5-2-2018

On Hold: Relationships in the Age of Mobile Phone Distraction

Isabel M. Bourget

Follow this and additional works at: http://vc.bridgew.edu/honors_proj

Part of the Psychology Commons

On Hold:

Relationships in the Age of Mobile Phone Distraction

Isabel M. Bourget

Submitted in Partial Completion of the

Requirements for Commonwealth Honors in Psychology

Bridgewater State University

May 2, 2018

Dr. Elizabeth Spievak, Thesis Advisor

Dr. Teresa King, Committee Member

Dr. Nesa Wasarhaley, Committee Member

Abstract

Interpersonal communication has been transformed by the more than 70 percent of adults who own smartphones (Greenwood, Perrin & Duggan, 2016) and other forms of portable technology. It is now more convenient than ever to stay in touch, find lost friends, and access constantly updated information online, but research has linked mobile phone use to decreased relationship and interaction quality. For example, McDaniel and Coyne (2016) found that self-reported technology use among married couples predicted more partner conflict and less relationship satisfaction, particularly for women. Brown, Manago and Trimble (2016) found similar results in that the more friend dyads were observed using their mobile phones in each other's presence, the lower they subsequently rated the quality of their interactions. Przybylski and Weinstein (2012) found that even the mere presence of a cell phone was linked to lower levels of trust, relationship quality, and perceived partner empathy among dyads instructed to talk about a meaningful topic. The current study addressed the call for more research on the links between computer mediated communication, relationships and well-being (Schiffrin, Edelman, Falkenstern & Stewart, 2010). Participants answered survey questions about five close relationships and completed standardized scales to measure cell phone use and other individual differences, including locus of control, subjective well-being and satisfaction with life. Results revealed a pattern across the five relationships; participants indicated that in-person communication was more common in family relationships than in romantic and friend relationships, in-person interactions were rated as more important than online interactions, and more in-person interactions predicted higher relationship quality scores. An external locus of control was significantly positively correlated with cell phone dependence and mobile phone usage, and predicted lower relationship quality, subjective well-being and satisfaction with life.

On Hold:

Relationships in the Age of Mobile Phone Distraction

Many of us have had a face-to-face conversation 'put on hold' by technology interference. Although we feel slighted when a friend or relative becomes distracted by their smartphone, most of us have committed this same social faux pas. We feel pressure to respond to a text, e-mail, phone call, or one of the many other cell phone notifications that we receive at all times of the day or night. Chronic inattentiveness and preoccupation are increasingly common and accepted human conditions, as distractions become more incessant (Hertlein, 2012). While there are recognized social benefits of mobile phone and media use (Blair & Fletcher, 2011; Hoffner, Lee & Park, 2016; Wei & Lo, 2006, Verduyn Ybarra, Resibois, Jonides & Kross, 2017), the negative implications are becoming more and more apparent. For example, the mere presence of a cell phone during a meaningful interaction has been linked to lower ratings of relationship quality, trust, and perceived partner empathy (Przybylski & Weinstein, 2012), and even when a cellphone is out of sight, knowledge that it may be within reach has been found to impair cognitive functioning (Ward, Duke, Gneezy & Bos, 2017). Technology-induced distraction has been linked to lower subjective well-being (McDaniel & Coyne, 2016; Schiffrin et al., 2010; Verduyn et al., 2017) and some people may be particularly vulnerable to the effects, either temporarily because of mood or boredom (Chen et al., 2017), or more persistently because of individual differences in age (Bianchi & Phillips, 2005) and traits such as locus of control (Chak & Leung, 2004; Li et al., 2015) and desire to conform with peers (Chen et al., 2017). What follows is a summary of the literature on mobile phone distraction and its implications for well-being, relationships and cognition, which informed the current investigation, a survey study on relationships, mobile phone use, well-being, and individual differences.

Technology in Daily Life

Preoccupation with our mobile phones seems to persist from the moment we wake to the moment we fall asleep. A survey administered to 1,000 participants across the United States by Braun Research Center (2015) revealed that 35% of respondents reported reaching for their mobile phones first thing in the morning, even before reaching for their significant other. Similarly, 23% reported having fallen asleep with their mobile phones in their hand, and 36% of respondents (and 54% of millennial respondents) reported that they constantly check and use their mobile phones. Individuals seem to be pulled towards these devices throughout the day, across a wide array of settings. Research indeed suggests that people have trouble controlling their mobile phone use; participants reported using their phones at inopportune times, such as before bed, while studying, in class, (Li et al., 2015) and in other public spaces. Hatucha and Toch (2016) observed students' mobile phone usage and behavior in private and public places on campus, and also administered a survey about phone usage habits. The authors found that smartphone users were more likely to use their phone or laptop in public, while basic phone users were more likely to read, rest, and talk with friends. Additionally, smartphone users were more detached from their environments (shown by less social interaction and less sensitivity to the social environment), while basic phone users were significantly more conscious of their surroundings than smartphone users. The authors assert that the divide between private and public is becoming blurry because previously private activities such as talking on the phone, searching the internet, watching movies, or listening to music can be done anywhere, including public spaces. The proliferation of smartphones and their expanded capabilities may have modified social norms such that many individuals likely feel no need to refrain or limit their use of technology. This may explain why cell phone use has been linked to poorer grades, sleep

quality, subjective well-being, lower life satisfaction scores, and more depressive symptoms (McDaniel & Coyne, 2016), as well as increased likelihood of auto accidents (National Safety Council, 2014).

