Article

Can you connect with me now? How the presence of mobile communication technology influences face-to-face conversation quality

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Abstract

Recent advancements in communication technology have enabled billions of people to connect over great distances using mobile phones, yet little is known about how the frequent presence of these devices in social settings influences face-to-face interactions. In two experiments, we evaluated the extent to which the mere presence of mobile communication devices shape relationship quality in dyadic settings. In both, we found evidence they can have negative effects on closeness, connection, and conversation quality. These results demonstrate that the presence of mobile phones can interfere with human relationships, an effect that is most clear when individuals are discussing personally meaningful topics.

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Recent advancements in communication technology have enabled billions of people in the developed and developing world to connect with others using mobile phones (Mieczakowski, Goldhaber, & Clarkson, 2011). The widespread availability and use of mobile phones mean that these devices are commonly present in public and private settings and during casual and intimate interactions, often as subtle background objects. Despite their ubiquity, it is not known how the presence of mobile communication technology influences face-to-face interactions. The present paper empirically explores this issue for the first time and examines the effects of merely having a mobile phone present during in-person conversations.

Psychological research on phone use broadly suggests that it is often aimed as a source of entertainment and a means for sociability (O'Keefe & Sulanowski, 1995), and indicates the use of phones is largely a way to feel closer with family members, to express care for others, and to be available to others (Leung & Wei, 2000). Despite the fact that people seem attracted to mobile phones as a means to interpersonal closeness, little psychological research to date has systematically investigated the actual influence these devices have in or outside the context of relationships. Instead, the thrust of research in this area has examined effects mobile communication technology has on attention. Specifically, this research indicates that use of mobile phones can reduce the quality of attention to real-world events such as operating motor vehicles (Strayer, Drews, & Johnston, 2003; Strayer & Johnston, 2001).

Most research focusing on mobile phones and relationships suggests they have the potential to influence a range of interpersonal processes. Interviews reveal mobile phones provide a continual sense of connection to the wider social world—a feeling that persists even if a mobile is in "silent mode" (Plant, 2000). Indeed, the presence of phones is often felt during intimate social outings. As an example, Geser (2002) observes that a significant portion of couples eating together repeatedly interrupt their meals to check for text or voice messages. In reviewing a wide range of survey data, Srivastava (2005) concluded mobile phones might exert these pervasive influences because people associate phones with wide-ranging social networks. The presence of a mobile phone may orient individuals to thinking of other people and events outside their immediate social context. In doing so, they divert attention away from a presently occurring interpersonal experience to focus on a multitude of other concerns and interests.

In line with this, a number of prominent theorists have argued that mobile communication technology can have a decidedly negative influence on interpersonal relationships (Turkle, 2011). Turkle cites a wide range of qualitative evidence collected in interviews that phones can direct attention away from face-to-face conversations by making concerns about maintaining wider social networks salient. Taken together with quantitative research that demonstrates environmental cues can activate relational schema and affect behavior without a person's awareness (Shah, 2003), there is reason to believe that merely having a phone at hand may degrade firsthand social interactions.

Effects such as these would be apparent when partners attempt to engage one another in a meaningful way. Particularly when strangers are interacting, a superficial conversation may do little to foster closeness and trust in the relationship. On the other hand, dyads engaged in a meaningful conversation may develop their relationship as they become better acquainted with one another and self-disclose relevant and personal

information (Aron, Melinat, Aron, Vallone, & Bator, 1997). In these cases, the presence of a diverting influence such as a mobile phone may inhibit relationship formation by reducing individuals' engagement and attention for their partners, and discouraging partners' perceptions that any self-disclosure had been met with care and empathy. Indeed, such an impediment to relationship formation may be frustrating and isolating. To test this idea, we investigated the degree to which the presence of mobile communication technology influences the quality of human interactions across different kinds of conversations.

Present studies

In the present research, we evaluated the idea that the presence of mobile communication technology may present a barrier to human interactions, especially when people are having meaningful conversations. To investigate this, we conducted two experiments in which pairs of strangers engaged in a brief relationship formation task, adapted from previous research (Aron et al., 1997). We also manipulated the innocuous presence versus absence of a mobile phone in the laboratory room. The first experiment examined the general effects of mobile phone presence on relational processes, and the second experiment investigated these dynamics for people having casual and meaningful interactions.

