

## Two Meta-Analyses of Mobile Phone Use and Presence

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Phubbing, or “phone snubbing, which is using a phone during a face-to-face interaction, is an emerging interpersonal problem that has drawn attention from both popular press and scholarly researchers. Although most people perceive phubbing as rude, it is also something people commonly admit doing (Rainee & Zickhur, 2015). Recent headlines illustrate the public concerns about phubbing, exclaiming “Just look me in the eyes already” (Shellenbarger, 2016), “Phubbing is hurting your relationship” (Ducharme, 2018), and “Phubbing: What is it and why it’s bad for our health” (Lego, 2018).

Social scientists have also sought to understand the effects of mobile device use during in-person interactions. Over the last decade, a line of empirical research has examined the impact of both mobile device use and mere presence on in-person interactions. Despite a shared interest in understanding these phenomena, studies have varied considerably. First, studies differ in terms of what behavior they examine: actual device *use* or merely device *presence*. Additionally, researchers use a range of terms to describe the intrusion of mobile device use during a face-to-face interaction including: “phubbing” (Chotpitayasunondh & Douglas, 2016); “copresent device use” (Caplan, 2018; Halpern & Katz, 2017); “technoference” (McDaniel & Coyne 2016); “mobile relational interference” (Hall, Baym, & Miltner, 2014); “multicommunicating” (Seo, Kim, & David, 2015); and “parallel communication” (Kneidinger-Müller, 2017).

In addition to confusion resulting from different terms, it is also challenging to organize results across studies that employ different methods, including laboratory experiments, field experiments, surveys, and focus groups to study these phenomena. Moreover, researchers have examined a variety of relational contexts including phubbing during interactions between friends, romantic partners, family members, and strangers. Such variation makes it difficult to summarize the findings accurately across different studies.

Although it is clear that device use has significant adverse effects on interactional outcomes, it is less clear how *large* those effects are, how *consistent* such effects are across studies, and how various *structural features of studies* might influence the observed effects. Also, without a common vocabulary or theoretical base, comparing or organizing the results that research has produced is difficult. Narrative reviews of this research area are available (Caplan, 2018), but there is no systematic quantitative review or summary of this body of research.

Given the different terminology, empirical approaches, and disciplinary practices that characterize research on phone snubbing, researchers disagree on the

oretical explanations. As a result, we believe the best way forward is to allow the data to guide the journey, at least for the near-term future. Consequently, two separate meta-analyses seem to be the best way to allow those data to speak.

Meta-analyses of studies in this area would summarize broad patterns in findings, problems, and identify areas for new inquiry. Such analyses are useful tools for systematically examining and summarizing the results from a body of quantitative research results. Tokunaga (2017, p. 2) noted: “Meta-analysis is one approach that can bring consonance to a research area by generating an overall effect size across a body of research and testing potential moderators of the effects.” Similarly, Rosenthal and DiMatteo (2001, p. 61) explained, meta-analysis “allows researchers to arrive at conclusions that are more accurate and more credible than can be presented in any one primary study or in a nonquantitative, narrative review.” Further, they point out that meta-analyses afford researchers an “opportunity to view the whole picture of a research enterprise” by illustrating the similarities and differences among different methods and results in the literature.

The present paper reports the results of the first two meta-analyses to assess the magnitude and significance of the effects reported in the literature. The results presented later support previous hypotheses about the harmful effects of phubbing but found no evidence of a mere presence effect across studies. The remainder of this paper presents four sections. The first section reviews the types of methods and measures that researchers have employed in previous studies and presents the research questions that guided the meta-analysis. Next, the methods and results sections report the details of two, separate meta-analyses of nearly four dozen empirical studies. Finally, the discussion summarizes the findings and explains how they help advance theory and suggest possible directions for subsequent research.

## Device Use Versus Mere Presence of Device

Research has explored two similar phenomena, actual phubbing (device use) and also the effects due to the mere presence of a phone that no one uses. The device-use studies have examined the outcomes of texting, phone checking, and other types of phone use during an in-person interaction. Mere presence studies, on the other hand, have investigated the interactional effects of a phone being present, but not used.

## Mobile Phone Use Studies

As we discuss shortly, there are over three dozen published studies on the effects of phubbing. Researchers have studied the effects of co-present device use on a variety of different outcome variables. Those with positive valence included, for example, intimacy, interaction quality, relationship satisfaction, relationship quality, warmth, and connectedness. Outcomes that assessed perceptions with a negative valence included: incivility, being annoyed, being disrespected, being ignored, and being offended.

The vast majority of the results found copresent device use contributed to more negative impressions of a partner, less interactional enjoyment, more strained in-

teractions, lower feelings of connection, greater distraction, and missed nonverbal cues (Caplan, 2018). For example, Rainie and Zickuhr (2015) asked participants how annoyed they were by the behavior. Other studies have assessed phubbing effects on feelings of social rejection (Chotpitayasunondh & Douglas, 2018) and perceived ostracism (Hale, Dvir, Wesselmann, Kruger, & Finkenauer, 2018). Vanden Abeele, Antheunis, and Schouten (2016) found similar results, indicating that phubbing negatively affected impression formation, social attraction, and overall interaction quality. Further, participants who used their phones during the interaction were perceived by their partners as less polite and less attentive (Vanden Abeele et al., 2016).

