Article

mmc

Mobile Media & Communication
1–19

DOI: 10.1177/2050157920958437
journals.sagepub.com/home/mmc
SAGE

Cellphone relevance in face-to-face interactions: The effects of cellphone use on conversational satisfaction

Ryan Cummings and Torsten Reimer
Communication and Cognition Lab, Brian Lamb School of Communication, Purdue University, USA

Abstract
The use of cellphones in conversations is ubiquitous. Although the overarching view of the social effects of cellphones in conversations appears to be negative, some research has also reported positive outcomes. The Cellphone Relevance Hypothesis predicts that effects of cellphone use on conversational satisfaction depend on the function of cellphones within a conversation. When a conversation partner integrates cellphone use into the conversation (integral use), conversational satisfaction is predicted to be higher than when the cellphone is used for a purpose unrelated to the conversation (incidental use). Two vignette studies provide support for the Cellphone Relevance Hypothesis and specify boundary conditions of the cellphone effect based on the involvement of respondents.

Keywords
Mobile phones, interpersonal communication, multimodality, interaction, conversation

Introduction

What are the effects of the use of cellphones in conversations? The overarching view of these effects appears to be negative, both within academic research and society at large (Turkle, 2015). For example, according to the Pew Research Center (2015), 82% of adults believe cellphone use decreases conversational satisfaction. When cellphones are regularly used in conversations among partners, they have the potential to reduce relational satisfaction, relational closeness, and life satisfaction while increasing relational

Corresponding author:
Ryan Cummings, Communication and Cognition Lab, Brian Lamb School of Communication, Purdue University, 100 North University Street, Beering Hall Room 2114, West Lafayette, IN 47907, USA.
Email: Rjcummings11@gmail.com

turmoil (Duran et al., 2011; Kelly & Miller-Ott, 2014; Miller-Ott et al., 2012; Misra et al., 2014; Przybylski & Weinstein, 2013). The use of phones within face-to-face interactions is so common that researchers have coined the phenomenon *phubbing*, a contracted form of phone snubbing (Roberts & David, 2016).

Yet as its name connotes, phubbing inherently carries a negative weight to the use of phones within face-to-face interactions. Indeed, phubbing researchers have focused extensively on the negative side of cellphone use in conversations. Scholars have identified negative psychological and behavioral constructs related to phubbing such as low self-esteem, lack of self-control, and internet addiction (Benvenuti et al., 2020). Related research has focused on the negative outcomes of phubbing such as decreased conversational intimacy (Vanden Abeele et al., 2019), negative impression formation, and decreased conversational quality (Vanden Abeele et al., 2016). McDaniel and Coyne (2016) coined the intrusion of technology in relational interactions as *technoference*, finding in a study of 143 co-habiting or married women that participants frequently reported negative outcomes of technology use.

However, there is some research on the effects of cellphone usage outside of the phubbing literature that has failed to identify negative effects, and some has even found positive outcomes. Although the phubbing literature has focused on the "mere use" of a cellphone within a conversation (Przybylski & Weinstein, 2013), research that identified positive effects of cellphone use included users' attitudes and perceptions towards cellphones. For example, Allred and Crowley (2016) found it was not the mere presence of a cellphone within a conversation but rather the recollection of the cellphone's presence that affected conversation satisfaction; this finding was replicated in a follow-up study (Crowley et al., 2018), suggesting that interlocutors' attitudes toward cellphone use may affect conversational satisfaction more than its mere use.

Several lines of research examining attitudes toward cellphones in conversations and relationships have challenged the "mere use" assumption common to the phubbing literature. As cellphone users can respond to texts, phone calls, emails, instant messages, and social media comments at any time, people have come to expect responses instantly (Weinberger, 2008). As a result, returning texts, searching for information on the web, and general use of cellphones within face-to-face interactions have become more socially acceptable (Duran et al., 2011; Miller-Ott & Kelly, 2015), as Gonzales and Wu (2016) discovered in their study, which demonstrated the general non-effects of cellphone use on social ostracism, except for those who have strong attitudes against cellphones.

The cited studies suggest that not all uses of a cellphone within face-to-face interactions may constitute phubbing; moreover, the function of the cellphone within the conversation may be important to consider beyond its "mere use." In this regard, focus group data from Miller-Ott and Kelly (2015) suggest the function of the cellphone use can influence perceptions of cellphone use within the conversation. Survey data from Kelly, Miller-Ott, and Duran (2019) supported this finding, showing that certain cellphone behaviors are perceived as being more face threatening than others; for example, contacting a boss or responding to a family member's text message was viewed as less face threatening than repeatedly looking at the phone or playing a game. Additionally, research has found that less frequent cellphone use is less threatening to the conversation than repeated, constant use (Chotpitayasunondh & Douglas, 2018).

Building on this literature that goes beyond the "mere use" of cellphones, the current project set out to identify and test conditions in which the use of cellphones in conversations increases and conditions in which it decreases conversational satisfaction. Drawing from Uses and Gratifications Theory (Ruggiero, 2000) and Grice's (1975) maxim of conversational relation, the Cellphone Relevance Hypothesis predicts that the effect of the use of a cellphone on conversational satisfaction depends on whether the cellphone is viewed by the conversational partner as incidental or integral to the conversation. In the remainder, we describe the basic tenets of the Cellphone Relevance Hypothesis and introduce a model that specifies a potential moderator and mediator of the proposed cellphone effect on satisfaction. We then report two empirical studies that tested the hypothesis using two vignette studies and conclude with a discussion and suggestions for future research.

The Cellphone Relevance Hypothesis

The Cellphone Relevance Hypothesis is based on the idea that within a face-to-face conversation, the effects of using a cellphone on the satisfaction of a conversational partner depend on the perceived function of the cellphone use. Specifically, these effects depend on whether the cellphone use is viewed as integral or incidental to the conversation. The key difference between incidental and integral use lies in whether the information from the cellphone is relevant to the conversation. The Cellphone Relevance Hypothesis is informed by two related lines of research—Uses and Gratifications Theory and research on the relevance principle.