Experiment 1

Participants and procedure

Seventy-four participants (26 women; M age $= 21.88$, $SD = 4.81$) were randomly assigned to one of two conditions: (a) phone absent or (b) phone present. For those assigned to the phone present condition, a nondescript mobile phone rested on a book, which was placed on a nearby desk outside participants' direct visual field. In the phone absent condition, a pocket notebook replaced the phone (see Figure 1). We used a relationship formation task adapted from previous research (Aron et al., 1997), which was meant to emulate the content of many real-life conversations. A pilot study indicated that the assigned conversation, "Discuss an interesting event that occurred to you over the past month," was a moderately intimate topic. Participants left personal belongings in a common waiting area before being led to a private booth along with a randomly assigned partner. Dyads were then asked to spend 10 minutes discussing the topic together. Following this encounter, participants completed measures used in previous research to assess relationship quality over time (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) and emotional sensitivity in both committed and newly formed relationships (Aron, Aron, & Smollan, 1992). Funneled debriefing of participants in both experiments indicated mobile phone placement was unobtrusive.

Measures

Relationship quality. Relationship quality was measured using a seven-item version of the connectedness subscale of the Intrinsic Motivation Inventory (McAuley, Duncan, &
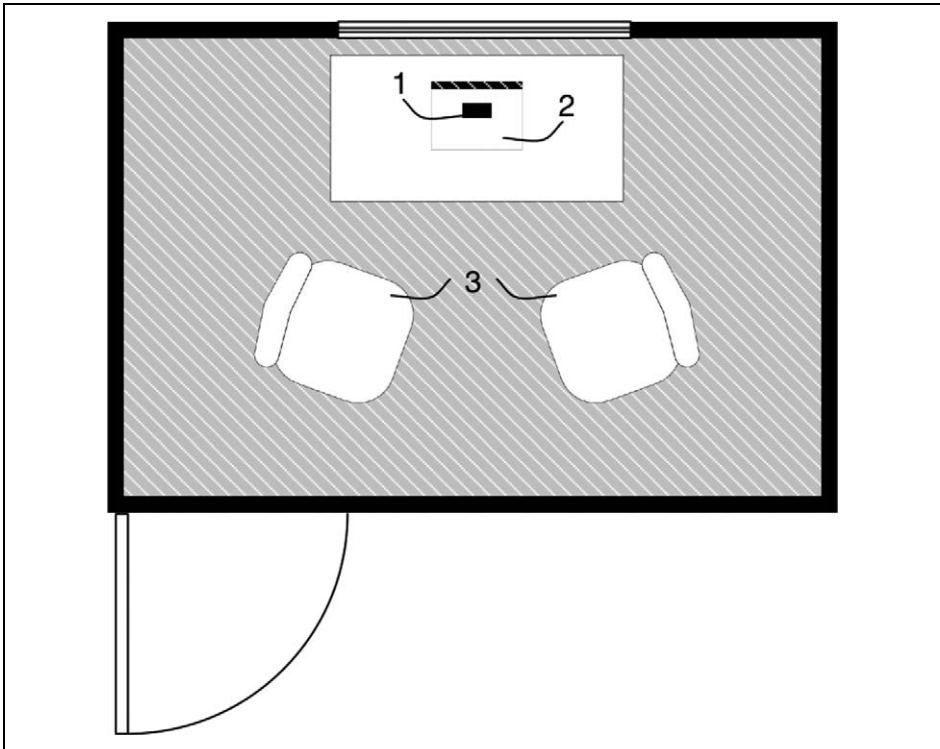
Figure 1. Overhead view of lab room. 1. Mobile phone or pocket notebook. 2. Book on desk. 3. Chairs used by participants.

Tammen, 1987), and included items such as "It is likely that my partner and I could become friends if we interacted a lot" ($M = 2.78$, $SD = 0.79$, $\alpha = .85$).

Partner closeness. Closeness between participants was measured using the Inclusion of Other in the Self Scale (Aron et al., 1992), which instructed participants to select one of seven increasingly overlapping circle pairs representing themselves and their conversation partner. (In the present study, participants responding averaged: $M = 3.57$, $SD = 1.46$.)

Covariate: Positive affect. Positive and negative affect was assessed using the nine-item Emmons Mood Indicator (Diener & Emmons, 1984) to account for the potential confounding effect of overall positive mood on relational outcomes. Items included *pleased*, *worried/anxious*, and *frustrated* ($\alpha = .83$), paired with a seven-point Likert-type scale ranging from 1 (*not at all*) to 7 (*extremely*).