Beyond impression formation and interaction quality, studies also indicate that phubbing can threaten relationship quality. Here, copresent device use correlates with device-related conflict, erosion of intimacy, and lower romantic relationship satisfaction (Halpern & Katz, 2017; McDaniel & Coyne, 2016a). Roberts and David's (2016) results revealed that conflict mediated the impact of copresent device use on device-related conflict in intimate relationships.

Researchers have examined the relational impacts of copresent device use across a variety of interactional contexts. These include interactions among friends (Brown et al., 2016; Miller-Ott & Kelly, 2017), conversations between romantic partners (McDaniel & Coyne 2016a; McDaniel, Galovan, Cravens, & Drouin, 2018; Miller-Ott & Kelly, 2015, 2016; Roberts & David, 2016), talk between coworkers (Roberts & David, 2017), and communication among family members (Hinker et al., 2015; Kushlev & Dunn, 2019; McDaniel & Coyne, 2016b; McDaniel & Radesky, 2018). Diversity of relationship types is a hallmark of these studies, and the potential of context to serve as a moderator will be investigated in a later section.

Another source of variability in the phubbing studies is setting. Researchers have examined interactions in a variety of locations, including waiting rooms, restaurants, playgrounds, and laboratories. This variety of contexts reflects the importance of the phenomenon and its general relevance to a wide array of interpersonal settings. However, comparing the effects across these studies is especially challenging, given the people involved have dramatically different relationships with each other. Nevertheless, diversity of setting is a potential moderator that will be examined subsequently.

Studies have used an assortment of empirical methods to study the interpersonal effects of co-present device use. Focus group research by Miller-Ott and Kelly (2017) indicated that people perceive copresent device use as rude and indicative of boredom. Researchers using a longitudinal 5-day diary method observed that people felt worse and less connected when interactions involved copresent device use (Kushlev, Kostadin, & Heintzleman, 2018). One unique method included participants viewing an animated interaction depicting an initial interaction where one character engaged in copresent device use (Chotpitayasunondh & Douglas, 2018). Other studies have observed parents' use of devices while spending time with their child at a playground or on a field trip to a museum (Kushlev & Dunn, 2018). Additionally, other studies have used self-report surveys (Stockdale, Coyne, & Padilla-Walker, 2018; Wang, Wang, Wang & Lei, 2017).

Although the device-use effect studies have employed different vocabulary, methods, and samples, they do provide a relatively consistent pattern of results

supporting the claim that phubbing has harmful effects on both interactional and relational outcomes. What is less clear, however, is the relative size of this effect across studies and an understanding of how different contextual variables might influence results. These studies give rise to the following research questions:

- RQ1: What is the effect of mobile phone *use* during in-person interactions on perceptions of partner and interaction?  
 RQ2: What moderators, if any, influence this relationship?

### **Mere Presence Effect Studies**

In the original mere presence paper, Przybylski and Weinstein (2013) reported results of two studies that found that, when compared to interactions where there was no phone present, the mere presence of a phone on a table during an in-person interaction resulted in reduced trust and perceived empathy. The studies indicated that the mere presence effect was more pronounced when discussions were meaningful rather than casual; topic importance seemed to moderate the mere presence effect. There have been only a small number of mere presence studies, and they have not yielded consistent results. The empirical support for the mere presence effect is equivocal. Follow-up studies have not been able to replicate the original mere-presence effects. But, again, these are difficult to compare due to different methods and measures across studies, and they are difficult to compare to results found in the phubbing studies.

Since the original mere presence study in 2013, efforts to replicate the effects have yielded inconsistent results. Misra, Cheng, Genevieve, and Yuan (2014) conducted a field experiment study in which 100 dyads were asked to have a 10-minute discussion at a coffee shop. Without prompting, twenty-nine of the dyads were observed to have used a mobile device during their interaction. After completing a post-discussion questionnaire, the dyads with visible device use provided lower ratings of interactional quality and partner empathy. However, because there was no experimental manipulation of the variables, the ordering of a causal relationship could not be established (i.e., lower interactional quality may have prompted phone use).

On the other hand, three more recent replication efforts observed little to no evidence of the effect. Allred and Crowley (2017) found that the mere presence effect only occurred when participants remembered seeing the phone. If the phone went unnoticed, there was no effect. Another study attempting a replication found no evidence of the mere presence effect (Crowley, Allred, Follon, & Volkmer, 2018). In this study, phone presence or absence did not significantly influence relationship quality or perceived empathy, nor was the meaningfulness of interaction a moderator of any mere presence effect. Finally, Caplan and Courtright (2019) compared three phone-present conditions (including one in which the phone rang) to a no-phone control condition. These researchers found no significant differences among the three conditions and control.

Given these inconsistent findings, the following research questions are advanced:

RQ3: What is the effect of mobile phone *mere presence* during in-person interactions on perceptions of partner and interaction?