Uses and Gratifications Theory has provided an enduring basis for media research, from the decades of print and television media to more recent social media (Katz et al., 1973; Ruggiero, 2000). In its essence, Uses and Gratifications Theory proposes that audiences choose to use certain media to meet specific needs, so its focus has rested far more on users' motivations to use certain media than on direct effects of the media itself. Although typologies for classifying various uses vary, Rubin (2009) proposed eight core needs: passing time, companionship, escape, enjoyment, social interaction, relaxation, information, and excitement.

In contrast to the phubbing literature, Uses and Gratifications Theory views media users as an active audience (Rubin, 1993). In focusing on the negative role of cellphones within face-to-face interactions, phubbing literature has claimed that communicators feel forced to use their cellphones in face-to-face interactions, either by lack of self-control (Benvenuti et al., 2020) or cellphone addiction (Karadağ et al., 2015). Typically, phubbing literature has painted cellphone users as a passive audience. Conversely, Uses and Gratifications Theory claims that people, including those who use cellphones in conversations, actively seek out media to meet certain needs. From this perspective, interlocutors may choose to use cellphones in conversations for prosocial and other gratifying reasons.

Based on these considerations, the current study set out to examine the role of positive needs that communicators may seek to meet by using a cellphone within a conversation. Although people use cellphones for various purposes in a conversation (Hiniker et al., 2016; Joo & Sang, 2013), communicators may be using their cellphones to demonstrate

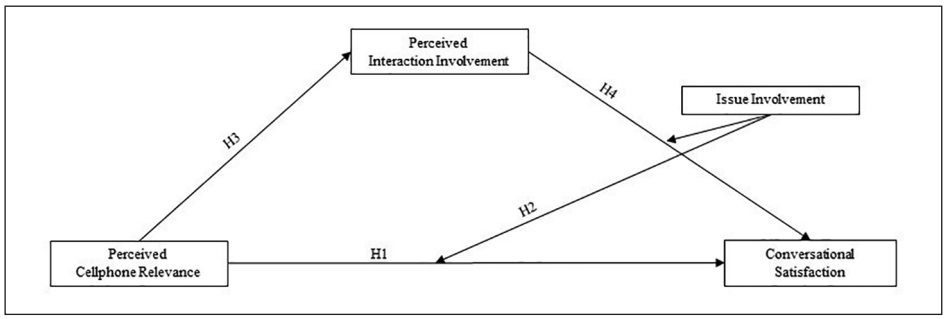

Figure 1. Conceptual model illustrating the conditional direct effect of perceived cellphone relevance on conversational satisfaction and the indirect effects of cellphone relevance on conversational satisfaction through perceived interaction involvement (other-orientation and immediacy).

sociability toward their conversation partner or to find relaxation away from the other partner (Leung & Wei, 2000). The partner's perceptions of these uses may influence conversational satisfaction more than the mere use of the cellphone.

A second, related line of research that provides a rationale for the Cellphone Relevance Hypothesis comes from research on conversational relevance (Sperber & Wilson, 1986), which also informs the expected effects of integral and incidental use within a single face-to-face interaction. Rooted in Grice's (1975) maxim of conversational relation, the relevance literature suggests that interlocutors assume utterances will be relevant to the conversation. It stands to reason that if someone is using a cellphone to look up information relevant to the conversation, their presentation of this information will be perceived by the partner as integral to the conversation by recognizing the relevance of the utterance to the conversational topic (Tracy, 1984). However, if someone is using a cellphone for reasons not related to the conversation, the presentation of this information will be perceived as incidental to the conversation by recognizing the information is not relevant to the conversational topic.

H1: Cellphone Relevance Hypothesis: People will report higher conversational satisfaction when they perceive their conversational partner to be using a cellphone for integral (i.e., relevant) than incidental (i.e., irrelevant) use.

Several variables may moderate and mediate this proposed cellphone effect. We focused on one construct that has been shown to moderate and mediate a variety of conversational characteristics on outcomes—the involvement of a conversation partner (e.g., see David & Roberts, 2017; Coker & Burgoon, 1987; see Figure 1). Coker and Burgoon (1987) defined involvement as the "degree to which participants are enmeshed in the topic, interpersonal relationship, and situation" (p. 463). Drawing on the distinction between issue involvement and interaction/conversational involvement (Coker & Burgoon, 1987), we hypothesized that issue involvement may moderate the effect of perceived cellphone relevance on conversational satisfaction, whereas

perceived interaction involvement may mediate the effect. Involvement serves as an intuitive basis for exploring conditional effects as both topic importance (Przybylski & Weinstein, 2013) and attentiveness (David & Roberts, 2017) have been demonstrated as salient to understanding cellphone effects in face-to-face interactions.

Issue involvement as a moderator

Issue involvement has been shown to moderate message effects in other contexts (Chen & Tsai, 2008; Quick et al., 2011). Accordingly, it can be expected that cellphone relevance will have stronger effects on conversational satisfaction under conditions of high issue involvement than conditions of low issue involvement. For example, perceptions of incidental use are predicted to yield lower conversational satisfaction when two friends are discussing the prospect of a new job for one of them (i.e., a topic high in issue involvement) than when they are discussing the new job of a friend neither of them have seen in a while (i.e., a topic low in issue involvement). The inattentiveness of the conversation partner is assumed to have stronger negative effects when they are both more concerned about the conversational topic. Thus, the following hypothesis is proposed.

H2: The effect of perceived cellphone relevance on conversational satisfaction will be stronger if issue involvement is high than if issue involvement is low.

Interaction involvement as a mediator

Whereas issue involvement is proposed as a moderator, interaction involvement is suggested as a potential mediator. Interaction involvement, also called conversational involvement, has been operationalized through two relational dimensions—immediacy and other-orientation (Burgoon & Hale, 1984). Immediacy concerns the nonverbal behaviors that communicate social closeness or distance between communicators (Burgoon & Hale, 1984; Wiener & Mehrabian, 1968). Other-orientation, also called *altercentrism* (Coker & Burgoon, 1987), is "the tendency to be attentive to, adaptive toward, and interested in other(s) during interaction" (Spitzberg & Hecht, 1984, p. 578).

Theoretically, it can be expected that communicators will perceive greater attentiveness from their partner when they are perceived to be using the phone for integral use than incidental use. Moreover, in incidental use, the information draws the cellphone user away from the conversation and the conversational partner, thus decreasing the immediacy and other-orientation. However, with integral use, the cellphone user integrates the information from the conversation with the phone. Based on these considerations, we offer the following hypotheses:

H3: Communicators will perceive greater interaction involvement (immediacy and other-orientation) from their partner when they perceive their conversational partner to be using a cellphone for integral than incidental use.

