*). Mood was computed as the average of responses to an 8-item scale (e.g., 'I feel happy;' $\alpha = .94$), and basic needs satisfaction was computed as the average of responses to a 15-item scale measuring a reliable composite of belonging, self-esteem, control, meaningful existence, and certainty (Williams, 2009; Wood et al., 2023; e.g., 'I feel good about myself;' $\alpha = .94$).

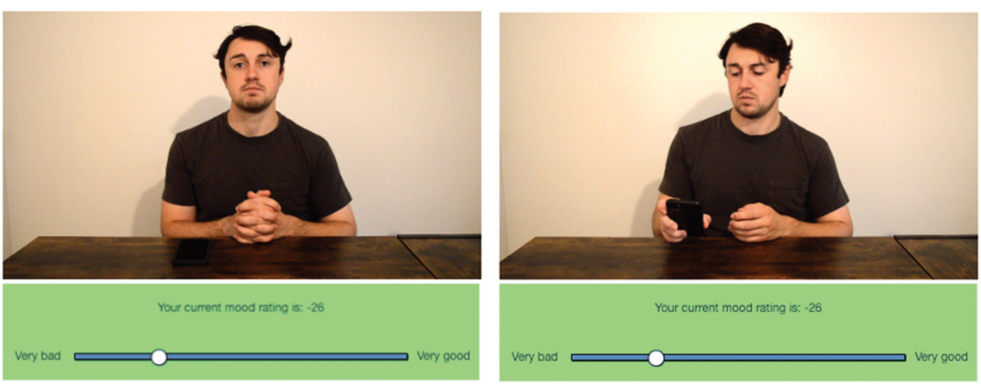

Figure 1. Images of the videos and continuous affective rating scale. Ratings were recorded at 1-second intervals

Finally, participants responded to a manipulation check item asking them to identify the behavior of the person in the video, with three response options corresponding to each of the three conditions. This research was reviewed and determined exempted by the local Institutional Review Board.

Analysis plan

Analyzing these intensive longitudinal results involved both a visual interpretation of the average responses across the experience for each group, as well as fitting a time-varying effects model (Dermody et al., 2017; Lanza et al., 2016; Tan et al., 2012). Time-varying effects models allow the coefficients of a traditional regression analysis to vary as a function of time across the duration of a given study, without assumptions that time has any fixed linear or non-linear parametric shape.

In our case, condition is represented with two dummy codes contrasting each phubbing group with the control condition. The time-varying effect model estimates and returns predicted values for the two coefficients at every moment in the study. The 95% confidence intervals (CIs) of these coefficients can be observed to identify moments in the video at which the conditions significantly differ from one another (i.e., the times when 95% CI for the contrast coefficient excludes zero). In this way, the approach is analogous to using a Johnson-Neyman technique, or 'floodlight analysis,' to identify regions of significance for a statistical interaction (Spiller et al., 2013). These regions of significance are indicated by the 95% CIs that do not include zero for each dummy-code coefficient. The particular model estimated in our analysis used B-spline estimation, as this tends to produce a more detailed and data-informed model representation than other approaches. B-spline preserves more of the original fluctuations over time observed in the data, as opposed to an alternative P-spline, which, although potentially more parsimonious, would have a greater amount of smoothing over timepoints, and produce a less detailed and data-sensitive model than the B-spline approach we report. This approach requires specifying the number of knots in the model (i.e., the number of intervals along the time series where the estimation function can change) to inform the level of data-sensitivity in the model. As preregistered, we identified the best fitting number of knots, 21, out of a maximum of 50 possible, and fit the model using the *tvem* package in R (Dziak et al., 2023).

Analysis of the reflective measures was conducted with one-way analyses of variance and planned contrasts comparing each phubbing group to the control condition.

Results

Manipulation check

Participants generally correctly identified the behavior of the target corresponding to their condition: 99% in the control condition, 90% in the single phub condition, and 99% in the repeated phub condition.