RQ4: What moderators, if any, influence this relationship?

## Methods

### Search of the Literature and Criteria for Inclusion

**Search Procedures.** An exhaustive search of the literature was conducted to identify the initial database of articles that would be further examined and culled according to the inclusion criteria presented below. The search was designed to discover articles with the terms copresent device use, copresent use, mere presence effect, multicomputing, phubbing, or technoferece in either the title or the abstract. The databases examined were *Communication and Mass Media Complete*, *Dissertation Abstracts*, *Google Scholar*, *JSTOR*, and *Psychinfo*. The Reference sections of articles that were discovered were further reviewed to identify additional studies on these search topics. Finally, after the initial set of articles was completed, their titles were submitted to the Web of Science (formerly Social Science Citation Index) to locate other articles in which they might have been cited.

**Criteria for Inclusion.** The various searches located 110 articles. For inclusion in the meta-analyses, articles were evaluated according to the following criteria:

1. The study had to examine the effects of an interactional partner's phone use (or presence) during an in-person interaction.
2. The study had to employ quantitative methods and report quantitative findings (e.g., focus group findings were excluded). Those findings had to be in the form of a correlation coefficient or another statistic that would allow the calculation of a correlation coefficient.
3. The study had to report the presence of two key variables: phone use or presence (past or concurrent) and an outcome measure that was either a socially oriented perception or behavioral reaction on the part of the non-device using partner.
4. The study's author(s) and affiliation(s) had to be identifiable.

Thirty-two articles met these criteria, although several reported multiple studies with independent samples. In the end, we retained a final set of 43 studies for analysis ( $N = 8,116$ ). Seventy-eight articles were excluded. The included articles, along with their sample size and effect size  $r$ , are displayed in Table 1.

**Potential Moderators.** The two authors independently coded the 43 articles for attributes that could be potential moderators of the effects. These were various instantiations of the concepts of setting or context, type of study, and type of relationship. These included: whether the study had student participants or others, the percent of female participants, the number of female participants, the racial makeup of the sample, the country where the sample was drawn, the type of study (experiment, survey, etc.), whether participants were acquainted, whether a confederate was used, the dyad type (e.g., same sex, opposite sex), and the dyad relationship (friends, parent-child, spouses).

**Table 1.** *Listing of Sample Sizes and Effects Sizes for Each Study Included In Analysis*

Mere Presence Studies		
Article	Sample Size ( <i>n</i> )	Effect Size ( <i>r</i> or $\bar{r}$ )
Allred & Crowley (2017)	48	-.16
Caplan & Courtright (2019)	124	-.01
Crowley et al. (2018)	87	.12
Misra et al. (2017)	200	-.25
Przybylski & Weinstein (2013) Study 1	74	-.45
Przybylski & Weinstein (2013) Study 2	68	-.39
Phone Snubbing Studies		
Article	Sample Size ( <i>n</i> )	Effect Size ( <i>r</i> or $\bar{r}$ )
Amichai-Hamburger & Etgar (2016)	128	-.23
Avelarm (2015)	100	-.64
Banjo et al. (2008)	28	-.60
Brown et al. (2016)	126	-.35
Cameron & Webster (2011)	324	-.43
Caplan & Courtright (2019)	96	-.39
Chambliss et al. (2015)	228	-.39
Chotpitayasunondh & Douglas (2018)	128	-.63
Cizmeci (2017)	500	.19
Cumisky (2005)	171	-.24
Davey et al. (2018)	400	-.33
David & Roberts (2017)	180	-.33
Dwyer et al. (2018) Study 1	304	-.15
Dwyer et al. (2018) Study 2	123	-.11
Gonzales & Wu (2017)	98	-.43
Hale et al. (2018) Study 1	151	-.62
Hale et al. (2018) Study 2	271	-.79
Halpern & Katz (2017)	275	-.18
Kushlev & Dunn (2018) Study 1	200	-.34
Kushlev & Dunn (2018) Study 2	292	-.28
Kushlev et al. (2019)	169	-.27

Lapierre & Lewis (2016)	171	-.17
Myruski et al. (2017)	50	-.39
Radesky et al. (2015)	301	-.13
Roberts & David (2016) Study 1	308	-.55
Roberts & David (2016) Study 2	145	-.34
Roberts & David (2017) Study 1a	200	-.30
Roberts & David (2017) Study 1b	95	-.37
Roberts & David (2017) Study 2	118	-.45
Servies (2012)	80	-.48
Stockdale et al. (2018)	1072	-.31
Thornton et al. (2014) Study 1	54	.12
Thornton et al. (2014) Study 2	47	-.23
Vanden Abeele et al. (2016) Study 1	52	-.46
Vanden Abeele et al. (2016) Study 2	134	-.01
Vanden Abeele & Postma-Nilsenova (2018)	125	-.79
Wang et al. (2017)	243	-.13

**Additional Exploratory Moderators.** Several additional moderators were also coded and were primarily structural aspects of the studies: the number of authors, whether authors were same or mixed gender, the discipline where the study was published, the publication date, the sample size, the length of interaction in minutes, whether a control group was used, whether a manipulation check was done, if reliability was reported, the size of reliability coefficient, if covariates were employed, and whether the study reported statistical interactions. The agreement on both sets of potential moderators was almost unanimous, with only a handful of disagreements out of 946 judgments (43 studies  $\times$  22 judgments) being settled by discussion.