H4: Perceived interaction involvement (immediacy and other-orientation) will mediate the effect of cellphone relevance on conversational satisfaction.

Study 1

Study 1 tested the Cellphone Relevance Hypothesis (H1) and the moderating effect of issue involvement (H2). Participants completed an online study in which they were asked to imagine themselves in a face-to-face conversation with a friend who introduces a cellphone to the conversation, either for integral or incidental use. In addition to manipulating cellphone relevance and issue involvement, the study also measured participants' anticipated conversational satisfaction.

Participants

Participants ($n = 283$) were recruited through an online research system at a large Midwestern university and received extra credit toward a communication class for their completion of the study. The mean age of participants was $M = 19.69$ ($SD = 1.49$), with a balance of males ($n = 147$) and females ($n = 136$). Most participants were either Caucasian ($n = 185$) or Asian/Pacific Islander ($n = 71$).

Design

The study consisted of a 2x2x3 experimental design with the factors *cellphone relevance* (integral vs incidental use), *issue involvement* (high vs low), and the *topic* that was covered in the scenario (trip, salary, and apartment). Conversational satisfaction was measured as the dependent variable. Cellphone relevance and issue involvement were manipulated between subjects. The three different topics were manipulated within subjects.

Cellphone relevance. Cellphone relevance consisted of two levels, integral use or incidental use, and was manipulated between subjects. Cellphone relevance was manipulated through the scenarios by varying the relevance of the hypothetical conversational participant's response to the conversation. Integral messages were directly related to the conversation, whereas incidental messages were unrelated to the conversation (see Tracy, 1984).

The following is a sample integral use scenario: "*Imagine you are grabbing a bite to eat with one of your friends from work at your favorite Mexican restaurant. As you are talking about your lives outside of work, you talk about your living conditions and mention that you are moving to a different state for a new job. You don't know anyone there and are worried about having to get an apartment on your own. You wonder if apartments there are more expensive, but neither of you know. Your friend grabs their phone, and after scrolling on it for a few seconds says, 'Apartments look about twice the price there!*'"

For each integral use scenario, a parallel incidental use scenario was constructed. In a respective incidental use scenario, the scenario was identical in all respects except the final sentence. Whereas in the integral condition, the cellphone user stayed within the same topic, in the incidental condition, the friend referred to a different topic after looking at the phone, such as saying: "Oh no! It is supposed to rain tomorrow."

Issue involvement. Issue involvement concerns how cognitively involved participants are in the conversational topic. Issue involvement was manipulated through whether the topic personally affected the participants (high) or not (low) and was manipulated between subjects (Sereno, 1968). For example, the *low involvement* condition for the apartment topic concerned the price of new apartments by a participant's workplace that they had noticed but did not plan to move to. Conversely, the *high involvement* condition for apartment concerned the price of apartments that the participants considered moving to.

Conversational topic. To test the effects of cellphone relevance across various contexts, each scenario had a different conversational topic. The three topics were taken from Head and Eisenberg's (2011) large-scale survey measuring college students' main uses of the internet: planning a vacation trip, salaries of various jobs, and renting an apartment.

Manipulation check and dependent variable

Issue involvement. Before participants read through the three scenarios and answered the cellphone relevance and satisfaction items, they were given six scenarios and rated their interest in each conversational topic. These scenarios were derived from the integral use scenarios, yet they did not include the part about the introduction of the cellphone into the conversation. This procedure was used to test the effectiveness of the manipulation of issue involvement before introducing the utterances manipulating cellphone relevance. Issue involvement was measured separately for each scenario using Zaichkowsky's (1985) semantic differential. The scale asked participants to rate their perceptions of the conversational topic on semantic differential scales ranging from 1–7, consisting of the following pairs of attributes: *relevant, irrelevant; important, unimportant*; and *uninterested, interested* (Cronbach's $\alpha = .87$).

Conversational satisfaction. Participants reported their anticipated conversational satisfaction after imagining each scenario. The measure for conversational satisfaction consisted of three items taken from Hecht's Conversational Satisfaction (1978) scale, ranging from 1 (strongly disagree) to 7 (strongly agree): *I was satisfied with the conversation; I did not enjoy the conversation;* and *I would like to have another conversation like this one.* The second item was reverse coded. The three answers were averaged to form a composite measure (Cronbach's $\alpha = .84$).

Perceived cellphone relevance. To measure participants' perceptions of cellphone relevance in the scenarios, they were asked to imagine three conversational scenarios and complete the following items, ranging on a scale from 1 (strongly disagree) to 7 (strongly agree): *My friend used the phone to look up information relevant to the conversation; My friend used the phone to enrich the conversation;* and *My friend combined information from the phone with the conversation*. Responses to those three items were averaged for each scenario (Cronbach's $\alpha = .83$).

Procedures

The study consisted of two sections. The first section focused on the manipulation check of issue involvement, ensuring validity of the manipulation before introducing the cellphones into the scenarios. Each participant read through all six generated scenarios—the high involvement and low involvement version of each of the three topics, reporting their perceptions of issue involvement. The second section focused on the effects of the independent variables on conversational satisfaction. Participants were assigned to one of four conditions (i.e., integral use/low involvement; integral use/high involvement; incidental use/low involvement; or incidental use/high involvement). Each participant was shown three scenarios in their condition, one for each topic (i.e., trip to Florida, salary for a new job, and apartments). After reading through each of their three scenarios, participants reported their perceptions of cellphone relevance and conversational satisfaction.

Results

The means and standard deviations for perceived conversational satisfaction, cellphone relevance, and issue involvement are reported in Table 1.

Manipulation check. The manipulation of cellphone relevance and issue involvement was effective. Incidental scenarios ($M = 3.56$, $SD = 1.28$) were viewed as significantly lower in cellphone relevance than integral scenarios ($M = 5.99$, $SD = .70$), $t(281) = -19.88$, $p < .001$, $d = 2.36$. Likewise, low involvement scenarios ($M = 4.06$, $SD = 1.08$) were viewed as significantly lower in issue involvement than high involvement scenarios ($M = 6.04$, $SD = .79$), $t(281) = -27.41$, $p < .001$, $d = 3.27$.

