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Citation: Brown, Genavee, Manago, Adriana M. and Trimble, Joseph E. (2016) Tempted to Text: College Students' Mobile Phone Use During a Face-to-Face Interaction With a Close Friend. *Emerging Adulthood*, 4 (6). pp. 440-443. ISSN 2167-6968

Published by: SAGE

URL: <https://doi.org/10.1177/2167696816630086> <<https://doi.org/10.1177/2167696816630086>>

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Abstract

We examined whether emerging adults would engage in mobile phone use (MPU) when given the opportunity to socialize face-to-face with a close friend in a laboratory setting. Sixty-three U.S. college student friendship dyads rated their friendship quality in an online survey before coming into the lab together. When they arrived for their appointment, they were asked to wait together in a room for 5 minutes. A hidden camera recorded each dyad. Friends then separately rated the quality of the interaction. We coded time spent using mobile phone in seconds. A hierarchical regression conducted at the level of the dyad controlling for friendship quality and gender showed that more mobile phone use was associated with lower quality interactions. We discuss findings in terms of the potential for MPU to interfere with the development of friendship intimacy.

Tempted to text: College students' mobile phone use during a face-to-face interaction with a
close friend

Although mobile devices may enhance our lives in many ways, the benefits could come at the cost of high quality face-to-face interactions. Through naturalistic observations in U.S. public spaces, Humphreys (2005) documented how mobile phones commonly distract people from their in-person interactions. In survey research, adult women report that mobile devices frequently interrupt quality time with romantic partners and the more frequent these interruptions, the lower their relationship satisfaction (McDaniel & Coyne, 2014). Even the simple presence of a mobile phone in a room may have negative consequences. Przybylski and Weinstein (2012) found that college students, meeting for the first time, reported lower feelings of trust and empathic understanding when there was a cell phone in the room, particularly when they discussed intimate topics. The authors speculate that the phone reminded participants of alternative possibilities and thus prevented them from fully engaging with their conversation partner.

Indeed, the ubiquity of mobile devices may tempt emerging adults to turn to their technology for immediate gratification, rather than be present for mutual fulfillment to unfold within social interactions in the physical world. This trend may be cause for concern given that intimacy development is a critical task of emerging adulthood (Arnett, 2000). Through interactions with close friends, emerging adults practice self-disclosure, vulnerability, empathy, emotional support, and trust (Allen & Land, 1999). Friends who spend greater proportions of their time together distracted by their mobile phones may experience poorly coordinated conversations and decreased access to emotional cues, which could reduce their opportunities to build a mature sense of intimacy in the long term.

To understand how mobile devices may impact friendship interactions, we examined the extent to which college students use their phones when waiting in a room with a close

friend and whether their phone use was associated with their perceptions of the quality of the interaction. We hypothesized that the more time the dyad spent engaged in phone use, the lower their interaction quality. We analyzed all data at the dyadic level because our goal was to examine dyadic phenomena: the use of mobile devices and interaction quality within an interdependent interaction between two friends.

Method

Participants

Participants, students enrolled in psychology courses at a university in the Pacific Northwest of the U.S. ($M_{age} = 18.79$, $SD_{age} = 0.99$), were asked to indicate a close friend to participate with them. Sixty-three out of 68 same-gender dyads met the recruitment requirements and fully completed the questionnaires. We recruited same-gender friendship dyads because cross-gender friendships are categorically different (Bleske-Rechek & Buss, 2001). Of the 126 participants (94 women, 32 men), 70% identified as Caucasian (Euro-American), 12% Asian, 9% Hispanic, and 9% other ethnicities. The average friendship length was more than two years ($M_{length} = 2.88$, $SD_{length} = 3.36$). Ninety percent of participants reported having access to their mobile phone during the laboratory appointment. Participants were reimbursed for their time with research credit or \$5.00 if not enrolled in a psychology course.