Results

Data analytic strategy. Analyses required accommodations for nesting persons within dyads (assuming nonindependence between the two interacting partners). Analyses were

therefore conducted with hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). Condition (1: phone present, −1: phone absent) was defined at level 2 (dyad level), while covariates (gender, age, and positive affect) were defined at level 1 (person level). Unconditional models were first assessed to determine whether sufficient variance existed between- and within-dyad. Intraclass correlation (ICC) derived from these models showed that across outcomes, 43% to 51% of the total variance occurred between persons. Given the substantial variance accounted for at each level, full models were tested. Across analyses, the general level 1 equation was as follows:

$$OV_{ij} = B_{oj} + B_1 X_{1ij} + B_2 X_{2ij} + B_3 X_{3ij} + e_{ij}$$

where B_{oj} reflects the average value of the relational outcome, B_1 reflects the estimated population slope of gender, B_2 reflects that of age, B_3 reflects that of positive affect, and e_{ij} represents level 1 error.

The level 2 equation was:

$$B_{oj} = G_{oo} + G_{01} X_{1j} + u_{0j}$$

where G_{oo} reflects the person level intercept for an average person and G_{01} refers to the effect of the phone condition. As Raudenbush & Bryk (2002) recommended, level 1 variables were centered on individual rather than sample means; level 2 variables were not centered.

Relationship quality. At level 1, positive affect related to better relationship quality, $b = 0.80$, $t(69) = 2.99$, $p < .001$, though there were no effects of either gender, $b = -20$, $t(69) = -0.61$, $p = .55$, or age, $b = -0.04$, $t(69) = -0.03$, $p = .12$. Controlling for these, individuals in the mobile phone condition reported lower relationship quality after the interaction, $b = -0.99$, $t(35) = 3.08$, $p = .004$.

Partner closeness. Results for perceived closeness with one's partner were largely consistent with relationship quality. None of the level 1 predictors related to perceived closeness with one's partner, $bs = -0.00$ to $-.09$, $ts(69) = -0.06$ to -0.64, $ps = .52$ to .95. Yet at level 2, those in the mobile phone condition reported less closeness with their partners, $b = -0.39$, $t(35) = -2.56$, $p = .02$.

Experiment 2

Experiment 1 found that dyadic partners who got to know one another in the presence of a mobile phone (via sharing a moderately meaningful discussion) felt less close with their partners and reported a lower quality of relationships than did partners who shared a conversation without a mobile phone present. Experiment 2 explored which relational contexts mobile phones most mattered by manipulating the content of discussion to be either casual or meaningful. We hypothesized mobile phones would impede relational outcomes when partners are attempting to build an intimate connection and have less effect in casual conversation, where little self-disclosure takes place. In addition, this second experiment explored two new relational outcomes that have been shown as important

indicators for building intimate relationships: interpersonal trust (Campbell, Simpson, Boldry, & Rubin, 2010) and perceived partner empathy (Reis, Clark, & Holmes, 2004).

Participants and procedure

Sixty-eight participants (43 women; M age $= 23.21$, $SD = 4.99$) were randomly assigned to one of the cells of a 2 (absent *vs.* present phone) $\times$ 2 (casual *vs.* meaningful conversation) between-subjects design. A modified version of the 10-minute relationship formation task from Experiment 1 was used for all 34 dyads. Participants in the casual conversation condition were instructed to discuss their thoughts and feelings about plastic holiday trees (casual condition); those assigned to the important conversation condition discussed the most meaningful events of the past year (meaningful condition).

Measures

To examine a more diverse set of relational outcomes that included processes indicative of intimate relationships, relationship quality was assessed in the same way as in Experiment 1 ($M = 4.98$, $SD = 1.09$, $\alpha = .86$) but was paired with two additional measures of relational functioning: trust and empathy.

Partner trust. Trust was assessed with an item asking participants to rate their agreement to the statement: "I felt like I could really trust my conversation partner" ($M = 3.25$, $SD = 1.01$).

Partner empathy. Empathy was measured with the nine-item Empathic Concern Scale (Davis, 1995), which included items such as: "To what extent do you think your partner accurately understood your thoughts and feelings about the topic?" ($M = 4.98$, $SD = 1.09$, $\alpha = .92$).