Test of the Cellphone Relevance Hypothesis. To test H1 and H2, a 2x2 analysis of variance was conducted on conversational satisfaction, with the factors of cellphone relevance and issue involvement. The responses to the three topics were highly correlated, with the conversational satisfaction scores across the three topics factoring together (Cronbach's $\alpha = .84$). Thus, for each participant, the satisfaction responses were averaged across the three scenarios (see the means and standard deviation for satisfaction in Table 1). Analysis of variance yielded a significant interaction effect and two significant main effects. As expected, anticipated conversational satisfaction was higher for integral use ($M = 5.33$, $SE = .08$) than for incidental use ($M = 3.56$, $SE = .08$); $F(1, 279) = 217.28$, $p < .001$, partial $\eta^2 = 44$. Therefore, H1 was supported.

As shown in Table 1 and in support of H2, this effect of perceived cellphone relevance on conversational satisfaction was stronger when issue involvement was high rather than low, yielding a significant interaction of issue involvement and cellphone relevance, $F(1, 279) = 11.91$, $p < .001$, partial $\eta^2 = .04$. Therefore, H2 was also supported.

Discussion

Study 1 tested the Cellphone Relevance Hypothesis and the moderating effect of issue involvement. The manipulation of cellphone relevance was effective, as was the

Table 1. Descriptive statistics of Study 1 conversational satisfaction, cellphone relevance, and issue involvement ($n = 283$).

	Integral use, low involvement		Integral use, high involvement		Incidental use, low involvement		Incidental use, high involvement	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Conversational satisfaction								
Trip	5.17	1.14	5.45	1.04	4.74	1.17	3.47	1.30
Salary	5.48	1.03	5.40	1.06	3.74	1.32	3.20	1.27
Apartment	5.43	.97	5.06	1.20	3.76	1.31	3.01	1.36
Average across topics	5.36	.93	5.30	.87	4.07	.94	3.23	1.09
Cellphone relevance								
Trip	6.06	.70	5.92	.95	5.27	1.01	3.45	1.76
Salary	6.05	.75	6.01	.87	3.51	1.49	2.92	1.48
Apartment	6.10	.66	5.83	.93	3.41	1.53	2.72	1.56
Average across topics	6.08	.62	5.92	.75	4.07	.98	3.03	1.34
Issue involvement								
Trip	3.72	1.61	5.61	1.18	3.72	1.51	5.78	1.12
Salary	3.75	1.43	6.18	.94	3.62	1.46	6.16	1.01
Apartment	4.72	1.36	6.18	1.04	4.70	1.40	6.31	.93
Average across topics	4.08	1.04	5.99	.82	4.04	1.12	6.09	.75

theory-driven yet novel manipulation of issue involvement. H1 claimed that participants would report higher conversational satisfaction for perceived integral use than incidental use of the cellphone in the conversation, and the data from Study 1 supported this claim. Not only was the effect of perceived cellphone relevance on conversational satisfaction significant, but it was large.

H2 claimed an interaction effect between cellphone relevance and issue involvement on conversational satisfaction and was also supported. As expected, the effect of cellphone relevance on conversational satisfaction was stronger for high involvement than for low involvement—the difference in the mean reports of conversational satisfaction between integral use and incidental use was greater for high than low involvement.

Study 2

Study 2 sought to replicate the findings from Study 1 and test all proposed hypotheses. Specifically, this study aimed to replicate the effect of perceived cellphone relevance on satisfaction and the hypothesis that issue involvement would moderate the effect of cellphone relevance. In addition, the study aimed to explore if interaction involvement may mediate the effect of cellphone relevance on conversational satisfaction (see

Figure 1). To test the effects proposed in the figure, Study 2 utilized the same design as Study 1 but added measurements of the proposed mediators, immediacy, and other-orientation. Mediation is best tested through experimental block designs and multi-wave data (Pirlott & MacKinnon, 2016). Using a cross-sectional design as in Study 1, we aimed to explore if the data are consistent with the proposed mediation hypothesis without providing a direct test of the proposed mediation hypothesis (for limitations of such a design, see Jacoby & Sassenberg, 2011; Pirlott & MacKinnon, 2016). Thus, Study 2 aimed to replicate Study 1 and explore the role of interaction involvement as a potential mediator.

Participants

Study 2 sampled participants ($n = 278$) using Amazon MTurk. Participants were compensated $1 for completion of the study. Although the MTurk population is not truly representative of the general population (e.g., MTurk participants tend to be more educated and less employed), their overall performance of cognitive tasks is similar to the general population and justified their utilization in examining cellphone effects (Chandler et al., 2014; Horton et al., 2011). Given there are large age differences in the understanding and use of technology (Chan, 2014), the current study focused on young adults as cellphones are embedded in their daily interactions. Participants had to be between ages 18 and 25 to complete the study ($M = 22.58$, $SD = 1.78$; 156 males and 122 females). Most participants were either Caucasian ($n = 142$) or Asian/Pacific Islander ($n = 73$), with Hispanics ($n = 26$), African Americans ($n = 25$), Other ($n = 8$), and Native Americans ($n = 4$) also completing the study.

Independent variables

Cellphone relevance, issue involvement, and the three topics were manipulated in the exact same way as in Study 1.

Dependent variable, manipulation check, and mediator

Conversational satisfaction. The dependent variable of the study, the anticipated conversational satisfaction, was measured in the same way as in Study 1. However, the second item ("*I did not enjoy the conversation*") did not correlate with the other two items in this second study, lowering Cronbach's α below .40 for some scenarios. Therefore, this item was dropped, and conversational satisfaction was computed by averaging across the remaining two items (Cronbach's $\alpha = .82$).

Perceived cellphone relevance. Participants completed a manipulation check of perceptions of cellphone relevance, using the scale developed in Study 1. The three items for the scale were reliable, Cronbach's $\alpha = .84$. The manipulation of cellphone relevance remained effective in this study, as incidental scenarios ($M = 3.45$, $SD = 1.16$) were viewed as significantly lower in relevance than integral scenarios ($M = 5.94$, $SD = .85$), $t(276) = -20.38$, $p < .001$, $d = 2.45$.