### Effect Size Calculation

The correlation coefficient,  $r$ , was the effect size of interest. Whenever possible, correlations were extracted directly from the study. Much more often, however, single degree-of-freedom  $F$ -tests or  $t$ -tests were used to calculate  $r$ . Finally, when a study reported more than a single finding that met the second inclusion criterion, a correlation was calculated for each result, the correlations were converted to Fisher's  $z'$ , the  $z'$ s were averaged, and the mean  $z'$  was transformed back to  $r$ , which was used as the size of the effect. Similarly, all results involving correlation coefficients reported below were calculated using  $z'$  and then converted back to  $r$ .

This decision to aggregate effect sizes was made because including the effect sizes of multiple dependent variables within the same study would (1) allow some studies to have greater impact on the outcome of the meta-analyses than others,

and (2) treat those multiple effects as independent when in fact they almost certainly displayed *intra*-study covariation. Moreover, this decision follows the advice of Rosenthal (1991, p. 27): “My own recommendation is to have each study contribute only a single effect size estimate and a single significance level to the overall analysis” (see also, Rosenthal & DiMatteo, 2001, p. 74).

## Reliability of Studies

At this point in the analysis, the 43 studies were divided into two categories: six studies that focused on the mere presence phenomenon, and 37 studies that investigated some aspect of phubbing. The six mere presence studies reported very acceptable reliability for their outcome measures ( $M = .89$ ,  $SD = .04$ ). Reporting the reliability of the 37 studies that focused on phubbing was not as straightforward, however, because 10 of those studies reported no reliability estimates.

For the remaining 27 studies (37 minus 10 not reporting reliability), the mean reliability was the same as the mere presence studies ( $M = .89$ ), but they exhibited slightly increased dispersion ( $SD = .07$ ). Given the small number of phubbing studies without reliability estimates, the decision was made to conduct a statistical comparison to ensure that results were similar to the 27 studies reported reliabilities.

Accordingly, we compared the  $z$ 's of the studies that reported reliability coefficients ( $M_{\text{yes}} = -0.34$ ,  $SD = 0.32$ ) to the  $z$ 's of those that did not ( $M_{\text{no}} = -0.38$ ,  $SD = 0.21$ ). The one-way ANOVA indicated that these means were not significantly different ( $F(1, 35) = 0.13$ ,  $p = .72$ ). As a result, the ten studies without reliability coefficients were included in the remaining analyses. In subsequent analyses when the reliabilities are used to weight the  $z$ 's, the average reliability ( $M = .89$ ) will be used in place of those missing values.

## Results

### Mere Presence Studies

The six studies (Allred & Crowley, 2017; Caplan & Courtright, 2019; Crowley, et al., 2018; Misra et al., 2016; Przybylski & Weinstein, 2013, Studies 1 & 2) had a combined sample size of  $N = 601$  and produced an average  $z'$  of  $M = -0.20$  ( $SD = 0.23$ , 95% CI  $[-0.39, -0.02]$ ), which converted to  $r(6) = -0.20$ ,  $p = .359$ , 95% CI  $[-0.43, 0.03]$ .

Because of the small number of studies, a weighted  $z'$  ( $z'_{\text{w}}$ ) was also calculated by using the reliability of each study as the weight of the individual  $z$ 's. As the result of this calculation,  $z'_{\text{w}} = -0.18$ , which converted to  $r(6) = -0.17$ ,  $p = .371$ . Both the weighted and unweighted correlations are relatively small and nonsignificant, but  $N = 6$  is also small, thus making statistical power approximately .11.<sup>1</sup>

### Effects of Phone Snubbing (“Phubbing”)

The typical approach of the 37 studies ( $N = 7,515$ ) that focused on phubbing was to compare—either in a survey format or an experiment—instances in which a mobile phone was used during an interaction to instances in which it was not. To



maintain consistency among the findings, whenever a finding exhibited a more negative perception or reaction to phone use, we entered the resulting correlation coefficient as negative, regardless of how the variables were coded in the original article.

Unlike the results for the mere presence effect, the results for phubbing were more robust. The 37 studies produced an average  $z'$  of  $M = -0.37$  ( $SD = 0.277$ , 95% CI [-0.45, -0.28]). This converted to a correlation coefficient of  $r(36) = -.35$ ,  $p = 0.017$ , 95% CI [-0.43, -0.27].

As before, a weighted  $z'$  was calculated for each for the 37 studies using the reported reliability of the study as the weight. The mean reliability ( $M = 0.89$ ) was used for those studies that did not report a reliability coefficient. The resulting mean  $z'_w$  was  $-.30$ , which converts to  $r(37) = -0.29$ ,  $p < .039$ .

Together, the results of these several tests suggest an affirmative answer to RQ3. There is considerable evidence for a decidedly negative effect of mobile phone use during interpersonal interactions.