Online and Face-to-Face Interactions

Despite widespread use and endorsement of computer-mediated communication (CMC), many recognize its drawbacks and understand the value of face-to-face interactions (FTF). Schiffrin et al. (2010) administered a questionnaire to 99 undergraduate students that measured subjective well-being, internet usage, perceptions of CMC versus FTF communication, and level of extraversion. Participants consistently reported that CMC was less beneficial than FTF communication; they indicated that FTF communication was more enjoyable, and significantly more beneficial for getting work done, building relationships, increasing emotional closeness, and making plans. In another study on relationships and technology use, Przybylski and Weinstein (2012) found that the mere presence of a cell phone was linked to lower levels of trust, relationship quality, and perceived partner empathy among dyads instructed to talk about a meaningful topic. Similarly, Brown et al. (2016) explored the effects of mobile phone use on interaction quality by observing and measuring dyads' mobile phone use while they were under the impression that they were waiting to begin an experiment. In support of their hypothesis, the researchers found that increased mobile phone usage was significantly negatively associated with interaction quality.

Despite widespread use and endorsement of computer-mediated communication (CMC), many recognize its drawbacks and understand the value of face-to-face interactions (FTF). Schiffrin et al. (2010) administered a questionnaire to 99 undergraduate students that measured subjective well-being, internet usage, perceptions of CMC versus FTF communication, and level

of extraversion. Participants consistently reported that CMC was less beneficial than FTF communication; they indicated that FTF communication was more enjoyable, and significantly more beneficial for getting work done, building relationships, increasing emotional closeness, and making plans. In another study on relationships and technology use, Przybylski and Weinstein (2012) found that the mere presence of a cell phone was linked to lower levels of trust, relationship quality, and perceived partner empathy among dyads instructed to talk about a meaningful topic. Similarly, Brown et al. (2016) explored the effects of mobile phone use on interaction quality by observing and measuring dyads' mobile phone use while they were under the impression that they were waiting to begin an experiment. In support of their hypothesis, the researchers found that increased mobile phone usage was significantly negatively associated with interaction quality.

McDaniel and Coyne (2016) examined the role of 'technoference,' which they defined as "everyday intrusions and interruptions in couple interactions or time spent together that occur due to technology" (p. 85) in personal and relational well-being. The researchers administered an online questionnaire to 143 women who were in heterosexual relationships to assess internet use, personal and relational well-being, and technology interference. Technology interference was measured by two scales. First, the Technology Device Interference Scale (TDIS; McDaniel & Coyne, 2016) assessed the general frequency of interruptions by media (e.g. mobile phones, television, computers/laptops and iPads/tablets). Second, the Technology Interference in Life Examples Scale (TILES; McDaniel & Coyne, 2016) assessed the frequency of technology interference in specific situations; for example, one scale item asked how often an individual's partner checked his mobile phone during a typical mealtime. Results indicated that computers were the most common form of technoference, followed closely by mobile phones. More than

half of the participants indicated that technoference interrupted their couple leisure time at least once per day. Furthermore, technoference during leisure, mealtime, and conversational interruptions was associated with increased conflict and lower relationship satisfaction.

Technoference has also been observed in parent-child relationships. In an observational study of 55 child-caregiver dyads eating at various fast food restaurants, observers noted some troubling caregiver behaviors (Radesky et al., 2014). Out of the 55 caregivers, 40 used their mobile phone at least once, and 16 remained preoccupied by it throughout the entire meal. The researchers noted that caregivers who were absorbed in their phone during the entire meal tended to behave dismissively by avoiding eye contact, responding mechanically, and scolding the child. One caregiver even pushed her young boy's hands away when he made a physical effort to direct her face away from her mobile phone.

