2014-12-01

"Technoference": The Interference of Technology in Couple Relationships and Implications for Women's Personal and Relational Well-Being

Brandon T. McDaniel
The Pennsylvania State University

Sarah M. Coyne
Brigham Young University - Provo, smcoyne@byu.edu

Original Publication Citation

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.

Psychology of Popular Media Culture
2016, Vol. 5, No. 1, 85–98

2160-4134/16/$12.00 http://dx.doi.org/10.1037/ppm0000065

"Technoference": The Interference of Technology in Couple Relationships and Implications for Women's Personal and Relational Well-Being

Brandon T. McDaniel
The Pennsylvania State University

Sarah M. Coyne
Brigham Young University

Technology use has proliferated in family life; everyday intrusions and interruptions due to technology devices, which we term "technoference," will likely occur. We examine the frequency of technoference in romantic relationships and whether these everyday interruptions relate to women's personal and relational well-being. Participants were 143 married/cohabiting women who completed an online questionnaire. The majority perceived that technology devices (such as computers, cell or smartphones, or TV) frequently interrupted their interactions, such as couple leisure time, conversations, and mealtimes, with their partners. Overall, participants who rated more technoference in their relationships also reported more conflict over technology use, lower relationship satisfaction, more depressive symptoms, and lower life satisfaction. We tested a structural equation model of technoference predicting conflict over technology use, which then predicted relationship satisfaction, which finally predicted depression and life satisfaction. By allowing technology to interfere with or interrupt conversations, activities, and time with romantic partners—even when unintentional or for brief moments—individuals may be sending implicit messages about what they value most, leading to conflict and negative outcomes in personal life and relationships.

Keywords: media use, technology use, couple relationships, relationship quality, depression

In recent years, there has been an explosion of technology use in everyday family life. Almost all adults in the United States have access to the Internet, with 65% or more having access at home (Smith, 2010). Approximately 91% of American adults own a cell phone (with 81% of 25- to 34-year-olds owning a smartphone), 61% have a laptop, 50% of parents in the United States have a tablet, and 72% of online adults now have a social networking site profile (Brenner & Smith, 2013; Lenhart et al., 2011; Pew Research Center, 2012; Rainie, 2012; Smith, 2013; Zickuhr, 2013). With so many technology devices in and around family life, brief interruptions will likely occur due to these devices. We term these interruptions *technoference*, which we define as everyday intrusions or interruptions in couple interactions or time spent together that occur due to technology. Technoference can occur in any type of interpersonal relationship and may range from interruptions in face-to-face conversations to the feelings of intrusion an individual experiences when his or her partner decides to check a device during couple leisure, even if partners were not interacting at that exact moment. The current study focuses on romantic relationships. Specifically, this article examines the frequency with which technoference occurs in romantic relationships and how these interruptions may relate to relationship conflict over technology use and to women's relational and personal well-being.

Positive Outcomes of Technology Use

Researchers have begun to examine how technology may help partners and spouses to connect with each other. Indeed, many interac-

This article was published Online First December 1, 2014.

Brandon T. McDaniel, Department of Human Development & Family Studies, The Pennsylvania State University; Sarah M. Coyne, School of Family Life, Brigham Young University.

Correspondence concerning this article should be addressed to Brandon T. McDaniel, Human Development and Family Studies, The Pennsylvania State University, 314 BBH Building, University Park, PA 16802. E-mail: bom5123@psu.edu

tions take place between partners via computers and cell phones through email, chat, text messaging, and so forth, and often individuals rate these interactions as positive in nature. A recent report found that most family members feel that technology has had a positive impact on their family life, with only 18% of participants stating it made their family life worse (Barna Group, 2011). Technology can allow couples to stay connected throughout the day (Pettigrew, 2009) and to reach out to each other when either partner experiences stress (Dietmar, 2005). Furthermore, some research suggests that technology-mediated relationship maintenance may increase commitment, satisfaction (Sidelinger, Avash, Godorhazy, & Tibbles, 2008), and communication (Coyne, Stockdale, Busby, Iverson, & Grant, 2011).

The Intrusion of Technology

Though this research suggests that technology use can be positive in relationships, a few studies indicate that certain types of technology use may become problematic in romantic relationships by increasing conflict and leading to poor relationship satisfaction (Ahlstrom, Lundberg, Zabriskie, Eggett, & Lindsay, 2012; Coyne et al., 2012; Schade, Sandberg, Bean, Busby, & Coyne, 2013). One explanation for these negative outcomes may be that technology use becomes intrusive in daily life and individuals struggle to disconnect from their devices. Research examining pathological levels of technology use reveals that technology use can be intrusive and can become so pervasive that individuals begin to experience problems with friends and family members (Elphinston & Noller, 2011; Gentile, Coyne, & Bricolo, 2013).

Though most individuals do not experience pathological levels of technology use, evidence suggests that many individuals struggle to control their use and the possible intrusions of technology into face-to-face interactions; they feel pulled toward their technology and have a difficult time resisting the urge to check their devices (Jarvenpaa & Lang, 2005; Middleton & Cukier, 2006; Oulasvirta, Rattenbury, Ma, & Raita, 2012; Rainie & Keeter, 2006). In Coyne et al.'s (2011) sample, 38% of participants reported sending texts or emails to others during conversations with their partners. Another small study found that women felt that their partners were distracted by their smartphones and that this dynamic negatively impacted their relationship (Czechowsky, 2008; also see Mazmanian, Orlikowski, & Yates, 2005). Indeed, one study estimates that one fourth or more of American adults feel like they *have to* answer their cell phones even if doing so will interrupt a meal or meeting (Rainie & Keeter, 2006). One individual explained the feeling in this way: "You really don't need to check every email you receive, you really don't, but you feel like you should if it [the phone] vibrates" (Middleton & Cukier, 2006, p. 255). These studies suggest that technology can intrude on relationships. In the current study, we extend this research by examining links between interruptions due to technology devices and technology use and conflict in relationships, relationship satisfaction, and personal outcomes.

One example of the potentially intrusive nature of ever-present technology comes from studies of work-to-family spillover. Often, these studies find that the use of cell phones blurs the boundaries between work and home, leading to increased negative work-to-family spillover, negative mood, and lower satisfaction with family life (Chesley, 2005; Mazmanian et al., 2005). The blurring of boundaries and effects on family life are likely due to the expectation that workers respond to email quickly, and they can become stuck in a self-reinforcing loop of frequently checking their email on their phone (Mazmanian et al., 2005). Workers often express feeling in control of their technology use and devices, but researchers suggest this feeling of control is more of an illusion and could better be expressed as "fighting the urge" to check their device (Middleton & Cukier, 2006, p. 255). Collectively, all of this research suggests that some types of technology use could be intrusive and interfere with interactions in daily life.