Measures

Friendship quality. The McGill Friendship Questionnaires (Mendelson & Aboud, 2012) contain two subscales: Friendship Functions (26 items) and Respondent's Affection (16 items). Sample items include “_____ is someone I can tell private things to” and “I am happy with my friendship with ____.” Participants wrote the name of the friend who participated with them and the online questionnaire inserted this name into all items. Subscales were averaged to create the friendship quality variable ($\alpha = .946$). Possible values

ranged from 1 to 9, and participants' average friendship quality was high ($M_{\text{FQ}} = 7.61$, $SD_{\text{FQ}} = 0.72$).

Interaction quality. The Interaction Quality Scale (Cuperman & Ickes, 2009; 18 items) measures participants' perceptions of the quality of the interaction, including their feelings of enjoyment, synchrony, and mutual understanding. Originally developed for stranger interactions, several questions were modified to better suit friendship interactions. An example item is: "To what degree did the interaction seem smooth, natural, and relaxed to you?" The scale ranged from 1 to 10 with higher scores indicating greater satisfaction with the interaction ($\alpha = .875$). Participants rated the lab interaction as highly representative of their normal friendship interactions ($M = 8.65$, $SD = 1.48$).

Procedure

Participants were emailed the friendship quality questionnaire a week before they attended the experiment in friendship pairs. Upon their arrival, participants were escorted to a waiting room and asked to be seated and wait about 5 minutes¹ for the experimenter to return with study materials, leaving the two friends alone together. The 5-minute interaction was videotaped with a hidden camera. When the experimenter reentered the room, she told participants that their interaction had been recorded and asked for consent to use the video for research. Participants were asked to complete the interaction quality questionnaire and then fully debriefed about the purpose of the study.

Coding Mobile Phone Use

The video tapes of the 5-minute interaction were coded for the amount of time in seconds each participant used their phone by either looking at, typing on, or scrolling through

¹ This amount of time was selected because it has been used in many face-to-face initial interaction studies (Ickes, 2009) and is long enough for participants to engage in a wide range of behaviors but not become suspicious about being observed.

information on the screen (range 0-300 seconds). The two friends' amounts of phone use were averaged to create a dyad phone use variable ($M = 57.00s$, $SD = 76.83$, range: 0-296.5s).

Results

We used dyad averages on all variables to conduct a hierarchical regression with the predictors at the level of the dyad in part due to moderate to high correlations between friends' scores on all variables. Intraclass correlations and correlations between dyad level variables are reported in Table 1. Furthermore, analyzing at the dyad level is theoretically important because interactions are interdependent--whether one person or both are using their phone, it impedes interaction.

A hierarchical linear regression was conducted including all dyads to test whether phone use time predicted interaction quality, controlling for gender and friendship quality. Means for the dyadic variables used in regression analyses are reported in Table 2. In the first step, gender and friendship quality were used to predict interaction quality ($R^2 = .11$, $p = .031$). Mobile phone use was added in the second step. The increase in the amount of variance explained was significant ($\Delta R^2 = .167$, $p < .001$). More time spent engaged in mobile phone use was associated with lower interaction quality.

Dyad's phone use time was slightly skewed due to a number of dyads in which there was no phone use. Therefore, a second analysis was conducted without the no-phone-use dyads to assess the impact of violations of normality on the results. The second regression analysis showed that mobile phone use again predicted lower interaction quality and significantly increased the amount of variance explained after controlling for gender and friendship quality ($\Delta R^2 = .160$, $p = .004$). Regression values for both analyses are presented in Table 3.

Discussion

In this study, we asked same-sex close friendship dyads in college to wait alone together for 5 minutes and observed that a majority of friendship dyads (76%) chose to use their phones at some point during the interaction. The more time the dyad spent using their phones, the lower they rated the quality of their interaction; that is, participants themselves were more likely to report that the interaction felt more strained and less enjoyable. Our findings confirm previous observational research documenting that phone use distracts from face-to-face conversations (Humphreys, 2005), and is associated with diminished feelings of closeness among romantic partners (McDaniel & Coyne, 2014), strangers meeting for the first time (Przybylski & Weinstein, 2012), and now close friends.