In addition to interpersonal drawbacks, reliance on CMC and social media have been linked to negative personal outcomes. For example, Schiffrin et al. (2010) found that the number of hours college students spent on the internet per week was significantly negatively associated with subjective well-being. In a recent review, Verduyn et al. (2017) explored the literature on social media use and well-being and found a pattern. Well-being appeared to differ based on how social media was used: passively, by "the monitoring other people's lives without engaging in direct exchanges with others" (p. 281) and actively, by direct communication with others. Passive use, such as scrolling through ones' newsfeed or looking at others' profiles and pictures, was significantly correlated with lower self-reported well-being. Active use, such as posting status updates, sharing links or uploading pictures, was significantly correlated with increased well-being. Verduyn et al. (2017) suggested that passively scrolling through social media may stimulate jealousy and social comparison, while actively using social media may create social

capital and promote feelings of social connectedness. Together the findings suggest that internet use and CMC may be detrimental to relationships, social support, and well-being. However, a "new internet paradox" (Schiffrin et al., 2010, p. 305) persists, in which individuals consistently report that online interaction is less fulfilling, but continue to increase the amount of time they communicate online, all while denying that CMC has any impact on their well-being.

Cognitive Responses to Our Mobile Devices

The inability to set aside or ignore our mobile devices in favor of more fulfilling relationships and improved well-being may be partially explained by cognitive research on our attachments to possessions, specifically the mere ownership effect. Individuals assign higher value to objects that they own (Beggan, 1992; Nesselroade, Beggan &Allison, 1999) and owned objects appear to become linked to the self. This effect was recently demonstrated by Ye and Gawronski (2016), who either assigned participants ownership of an object (by showing them a picture) or gave participants the ability to choose between two depicted objects. Next, participants completed an implicit association test (IAT), which is a measure of implicit self-object linking, that included the previously viewed objects. Participants were faster and more accurate when they viewed pictures of owned objects (indicating higher implicit self-object linkage), particularly in the ownership-by-choice condition. Neuropsychological research has supported the mere ownership effect, in that activity in the medial prefrontal cortex (MPFC), an area of the brain linked with self-related information processing, has been shown to increase during laboratory induced ownership. Kim and Johnson (2010; 2013) found that MPFC activity increased when participants used a computer program to assign randomly presented objects to a virtual "Mine" basket (in comparison to an "Other" basket), and it increased again when the

participants later recalled the objects. These results suggest that self-related information and self-related objects are similarly processed.

There may be a biological and evolutionary explanation for our strong connections to our phones, and our seemingly unavoidable attentional shifts to screens (Bruya, 2010). Our brains have evolved to instantly attend to unexpected or abrupt shifts in sound and light (Yantis & Jonides, 1984; 1990), because they may warn us of an important threat we should avoid or an opportunity we should pursue (Yantis & Hillstrom, 1994). The sounds and/or lights emitted from a mobile device are nearly impossible to miss and even harder to ignore. Modern-day marketers and product designers use their knowledge of human cognition to their benefit to gain and direct consumers' attention (Wickens & McCarley, 2008).

While neurological responses and mere ownership have not been explicitly demonstrated for cell phones, people anecdotally report feeling anxiety and isolation in response to being separated from their mobile phones (Hoffner et al., 2016). In one study, 175 college students completed a survey after they silenced their wireless devices and put them out of sight, or left their devices in a secure location. Regardless of condition (location of cell phone), and for all but the lowest frequency users, anxiety continued to increase over three 10-minute testing intervals and did not level off or subside during the testing period (Cheever, Rosen, Carrier & Chavez, 2014). Individuals even report feeling phantom vibrations when they have not received a new notification; Drouin, Kaiser and Miller (2012) administered a survey to 290 undergraduate students and found that 89% reported experiencing this phenomenon.

As a result of real or imagined notifications, individual attentional shifts occur within milliseconds, and cell phones produce stimuli that effectively grab voluntary and involuntary attentional resources that might otherwise be available for daily tasks and face-to-face

interaction. Hadlington (2015) administered an online survey to 210 participants that measured excessive internet use, problematic mobile phone use, and occurrence of daily cognitive failures. Higher self-reported excessive internet use and problematic mobile phone use scores predicted significantly more cognitive failures (e.g. failure to recall people's names or forgetting the reason for entering a room) as measured by the Online Cognition Scale (OCS; Davis, Flett & Besser, 2002). The researchers explained that the pull of the internet and other mobile devices may create competition for the brain's limited resources, drawing attention away from activities such as driving and household chores. Ward et al. (2017) came to the same conclusions based on their studies of college students who performed more poorly on tests of working memory and fluid intelligence when their cell phones were within reach, even if they were out of sight and silenced, and despite students' claims that they had not thought about their cell phones at all.

Individual Differences and Technology Use

Although many people find it challenging to limit use of mobile devices, research suggests that those with an external locus of control may be particularly susceptible to internet addiction. Chak and Leung (2004) asked participants to self-report internet use, shyness, and locus of control. Self-reported internet addiction was negatively correlated with internality, or the extent to which people believe that they have control over their own lives, and positively correlated with powerful others locus of control, or the belief that other persons control the daily events in their life, and with chance locus of control, or belief in fate. Li et al. (2015) uncovered a similar link in their study of college students' locus of control, life satisfaction, sleep quality, and mobile phone use. Individuals whose responses indicated an external locus of control were significantly more likely to report using their phones at inopportune times, such as during classes, times designated for studying, and before bed. Cell phone use before bed was

significantly negatively correlated with sleep quality, and sleep quality significantly predicted lower life satisfaction. Cell phone use during class and study time was significantly negatively correlated with college grade point average. Perhaps those with an external locus of control feel the effects of peer pressure more acutely, or are less confident in their judgements about the relative importance or urgency of interruptions and cell phone contact, making limits on inopportune use more difficult to enforce than for those with an external locus of control.