Technoference in Romantic Relationships

In the previous section, we described how technology use can sometimes be problematic in relationships as well as some ways that technology can become intrusive and interfere with interactions between partners. As technology interrupts daily interactions with others, it may have a detrimental impact on romantic relationships. Popular news outlets sometimes play this

dilemma to the extreme, with one recent piece portraying families as starting their days by checking their email, Facebook, or other online accounts (Stone, 2009). Such use could affect the quality of the time that families spend together. Additionally, such use of technology could lend itself to interruptions in family interactions—for instance, one partner may wish to plan the day, while the other partner is still checking email. The extent to which technology devices themselves—such as cell phones, televisions, computers, and tablets—interfere with interactions between romantic partners has been given little attention in prior research.

To our knowledge, although there are studies that examine problematic technology use (Bianchi & Phillips, 2005), there is only one study that has examined aspects similar to technoference in relationships. Coyne et al. (2011) examined the ways in which romantic couples use technology. Though the study was not focused on technoference specifically, there was a single technology use item that asked couples how frequently they connected with others via technology when interacting with their romantic partner. This behavior was positively related to overall technology use and, at the bivariate level, was associated with poor relationship satisfaction. This study does provide some basic support for the idea that technoference can produce negative outcomes; however, the study was limited in a number of ways. First, it was measured with a single item and was specific only to connecting with others. We suspect that the causes of technoference are much more multifaceted than simply connecting with other people. For example, individuals could be checking email, playing games, watching videos, listening to music, shopping online, checking the weather, and much more; many brief interruptions could also be caused by the technology devices themselves due to lights, sounds, and notifications. Accordingly we provide a more complete view of technoference in our current study.

Coyne et al. (2011) also only examined relationship satisfaction as an outcome. We build on this in the current study by also examining a number of other individual outcomes, including depression and life satisfaction. Most importantly, we examine whether technoference predicts conflict in the relationship over technology use and whether this conflict accounts for negative outcomes. Other research has shown that high technology use by itself is not necessarily problematic in romantic relationships. For example, Coyne et al. (2012) found that time spent playing video games was not directly related to negative outcomes in romantic relationships. Instead, it was the presence and amount of *conflict* over games that caused relationship problems. As an illustration, there may be no effect on relationship satisfaction in couples where one partner plays video games for hours each day, until such game play causes conflict and is viewed as problematic (Coyne et al., 2012). We build on this research and examine whether technoference increases conflict in relationships and whether this conflict is responsible for any associations between technoference and negative outcomes in relationship and individual well-being.

Technology may interfere with the development of face-to-face intimacy in romantic relationships in two major ways. First, individuals may develop "intimacy" with electronic devices at the cost of real-life intimacy. Several studies suggest that cell phone users experience intimacy with their electronic devices through the development of a strong emotional attachment to their cell phones (Turner & Turner, 2013; Vincent, Haddon, & Hamill, 2005; Wehmeyer, 2007). Carbonell, Oberst, and Beranuy (2013) explain that mobile devices can entice individuals to form strong attachments with them due to their inherently gratifying features. Some of these features include that mobile devices (1) can help individuals feel valued and loved as they send and receive messages, (2) are highly personalizable and can become an extension of an individual's personality and social position, and (3) are multifunction devices, meaning they can be used as a phone, map, calculator, clock, music player, gaming system, and so forth in all aspects of the person's life. Our relationship with electronic devices allows us to become increasingly connected with others but may interfere in the development of face-to-face relationships. Communication becomes truncated on electronic devices, and individuals may begin to prefer online interactions as opposed to those that are face-to-face (Rettie, 2007).

Another reason that technology may interfere with the development of face-to-face intimacy in romantic relationships is that individuals may "multitask" with technology while interacting

with others. Such behavior results in being "alone together," where couples are physically together in the same room but the partners are more involved with their separate technology devices than they are with the other person (Turkle, 2012). As an example, it is now fairly common to see couples on a date where both are engrossed with their cell phones as opposed to engaging in meaningful conversation. These situations could be considered moments of media multitasking, where individuals are attempting to engage with both their partner and their technology device, and it is quite possible that one partner may feel that the devices are intruding or interrupting their couple interactions and communication. Indeed, some evidence suggests that media multitasking negatively affects relationships. For example, Pea et al. (2012) found that media multitasking was related to reduced face-to-face contact and several negative social outcomes among 8- to 12-year-old girls, such as difficulty making and keeping friends. Conversely, face-to-face communication was associated with positive social outcomes. Though this study was conducted with young girls, the results of this study likely apply to romantic situations as well. One partner may use technology at high levels or at times that the other partner deems inappropriate, such that interference or interruptions occur in their interactions. As a result, these perceived intrusions into the relationship may then increase conflict and could negatively influence the individual's relationship with their partner (Coyne et al., 2012).

Additionally, research on *general* interruptions in conversations is also informative to the present study. Interruptions in conversations have been related to perceived problems in the interaction, including conflict (Bangerter, Chevalley, & Derouwaux, 2010; Farley, Ashcraft, Stasson, & Nusbaum, 2010; Hawkins, 1988). Longer interruptions are perceived by partners to be more problematic than short ones (Hodgetts & Jones, 2006). Furthermore, interruptions in conversations that are "face threatening," where only one partner is engaged with the interruption and the other is kept waiting, are particularly problematic (Brown & Levinson, 1987). Although technoference can result from problematic or too frequent use of technology by individual partners, as mentioned earlier, technoference can also result from *everyday* intrusions that occur due to the technology itself, such as when someone receives an unexpected text message or other notification. Therefore, technoference may represent both short and long interruptions in couple interactions and may also produce a sort of media multitasking, where individuals attempt to engage with both their technology and their partner. Technoference may be face threatening, as well, as only one individual is generally engaged with the technology device at the time of the intrusion, making technology interruptions particularly impactful.

Conceptual Model of Influence of Technoference on Relational and Personal Well-Being

In line with the research in the previous section, we believe that interruptions due to technology devices (either caused by individual use or by the devices themselves) will increase the likelihood of relationship conflict specifically over the use of technology. Relationship conflict could occur because individuals feel that their relationship is threatened or because they are frustrated with the interruptions and lack of intimacy the technology use may cause (Turkle, 2012). In prior work, conflict over technology use has been shown to be an important mediator or mechanism through which technology use influences relationship outcomes (Clayton, Nagurney, & Smith, 2013). Relationship conflict often spills over into feelings of relationship satisfaction (Gottman & Levenson, 1992). This lowered relationship satisfaction occurs because partners likely become distressed by and have aversive reactions to the increased conflict (Koerner & Jacobson, 1994), which can lead to cycles of negativity between partners and possibly withdrawal as they respond to each other's negative affect and irritation (for a review, see Fincham, 2003). Conflict can also lead to negative cognitions, especially when partners do not feel understood and validated (Verhofstadt, Buysse, Ickes, De Clercq, & Peene, 2005).