### The Search for Moderators

**Mere Presence.** Because the mean weighted effect size ( $M = -0.17$ ) was not significant, a follow-up search for moderators would usually not be performed. In the spirit of exploration, however, we employed the  $Q$  statistic presented by Hedges and Olkin (1985, p. 235) to determine if there was enough heterogeneity among the effects that moderation was a possibility. The result was  $Q(6) = 4.99$ , which is distributed as a  $\chi^2$  with 6 degrees-of-freedom. This statistic was not significant ( $p = .544$ ); hence no moderation would be expected. Indeed, when all the moderators listed previously were correlated with the effect sizes, none achieved a significant association.<sup>2</sup> Hence a cautious but negative answer must be given to RQ2.

**Phone Snubbing.** The Hedges and Olkin (1985)  $Q$  statistic was calculated for the 37 studies that investigated phone snubbing. The result was  $Q(36) = 534.48$ , which is distributed as a  $\chi^2$  with 36 degrees-of-freedom. A  $Q$  of this size is significant ( $p < .00001$ ), so it is reasonable to assume that at least some moderators will be operating.

Despite this reasonable assumption, only one of the variables produced a significant relationship with the effects: whether the original research reported an interaction. Quite surprisingly, none of the other potential moderator variables achieved a significant relationship with the effect sizes.

Regarding RQ4, the finding indicates that the ten studies that reported interactions in their design (all of the effects used in the current study were unmoderated) showed a much stronger effect of phubbing ( $M = -0.51$ ,  $SD = 0.32$ ) than the 27 studies that employed no moderators ( $M = -0.30$ ,  $SD = 0.227$ ). This was a significant difference,  $F(1, 35) = 4.13$ ,  $p < .05$ ,  $r^2 = .11$ .

### Discussion

People's ubiquitous use of mobile phones has required the consideration and adoption of new rules of etiquette about when, where, and in what way these devices should be appropriately used. The current study examined two facets of

this etiquette debate: the mere presence of a mobile phone and the use of a phone during in-person interaction.

### Mere Presence Effects

Since the original article was published, the pair of studies by Przybylski and Weinstein (2013) have posed something of a conundrum. The original paper offered no theoretical explanation for why the findings occurred. Subsequently, three separate studies have failed to replicate these effects. Even if the work of Misra et al. (2014) is credited as a replication (which it was in the current study), the totality of the findings is not significantly different from zero.

The Misra et al. (2014) study, however, was a field experiment in which one or both members of a couple were observed using a mobile device in a public setting. Because there were no controls over cause and effect, whether phubbing led to negative perceptions or negative perceptions of the interaction prompted phubbing cannot be determined. If the Mira et al. study was to be deleted from this small sample, the mean effect size would become even smaller.

Still, the question remains, why no replication? The most likely explanation is an evolving sense of cell phone etiquette. Given that Przybylski and Weinstein's studies were published in 2013, they almost certainly gathered the data a year or two (or more) earlier (it was first published online in July 2012). As Crowley et al. (2018, p. 291) observed, "it may be that cell phone presence is no longer considered a violation of interactional norms or that expectations surrounding cell phone presence are becoming less restrictive." Mere presence effects will likely remain an intriguing yet unresolved dilemma.

### Phubbing Effects

Even as mere presence effects remain unresolved, the perceptual or behavioral reactions to one partner manipulating a cell phone during an interpersonal interaction are well documented and have a solid theoretical explanation. The current meta-analysis found a mean effect size of  $r = -0.34$  and a weighted effect size (i.e., weighted by reliability) of  $r = -0.29$ .

The most surprising finding of the current meta-analysis is that only one of the potential moderators was related to the set of effect sizes. Studies that reported interactions had more substantial effects than those that did not. There is no obvious theoretical explanation for this finding. One speculation might be that the researchers who employed moderators in their studies were more thoughtful and planned more carefully, thus resulting in stronger effects. Such an explanation, however, remains speculative. This finding addresses RQ4, indicating a lack of theoretically meaningful moderators identified across the literature.

All other potential moderators were nonsignificant, even though a very large  $Q$  statistic indicated a good deal of heterogeneity was present, usually a precursor to finding moderation. Perhaps we have overlooked some structural element among these 37 studies that would serve as a moderator, but the probability of such an oversight is small.

The current study did reveal that interactions were reported in 10 of the studies examined. Moreover, when those interactions were significant, they were usually involved some form of individual difference variable and not the structural type of variable analyzed in this study. Hence, future research should look at additional individual difference variables such as one's sensitivity to face threats, social skill, empathy, or self-esteem. Doing so will help scholars develop more detailed and explicit theories explaining phubbing effects and will also allow future meta-analyses of this area to use individual difference variables as moderators rather than the structural variables employed in the present study.

### What Did the Data Tell Us?

Several takeaways are apparent. First, the admitted paucity of studies tentatively suggests that the mere presence of a mobile phone no longer evokes the same reaction that it did seven or eight years ago. In their two studies, Przybylski & Weinstein (2013) found negative associations of  $-.46$  and  $-0.39$  between mobile device presence and perceptions of relational quality. None of the other mere presence studies discovered relationships of this magnitude (see Table 1). The most likely explanation is that mobile phones have become so ubiquitous that we no longer notice or care about their presence.