Despite ample evidence suggesting that mobile phones and media have negative implications for physical and mental well-being, cognition, interaction quality, and relationship quality (Brown et al., 2016; Hadlington, 2015; Hatucha & Toch, 2016; Lepp et al., 2015; Li et al., 2015; McDaniel & Coyne, 2016; Radesky et al., 2014 Schiffrin et al., 2010; Verduyn et al., 2017), many individuals are seemingly unable to separate themselves from their mobile devices and continue to anecdotally self-report mostly positive impacts (Wei & Lo, 2006; Blair & Fletcher, 2011; Hoffner et al., 2016). The current study addressed Schiffrin et al.'s (2010) call for research on CMC, individual differences, relationships, and well-being. The survey included measures of online interactions, relationship quality, cell phone use and dependence, subjective well-being, satisfaction with life, and individual differences in locus of control. It was hypothesized that participants would report having lower relationship quality with those whom they communicated more online than in person, that mobile phone use would be negatively associated with subjective well-being and satisfaction with life, and that locus of control and mobile phone use would be positively correlated.

Method

Participants

One hundred and fifty-three students (45 males, 105 females, 3 unknown, $M_{age} = 20.192$, $SD_{age} = 3.961$) recruited from the Psychology department's subject pool have taken part in this survey in exchange for course credit. Most participants identified themselves as Freshmen (56%) and Caucasian (66%). The balance of the sample was 20% Sophomores, 15% Juniors, 7% Seniors, 14% African American, 6% Latin-American, 4% European, 2% Asian-American, and 6% indicated "other" as their ethnic background.

Materials and Procedure

Upon arrival to the lab, participants were led to a room where they were pre-briefed and reviewed consent materials before they completed a pencil-and-paper survey about their technology use, general attitudes, and relationships.

First, participants were instructed to answer questions about five of their close relationships. They were asked to choose at least one friend, family or romantic relationship, if possible. Participants provided the initials of each close other they rated, and indicated whether each was a friend, family member, or romantic interest. Participants rated each relationship on the Relationship Quality Scale (Ivan, Koyanago, Tyrovolas, & Haro, 2015), which consists of 7 items on a 10-point Likert scale; 3 items relate to partner support ($\alpha = .86$), and 4 items relate to negative partner interactions ($\alpha = .78$). After completing the Relationship Quality Scale, participants also completed two scale items created to assess the role of online communication in each relationship. Each was a single item, pictorial measure adapted from Aron, Aron and Smollan's (1992) Inclusion of Other in the Self (IOS) Scale. The first measure used blocks to measure the amount that participants communicated online in each of the five relationships (See

Figure 1). The second item used Venn Diagrams to measure participants' valuation of online versus in-person interactions for each relationship (See Figure 2). Both measures were designed so that each block or Venn diagram depicted a different degree of overlap between online and in-person interactions. The degree of overlap progressed linearly, creating an interval-level scale for each measure.

After answering questions about each of the five close relationships, participants completed the Mobile Phone Use Addiction Scale (Karadağ et al., 2015), which consists of 15 items on a 5-point Likert scale, to measure self-reported cell phone dependence. This scale includes three subscales; deprivation (7 items, $\alpha = .86$), control difficulties (3 items, $\alpha = .78$), and application (5 items, $\alpha = .85$). In addition, participants used a 5-point Likert scale to indicate their agreement with statements on Lee's (2014) 5-item Self-Perceived Dependence on Cell phone Scale, for which there is no published reliability information. Participants reported agreement with the 5 items of the Satisfaction with Life Scale ($\alpha = .87$; Diener, Emmons, Larsen & Griffin, 1985) on a 7-point Likert scale. Subjective well-being was measured using the 5-point Short Subjective Well-Being Scale ($\alpha = .71$; Røysamb, Harris, Magnus, Vittersø & Tambs, 2002). Finally, participants indicated their agreement with 9 items on a 7-point Brief Locus of Control Scale (Sapp & Harrod, 1993), which consists of three, 3-item subscales; the internal control subscale ($\alpha = .59$), the chance subscale ($\alpha = .65$), and the powerful others subscale ($\alpha = .72$). Upon survey completion, participants were thanked and debriefed.