Limitations in this study include a small sample of male participants, restricting our power to detect gender differences, and the lack of experimental manipulation that would provide stronger evidence for a causal relationship between phone use and interaction quality. Moreover, a fuller understanding of the implications of our findings for developmental processes in emerging adulthood would require longitudinal designs examining whether sub-optimal face-to-face interactions due to the interference of communication technologies create cascade effects (Masten & Cicchetti, 2010) that impede the maturation of intimacy over time.

Nevertheless, our study highlights the potential for communication technologies to diminish opportunities for self-disclosure and empathic attention during face-to-face interactions in emerging adults' close friendships. Compared to past generations, millennial youth are developing intimacy skills alongside greater capacities to maintain large networks of social contacts and to gratify immediate impulses on their digital devices. Indeed, mobile phone use is strongly habit-forming due to its provision of intermittent rewards of novel information (e.g., Oulasvirta, Rattenbury, Ma, & Raita, 2012). Adolescents and emerging adults may be particularly vulnerable to the temptations of their digital devices given increased sensitivity to rewards in early adolescence and delayed maturation of neural

systems responsible for inhibition until the mid to late twenties (Galvan et al., 2006). Thus an important developmental task during the transition to adulthood now includes learning how to balance instantaneous digital gratifications with sustained engagement in face-to-face interactions. We recommend future research not only explore how reduced proficiency in reading facial expressions due to communication technology use could contribute to documented generational decreases in empathy (see Uhls et al., 2014; Twenge, 2013) but to also examine how many young people learn to successfully balance communication technology use with deep interpersonal connections.

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Table 1

Intraclass and Pearson correlations between variables used in the regression analyses

	MPU	FQ	IQ
MPU	$\rho = .71 (p < .001)$		
FQ	$r = .179 (p = .161)$	$\rho = .34 (p = .006)$	
IQ	$r = -.352 (p = .005)$	$r = .321 (p = .010)$	$\rho = .50 (p < .001)$

Note. FQ: friendship quality, MPU: mobile phone use (time in seconds), IQ: interaction quality. Intraclass correlations, calculated using the ANOVA technique outlined by Kenny, Kashy, and Cook (2006), are displayed on the diagonal of the table and show correlations between friends' scores. The intraclass correlation for MPU was calculated without no-phone-use dyads to avoid biasing the correlation.

Table 2

Measures of normality for dyadic variables in the regression analyses

	Mean	SD	n	Skew	kurtosis
All Dyads					
FQ	7.61	0.73	63	-1.35	2.61
MPU	57.00	76.83	63	1.48	1.44
IQ	7.72	0.97	63	-0.73	1.17
Some MPU Dyads					
FQ	7.72	0.63	48	-0.83	1.46
MPU	74.81	80.61	48	1.15	0.53
IQ	7.69	1.00	48	-0.83	1.46

Note. FQ: friendship quality, MPU: mobile phone use (time in seconds), IQ: interaction quality

Table 3

Regression analysis testing the association between mobile phone use and interaction quality

		β	df	t	p	R ²	P
Analysis 1	Step 1					.11	.031
		FQ	60	2.71	.009		
		Gender	60	0.66	.508		
	Step 2					.28	<.001
		MPU	59	-3.69	<.001		
Analysis 2	Step 1					.10	.094
		FQ	45	1.90	.063		
		Gender	45	1.30	.200		
	Step 2					.26	.004
		MPU	44	-3.10	.003		

Note. Analysis 1 includes all dyads. Analysis 2 includes only dyads with non-zero scores for mobile phone use. FQ: friendship quality, MPU: mobile phone use, IQ: interaction quality.