Second, the existing studies at the time of this meta-analysis suggest quite clearly that the effects of phubbing are not moderated by any of the structural elements that characterize them; gender of authors, country of origin, experiments versus surveys versus observations, etc. These attributes can safely be ignored in future analyses. Moreover, this finding should be viewed as positive: artifactual issues that are extrinsic to the participants themselves did not influence the participants' reactions to phone snubbing.

Finally, in those several studies that did identify statistical interactions, those interactions without exception involved individual differences variables. That fact should not be overlooked, nor should it be under-emphasized. The future of theory development in mobile device use and abuse should be directed at finding those individual difference variables that moderate the effects of phubbing. This is what the data are telling us, and this is the direction on which future research should focus.

### Limitations

There can be little doubt that the primary limitation of the current meta-analysis is the small number of studies that are available for aggregation. Moreover, and for reasons mentioned previously, the six studies that comprise the mere presence effect will likely be all that there are for the foreseeable future. After three unsuccessful attempts at replication, there will be little interest among researchers or journal Editors to attempt still more.

The 37 studies that comprised the corpus of research on phubbing had somewhat more statistical power, but certainly not enough. In several instances, the differences between levels of a nominal level moderator were strikingly substantial (e.g., the effect sizes between experiments and surveys), but they did not reach

statistical significance. Had there been an additional 15 to 20 studies available for inclusion, there would likely have been much more to report.

## Conclusion

The primary conclusion from this meta-analysis is that using a mobile phone during interpersonal interaction engenders relatively strong negative reactions from one's interactional partner. The size of this reaction (i.e., the effect size) was highly inconsistent from study to study. Currently, that heterogeneity remains unexplained. Accordingly, future scholarship should focus on the variables that prompt more or less intense adverse reactions to the use of mobile phones during an interaction. Finally, researchers need to continue to develop theory-based accounts that explain the effects of phubbing on interpersonal interaction and relationships.

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## Notes

1. As a comparison, a correlation of this magnitude would require a sample size of between 65 and 70 observations for sufficient power to achieve significance.
2. Again, we cannot forget that a sample size of six provides virtually no statistical power to discover such moderation.

## References

**Articles with an \* were included in one of the two meta-analyses.**

- Abeele, M. M. V., Antheunis, M. L., & Schouten, A. P. (2016). The effect of mobile messaging during a conversation on impression formation and interaction quality. *Computers in Human Behavior*, *62*, 562-569. <https://doi:10.1016/j.chb.2016.04.005>
- \*Allred, R. J. & Crowley, J. P. (2017). The "mere presence" hypothesis: Investigating the nonverbal effects of cell-phone presence on conversation satisfaction. *Communication Studies*, *68*, 22-36. <https://doi:10.1080/10510974.2016.1241292>
- \*Amichai-Hamburger, Y. & Etgar, S. (2016). Intimacy and smartphone multitasking—A new oxymoron? *Psychological Reports*, *119*, 826-838. <https://doi:10.1177/0033294116662658>
- Avelar, D. (2015). Tell me why you're texting! Effect of cell phone use on interpersonal interactions. Unpublished Master's Thesis. Franklin & Marshall College.
- \*Banjo, O., Hu, Y., & Sundar, S. S. (2008). Cell phone usage and social interaction with proximate others: Ringing in a theoretical model. *The Open Communication Journal*, *2*, 127-135. <https://doi:10.2174/1874916x00802010127>
- \*Brown, G., Manago, A. M., & Trimble, J. E. (2016). Tempted to text: College students' mobile phone use during a face-to-face interaction with a close friend. *Emerging Adulthood*, *4*, 440-443. <https://doi:10.1177/2167696816630086>