Results

No gender differences were found. Therefore, the remaining analyses are collapsed across gender. As predicted, more in-person interactions and higher importance ratings of in-person interactions predicted significantly higher scores for positive items, and significantly

lower scores for negative items on the Relationship Quality Scale (See Table 1). Multivariate

analyses of variance (MANOVA) was used to compare participants' characterizations of online

and in-person interactions in each of the five relationships. Results yielded significant

differences for the first four relationships participants listed (F_{Rel1} (4, 290) = 5.41, $p < .001$, $\eta^2 =$

.07; F_{Rel2} (4, 294) = 4.69, $p < .01$, $\eta^2 = .06$; F_{Rel3} (4, 278) = 6.36, $p < .001$, $\eta^2 = .08$; F_{Rel4} (4, 290)

= 2.69, $p < .05$, $\eta^2 = .04$), driven primarily by stronger in-person ratings for family relationships.

MANOVA results for the fifth listed relationships did not reach significance. Pairwise

comparisons revealed that participants rated in-person interactions as more important for family

relationships than for romantic and friend relationships, and family relationships were more

likely to be conducted in-person than romantic and friend relationships. The means appear in

Table 2. In the left panel, higher scores reflect more in-person interactions, and suggest that

family relationships are conducted more in-person. In the right panel, higher scores reflect higher

valuations of in-person interactions and indicate that participants rate in-person interactions

within the family as more important.

Powerful others locus of control was significantly positively correlated with self-reported

dependence on cell phones and mobile phone usage, and significantly negatively correlated with

lower subjective well-being and satisfaction with life (See Table 3). Powerful others locus of

control was also significantly negatively linked to positive items, and significantly positively

linked to negative items on the relationship quality scale (See Table 3).

The hypothesis that mobile phone use would be negatively associated with subjective

well-being and satisfaction with life was not supported.

Discussion

Results supported the hypothesis that relationships that were conducted more online than in-person would be evaluated less positively. Across all five self-reported relationships, scores on the Relationship Quality Scale were more positive, and less negative, when the relationships were conducted more in-person, and when the in-person interactions were more valued (see Table 1). Furthermore, participants indicated that family relationships were significantly more likely to be conducted in-person than romantic and family relationships, and in-person interactions were rated as more important than online interactions for family relationships. The results support Schiffrin et al.'s (2010) findings that participants rated FTF communication as more enjoyable, and significantly more beneficial for building relationships and increasing emotional closeness. Participants in the current study reported that in-person interactions were more important for family relationships, and reported having significantly higher relationship quality with those whom they communicated more in-person. These findings are consistent with other research linking cell phone and internet use to negative relationship quality, including McDaniel and Coyne's (2016) findings that "technoference" was negatively correlated with relationship quality among married couples.

Our inclusion of a locus of control measure yielded significant results; powerful others locus of control was significantly linked to higher mobile phone use and dependency, and lower subjective well-being. Additionally, powerful others locus of control was significantly linked to poorer relationship quality, suggesting a possible link between problematic mobile phone use and poor relationship quality. Powerful others locus of control is a specific type of external locus of control that represents an individual's belief that their life is primarily controlled by other people. It is not surprising that powerful others locus of control is linked to higher mobile phone

usage and dependency, as notifications are often text messages or calls from close others. This may also explain why this type of locus of control is linked to lower relationship quality and well-being, as individuals can be reached at a moment's notice at all times; at the cost of individuals' sense of privacy and independence.

Past research has linked an external locus of control to higher vulnerability to the negative effects of cell phone use and lower self-reported subjective well-being (Li et al., 2015). The outcome of the current study supports those findings as well as Chen et al.'s (2017) findings that conformity motives predicted significantly higher self-reported smartphone addiction. Essentially, those who use their mobile phones in order to fit in with their peers may be at higher risk for mobile phone addiction. Results of the current study add to the literature on the positive correlation between external locus of control and excessive cell phone use and add credence to the argument that many individuals, but especially those who are susceptible to outside influences such as peer pressure, have difficulty limiting their mobile phone use and as a result, their well-being may suffer.

The findings have a number of everyday applications. For example, individuals who wish to improve their relationships with close others should attempt to limit online interactions and aim to achieve more face-to-face interactions. Additionally, a clinician who suspects their client to have an external locus of control should be aware of their client's heightened vulnerability to mobile phone addiction, and the negative effects that their client may be experiencing relating to sleep quality, inopportune cell phone use, and heightened distractibility. Overall, individuals should aim to limit cell phone use, especially in the facilitation and maintenance of close relationships.

Future research should focus on the specifics of online interactions in relation to relationship quality. For example, researchers should aim to differentiate between different types of online communication, including text messages, video chats, phone calls, and possibly even social media interactions. Additionally, it would be beneficial to have a more diverse sample regarding gender and age, as our sample was mostly comprised of females (69%), $M_{age} = 20.192$, $SD_{age} = 3.961$. Including more age groups would help researchers understand the interaction between mobile phone use and age, and possibly allow for a quasi-experimental study involving older adults who may not use mobile phones as much, or for as many diverse tasks.