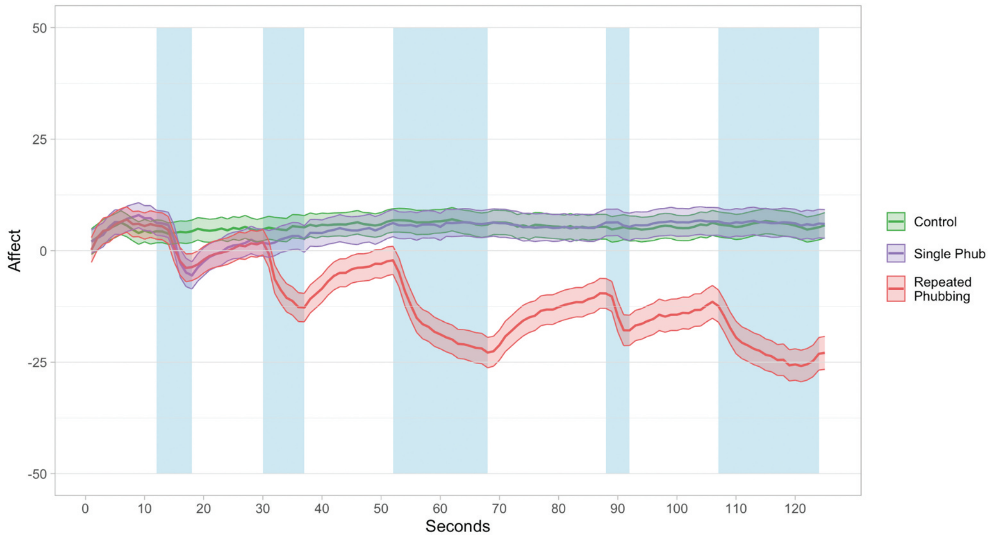

Figure 2. Average mood ratings for each condition across the experience (N = 608). *Note.* Shaded regions represent moments in the video when the target was phubbed in the repeated phub condition (and, in the case of the first shaded region, also the single phub condition). Error bands represent 95% confidence intervals.

Real-time mood ratings

Overall results

The results of the experiment are shown in Figure 2, which plots the average mood rating for each condition across the video, with error bands representing 95% confidence intervals around the mean of each group at each timepoint. The shaded blue blocks indicate the moments in the video where the target is using his phone in the repeated phubbing condition (and, in the case of the first shaded region, also in the single phubbing condition).

A visual inspection of the graph generally supports the hypotheses. A single phub causes negative affect in both the single phub condition and in the first of the many phubs in the repeated phubbing condition. In the moments following this first phub (which both phubbing conditions experienced), both conditions noticeably improved. And, in the repeated phubbing condition, successive phubs are followed by discernable corresponding declines in affect, with clear trends toward recovery between occurrences.

Time-varying effects model

The time-varying effects model confirms these impressions. Figure 3 shows the model's estimates of each dummy code contrast as a function of time. The top panel displays the effect of the single phubbing condition compared to the control condition across the time series. The lower panel shows the effect of the repeated phubbing condition compared to the control condition. For each, 95% confidence intervals around average condition differences are shown, and regions, where they exclude zero are interpreted as moments in which phubing significantly decreased affect.