Issue involvement. Three items were used to measure perceptions of issue involvement, and the scale was reliable (Cronbach's $\alpha = .90$). To control for possible effects of measuring issue involvement on conversational satisfaction, only half of the participants completed the measure of issue involvement, in which they read through the first part of all six topics, up through the introduction of the cellphone into the conversation. As expected, measuring issue involvement did not affect reported conversational satisfaction. The average reports for conversational satisfaction were nearly identical for those who completed the manipulation check ($M = 4.65$, $SD = 1.35$) and those who did not ($M = 4.63$, $SD = 1.47$). Furthermore, the manipulation check for issue involvement demonstrated the effectiveness of the manipulation as scenarios low in issue involvement ($M = 4.31$, $SD = 1.16$) were viewed as significantly lower in issue involvement than those high in issue involvement ($M = 6.04$, $SD = .90$), $t(135) = -15.59$, $p < .001$, $d = 2.68$.

Interaction involvement. The proposed mediator in the model, interaction involvement, consisted of two components: other-orientation and immediacy. Participants rated the perceived interaction involvement of their conversational partner in the scenarios. Other-orientation was measured using Guerrero's (1997) three-item semantic differential measure for attentiveness, ranging from 1 (low) to 7 (high): *The other person was (inattentive/attentive) during the conversation, The other person was (distracted/focused) during the conversation*, and *The other person was (unalert/alert) during the conversation.* Immediacy was measured using two items from Guerrero's (1997) semantic differential scale measuring interest in the interaction: *The other person was (detached/involved) during the conversation*, and *The other person was (bored/interested) in the conversation.* Other-orientation and immediacy were very highly correlated, $r(276) = .95$, $p < .001$, indicating one factor (i.e., interaction involvement) rather than two separate factors. Consequently, the items for other-orientation and immediacy were averaged to give one score for interaction involvement.

Perceived realism. Participants also reported their perceived realism for the scenarios. A measurement for realism was included in this study to see if there were systematic differences in perceived realism between scenarios across the experimental conditions and to be able to control for differences in perceived realism by including the variable as a covariate. The three-item scale was derived from Burleson et al. (1986) and consisted of the following items: To what degree was the situation you just read (scale: 1–7) *Not very believable/very believable, Not easy to imagine myself in this situation/easy to imagine myself in this situation*, and *Not very realistic/very realistic?* The scale was reliable (Cronbach's $\alpha = .90$). Realism was treated as a covariate in analyses.

Participants perceived the scenarios as generally realistic, with all means above 5.50 on a seven-point scale; the minimum was $M = 5.52$, $SD = 1.42$, and the maximum was $M = 6.27$, $SD = .99$. Across all scenarios, those low in issue involvement ($M = 5.95$, $SD = 1.01$) were viewed as equally realistic as those high in issue involvement ($M = 6.00$, $SD = 1.02$), $t(276) = -.44$, $p = .66$. Although integral use conditions were perceived as somewhat more realistic than incidental use scenarios ($t(276) = 2.04$, $p < .05$, $d = .25$), both integral use scenarios ($M = 6.10$, $SD = .92$) and incidental use scenarios ($M = 5.85$, $SD = 1.09$) were viewed as quite realistic.

Procedures

Participants completed the study through Amazon MTurk. Half of the participants reported their issue involvement for the six topics; the other half were not shown this section of the survey. The next section consisted of the measurement of conversational satisfaction through the scenarios. Participants were randomly assigned to one of the four experimental conditions of the between-subjects factors *cellphone relevance* (integral vs incidental use) and *issue involvement* (high vs low). As in Study 1, each participant was shown three scenarios, one for each of the three topics (trip, salary, and apartment). After reading through each scenario, participants reported their anticipated conversational satisfaction, perceived interaction involvement of their conversational partner, and perception of cellphone relevance.

Results

Study 2 sought to test all hypotheses represented in Figure 1, replicating the test of the Cellphone Relevance Hypothesis. The effects were tested using Hayes's (2013) PROCESS macro, Model 15, which tests for a model with one independent variable, one dependent variable, one mediator, the interaction effect between the independent variable and the moderator, the interaction effect between the mediator and the moderator, and covariates. In this study, the model included the continuous variable conversational satisfaction as the dependent variable, the dichotomous variable cellphone relevance (0 = incidental; 1 = integral) as the independent variable, the dichotomous variable issue involvement (0 = low involvement; 1 = high involvement) as the moderator, and the continuous variable interaction involvement as the mediator. As a covariate, perceived realism was included. The results of the PROCESS analysis are summarized in Table 2. As in Study 1, conversational satisfaction was similar across the three topics ($\alpha = .82$), and responses of each participant were averaged across the three scenarios.

H1 claimed that participants would report higher conversational satisfaction for integral than incidental use of the cellphone. The PROCESS analysis revealed a significant direct effect of cellphone relevance on conversational satisfaction, $b = .50$, $p < .01$. The direction of the effect was as hypothesized, with integral use yielding higher conversational satisfaction ($M = 5.56$, $SD = .92$) than incidental use ($M = 3.64$, $SD = 1.22$). Therefore, H1 was supported, and the effect of cellphone relevance on conversational satisfaction was replicated from Study 1.

H3 claimed that cellphone relevance would affect perceptions of interaction involvement. The process model revealed that cellphone relevance had a strong effect on perceptions of interaction involvement, $b = 2.05$, $p < .001$, $R^2 = .52$. The means indicated that this effect was in the hypothesized direction, with interaction involvement higher for integral use ($M = 5.81$, $SD = 3.69$) than incidental use ($M = 3.69$, $SD = 1.30$). Therefore, H3 was supported.

H4 claimed that perceived interaction involvement would mediate the effect of cellphone relevance on conversational satisfaction. As illustrated in Table 2, the PROCESS analysis indicated a significant effect of cellphone relevance on interaction involvement ($b = 2.05$, $p < .001$) and a significant effect of interaction involvement on conversational

Table 2. Summary of Study 2 analysis predicting interaction involvement and conversational satisfaction.