References

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in self scale and the structure of

interpersonal closeness. *Journal of Personality and Social Psychology*, *60*, 596-612.

Bank of America. (2015). Trends in consumer mobility report. Retrieved from

http://newsroom.bankofamerica.com/files/doc_library/additional/2015_BAC_Trends_in_

Consumer_Mobility_Report.pdf

Banks, M. R., Willoughby, L. M., & Banks, W. A. (2008). Animal-assisted therapy and

loneliness in nursing homes: Use of robotic versus living dogs. *Journal of the American

Medical Directors Association, 9*, 173-177. doi:10.1016/j.jamda.2007.11.007

Beggan, J. K. (1992). On the social nature of nonsocial perception: The mere ownership

effect. *Journal of Personality and Social Psychology, 62*, 229-237.

Bergdall, A. R., Kraft, J. M., Andes, K., Carter, M., Hatfield-Timajchy, K., & Hock-Long, L.

(2012). Love and hooking up in the new millennium: Communication technology and

relationships among urban African American and Puerto Rican young adults. *Journal of

Sex Research, 49*, 570-582. doi:10.1080/00224499.2011.604748

Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone

use. *CyberPsychology & Behavior, 8*(1), 39-51. doi:10.1089/cpb.2005.8.39

Blair, B. L., & Fletcher, A. C. (2011). "The only 13-year-old on planet Earth without a cell

phone": meanings of cell phones in early adolescents' everyday lives. *Journal of

Adolescent Research, 26*, 155-177. doi:10.1177/0743558410371127

Brown, G., Manago, A. M., & Trimble, J. E. (2016). Tempted to text: College students' mobile

phone use during a face-to-face interaction with a close friend. *Emerging Adulthood, 4*,

440-443. doi:10.1177/2167696816630086

Bruya, B. (2010). *Effortless Attention: A New Perspective in the Cognitive Science of Attention and Action*. Cambridge: The MIT Press.

Chak, K., & Leung, L. (2004). Shyness and locus of control as predictors of internet addiction and internet use. *CyberPsychology & Behavior, 7*, 559-570. doi:10.1089/1094931042403073

Cheever, N. A., Rosen, L. D., Carrier, L. M., & Chavez, A. (2014). Out of sight is not out of mind: The impact of restricting wireless mobile device use on anxiety levels among low, moderate and high users. *Computers in Human Behavior, 37*, 290-297. doi:10.1016/j.chb.2014.05.002

Chen, C., Zhang, K. Z., Gong, X., Zhao, S. J., Lee, M. K., & Liang, L. (2017). Examining the effects of motives and gender differences on smartphone addiction. *Computers in Human Behavior, 75*, 891-902. doi:10.1016/j.chb.2017.07.002

Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring problematic internet use: Implications for pre-employment screening. *CyberPsychology & Behavior, 5*, 331-345. doi:10.1089/109493102760275581

Diener, E., Emmons, R., Larsen, J., & Griffin, S. (1985). The satisfaction with life scale. *Personality Assessment, 49,* 71–75.

Drouin, M., Kaiser, D. H., & Miller, D. A. (2012). Phantom Vibrations Among Undergraduates: Prevalence and associated psychological characteristics. *Computers in Human Behavior, 28*, 1490-1496.

Federer, A. E., Taylor, D. C., & Mather, R. C. (2013). Using evidence-based algorithms to improve clinical decision making. *Sports Medicine and Arthroscopy Review, 21*, 155-165. doi:10.1097/jsa.0b013e31829f608c

Greenwood, S., Perrin, A., & Duggan, M. (2016). Social media update 2016: Facebook usage

and engagement is on the rise, while adoption of other platforms holds steady. *Pew

Research Center.*

Hadlington, L. (2015). Cognitive failures in daily life: Exploring the link with internet addiction

and problematic mobile phone use. *Computers in Human Behavior, 51*, 75-81.

doi:10.1016/j.chb.2015.04.036

Hatuka, T., & Toch, E. (2014). The emergence of portable private-personal territory:

Smartphones, social conduct and public spaces. *Urban Studies,53*(10), 2192-2208.

doi:10.1177/0042098014524608

Hertlein, K. M. (2012). Digital dwelling: Technology in couple and family relationships. *Family

Relations, 61*, 374-387. doi:10.1111/j.1741-3729.2012.00702.x

Hoffner, C. A., Lee, S., & Park, S. J. (2015). "I miss my mobile phone!": Self-expansion via

mobile phone and responses to phone loss. *New Media & Society, 18*, 2452-2468.

doi:10.1177/14614448155926625

Ivan, S. Z., Koyanago, A., Tyrovolas, S., & Haro, J. M. (2015). Relationship Quality