Thus, as we have seen, conflict can lead to more negative views of one's romantic partner and the relationship in general. Then, poor relationship quality has been shown to negatively influence individuals' mental health, such as depression, and life satisfaction (Beach, Katz,

Kim, & Brody, 2003; Davila, Karney, Hall, & Bradbury, 2003; Hawkins & Booth, 2005; Horowitz, McLaughlin, & White, 1998; Proulx, Helms, & Buehler, 2007; Whisman, 2001). One explanation for the link between relationship quality and personal well-being is the marital discord model of depression (Beach, Sandeen, & O'Leary, 1990), which suggests that the ability to cope effectively with life and relationship challenges is reduced because poor relationship quality simultaneously increases negative interactions and decreases positive interactions between partners.

Accordingly, it is not always enough to simply measure the frequency of technology use; studies have specifically found that technology use generally does not always directly predict relationship outcomes. Rather, it is when individuals in the relationship view the technology use as problematic and conflict over technology use arises (Coyne et al., 2012). In the current study, we examine the relationships among technoference, conflict, and relationship and individual outcomes. In light of all of the work mentioned previously, we expect everyday interruptions due to technology in couple interactions to increase conflict over technology use, which will then lead to further feelings of relationship distress and finally worse perceptions of personal well-being (marked by greater depressive symptoms and lower life satisfaction). Figure 1 shows our conceptual model.

The Current Study

The research and theory already mentioned would suggest that technology use can influence a number of key outcomes in romantic relationships (Chesley, 2005; Coyne et al., 2011; Duran, Kelly, & Rotaru, 2011; Elphinston & Noller, 2011; Schade et al., 2013; Turkle, 2012). However, this research often focuses on problematic use (such as overuse or addiction-like behaviors) or simply the amount of use. Although problematic use and overuse can intrude in relationships, the current study extends this work by specifically examining *everyday* technology interruptions. This extension is important, as technology has come to be ever present in many everyday interactions; therefore, an individual does not necessarily need to have developed pathological or problematic use in order to experience everyday interruptions due to technology. For example, intrusions can also be caused by the devices themselves when individuals receive calls, text messages, or notifications. We also examine whether this technoference is related to negative outcomes for both relationship and individual well-being.

First, we examined how often women perceived particular technology devices as interfering with their interactions with their partner. Then we examined their ratings of the frequency of some technoference scenarios in everyday life. We expected most of the participants in our study to experience at least some technoference in their daily lives, as technology is commonplace in families (Padilla-Walker, Coyne, & Fraser, 2012). We also examined which devices and scenarios were rated as interfering or occurring most frequently. Finally, according to our conceptual model, we hypothesized that more frequent technological interruptions would be related to decreased well-being—marked by lower relationship satisfaction, lower life satisfaction, and higher levels of depressive symptoms. These associations would specifically be mediated by relationship conflict over technology use. Specifically, we expected technoference to be indirectly related to romantic and personal outcomes through a chain reaction of sorts—greater reported technoference would predict more conflict over technology use. We then hypothesized that conflict over technology use would predict lower relationship quality. Finally, we predicted that lower relationship quality would spill over into lower life satisfaction and higher depressive symptoms. Figure 1 shows our conceptual model.

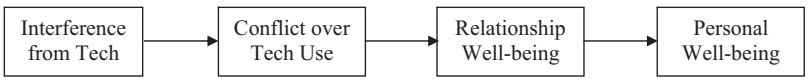

Figure 1. Conceptual model of how technology interference in couple interactions may lead to conflict over this technology use, which may then spill over into relationship and personal well-being.

These outcomes were selected for the current study due to our conceptual model and because prior work has linked greater technology use in general and problematic technology use with greater negative mood, depressive symptoms, stress, feelings of loneliness, and lower satisfaction with relationships and family life (Ayyagari, Grover, & Purvis, 2011; Bianchi & Phillips, 2005; Billieux, Van der Linden, & Rochat, 2008; Chesley, 2005; Takao, Takahashi, & Kitamura, 2009; Thomée, Härenstam, & Hagberg, 2011).

Methods

Participants and Procedure

Participants included 143 married or cohabiting women in heterosexual relationships. These participants were recruited through emails and fliers posted in local community buildings. Participants completed an online survey, which assessed Internet use, relational and personal well-being, and technology interference. The University Institutional Review Board approved this research. On average, the women were 30.37 years old (SD = 5.22). All were married or cohabiting (90% married). Most of the women were White (89%) and had completed some college (82%). The average household income was US$68,000 ($SD$ = US$40,000). Many women had each of the following devices in their homes: cell phone/smartphone (95%), TV (90%), computer (91%), and tablet (58%).

Measures

Technology Device Interference Scale (TDIS). Participants were asked in general how frequently cell phones/smartphones, TV, computers/laptops, and iPads or other tablets get in the way of or even interrupt interactions that they have with their partners. They rated their perceptions on a six-point Likert-type scale: 0 (*never*), 1 (*rarely*), 2 (*sometimes*), 3 (*often*), 4 (*very often*), and 5 (*all the time*). A principal components analysis revealed one factor that accounted for 54% of the variance, and factor loadings for cell phones/smartphones, TV, computers/laptops, and iPads or other tablets were .78, .77, .81, and .44, respectively. These items were examined separately as well as combined into an overall average Technology Device Interference Scale (TDIS) score, with higher scores representing more frequent interference in couple relationships (Cronbach's alpha = .67). Although the alpha was marginally lower than the typical acceptable cutoff, we expected some variability within some individuals' responses across the devices (especially as tablet use is less common), which likely accounts for the lower alpha.

Technology Interference in Life Examples Scale (TILES). An additional five items assessed the frequency with which participants experienced some situations in general. These items included the following:

1. During a typical mealtime that my partner and I spend together, my partner pulls out and checks his phone or mobile device.
2. My partner sends texts or emails to others during our face-to-face conversations.
3. When my partner's phone or mobile device rings or beeps, he pulls it out even if we are in the middle of a conversation.
4. During leisure time that my partner and I are able to spend together, my partner gets on his phone, mobile device, or tablet.
5. My partner gets distracted from our conversation by the TV.