- Caplan, S. E., (2018). *The changing face of problematic Internet use: An interpersonal approach*. New York: Peter Lang.
- \*Caplan, S. E. & Courtright, J. A. (2019). Don't pick up that phone (or you'll be sorry): Mobile device use and presence on in-person conversations. A paper presented at the National Communication Association Conference in Baltimore, MD.
- \*Cameron, A.-F. & Webster, J (2011). Relational outcomes of multicommuting: Integrating incivility and social exchange perspectives. *Organization Science*, 22, 754-771. <https://doi:10.1287/orsc.1100.0540>
- \*Chambliss C., Short, E., Hopkins-Desantis, J., Putnam, H., Martin, B., Millington, M. . . . Lee, J. (2015). Young adults' experience of mobile device disruption of proximate relationships. *International Journal of Virtual Worlds and Human Computer Interaction*, 3, 10-17. <https://doi:10.11159/vwhci.2015.002>
- Chotpitayasunondh, V., & Douglas, K. M. (2016). How "phubbing" becomes the norm: The antecedents and consequences of snubbing via smartphone. *Computers in Human Behavior*, 63, 9–18. <https://doi:10.1016/j.chb.2016.05.018>
- \*Chotpitayasunondh, V., & Douglas, K. M. (2018). The effects of "phubbing" on social interaction. *Journal of Applied Social Psychology*, 48, 304–316. <https://doi:10.1111/jasp.12506>
- \*Cizmeci, E. (2017). Disconnected though satisfied: Pphubbing behavior and relationship satisfaction. *The Turkish Online Journal of Design, Art, & Communication*, 17, 364-375. <https://doi:10.7456/10702100/018>
- \*Crowley, J. P., Allred, R.J., Follon, J., & Volkmer, C. (2018). Replication of the mere presence hypothesis: The effects of cell phones on face-to-face conversations. *Communication Studies*, 69:3, 283-293. <https://doi:10.1080/10510974.2018.1467941>
- \*Cumiskey, K. M. (2005). "Surprisingly, nobody tried to caution her": Perceptions of intentionality and the role of social responsibility in the public use of mobile phones. *Mobile Communications*, 41, 225-236. [https://doi:10.1007/1-84628-248-9\\_15](https://doi:10.1007/1-84628-248-9_15)
- \*Davey S, Davey A, Raghav SK, Singh JV, Singh N, Blachnio A, et al. (2018) Predictors and consequences of "Phubbing" among adolescents and youth in India: An impact evaluation study. *Journal of Family & Community Medicine*, 25, 35-42. [https://doi:10.4103/jfcm.JFCM\\_71\\_17](https://doi:10.4103/jfcm.JFCM_71_17)
- \*David, M. E. & Roberts, J. A. (2017). Phubbed and alone: Phone snubbing, social exclusion, and attachment to social media. *International Journal of Human-Computer Interaction*, 2, 155-163. <https://doi:10.1086/690940>
- Ducharme, J. (2018, March 29) 'Phubbing' is hurting your relationships. Here's what it is. *Time*. <http://time.com/5216853/what-is-phubbing/>
- \*Dwyer, R. J., Kushlev, K., & Dunn, E. W. (2018). Smartphone use undermines enjoyment of face-to-face social interactions. <https://doi:10.1016/j.jesp.2017.10.007>
- \*Gonzales, A. L., & Wu, Y. (2016). Public cellphone use does not activate negative responses in others... unless they hate cellphones. *Journal of Computer-Mediated Communication*, 21(5), 384-398. <http://doi:10.1111/jcc4.12174>
- \*Hales, A. H., Dvir, M., Wesselmann, E. D., Kruger, D. J., & Finkenauer, C. (2018). Cell phone-induced ostracism threatens fundamental needs. *The Journal of Social Psychology*, 158(4), 460-473. <https://doi:10.1080/00224545.2018.1439877>

- Hall, J. A., Baym, N. K., & Miltner, K. M. (2014). Put down that phone and talk to me: Understanding the roles of mobile phone norm adherence and similarity in relationships. *Mobile Media & Communication*, 2(2), 134–153. <https://doi.org/10.1177/2050157913517684>
- \*Halpern, D. & Jatz, J. E. (2017). Texting’s consequences for romantic relationships: A cross-lagged analysis highlights its risks. *Computers in Human Behavior*, 71, 386–394. <http://dx.doi.org/10.1016/j.chb.2017.01.051>
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.
- \*Kushlev, K., & Dunn, E. W. (2019). Smartphones distract parents from cultivating feelings of connection when spending time with their children. *Journal of Social & Personal Relationships*, 35 (6), 1619–1639. <http://doi.org/10.1177/0265407518769387>
- \*Kushlev, K., Hunter, J. F., Pressman, S. D., & Dunn, E. (2019). Smartphones reduce smiles between strangers. *Computers in Human Behavior*, 91, 12–16. <https://doi.org/10.1016/j.chb.2018.09.023>
- \*Lapierre, M. A. & Lewis, M. N. (2016). Should it stay or should it go now? Smartphones and relational health. *Psychology of Popular Media Culture*, 7, 384–398. <https://doi.org/10.1037/ppm0000119>
- Lego, V. (2018, April 24). ‘Phubbing’: What is it, and why is it bad for our health. *USA Today* <https://www.usatoday.com/story/tech/news/2018/04/24/phubbing-phone-snubbing-mental-health/546124002/>
- McDaniel, B. T., & Coyne, S. M. (2016). “Technoference”: The interference of technology in couple relationships and implications for women’s personal and relational well-being. *Psychology of Popular Media Culture*, 5(1), 85–98. <https://doi.org/10.1037/ppm0000065>
- McDaniel, B. T., Galovan, A. M., Cravens, J. D., & Drouin, M. (2018). “Technoference” and implications for mothers’ and fathers’ couple and coparenting relationship quality. *Computers in Human Behavior*, 80, 303–313. <https://doi.org/10.1016/j.chb.2017.11.019>
- McDaniel, B. T., & Radesky, J. S. (2018). Technoference: Parent distraction with technology and associations with child behavior problems. *Child Development*, 89(1), 100–109. <https://doi.org/10.1111/cdev.12822>
- Miller-Ott, A. E., & Kelly, L. (2015). The presence of cell phones in romantic partner face-to-face interactions: An expectancy violation theory approach. *Southern Communication Journal*, 80(4), 253–270. <https://doi.org/10.1080/1041794X.2015.1055371>
- Miller-Ott, A. E., & Kelly, L. (2017). A Politeness Theory analysis of cell-phone usage in the presence of friends. *Communication Studies*, 68(2), 190–207. <https://doi.org/10.1080/10510974.2017.1299024>
- \*Misra, S., Cheng, L., Genevie, J., & Yuan, M. (2016). The iPhone effect: The quality of in-person social interactions in the presence of mobile devices. *Environment and Behavior*, 48, 275–298. <https://doi.org/10.1177/0013916514539755>
- \*Myruski, S., Gulyayeva, O., Birk, S., Pérez-Edgar, K., Buss, K. A., & Dennis-Tiway, T. A. (2018). Digital disruption? Maternal mobile device use is related to infant social-emotional functioning. *Developmental Science*, 21(4), e12610. <https://doi.org/10.1111/desc.12610>