Scale. *PsycTESTS Dataset*. dio:10.1037/t42088-000

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*, 60-74.

doi:10.1556/2006.4.2015.005

Kim, K., & Johnson, M. K. (2010). Extended self: medial prefrontal activity during transient

association of self and objects. *Social Cognitive and Affective Neuroscience, 7*, 199-207.

doi:10.1093/scan/nsq096

Kim, K., & Johnson, M. K. (2013). Extended self: spontaneous activation of medial prefrontal cortex by objects that are 'mine'. *Social Cognitive and Affective Neuroscience, 9*, 1006-1012. doi:10.1093/scan/nst082

Lee, E. B. (2014). Self-Perceived Dependence on Cell Phone Scale. *PsycTESTS Dataset*. doi:10.1037/t33927-000

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The relationship between cell phone use and academic performance in a sample of U.S. college students. *SAGE Open, 5*, 215824401557316. doi:10.1177/2158244015573169

Li, J., Lepp, A., & Barkley, J. E. (2015). Locus of control and cell phone use: Implications for sleep quality, academic performance, and subjective well-being. *Computers in Human Behavior, 52*, 450-457.

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*, 85-98.

McDaniel, B. T., & Coyne, S. M. (2016). Technology Device Interference Scale. *PsycTESTS Dataset*. doi:10.1037/t49232-000

McDaniel, B. T., & Coyne, S. M. (2016). Technology Interference in Life Examples Scale. *PsycTESTS Dataset*. doi:10.1037/t49257-000

Murray, C. E., & Campbell, E. C. (2015). The pleasures and perils of technology in intimate relationships. *Journal of Couple & Relationship Therapy, 14*, 116-140. doi:10.1080/15332691.2014.953651

National Safety Council. (2014). *NSC releases latest injury and fatality statistics and trends* [Press release]. Retrieved from http://www.prnewswire.com/news-releases/nsc-releases-latest-injury-and-fatality-statistics-and-trends-252258891.html

Nesselroade, K. P., Beggan, J. K., & Allison, S. T. (1999). Possession enhancement in an interpersonal context: An extension of the mere ownership effect. *Psychology and Marketing, 16*, 21-34.

Newman, E., Willard, T., Sinclair, R., & Kaloupek, D. (2001). Empirically supported ethical research practice: The costs and benefits of research from the participants' view. Accountability in Research, *8*, 309-329.

Przybylski, A. K., & Weinstein, N. (2012). Can you connect with me now? *Social and Personal Relationships, 30*, 237-246.

Radesky, J. S., Kistin, C. J., Zuckerman, B., Nitzberg, K., Gross, J., Kaplan-Sanoff, M., . . . Silverstein, M. (2014). Patterns of mobile device use by caregivers and children during meals in fast food restaurants. *Pediatrics, 133*. doi:10.1542/peds.2013-3703

Reed, J., Hirsh-Pasek, K., & Golinkoff, R. M. (2017). Learning on hold: Cell phones sidetrack parent-child interactions. *Developmental Psychology, 53*, 1428-1436. doi:10.1037/dev0000292

Resnick, P., & Varian, H. R. (1997). Recommender systems. *Communications of the ACM, 40*, 56-58.

Røysamb, E., Harris, J. R., Magnus, P., Vittersø, J., & Tambs, K. (2002). Subjective well-being--short scale. *PsycTESTS Dataset*. doi:10.1037/t13453-000

Sapp, S.G., & Harrod, W.J. (1993). Reliability and validity of a brief version of Levenson's

      Locus of Control Scale. *Psychological Reports*, *72*, 539-550. doi:

      10.2466/pr0.1993.72.2.539

Schiffrin, H., Edelman, A., Falkenstern, M., & Stewart, C. (2010). The associations among

      computer-mediated communication, relationships, and well-being. *Cyberpsychology,*

      Behavior, and Social Networking, 13, 299-306. doi:10.1089/cpb.2009.0173

Twenge, J. M., Krizan, Z., & Hisler, G. (2017). Decreases in self-reported sleep duration among

      U.S. adolescents 2009–2015 and association with new media screen time. *Sleep*

      Medicine,39, 47-53. doi:10.1016/j.sleep.2017.08.013

Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites

      enhance or undermine subjective well-being? A critical review. *Social Issues and Policy*

      Review, *11*, 274-302.

Ward, A. F., Duke, K., Gneezy, A., & Bos, M. W. (2017). Brain Drain: The mere presence of

      one's own smartphone reduces available cognitive capacity. *Journal of the Association*

      for Consumer Research, 2, 140-154. doi:10.1086/691462

Wei, R., & Lo, V. (2006). Staying connected while on the move: Cell phone use and social

      connectedness. *New Media & Society, 8*, 53-72. doi:10.1177/1461444806059870

Wickens, C. D., & McCarley, J. S. (2008). *Applied Attention Theory*. Boca Raton, FL: Taylor &

      Francis Group.