Participants rated these items on an eight-point scale: 0 (*never*), 1 (*less than once a week*), 2 (*once a week*), 3 (*once every few days*), 4 (*once a day*), 5 (*2 to 5 times a day*), 6 (*6 to 9 times a day*), and 7 (*10 or more times a day*). A principal components analysis revealed one factor that accounted for 63% of the variance, and factor loadings for the five items (as listed above) were .83, .86, .85, .80, and .62, respectively. These items were examined separately and also averaged to produce an overall Technology Interference in Life Examples Scale (TILES) score, with higher scores representing more frequent interference in couple interactions and time spent together (Cronbach's alpha = .85).

Conflict over technology use. Participants completed a modified version of the frequency of relationship conflict measure, a scale obtained from the RELATE battery (Busby, Holman, & Taniguchi, 2001). We modified the measure to include eight technology use items, such as "time spent watching TV," "time spent talking or texting on cell phone," and "time spent on computer." Participants responded concerning the frequency with which they per-

ceived conflict over each item on a five-point scale ranging from 1 (*never*) to 5 (*very often*). Items were averaged to produce an overall conflict over technology use score, with higher scores representing more frequent conflict (Cronbach's alpha = .82).

Depressive symptoms. Participants completed the CES-D (Radloff, 1977), in which they were asked to rate how often they felt 20 different symptoms during the past week on a four-point scale ranging from 0 (*rarely or none of the time—less than 1 day*) to 3 (*most or all of the time—5 to 7 days*). Items were summed to produce an overall depression score, with higher scores representing more symptoms (Cronbach's alpha = .91).

Life satisfaction. Participants' life satisfaction was measured using one item: "How satisfied are you with your life in general?" Participants rated their satisfaction on a five-point scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*).

Relationship satisfaction. The Quality of Marriage Index (Norton, 1983) was used to measure participants' relationship satisfaction. We changed the wording to *partner* and to *relationship*. The first five items, such as "We have a good relationship" and "My relationship with my partner is very stable," asked participants to rate their agreement on a seven-point scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). The sixth item asked participants to rate their overall relationship happiness on a 10-point scale ranging from 1 (*unhappy*) to 10 (*perfectly happy*). We first standardized the items and then averaged them to produce an overall relationship satisfaction score; higher scores indicate more satisfying relationships (Cronbach's alpha = .97).

Results

How Often Does Technology Interfere With Couple Interactions?

Computers were rated as interfering most often in interactions between partners ($M = 2.26$, $SD = 1.27$; 74% of participants rated *sometimes*, *often*, *very often*, or *all the time* on this item), followed closely by cell phones/smartphones ($M = 2.18$, $SD = 1.29$; 70%), TV ($M = 1.91$, $SD = 1.24$; 71%), and then tablets ($M = 1.00$, $SD = 1.29$; 32%). Participants who did not own these devices were included in these frequencies. A repeated measures ANOVA found that the frequency of technoference depended on type of device, $F(1, 142) = 27.10$, $p < .001$, with pairwise comparisons revealing that tablets were rated as interfering less frequently than all other devices (all comparisons $p < .001$)—likely due to fewer families owning tablets in this sample compared with other devices. Computers interfered more frequently than TV ($p = .03$); however, there were no significant differences for other technologies.

Examining the five life scenario items, the most frequently occurring was a participant's partner getting on his phone, mobile device, or tablet during couple leisure time ($M = 3.66$, $SD = 1.94$; 62% of participants rated this as occurring *once a day* or more often), followed by a participant's partner getting distracted from the couple's conversation by the TV ($M = 2.76$, $SD = 1.95$; 40%), a participant's partner pulling out his phone when it sounds even when the couple is in the middle of a conversation ($M = 2.71$, $SD = 1.93$; 35%), a participant's partner pulling out his phone during mealtime ($M = 2.41$, $SD = 1.97$; 33%), and finally a participant's partner sending texts or emails to others during the couple's face-to-face conversations ($M = 1.93$, $SD = 1.96$; 25%). A repeated measures ANOVA found significant differences dependent on the type of scenario, $F(1, 142) = 38.19$, $p < .001$. Pairwise comparisons revealed that technoference during leisure time was rated as occurring more frequently than any of the other life technoference scenarios (all comparisons $p < .001$). Having a partner send texts or emails to others during face-to-face conversations was rated as occurring significantly less often than all other scenarios (all comparisons $p < .001$). No other significant differences were found.

Bivariate Correlations Between Technology Interference and Well-Being

A series of bivariate correlations on the main variables revealed significant correlations between technoference and the well-being variables (Table 1). Overall, those who rated themselves as experiencing more technoference in their relationship also reported more frequent conflict over technology use, more depressive

Table 1
Summary of Intercorrelations, Means, and Standard Deviations for All Study Variables

Study variables	1. Device interference	2. Tech interference in life	3. Conflict over tech	4. Relationship satisfaction	5. Depression	6. Life satisfaction
1. Frequency of device interference	1	.56***	.51***	−.30***	.38***	−.36***
2. Tech interference in life examples		1	.33***	−.21*	.24**	−.21*
3. Conflict over technology use			1	−.37***	.29**	−.43***
4. Relationship satisfaction				1	−.25**	.46***
5. Depression					1	−.52***
6. Life satisfaction						1
Mean	1.84	2.69	1.74	0.02	11.11	4.13
Standard deviation	0.90	1.55	0.63	0.89	9.23	0.76

Note. $N = 143$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

symptoms, lower life satisfaction, and lower relationship satisfaction.

Model of Technology Interference and Its Influence on Well-Being

Analysis plan. We used structural equation modeling (SEM) using maximum likelihood estimation in the Analysis of Moments Structure (AMOS) software (Arbuckle & Wothke, 1999) to examine whether our conceptual model (Figure 1) fit the data well. It was believed that more frequent technology interruptions would predict more conflict specifically about technology use. Experiencing more frequent conflict over technology was expected to predict worse relationship quality, and we expected worse relationship quality to predict worse personal well-being, including greater depressive symptoms and lower life satisfaction. In our model, we also created a technoference latent construct on which our two scales of technology interference (i.e., the *Technology Device Interference Scale* and the *Technology Interference in Life Examples Scale*) were loaded.