- \*Przybylski, A. K., & Weinstein, N. (2013). Can you connect with me now? How the presence of mobile communication technology influences face-to-face conversation quality. *Journal of Social and Personal Relationships*, 30(3), 237–246. <https://doi.org/10.1177/0265407512453827>
- \*Radesky, J. S., Miller, A. L., Rosenblum, K. L., Appugliese, D., Kaciroti, N., & Lumeng, J. C. (2015). Maternal mobile device use during a structured parent-child interaction task. *Academic Pediatrics*, 15(2), 238–244. <https://doi:10.1016/j.acap.2014.10.001>
- Rainie, L., & Zickuhr. (2015). American's views of mobile etiquette. *Pew Research Center*. Retrieved from <http://www.pewinternet.org/2015/08/26/americans-views-on-mobile-etiquette/>
- \*Roberts, J.A. & David, M.E. (2016). My life has become a major distraction from my cell phone: Partner phubbing and relationship satisfaction among romantic partners. *Computers in Human Behavior*, 54, 134-141. <https://doi:10.1016/j.chb.2015.07.058>
- \*Roberts, J. A. & David, M. E. (2017). Put down your phone and listen to me: How boss phubbing undermines the psychological conditions necessary for employee engagement. *Computers in Human Behavior*, 75, 206-217. <https://doi:10.1016/j.chb.2017.05.021>
- Rosenthal, R. (1991). *Applied social research methods series, Vol. 6. Meta-analytic procedures for social research (Rev. ed.)*. Thousand Oaks, CA, US: Sage.
- Rosenthal, R., & DiMatteo, M. R. (2001). Meta-analysis: Recent developments in quantitative methods for literature reviews. *Annual Review of Psychology*, 52(1), 59–82. <https://doi:10.1146/annurev.psych.52.1.59>
- \*Servies, A. (2012). *Cell phones and couple communication: The impact of mobile device distractions during a dyadic interaction*. Unpublished Master's Thesis. University of Arkansas, Fayetteville, AR. <http://scholarworks.uark.edu/psyuht/1>
- Seo, M., Kim, J. H., & David, P. (2015). Always connected or always distracted? ADHD symptoms and social assurance explain problematic use of mobile phone and multicomputing. *Journal of Computer-Mediated Communication*, 20(6), 667–681. <https://doi:10.1111/jcc4.12140>
- \*Stockdale, L. A., Coyne, S. M., & Padilla-Walker, L. M. (2018). Parent and child technoference and socioemotional behavioral outcomes: A nationally representative study of 10- to 20-year-old adolescents. *Computers in Human Behavior*, 88, 219–226. <https://doi:10.1016/j.chb.2018.06.034>
- \*Thornton, B., Faires, A., Robbins, M., & Rollins, E. (2014). The mere presence of a cell phone may be distracting. *Social Psychology*, 45(6), 479–488. <https://doi:10.1027/1864-9335/a000216>
- Tokunaga, R. S. (2017). A meta-analysis of the relationships between psychosocial problems and internet habits: Synthesizing internet addiction, problematic internet use, and deficient self-regulation research. *Communication Monographs*, 84(4), 423–446. <https://doi:10.1080/03637751.2017.1332419>
- \*Vanden Abeele, M., Antheunis, M. L., & Schouten, A. P. (2016). The effect of mobile messaging during a conversation on impression formation and interaction quality. *Computers in Human Behavior*, 62, 562–569. <https://doi:10.1016/j.chb.2016.04.005>

- \*Vanden Abeele, V. P. & Postma-Nilsenova, M. (2018) More than just gaze: An experimental vignette study examining how phone-gazing and newspaper-gazing and phubbing-while-speaking and phubbing-while-listening compare in their effect on affiliation. *Communication Research Reports*, 35:4, 303-313. <https://doi:10.1080/08824096.2018.1492911>
- \*Wang, X., Xie, X., Wang, Y., Wang, P., & Lei, L. (2017). Partner phubbing and depression among married Chinese adults : The roles of relationship satisfaction and relationship length. *Personality & Individual Differences*, 110, 12–17. <https://doi:10.1016/j.paid.2017.01.014>