Variable	*b*	*SE*	95% CI
Dependent Variable = Interaction involvement			
Cellphone relevance	2.05***	.39	(1.79, 2.31)
Realism	.32***	.07	(.19, .44)
R^2 .51			
F 144.13***			
Dependent Variable = Conversational satisfaction			
Interaction involvement	.68***	.06	(.56, .81)
Cellphone relevance	.50**	.17	(.17, .83)
Issue involvement	–.10***	.32	(-.72, .52)
Realism	.09***	.04	(.01, .17)
Interaction involvement x issue involvement	.07***	.08	(-.09, .22)
Cellphone relevance x issue involvement	–.45*	.23	(-.89, -.001)
R^2 .78			
F 156.94***			

$n = 278$.
CI: confidence interval.
*$p < .05$, **$p < .01$, ***$p < .001$.

satisfaction ($b = .68$, $p < .001$). Using 5,000 bootstrapped samples (Hayes, 2009), the indirect effect of cellphone relevance on conversational satisfaction through interaction involvement was significant for low issue involvement (1.40, 95% confidence interval (CI) (1.12, 1.71)) and high issue involvement (1.53, 95% CI (1.25, 1.82)). Although the indirect effect was significant, the direct effect of cellphone relevance on conversational satisfaction remained significant in the model, $b = .49$, $p < .01$. Therefore, the data are consistent with the interpretation that interaction involvement partially mediated the effect of cellphone relevance on conversational satisfaction (see H4).

H2 predicted that issue involvement would moderate the effect of cellphone relevance on conversational satisfaction. As Table 2 shows, the PROCESS macro revealed that issue involvement moderated the effect of perceived cellphone relevance on satisfaction; the interaction of issue involvement and cellphone relevance was significant, $b = -.45$, $p < .05$. However, contrary to H2, cellphone relevance had a significant effect on conversational satisfaction for low issue involvement, $b = .50$, $p < .01$, but not for high issue involvement, $b = .05$, $p = .75$. Issue involvement did not have a direct effect on conversational satisfaction, $b = -.10$, $p = .76$. Therefore, H2 was not supported in Study 2.

Discussion

Study 2 tested the main and moderated effects of cellphone relevance on conversational satisfaction and explored a mediation. Although the study replicated some of the findings from Study 1, it also extended the study and provided further clarification of the moderation effect. Most importantly, Study 2 replicated the support for the Cellphone Relevance

Hypothesis from Study 1. Both studies not only found that integral use yielded higher reports of conversational satisfaction than incidental use but also demonstrated a strong effect.

The results concerning issue involvement were different in Study 1 and Study 2. Both Study 1 and Study 2 found an interaction effect between issue involvement and cellphone relevance, yet this effect was different between the studies. In Study 1, the hypothesized effect was supported: the effect of cellphone relevance on conversational satisfaction was stronger for high involvement than low involvement. Although significant, this effect was small. In Study 2, however, cellphone relevance had an effect on conversational satisfaction for low involvement but not for high involvement. This moderation effect was the opposite direction from the hypothesized effect in H2. These differing results may be due to the inclusion of interaction involvement and its interaction effect with issue involvement in the model. According to this interpretation, the significant yet counterintuitive interaction is describing the part of the effect of cellphone relevance on conversational satisfaction that is not covered by interaction involvement. The small effects from Study 1 and the conflicting results from Study 2 suggest that issue involvement does not have a clear moderating effect of cellphone relevance on conversational satisfaction. In addition, as hypothesized, integral use yielded significantly higher reports of interaction involvement (i.e., immediacy and other-orientation) than did incidental use.

General discussion

We started out to test the effect of cellphone use on conversational satisfaction and its effects through two forms of involvement. Two studies provide new findings that add to and enrich the theoretical understanding of cellphone use in face-to-face interactions. Major findings and contributions of the studies are summarized, and future directions for research are given below.

Cellphone relevance

The studies served the central purpose to test the Cellphone Relevance Hypothesis, which claims that perceptions of cellphone use integral to a conversation will yield higher conversational satisfaction than perceptions of incidental use. Asking participants to imagine a variety of different scenarios, this hypothesis was tested and supported twice. In both studies, the effect of cellphone relevance on conversational satisfaction was strong, with integral scenarios yielding systematically higher anticipated conversational satisfaction than incidental scenarios.

Theoretically, this project drew from Uses and Gratifications Theory (Ruggiero, 2000) to explore if different uses of the cellphone could have negative or positive conversational effects. The project challenged the focus of much of the phubbing literature (Roberts & David, 2016) that the "mere presence" (Przybylski & Weinstein, 2013) of a cellphone in a conversation necessarily yields negative social outcomes. Rather, the findings from the reported studies support the suggestion of other literature that the communicative effects of cellphones in conversations are more complex and cannot be reduced

to the mere presence (Allred & Crowley, 2016; Miller-Ott & Kelly, 2015). More specifically, the reported studies demonstrate that how the cellphone is used in the conversation—whether in an integral or an incidental fashion—affects conversational satisfaction, with integral use offering positive communicative effects. This finding supports the active audience assumption of Uses and Gratifications Theory (Rubin, 1993), demonstrating that communicators who actively seek to enrich the conversation may do so by integrating a cellphone into their conversation.

Drawing upon the relevance research within interpersonal communication (Tracy, 1984), cellphone relevance can be inferred through the relevance of the utterance after a conversational partner uses their cellphone. These findings demonstrate that although incidental use and general interruptions from cellphones may harm face-to-face interactions, integral use has the potential to enrich face-to-face conversations and the satisfaction that communicators experience within them.

Involvement

Drawing upon Coker and Burgoon's (1987) distinction between issue and interaction involvement, each form of involvement was expected to have different effects on conversational satisfaction. In short, the mediating effect of interaction involvement was consistent with the observed data; the moderating effect of issue involvement was inconclusive and not supported throughout.

Study 1 proposed a theory-driven (Sereno, 1968) yet original manipulation of issue involvement. Study 1 and Study 2 found somewhat different and small effects for issue involvement. In Study 1, issue involvement had a small interaction effect with cellphone relevance on conversational satisfaction. In Study 2, the direction of the effect was reversed in that cellphone relevance had a direct effect on conversational satisfaction for low involvement but not high involvement. The observed strong mediating effect of interaction involvement in the model may provide one explanation for this reversed effect. Taken together, the role of issue involvement as a potential moderator of the effects of cellphone relevance on conversational satisfaction are inconclusive.