Results

Analytic strategy. HLM analyses were conducted as in Experiment 1, although in the present study, phone manipulation (1: phone present, -1: phone absent) was interacted with conversation type (1: meaningful, -1: casual), both entered at level 2. Preliminary unconditional models showed 39% to 47% of variance was at the between-person level. Figure 2 presents the means of observed for relationship quality, partner trust, and partner empathy across conditions.

Relationship quality. There were no effects of gender, age, or positive affect on relationship quality, $bs = 0.01$ to 0.09, $ts(60) = 0.13$ to 1.28, $ps = .21$ to $.90$. At level 2 and consistent with Experiment 1, mobile phone presence predicted lower relationship quality, $b = -0.19$, $t(30) = -2.29$, $p = .03$, and new to this study, results showed an interaction between mobile phone presence and conversation type, $b = -0.26$, $t(30) = -3.02$, $p = .006$ (no effect of conversation type, $b = 0.03$, $t(30) = 0.29$, $p = .78$). Simple slopes
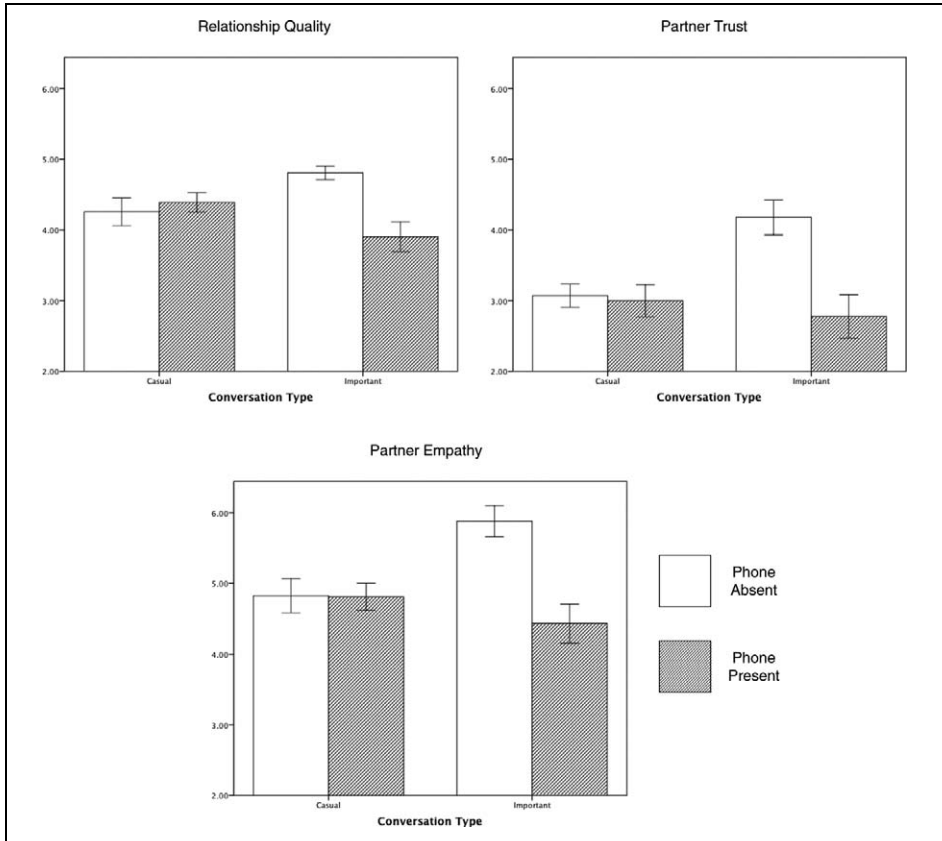
Figure 2. This figure shows that the presence of a mobile phone in the laboratory room leads to lower levels of relationship quality, trust, and empathy. All critical *t*-tests are significant at $p < .05$. Error bars are based on standard error.

analyses showed no effect of phone when the conversation was casual, $b = 0.02$, $t(14) = 0.50$, $p = .63$. On the other hand, the presence of the mobile phone predicted lower relationship quality when the conversation was meaningful, $b = -0.45$, $t(16) = -4.21$, $p = .001$.