Yantis, S., & Jonides, J. (1984). Abrupt visual onsets and selective attention: Evidence from

      visual search. *Journal of Experimental Psychology: Human Perception and*

      Performance, 10, 601-621. doi:10.1037//0096-1523.10.5.601

Yantis, S., & Jonides, J. (1990). Abrupt visual onsets and selective attention: Voluntary versus automatic allocation. *Journal of Experimental Psychology: Human Perception and Performance, 16*, 121-134. doi:10.1037//0096-1523.16.1.121

Yantis, S., & Hillstrom, A. P. (1994). Stimulus-driven attentional capture: Evidence from equiluminant visual objects. *Journal of Experimental Psychology: Human Perception and Performance, 20*, 95-107. doi:10.1037/0096-1523.20.1.95

Ye, Y., & Gawronski, B. (2016). When possessions become part of the self: Ownership and implicit self-object linking. *Journal of Experimental Social Psychology, 64*, 72-87.

Table 1

Correlates of Relationship Quality Scale Questions

	How much does he/she really understand the way you feel about things?	How much can you rely on him/her if you have a serious problem?	How much can you open up to him/her if you need to talk about your worries?	How often does he/she make too many demands of you?	How much does he/she criticize you?	How much does he/she let you down when you're counting on him/her?	How much does he/she get on your nerves?
	(1= not at all, 10= all the time)						
Circle the block that best describes your relationship with this person (1=online only, 7=in-person only)	.335**	.333**	.331**	.044	-.095	-.127	-.145
Circle the diagram that best shows the importance of your online and in-person interactions with this person (1=online, 6=in-person)	.160*	.184*	.169	.023	-.059	-.147	.022
Powerful Others Locus of Control (1=lowest, 6=highest)	-.170*	-.164*	-.121	.164*	.240**	.184*	.152

** correlation is significant at the .01 level (2-tailed).

* correlation is significant at the .05 level (2-tailed).

Table 2

Relationship Type and Online vs. In-Person Attributions

	Circle the block that best describes your relationship with this person (1= online only, 7= in-person only)			Circle the diagram that best shows the importance of your online and in-person interactions with this person (1= online, 6= in-person most important)		
	Relationship Type					
	Family	Romantic	Friend	Family	Romantic	Friend
Relationship 1	6.105*	5.714	5.231	5.084*	5.071	4.564
Relationship 2	5.694*	5.130	4.727	4.875	4.957	4.364
Relationship 3	5.762**	4.947	4.597	4.730*	4.526	4.000
Relationship 4	5.388*	5.000	4.768	4.821*	4.000	4.101
Relationship 5	5.255*	4.833	4.679	4.636*	4.667	4.185

* mean score is significantly greater than friend and romantic relationship at the .05 level (2-tailed).
** mean score is significantly greater than friend and romantic relationship at the .01 level (2-tailed).

Table 3

Correlates of Powerful Others Locus of Control

	Subjective Well-Being (1= lowest, 7 = highest)	Satisfaction with Life (1= lowest, 6= highest)	Self-Perceived Dependence on Cell Phone (1= lowest, 5= highest)	Mobile Phone Usage (1= lowest, 5= highest)
Powerful others locus of control (1= lowest, 6= highest)	-.300**	-.203*	.263*	.175*

* correlation is significant at the .05 level (2-tailed).
** correlation is significant at the .01 level (2-tailed).

Circle the block that best describes your relationship with this person.

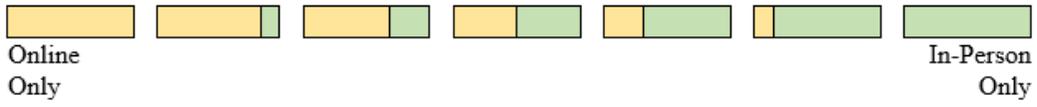

Online
Only

In-Person
Only

Figure 1. First relationship measure that assessed the degree to which each close relationship was conducted online or in-person.

Circle the diagram that best shows the **importance of your online and in-person interactions** with this person.
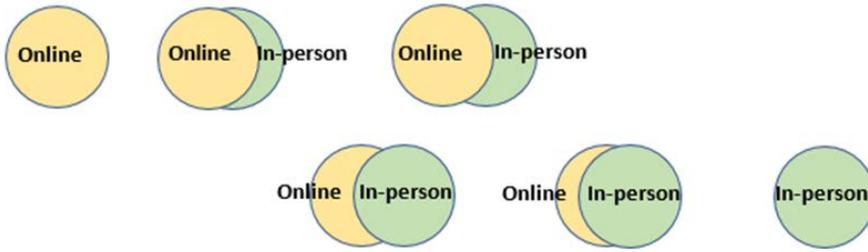

Figure 2. Second relationship measure that assessed participants' importance ratings for online and in-person interactions.