Past research has reported that the use of cellphones in conversations may have mixed conversational effects (Kelly et al., 2019). Study 2 suggests the introduction of a cellphone into a conversation does not necessarily lower perceptions of engagement to the extent that participants recognize their partners are able to integrate the phone into the conversation in a way that increases engagement. Furthermore, as suggested by past research (Hecht, 1978), the exploratory inclusion of interaction involvement as a potential mediator is consistent with the interpretation of the data that interaction involvement had an effect on conversational satisfaction, partially mediating the effect of cellphone relevance on conversational satisfaction.

Future directions

The studies offer a theoretical and empirical enrichment of the understanding of cellphone use within face-to-face interactions. Indeed, the conceptualization of the Cellphone Relevance Hypothesis and the related findings allow for further extension for studying

interpersonal and technologically mediated communication. Both the findings and the limitations of the conducted studies allow for further research in two main areas: (a) the extension of the hypothesis to other communicative domains and (b) to further our understanding of boundary conditions on cellphone relevance effects.

First, the studies revealed the positive impact of integral use on conversational satisfaction, yet future research should seek to replicate and extend the Cellphone Relevance Hypothesis to other contexts. The use of the scenarios strongly indicated the effects of cellphone relevance, yet the utilization of the scenarios has methodological strengths and limitations. The inclusion of three topics suggests the cellphone relevance effects are not restricted to very specific contexts, and the inclusion of realism as a covariate in Study 2 showed that participants were able to imagine themselves in the conversational situations. However, in Study 2, participants perceived integral use scenarios as somewhat more realistic than incidental use scenarios, perhaps because the former met the conversational relevance maxim (Grice, 1975). Future research may test cellphone relevance effects through lab experiments with a confederate. Furthermore, future research should consider amended measurements of conversational satisfaction as Study 2 discovered a low reliability alpha for the scale for two of the 12 scenarios. Although the low alphas may have been due to the careless reading of some participants (e.g., missing the word "not" for one item), including additional items in the scale could improve the reliability of the scale.

Second, Study 2 explored interaction involvement as a mediator and, thus, offers a possible path that can explain how cellphone relevance may affect conversational satisfaction. At the same time, the study did not find clear support for issue involvement as a moderator. Future studies may explore additional moderators of the Cellphone Relevance Hypothesis. Possible candidates for moderators include the closeness of the relationship of the communicators (Duran et al., 2011) and the age of the communicators (Chan, 2014), which may moderate the effect of cellphone relevance on conversational satisfaction. In summary, future research can continue to explore the complexities of cellphone use in face-to-face conversations, focusing not only on the detriments but also the potential benefits that were reported in this study.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Ryan Cummings https://orcid.org/0000-0003-4003-1488

References

Allred, R. J., & Crowley, J. P. (2016). The "mere presence" hypothesis: Investigating the nonverbal effects of cell-phone presence on conversation satisfaction. *Communication Studies*, *68*(1), 22–36. https://doi.org/10.1080/10510974.2016.1241292

Benvenuti, M., Błachnio, A., Przepiorka, A. M., Daskalova, V. M., & Mazzoni, E. (2020). Factors related to phone snubbing behavior in emerging adults. In Desjarlais M. (Ed.), *The Psychology and dynamics behind social media interactions* (pp. 164–187). IGI Global. https://doi.org/10.4018/978-1-5225-9412-3.ch007

Burgoon, J. K., & Hale, J. L. (1984). The fundamental topoi of relational communication. *Communication Monographs*, *51*(3), 193–214. https://doi.org/10.1080/03637758409390195

Burleson, B. R., Wilson, S. R., Waltman, M. S., Goering, E. M., Ely, T. K., & Whaley, B. B. (1986, November). Item desirability effects in compliance-gaining research: Seven empirical studies showing why the checklist methodology produces garbage [Paper presentation]. Speech Communication Association, Chicago, IL. https://doi.org/10.1111/j.1468-2958.1988.tb00164.x

Chan, M. (2014). Multimodal connectedness and quality of life: Examining the influences of technology adoption and interpersonal communication on well-being across the life span. *Journal of Computer-Mediated Communication*, *20*, 3–18. https://doi.org/10.1111/jcc4.12089

Chandler, J., Mueller, P., & Paolacci, G. (2014). Nonnaïveté among Amazon Mechanical Turk workers: Consequences and solutions for behavioral researchers. *Behavior Research Methods*, *46*(1), 112–130. https://doi.org/10.3758/s13428-013-0365-7

Chen, C. F., & Tsai, M. H. (2008). Perceived value, satisfaction, and loyalty of TV travel product shopping: Involvement as a moderator. *Tourism Management*, *29*(6), 1166–1171. https://doi.org/10.1016/j.tourman.2008.02.019

Chotpitayasunondh, V., & Douglas, K. M. (2018). The effects of "phubbing" on social interaction. *Journal of Applied Social Psychology*, *48*(6), 304–316. https://doi.org/10.1111/jasp.12506.

Coker, D. A., & Burgoon, J. (1987). The nature of conversational involvement and nonverbal encoding patterns. *Human Communication Research*, *13*(4), 463–494. https://doi.org/10.1111/j.1468-2958.1987.tb00115.x

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.org/10.1080/10510974.2018.1467941

David, M. E., & Roberts, J. A. (2017). Phubbed and alone: Phone snubbing, social exclusion, and attachment to social media. *Journal of the Association for Consumer Research*, *2*(2), 155–163. https://doi.org/10.1086/690940

Duran, R. L., Kelly, L., & Rotaru, T. (2011). Mobile phones in romantic relationships and the dialectic of autonomy vs. connection. *Communication Quarterly*, *59*, 19–36. https://doi.org/10.1080/01463373.2011.541336.