Results. Based on the pattern of the fit indexes, we judged the fit of our conceptual model to be good ($\chi^2(6) = 9.56$, $p = .26$; RMSEA = .04; CFI = .99; Hu & Bentler, 1999). Figure 2 shows the model with standardized path estimates. The frequency of technoference predicted conflict over technology use ($\beta = .56$, $p < .001$). This conflict predicted lower relationship quality ($\beta = -.37$, $p < .001$), and lower relationship quality predicted lower life satisfaction ($\beta = .39$, $p < .001$) and a trend toward higher depression ($\beta = -.14$, $p = .07$). We were unsure whether technoference would still directly relate to personal well-being once the indirect path through conflict and relationship quality was accounted for. In our model, we found that after accounting for the indirect path, the direct paths from technoference to depression ($\beta = .37$, $p < .001$) and to life satisfaction ($\beta = -.31$, $p < .001$) were significant; the significance of these direct paths indicates that although our hypothesized pathway is viable, there may also be other ways in which technoference relates to personal well-being.

Bootstrapping analyses for indirect effects based on 2,000 bootstrapping resamples and a 95% confidence interval were conducted for the

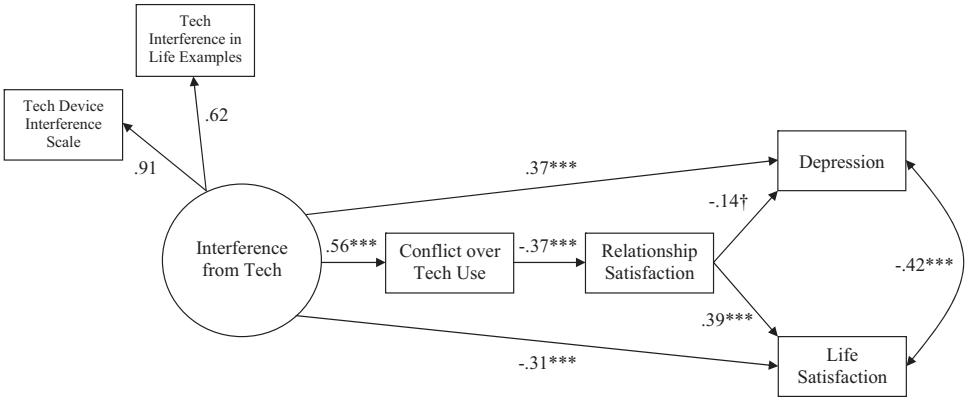

Figure 2. Model of how the frequency of technology interference (technoference) may lead to conflict over this technology use, which may then spill over into relationship and personal well-being. The figure shows the model with standardized path estimates. *** $p < .001$, † $p < .10$.

indirect effects of the frequency of technoference on well-being. As expected, significant indirect effects were observed between technoference and relationship satisfaction ($\beta = -.23$, 95% CIs [−.37, −.13]) and life satisfaction ($\beta = -.09$, 95% CIs [−.16, −.04]; *ps* < .001), but unexpectedly not between technoference and depression, which was a trend ($\beta = .03$, 95% CIs [.00, .07]; $p = .09$).

Discussion

The majority of our participants perceived that technology interrupted their interactions with their partners. Interestingly, around 70% of our participants perceived computers, cell or smartphones, or TV as interfering in their relationship with their partner sometimes or more often. It is important to note how frequently technology interfered when couples could be spending time together, as other research has found that quality time spent together is related to well-being (Johnson, Zabriskie, & Hill, 2006). For example, the majority (62%) of participants reported that technology interfered in their couple leisure time at least once a day, and a substantial proportion reported that it interfered with their conversations (35%) and at mealtime (33%) at least once a day. These types of interruptions were associated with increased conflict over technology use and lower relationship satisfaction.

This study expands on prior work (Coyne et al., 2011) by examining *everyday intrusions* of technology broadly in romantic relationships and how this technoference may affect conflict in the relationship and relational and personal well-being. The current study assessed the frequency of interruptions or interference that women experienced due to technology, such as cell phones or smartphones, computers, televisions, and tablets, in their relationships with their partners and found that those who perceived more frequent technoference tended to show worse overall well-being (lower relationship satisfaction, greater depressive symptoms, and lower life satisfaction). This result coincides with prior research that has found that problematic use of cell phones or social networking sites is connected to greater depressive symptoms, lower satisfaction with family life, and lower relationship quality, though it should be noted that none of these prior studies examined technology interference as defined broadly here (Bianchi & Phillips, 2005; Billieux et al., 2008; Chesley, 2005; Elphinston & Noller, 2011; Miller-Ott, Kelly, & Duran, 2012; Thomée et al., 2011).

Perhaps most pertinent to our study, technology has the potential to interrupt face-to-face interactions because of its *ever-present* and *always-on* nature (Jarvenpaa & Lang, 2005; Middleton, 2007). It is difficult to have a meaningful conversation with, pay attention to, and

truly listen to one's partner when daily interactions are intermittently interrupted by technology. An individual's attention resources only stretch so far (Bowman, Levine, Waite, & Gendrom, 2010; Ophir, Nass, & Wagner, 2009; Pea et al., 2012), and our results suggest that technoference during relationship interactions may breed conflict in the relationship. Indeed, as stated earlier, conflict appears to be one mediating variable or mechanism between technoference and relationship outcomes. When individuals place their technology above their partner, even if only for a brief moment, they can sow conflict in their romantic relationship, which may then lead to negative outcomes. The current study confirms previous research showing that *general* interruptions in day-to-day conversations can be problematic (such as a waiter interrupting conversations to take an order) and extends it to the world of technology (Bangerter et al., 2010; Farley et al., 2010; Hawkins, 1988).

The current study found that technoference was relatively common. Left unchecked, the small, but frequent, interruptions by technology may be a source of conflict in relationships.

Indeed, one major strength of the current research is to highlight the role of conflict in the intersection of technology use and romantic relationships. Conflict was a significant mediator, or mechanism, between technoference and relationship satisfaction. This result suggests that technoference is related to increased conflict in relationships, and this conflict is partially responsible for feelings of dissatisfaction in the relationship (Coyne et al., 2012).

Couples should openly and honestly discuss why technology can be a source of conflict in their relationship and then further discuss ideas on how to reduce feelings of conflict as both individuals manage technology in their lives. The answer is not simply to ban technology in relationships, as this is not realistic or particularly useful. Instead, couples should work out ways they can use technology that do not increase feelings of conflict and dissatisfaction when they are together. For some couples, it may be prudent to silence technological devices or at times turn them off completely when interacting with each other, as this places each individual's sole focus on his or her partner and not on their devices. For other couples, it may mean checking email is permitted only as long as it does not become extensive, for example. The way couples manage the interference of technology in their relationships will likely differ, but it will require an open and continuous dialogue between partners.