Partner trust. None of the covariates (gender, age, or positive affect) related to trust, $bs = 0.02$ to 0.13, $ts(60) = -0.13$ to 1.50, $ps = .13$ to $.90$. At level 2, phone presence predicted less trust between partners, $b = -0.36$, $t(30) = -3.76$, $p < .001$, and meaningful conversations marginally encouraged trust, $b = 0.21$, $t(30) = 2.00$, $p = .06$. These main effects were qualified by their interaction, $b = -0.33$, $t(30) = -3.48$, $p = .002$. Simple slopes analyses complemented those of relationship quality, indicating that when the conversation was casual the presence of a mobile phone had no effect on partners' trust, $b = -0.07$, $t(14) = -0.26$, $p = .80$, yet partners who attempted to share a meaningful conversation in the presence of a phone reported less trust than those who did so in its absence, $b = -0.69$, $t(16) = -5.24$, $p < .001$.

Perceived empathy. A final series of analyses were conducted predicting perceived empathy from partners. Older participants reported perceiving marginally higher empathy from their partners, $b = 0.04$, $t(60) = 1.92$, $p = .06$, though there was no relation with gender, $b = -0.08$, $t(60) = -0.29$, $p = .77$, or positive affect, $b = 0.21$, $t(60) = 1.55$, $p = .13$. At level 2, participants reported lower perceived empathy when the phone was present compared to absent, $b = -0.37$, $t(30) = -3.60$, $p = .002$, yet no effect of conversation type, $b = 0.18$, $t(30) = 1.49$, $p = .15$. These relations were qualified by an interaction, $b = -0.36$, $t(30) = -3.41$, $p = .002$. As before, simple slopes analyses showed no differences in perceived empathy between the two phone conditions when the conversation was a casual one, $b = -0.01$, $t(14) = -0.06$, $p = .95$; however, when the conversation was meaningful the presence of a phone predicted less perceived empathy following the conversation, $b = -0.72$, $t(16) = -4.66$, $p < .001$.

Conclusions

These results demonstrated that the mere presence of mobile communication technology might interfere with human relationship formation, lending some empirical support to concerns voiced by theorists (Turkle, 2011). Evidence derived from both experiments indicates the mere presence of mobile phones inhibited the development of interpersonal closeness and trust, and reduced the extent to which individuals felt empathy and understanding from their partners. Results from the second experiment indicated that these effects were most pronounced if individuals were discussing a personally meaningful topic. More specifically, results of this experiment showed that meaningful conversation topics tended to encourage intimacy and trust under neutral conditions. This difference between those in the casual and meaningful conversation conditions was absent in the presence of a mobile phone, which appeared to interfere in conditions that were otherwise conducive to intimacy. More interesting, the debriefing procedure suggests that these effects might happen outside of conscious awareness.

The present findings are qualified by a number of limitations that provide avenues for future research. The first and most important question this research leaves open concerns the mechanism through which a mobile phone impedes relationship formation. Given that the effects do not appear to depend on conscious awareness, it is possible that phones operate as a prime that activates implicit representations of wider social networks, which in turn crowd out face-to-face conversations. It is also possible that people form individual and enduring implicit associations with phones; and such attitudes, behaviors, and cognitions interrupt here-and-now interactions. In both cases, these mechanisms could be examined in future research using sequential priming and or lexical decision tasks (e.g., Shah, 2003).

In a similar vein, an expanding body of qualitative research (e.g., Srivastava, 2005) suggests people form important and diverse kinds of connections to their personal devices. Future work might replicate and extend the present studies by exploring how the presence of a range of personally owned communication devices such as portable or tablet computers shape conversations. In the present experiments, we examined mobile phones in the context of casual and meaningful conversations, but the presence of mobile phones may show a curvilinear relationship such that they do not obstruct relationship

formation in deeply meaningful conversations; future research may explore these processes across conversation types. In addition, future research should test behavior directly to answer the question: do mobile phones change the way partners behave toward one another (e.g., via the amount of self-disclosure, nonverbal relational behaviors, attentiveness), or whether they primarily shape subjective perceptions of conversations. Finally, these experiments explored the effects of mobile phone presence on relationships among heretofore strangers. Future research may focus on the extent to which mobile devices would have such effects in established relationships, such as those between business associates, parents and children, or romantic partners.

All things considered, this research presents interesting empirical findings that inform the billions of conversations that take place daily, as many are accompanied by a phone placed casually on a table or bar. These results indicate that mobile communication devices such as phones may, by their mere presence, paradoxically hold the potential to facilitate as well as to disrupt human bonding and intimacy.

Funding

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