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*, 384–398. https://doi.org/10.1111/jcc4.12174

Grice, H. P. (1975). Logic and conversation. In P. Cole, & J. L. Morgan (Eds.), *Syntax and semantics: Speech acts (Vol. 3)*. Academic. https://doi.org/10.1057/9780230005853_5

Guerrero, L. K. (1997). Nonverbal involvement across interactions with same-sex friends, opposite-sex friends and romantic partners: Consistency or change? *Journal of Social and Personal Relationships*, *14*(1), 31–58. https://doi.org/10.1177/0265407597141002

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*, 408–420. https://doi.org/10.1080/03637750903310360

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Head, A. J., & Eisenberg, M. B. (2011). How college students use the Web to conduct everyday life research. *First Monday*, *16*(4). https://doi.org/10.5210/fm.v16i4.3484

Hecht, M. L. (1978). Toward a conceptualization of communication satisfaction. *Quarterly Journal of Speech*, *64*(1), 47–62. https://doi.org/10.1080/00335637809383411

Hiniker, A., Patel, S. N., Kohno, T., & Kientz, J. A. (2016). Why would you do that? Predicting the uses and gratifications behind cellphone-usage behaviors [Paper presentation]. In *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing* (pp. 634–645). https://doi.org/10.1145/2971648.2971762

Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics*, *14*(3), 399–425. https://doi.org/10.1007/s10683-011-9273-9

Jacoby, J., & Sassenberg, K. (2011). Interactions not only tell us *when*, but can also tell us *how*: Testing process hypotheses by interaction. *European Journal of Social Psychology*, *41*, 180–190. https://doi.org/10.1002/ejsp.762

Joo, J., & Sang, Y. (2013). Exploring Koreans' cellphone usage: An integrated model of the technology acceptance model and uses and gratifications theory. *Computers in Human Behavior*, *29*(6), 2512–2518. https://doi.org/10.1016/j.chb.2013.06.002

Karadağ, E., Tosuntaş, Ş. B., Erzen, E., Duru, P., Bostan, N., Şahin, B. M., . . . Babadağ, B. (2015). Determinants of phubbing, which is the sum of many virtual addictions: A structural equation model. *Journal of Behavioral Addictions*, *4*(2), 60–74. https://doi.org/10.1556/2006.4.2015.005

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *Public Opinion Quarterly*, *37*(4), 509–523. https://doi.org/10.1086/268109

Kelly, L., & Miller-Ott, A. E. (2014, November). Divided attention: Romantic interactions in an age of continuous availability by cell phones. [Paper presentation]. National Communication Association, Chicago, IL.

Kelly, L., Miller-Ott, A. E., & Duran, R. L. (2019). Phubbing friends: Understanding face threats from, and responses to, friends' cell phone usage through the lens of politeness theory, *Communication Quarterly*, *67*(5), 540-559. https://doi.org/10.1080/01463373.2019.1668443

Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. *Journalism & Mass Communication Quarterly*, *77*(2), 308–320. https://doi.org/10.1177/107769900007700206

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. https://doi.apa.org/doi/10.1037/ppm0000065

Miller-Ott, A., & 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., & Duran, R. L. (2012). The effects of cell phone usage rules on satisfaction in romantic relationships. *Communication Quarterly*, *60*, 1–18. https://doi.org/10.1080/01463373.2012.642263

Misra, S., Cheng, L., Genevie, J., & Yuan, M. (2014). The iPhone effect: The quality of in-person social interactions in the presence of mobile devices. *Environment and Behavior*, *48*(2), 275-298. https://doi.org/10.1177/0013916514539755

Pew Research Center (2015). *Manners 2.0: Key findings about etiquette in the digital age*. Pew Research. https://pewresearch-org-preprod.go-vip.co/fact-tank/2015/08/26/key-findings-about-etiquette-in-the-digital-age/

Pirlott, A. G., & MacKinnon, D. P. (2016). Design approaches to experimental mediation. *Journal of Experimental Social Psychology*, *66*, 29–38. https://doi.org/10.1016/j.jesp.2015.09.012

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*, 237–246. https://doi.org/10.1177/0265407512453827

Quick, B. L., Scott, A. M., & Ledbetter, A. M. (2011). A close examination of trait reactance and issue involvement as moderators of psychological reactance theory. *Journal of Health Communication*, *16*, 660–679. https://doi.org/10.1080/10810730.2011.551989

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.org/10.1016/j.chb.2015.07.058

Rubin, A. M. (1993). Audience activity and media use. *Communication Monographs*, *60*(1), 98–105. doi: 10.1080/03637759309376300

Rubin, A. M. (2009). Uses-and-gratifications perspective on media effects. In J. Bryant, & M. B. Oliver (Eds.), *Media effects: Advances in theory and research* (pp. 165–184). Erlbaum.

Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Communication and Society*, *3*(1), 3–37. https://doi.org/10.1207/s15327825mcs0301_02

Sereno, K. K. (1968). Ego-involvement, high source credibility, and response to a belief-discrepant communication. *Communications Monographs*, *35*(4), 476–481. https://doi.org/10.1080/03637756809375597

Sperber, D., & Wilson, D. (1986). *Relevance: Communication and cognition*. Blackwell.

Spitzberg, B. H., & Hecht, M. L. (1984). A component model of relational competence. *Human Communication Research*, *10*(4), 575–599. https://doi.org/10.1111/j.1468-2958.1984.tb00033.x

Tracy, K. (1984). Staying on topic: An explication of conversational relevance. *Discourse Processes*, *7*(4), 447–464. https://doi.org/10.1080/01638538409544600

Turkle, S. (2015). *Reclaiming conversation: The power of talk in a digital age*. Penguin.

Vanden Abeele, M. M. P., 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.org/10.1016/j.chb.2016.04.005

Vanden Abeele, M. M. P., Hendrickson, A. T., Pollmann, M. M. H., & Ling, R. (2019). Phubbing behavior in conversations and its relation to perceived conversation intimacy and distraction: An exploratory observation study, *Computers in Human Behavior*, *100*, 35–47. https://doi.org/10.1016/j.chb.2019.06.004.

Weinberger, D. (2008). *Small pieces loosely joined: A unified theory of the Web*. Basic Books.

Wiener, M., & Mehrabian, A. (1968). *Language within language: Immediacy, a channel in verbal communication*. Ardent Media.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of consumer research*, 341–352. https://doi.org/10.1086/208520

Author biographies

Ryan Cummings completed his PhD in Communication at Purdue University, where Torsten Reimer served as his advisor. His research focuses on interpersonal and mediated communication.

Torsten Reimer is professor of Communication and Psychology and Director of the Communication and Cognition Lab at Purdue University. The lab employs psychological methods to test theories about communication and decision making in individuals, social groups, and organizations.