It should be noted that though our pattern of results confirmed our hypotheses for the most part, we did not find that conflict or relationship satisfaction *fully* mediated the path between technoference and personal well-being (depressive symptoms and life satisfaction); rather, direct effects remained in which more technoference was associated with greater depressive symptoms and lower life satisfaction. Certainly, other research has found a link between high levels of technology use and depression (Gentile et al., 2011; Pantic et al., 2012). It is likely that the relationship between more frequent technology interference and depression is bidirectional, with depressed individuals using technology as a way to cope with problems; however, this increased use of and reliance on technology may then backfire and increase feelings of depression and worthlessness when technology does not "fix" personal problems, but rather, also interferes with face-to-face relationships and communication.

Limitations and Future Directions

As it is with any correlational research, we cannot assume causation. It is likely that the relationship between technoference and well-being is bidirectional. However, we would still hypothesize that when partners experience what they perceive to be an interruption due to technology, their views of the relationship are likely to suffer, especially if these interruptions are frequent. More intensive longitudinal designs (such as daily diaries) are necessary to more fully examine the potential processes involved. Additionally, due to our sample size ($N = 143$), we could not examine more complex SEM models, although we believe our results are an encouraging first step to examining technoference in family life. Our study was limited by respondents being only women, many of whom were married and highly educated. It may very well be that the relational and personal well-being of men or other samples of women are affected in different ways by technoference. This idea should be tested in future work. Due to the nature of our sample, we also could not test the intricacies of how technoference functions in couple relationships. For example, it would be important in the future to determine whether partners perceive technoference similarly and who or what

caused the interference, as well as how personal choice and preferences for technology use influence the whole process.

Observational measures of couple interaction and communication quality would significantly add to this work. For instance, recording couples during leisure time or mealtimes could provide us with a wealth of data on whether perceptions match the actual frequency of technoference. Observations would allow us to assess how couple communication quality might be affected, and we could also more fully assess the potentially circular nature of the interruptions or how individuals' interpersonal styles of technology use may play out within observed couple interactions. It should also be noted that legacy media, such as reading paper books or listening to the radio, were not included in our measures of technoference.

Finally, it is crucial to remember that we are examining complex relationships, and we cannot blame only the technology for the potential interference. Often, specific individual characteristics, such as personality (Ehrenberg, Juckes, White, & Walsh, 2008) and romantic attachment style (Morey, Gentzler, Creasy, Oberhauser, & Westerman, 2013), influence the adoption of specific technology devices and particular technology use strategies. Due to their *always-on* nature (Middleton, 2007), there are likely times when technology devices directly interrupt interpersonal interactions, such as when a phone rings due to a friend or work calling. Although devices can be silenced, illustrating that there is still some personal choice in the matter, even brief unintentional interruptions may cause frustration in one's partner. At other times, individuals may turn to devices to escape frustrating relationships. Overall, the current study suggests that women perceive at least some interruptions due to technology. Future work is needed to examine the complex nature of technoference, as interruptions can have multiple sources and can be influenced by individual characteristics and choices.

Conclusion and Practical Implications

In summary, interruptions in couple interactions due to technology use appear to negatively relate to relational and personal well-being. For instance, those who perceive more technoference also tend to show more frequent conflict over technology use, lower relationship satisfaction, more depressive symptoms, and lower life satisfaction. It is important to note that lower well-being was related to even small amounts of perceived technoference, which suggests that even normative technology use may feed into individuals' relational and personal well-being. Although technology can help couples to connect (Coyne et al., 2011), couples' technology use—when not directed toward connecting with each other—may also interfere at times in their relationships. Some may benefit from "technology use etiquette" training, in which they could be taught best practices for when devices should be put away, how to deal with phones when they beep in the middle of conversations, and so on such that one's partner continues to feel cared for. As technology use has become commonplace, couple communication programs may need to explicitly integrate such training in order to improve the quality of communication and listening between partners.

Finally, we wish to express that technoference is a simple concept in theory but can be complex to measure. It is not only the technology that is to blame for the interruptions; personal characteristics and choice can also have a large, sometimes unseen, role. Therefore, we do not wish for technology to be viewed negatively in and of itself, but due to its often *always-on-in-the-background* nature, boundaries on its use should be considered. Individuals may wish to examine their own technology use and whether what they do on a daily basis could be considered as unduly frustrating and interrupting to their interactions with others.

References

Ahlstrom, M., Lundberg, N., Zabriskie, R., Eggett, D., & Lindsay, G. (2012). Me, my spouse, and my avatar: The relationship between marital satisfaction and playing massively multiplayer online role-playing games (MMORPGs). *Journal of Leisure Research, 44,* 1–22.

Arbuckle, J. L., & Wothke, W. (1999). *Amos 4.0 user's guide*. Chicago: Small Waters.

Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological antecedents and implications. *Management Information Systems Quarterly, 35,* 831–858.

Bangerter, A., Chevalley, E., & Derouwaux, S. (2010). Managing third-party interruptions in conversations: Effects of duration and conversational role. *Journal of Language and Social Psychology, 29,* 235–244. http://dx.doi.org/10.1177/0261927X09359591

Barna Group. (2011). The family & technology report: How technology is helping families—And

where they need help. *State of The Church & Family: 2011 Annual Report*. Retreived from http://www.barna.org/store?p.=shop.product_details&flypage=flypage.tpl&product_id=116&category_id=4

Beach, S. R., Katz, J., Kim, S., & Brody, G. H. (2003). Prospective effects of marital satisfaction on depressive symptoms in established marriages: A dyadic model. *Journal of Social and Personal Relationships, 20,* 355–371. http://dx.doi.org/10.1177/0265407503020003005

Beach, S. R., Sandeen, E., & O'Leary, K. D. (1990). *Depression in marriage: A model for etiology and treatment*. New York, NY: Guilford Press.

Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology and Behavior, 8,* 39–51. http://dx.doi.org/10.1089/cpb.2005.8.39

Billieux, J., Van der Linden, M., & Rochat, L. (2008). The role of impulsivity in actual and problematic use of the mobile phone. *Applied Cognitive Psychology, 22,* 1195–1210.

Bowman, L. L., Levine, L. E., Waite, B. M., & Gendron, M. (2010). Can students really multitask? An experimental study of instant messaging while reading. *Computers and Education, 54,* 927–931.

Brenner, J., & Smith, A. (2013). 72% of online adults are social networking site users. *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/Reports/2013/social-networking-sites/Findings.aspx

Brown, P., & Levinson, S. (1987). *Politeness: Some universals in language use*. Cambridge, UK: New York, NY: Cambridge University Press.