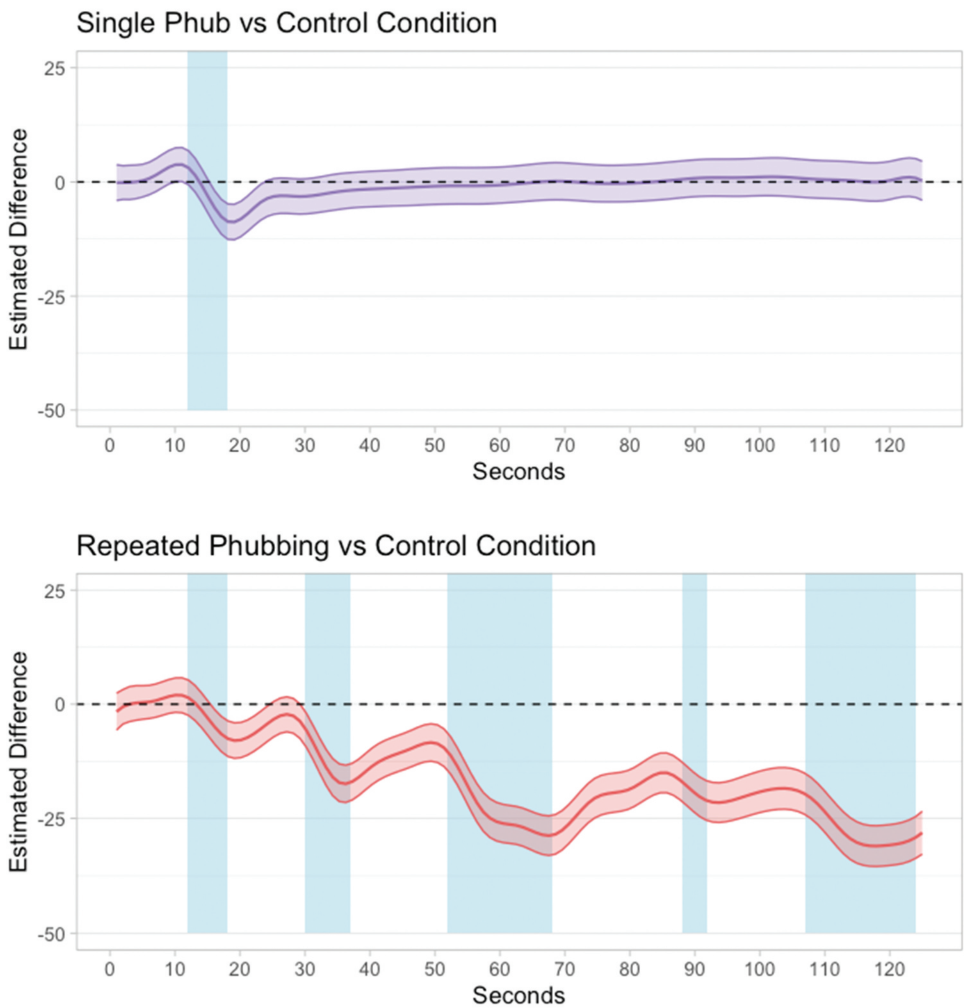

Figure 3. Time varying-effect model results ($N = 608$). Blue shaded regions represent moments in the video when phubbing occurred in the phubbing conditions. Error bands represent 95% confidence intervals around the estimated difference between single phub condition and control (top panel) and repeated phub and control (bottom panel).

The single phubbing condition showed an immediate decrease in affect compared to the control condition following the first phub: $d = -0.49$ (at 18 seconds). As predicted, participants in this condition quickly returned to comparable levels as the control condition: By 24 seconds, just 6 seconds after the end of the first phub, the single phub group had returned to levels not statistically distinguishable from the control group, where it stayed for the remainder of the video. At the end of the video, the single phub group mean was practically identical to the control group, $d = 0.01$.

The repeated phubbing condition showed a similar response to the first phub, with an initial decrease in affect relative to the control group, $d = -0.40$, and quick recovery to levels comparable to the control group (based on CIs including zero) at 25 seconds, just 7

Table 1. Condition means, standard deviations, and ANOVA results for reflective measures.

	Condition			
	Control (n = 209)	Single Phub (n = 198)	Repeated Phubs (n = 201)	ANOVA Result
Reflective mood	4.89 (1.31)	4.89 (1.25)	4.03 (1.56)	$F(2, 605) = 25.82$, $p < .001$, $\eta_p^2 = .08$
Reflective basic needs	4.77 (1.18)	4.67 (1.20)	4.20 (1.42)	$F(2, 605) = 11.41$, $p < .001$, $\eta_p^2 = .04$

N = 608. Standard deviations in parentheses.

seconds after the end of the first phub. This recovery process appears to have been reversed with the onset of the second phub at the 30-second mark, leading to a yet greater decrease in affect relative to the control condition ($d = -0.85$ at 37 seconds). This pattern repeated again, with intensifying negative affect after the third phub ($d = -1.24$ at 70 seconds), followed by two cycles of partial recovery interrupted by the fourth (shorter lasting) phub, and the final fifth phub. At the end of the video, the repeat phubbing group mean was substantially lower than the control group, $d = -1.22$.

Reflective mood and basic needs

Table 1 shows the condition means, standard deviations, and ANOVA results for the reflective mood and basic needs measures.