Busby, D. M., Holman, T. B., & Taniguchi, N. (2001). RELATE: Relationship evaluation of the individual, family, cultural, and couple contexts. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 50,* 308–316. http://dx.doi.org/10.1111/j.1741-3729.2001.00308.x

Carbonell, X., Oberst, U., & Beranuy, M. (2013). The cell phone in the twenty-first century: A risk for addiction or a necessary tool? In P. M. Miller (Ed.), *Principles of addiction: Comprehensive addictive behaviors and disorders* (Vol. 1, pp. 901–909). New York, NY: Academic Press. http://dx.doi.org/10.1016/B978-0-12-398336-7.00091-7

Chesley, N. (2005). Blurring boundaries: Linking technology use, spillover, individual distress, and family satisfaction. *Journal of Marriage and Family, 67,* 1237–1248. http://dx.doi.org/10.1111/j.1741-3737.2005.00213.x

Clayton, R. B., Nagurney, A., & Smith, J. R. (2013). Cheating, breakup, and divorce: Is Facebook use to blame? *CyberPsychology, Behavior, and Social Networking, 16,* 717–720. http://dx.doi.org/10.1089/cyber.2012.0424

Coyne, S. M., Busby, D., Bushman, B. J., Gentile, D. A., Ridge, R., & Stockdale, L. (2012). Gaming in the game of love: Effects of video games on conflict in couples. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 61,* 388–396. http://dx.doi.org/10.1111/j.1741-3729.2012.00712.x

Coyne, S. M., Stockdale, L., Busby, D., Iverson, B., & Grant, D. M. (2011). "I luv u:)!": A descriptive study of the media use of individuals in romantic relationships. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 60,* 150–162. http://dx.doi.org/10.1111/j.1741-3729.2010.00639.x

Czechowsky, J. D. (2008). *The impact of the BlackBerry on couple relationships*. (Unpublished doctoral dissertation). Wilfrid Laurier University. Retrived from http://scholars.wlu.ca/cgi/viewcontent.cgi?article=2055&context=etd

Davila, J., Karney, B. R., Hall, T. W., & Bradbury, T. N. (2003). Depressive symptoms and marital satisfaction: Within-subject associations and the moderating effects of gender and neuroticism. *Journal of Family Psychology, 17,* 557–570. http://dx.doi.org/10.1037/0893-3200.17.4.557

Dietmar, C. (2005). Mobile communication in couple relationships. In K. Nyiri (Ed.), *A sense of place: The global and the local in mobile communication* (pp. 201–208). Vienna, Austria: Passagen Verlag.

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. http://dx.doi.org/10.1080/01463373.2011.541336

Ehrenberg, A., Juckes, S., White, K. M., & Walsh, S. P. (2008). Personality and self-esteem as predictors of young people's technology use. *CyberPsychology and Behavior, 11,* 739–741. http://dx.doi.org/10.1089/cpb.2008.0030

Elphinston, R. A., & Noller, P. (2011). Time to face it! Facebook intrusion and the implications for romantic jealousy and relationship satisfaction. *Cyberpsychology, Behavior, and Social Networking, 14,* 631–635. http://dx.doi.org/10.1089/cyber.2010.0318

Farley, S. D., Ashcraft, A. M., Stasson, M. F., & Nusbaum, R. L. (2010). Nonverbal reactions to conversational interruption: A test of complementarity theory and the status/gender parallel. *Journal of Nonverbal Behavior, 34,* 193–206. http://dx.doi.org/10.1007/s10919-010-0091-0

Fincham, F. D. (2003). Marital conflict correlates, structure, and context. *Current Directions in Psychological Science, 12,* 23–27. http://dx.doi.org/10.1111/1467-8721.01215

Gentile, D. A., Choo, H., Liau, A., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). Pathological video game use among youths: A two-year longitudinal

study. *Pediatrics, 127,* e319–e329. http://dx.doi.org/10.1542/peds.2010-1353

Gentile, D. A., Coyne, S. M., & Bricolo, F. (2013). Pathological technology addictions: What is scientifically known and what remains to be learned. In K. Dill (Ed.), *The Oxford Handbook of Media Psychology* (pp. 382–402). New York, NY: Oxford University Press. http://dx.doi.org/10.1093/oxfordhb/9780195398809.013.0022

Gottman, J. M., & Levenson, R. W. (1992). Marital processes predictive of later dissolution: Behavior, physiology, and health. *Journal of Personality and Social Psychology, 63,* 221–233. http://dx.doi.org/10.1037/0022-3514.63.2.221

Hawkins, D. N., & Booth, A. (2005). Unhappily ever after: Effects of long-term, low-quality marriages on well-being. *Social Forces, 84,* 451–471. http://dx.doi.org/10.1353/sof.2005.0103

Hawkins, K. (1988). Interruptions in task-oriented conversations: Effects of violations of expectations by males and females. *Women's Studies in Communications, 11,* 1–20.

Hodgetts, H. M., & Jones, D. M. (2006). Interruption of the Tower of London task: Support for a goal-activation approach. *Journal of Experimental Psychology: General, 135,* 103–115. http://dx.doi.org/10.1037/0096-3445.135.1.103

Horowitz, A. V., McLaughlin, J., & White, H. R. (1998). How the negative and positive aspects of partner relationships affect the mental health of young married people. *Journal of Health and Social Behavior, 39,* 124–136. http://dx.doi.org/10.2307/2676395

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55. http://dx.doi.org/10.1080/10705519909540118

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. *Information Systems Management, 22,* 7–23. http://dx.doi.org/10.1201/1078.10580530/45520.22.4.20050901/90026.2

Johnson, H. A., Zabriskie, R. B., & Hill, B. (2006). The contribution of couple leisure involvement, leisure time, and leisure satisfaction to marital satisfaction. *Marriage and Family Review, 40,* 69–91. http://dx.doi.org/10.1300/J002v40n01_05

Koerner, K., & Jacobson, N. J. (1994). Emotion and behavior in couple therapy. In S. M. Johnson & L. S. Greenberg (Eds.), *The heart of the matter: Perspectives on emotion in marital therapy* (pp. 207–226). New York, NY: Brunner/Mazel.