By the time the reflective measure was reported, planned contrasts detected no remaining effect of the single phub compared to the control condition on mood, $t(605) < .001$, $p = .999$, $d < 0.01$, or basic needs, $t(605) = -.81$, $p = .419$, $d = -0.09$. The repeated phubbing condition, however, did report more negative reflective outcomes than the control condition for both mood, $t(605) = -6.27$, $p < .001$, $d = -0.60$, and basic needs, $t(605) = -4.50$, $p < .001$, $d = -0.43$.

Unplanned analyses

We also ran exploratory time-varying effects models probing for moderation by participant age or gender, and found no strong evidence for moderation. See the online supplement for details.

Discussion

The results of this experiment replicate numerous studies finding that phubbing has an immediate negative effect on people's feelings (e.g., Knausenberger et al., 2022): Participants who were phubbed felt worse than those who were not. However, it appears that this effect dissipates relatively quickly: Within just about 7 seconds, the mood in the phubbed groups was no longer significantly lower than the control group, and by about 30 seconds later the mean had returned to near-baseline. This is consistent with the temporal need-threat model's postulation that people are sensitively tuned to signs of exclusion and quickly begin recovering afterward (Williams, 2009).

The speedy recovery observed here does not necessarily mean that the effects of phubbing are trivial, for at least two reasons. First, even if mood recovers quickly, it is still temporarily and non-trivially damaged when a conversation partner looks at their phone just once – a mood decrease of 0.4 standard deviations is not particularly small nor pleasant to experience, even if short-lived. Second, the results in the repeated phubbing condition make clear that the dose matters. When a conversation partner repeatedly looks at their phone, someone's affect recovery is thwarted, and the more often they are phubbed the worse they feel. In other words, repeated and persistent phubbing had a stronger effect in the moment and plausibly longer lasting effect: Even after the video had ended, this group reported substantially worse mood and lower basic needs satisfaction (in line with other research finding that that degree of phubbing matters; Chotpitayasunondh & Douglas, 2018; Knausenberger et al., 2022). This indicates both that the effects of phubbing have the potential to be somewhat lingering, and also that the task instructions and procedures employed here were sufficiently immersive and involving to produce active engagement from participants with the task, as they were instructed.

People are aware that ostracism is painful (Wesselmann et al., 2013), and they generally do not like to use it to hurt others (Legate et al., 2021). Thus, we might expect phubbing to be rare. Yet, research on phubbing shows two clear facts: while it is hurtful, it is also common (Capilla Garrido et al., 2021; Thabassum, 2021). The present results raise the possibility that one reason people frequently indulge in phubbing is that they understand that while painful, the negative effects are relatively brief.

Limitations

The present experiment was not designed to estimate phubbing's effects in daily life. The results in the current study likely magnify the strength of phubbing's effects, given the (deliberately) minimal and distraction-free nature of the videos. In real life, conversations can be deeply engaging, have concrete substance, and trajectories of topics that may cause one to more quickly recover from, or even forget, a brief phub. Conversation partners can also apologize and give context for the reason they are using their phone (McDaniel & Wesselmann, 2021). So, many real-world phubs may have smaller impact, and people may recover from them even more quickly than what was observed here.

The instructions in the present study specified that the conversation partner was a friend and that participants were to picture a relatively involved/close conversation (catching up on things going on in their life). Future research can systematically investigate the extent to which factors such as the closeness of the partner or the importance of the conversation moderate the time-course of recovery from single or repeated phubs.

Additionally, participants did not appear to feel particularly positively in the control condition. This is likely due to the somewhat neutral expressions of the conversation partner potentially being interpreted as negative, and also due to the fact that in the control condition, the phone was still present on the table, and the mere presence of a phone can harm conversation quality (Przybylski & Weinstein, 2013).

Conclusion

People generally do not like to be ignored. The present study shows that the effect of a single phub appears to be immediate, substantial, and brief. Yet, when repeatedly phubbed, people are unable to recover and experience increasingly negative affect. These findings suggest that one should avoid looking at their phone when conversing with another person, but if necessary they should do so as quickly and infrequently as possible.

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Study materials are available at https://researchbox.org/2724.

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Open scholarship

This article has earned the Center for Open Science badges for Open Data and Preregistered. The data and materials are openly accessible at https://researchbox.org/2724

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