Lenhart, A., Madden, M., Smith, A., Purcell, K., Kickuhr, K., & Rainie, L. (2011). Teens, kindness and cruelty on social network sites. *Pew Internet & American Life Project*. Retrieved from http://pewinternet.org/Reports/2011/Teens-and-social-media/Part-1/Social-network-sites.aspx

Mazmanian, M. A., Orlikowski, W. J., & Yates, J. (2005). Crackberries: The social implications of ubiquitous wireless e-mail devices. In C. Sørensen, Y. Yoo, K. Lyytinen, & J. DeGross (Eds.), *Designing ubiquitous information environments: Socio-technical issues and challenges* (pp. 337–343). New York, NY: Springer. http://dx.doi.org/10.1007/0-387-28918-6_25

Middleton, C. A. (2007). Illusions of balance and control in an always-on environment: A case study of BlackBerry users. *Continuum (Perth), 21,* 165–178. http://dx.doi.org/10.1080/10304310701268695

Middleton, C. A., & Cukier, W. (2006). Is mobile email functional or dysfunctional? Two perspectives on mobile email usage. *European Journal of Information Systems, 15,* 252–260. http://dx.doi.org/10.1057/palgrave.ejis.3000614

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,* 17–34. http://dx.doi.org/10.1080/01463373.2012.642263

Morey, J. N., Gentzler, A. L., Creasy, B., Oberhauser, A. M., & Westerman, D. (2013). Young adults' use of communication technology within their romantic relationships and associations with attachment style. *Computers in Human Behavior, 29,* 1771–1778. http://dx.doi.org/10.1016/j.chb.2013.02.019

Norton, R. (1983). Measuring marital quality: A critical look at the dependent variable. *Journal of Marriage and the Family, 45,* 141–151. http://dx.doi.org/10.2307/351302

Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences of the United States of America, 106,* 15583–15587. http://dx.doi.org/10.1073/pnas.0903620106

Oulasvirta, A., Rattenbury, T., Ma, L., & Raita, E. (2012). Habits make smartphone use more pervasive. *Personal and Ubiquitous Computing, 16,* 105–114. http://dx.doi.org/10.1007/s00779-011-0412-2

Padilla-Walker, L. M., Coyne, S. M., & Fraser, A. M. (2012). Getting a high speed family connection: Associations between family media use and family connection. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 61,* 426–440. http://dx.doi.org/10.1111/j.1741-3729.2012.00710.x

Pantic, I., Damjanovic, A., Todorovic, J., Topalovic, D., Bojovic-Jovic, D., Ristic, S., & Pantic, S. (2012). Association between online social networking and depression in high school students: Behavioral physiology viewpoint. *Psychiatria Danubina, 24,* 90–93.

Pea, R., Nass, C., Meheula, L., Rance, M., Kumar, A., Bamford, H., . . . Zhou, M. (2012). Media use, face-to-face communication, media multitasking, and social well-being among 8- to 12-year-old girls. *Developmental Psychology, 48,* 327–336. http://dx.doi.org/10.1037/a0027030

Pettigrew, J. (2009). Text messaging and connectedness within close interpersonal relationships. *Marriage and Family Review, 45,* 697–716. http://dx.doi.org/10.1080/01494920903224269

Pew Research Center. (2012). A closer look at gadget ownership. *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/Infographics/2012/A-Closer-Look-at-Gadget-Ownership.aspx

Proulx, C. M., Helms, H. M., & Buehler, C. (2007). Marital quality and personal well-being: A meta-analysis. *Journal of Marriage and Family, 69,* 576–593. http://dx.doi.org/10.1111/j.1741-3737.2007.00393.x

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385–401. http://dx.doi.org/10.1177/014662167700100306

Rainie, L. (2012). *Smartphone ownership update: September 2012*. Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/Reports/2012/Smartphone-Update-Sept-2012.aspx

Rainie, L., & Keeter, S. (2006). Americans and their cell phones. *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/Reports/2006/Americans-and-their-cell-phones.aspx

Rettie, R. (2007). Texters not talkers: Phone call aversion among mobile phone users. *PsychNology Journal, 5,* 33–57.

Schade, L. C., Sandberg, J., Bean, R., Busby, D., & Coyne, S. M. (2013). Using technology to connect in romantic relationships: Effects on attachment, relationships satisfaction, and stability in emerging adults. *Journal of Couple and Relationship Therapy, 12,* 314–338. http://dx.doi.org/10.1080/15332691.2013.836051

Sidelinger, R. J., Ayash, G., Godorhazy, A., & Tibbles, D. (2008). Couples go online: Relational maintenance behaviors and relational characteristics use in dating relationships. *Human Communication, 11,* 341–355.

Smith, A. (2010). *Home Broadband 2010*. Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/Reports/2010/Home-Broadband-2010.aspx

Smith, A. (2013). Smartphone ownership 2013. *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/Reports/2013/Smartphone-Ownership-2013/Findings.aspx

Stone, B. (2009, August 9). Breakfast can wait. The day's first stop is online. *New York Times*. Retrieved from http://www.nytimes.com/2009/08/10/technology/10morning.html

Takao, M., Takahashi, S., & Kitamura, M. (2009). Addictive personality and problematic mobile phone use. *CyberPsychology and Behavior, 12,* 501–507. http://dx.doi.org/10.1089/cpb.2009.0022

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults—A prospective cohort study. *BMC Public Health, 11,* 66. http://dx.doi.org/10.1186/1471-2458-11-66

Turkle, S. (2012). *Alone together: Why we expect more from technology and less from each other*. New York, NY: Basic Books.

Turner, P., & Turner, S. (2013). Emotional and aesthetic attachment to digital artefacts. *Cognition Technology and Work, 15,* 403–414. http://dx.doi.org/10.1007/s10111-012-0231-x

Verhofstadt, L. L., Buysse, A., Ickes, W., De Clercq, A., & Peene, O. J. (2005). Conflict and support interactions in marriage: An analysis of couples' interactive behavior and online cognition. *Personal Relationships, 12,* 23–42. http://dx.doi.org/10.1111/j.1350-4126.2005.00100.x

Vincent, J., Haddon, L., & Hamill, L. (2005). The influence of mobile phone users on the design of 3G products and services. *Journal of the Communications Network, 4,* 69–73.

Wehmeyer, K. (2007). *Assessing users' attachment to their mobile devices*. Proceedings of the Sixth International Conference on the Management of Mobile Business, IEEE Computer Society, Toronto, Ontario, Canada. http://dx.doi.org/10.1109/ICMB.2007.19

Whisman, M. A. (2001). The association between depression and marital dissatisfaction. In S. R. H. Beach (Ed.), *Marital and family processes in depression: A scientific foundation for clinical practice* (pp. 3–24). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/10350-001

Zickuhr, K. (2013). Tablet ownership 2013. *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/Reports/2013/Tablet-Ownership-2013/Findings.aspx

Received October 25, 2013
Revision received October 18, 2014
Accepted October 24, 2014 ■