The Social Price of Constant Connectivity: Smartphones Impose Subtle Costs on Well-Being

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Abstract

Smartphones provide people with a variety of benefits, but they may also impose subtle social costs. We propose that being constantly connected undercuts the emotional benefits of face-to-face social interactions in two ways. First, smartphone use may diminish the emotional benefits of ongoing social interactions by preventing us from giving our full attention to friends and family in our immediate social environment. Second, smartphones may lead people to miss out on the emotional benefits of casual social interactions by supplanting such interactions altogether. Across field experiments and experience-sampling studies, we find that smartphones consistently interfere with the emotional benefits people could otherwise reap from their broader social environment. We also find that the costs of smartphone use are fairly subtle, contrary to proclamations in the popular press that smartphones are ruining our social lives. By highlighting how smartphones affect the benefits we derive from our broader social environment, this work provides a foundation for building theory and research on the consequences of mobile technology for human well-being.

Smartphones have been adopted faster than any other technology in human history (Pew Research Center, 2018). These handheld computers have become so integral to daily life that most users declare that they cannot imagine living without one (Smith, 2015). Given how eagerly people around the world have embraced smartphones, it stands to reason that these devices enhance human well-being. Indeed, smartphones offer ubiquitous access to valuable information, entertainment, and far-flung friends and family. While acknowledging these obvious benefits, we propose that being constantly connected may also create subtle costs by partially undermining the important well-being benefits of face-to-face social interactions (Baumeister & Leary, 1995; Diener et al., 2017).

We begin with the assumption that smartphones are theoretically distinct from their closest cousins—computers—because of their pervasiveness throughout daily life. Indeed, approximately 95% of smartphone owners report having used their phones during their most recent social activity (Smith, 2015). Over the past 6 years, we have documented how smartphones can subtly curtail the emotional benefits of face-to-face social interactions, thereby partially undercutting the overall value of this technology for well-being. We propose that this occurs through two key pathways. First, smartphone use may diminish the emotional benefits we reap from concurrent social interactions: By providing constant access to information and entertainment, smartphones can distract us from giving our full attention to friends and family in our immediate social environment. Second, smartphones may supplant casual social interactions: By making it easy to order food or find directions without talking to anyone, smartphones obviate the need to interact with other people across a range of daily tasks. As shown in Figure 1, the vast potential benefits of smartphones for human happiness

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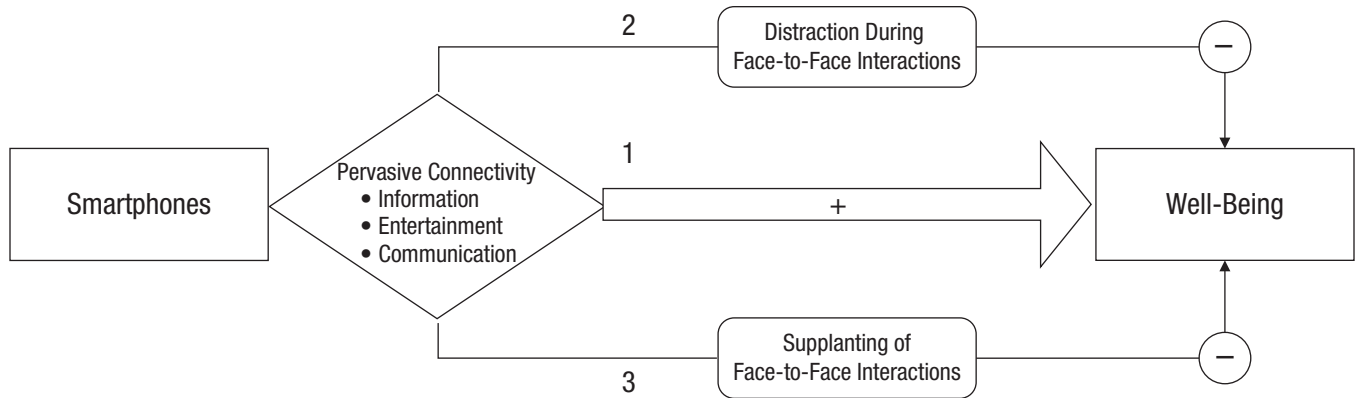E-mail: kk1199@georgetown.edu

Fig. 1. Theoretical mechanisms of the effects of smartphone use on well-being during face-to-face social interactions. Path 1 shows the potential benefits of smartphone use on well-being, whereas Paths 2 and 3 show how these benefits may be at least partially offset by subtle costs to social life. Path 1 is intentionally thicker than Paths 2 and 3 because we assume that the benefits of smartphone use can potentially outweigh the subtle costs documented in our research, although there is still much to be learned about this positive pathway.

(Path 1) may be at least partially offset by these subtle costs to social life (Paths 2 and 3).

Distraction Undermines the Benefits of Social Interactions

We start with the assumption that smartphones have been intentionally designed to capture attention, which suggests that smartphones should provide a potent source of distraction in daily life (Fig. 1, Path 2). Indeed, we found that students ($N = 221$) experienced more symptoms of inattentiveness during a week when they were assigned to keep their phones in reach with alerts on than when assigned to keep their phones out of reach with alerts off ($d = 0.44$; Kushlev, Proulx, & Dunn, 2016). To examine whether such distraction interferes with the benefits of face-to-face social interactions, we conducted a preregistered field experiment at a science museum in Vancouver (Kushlev & Dunn, 2019). We recruited 200 parents who were visiting the museum with their children and randomly assigned them to use their phones as much as possible or as little as possible while at the museum. Before leaving the museum, parents were asked to complete a questionnaire about their experience, including how distracted they were, how close to other people they felt, and to what extent they experienced a sense of purpose and meaning in life. Compared with parents who minimized their smartphone use, parents who were assigned to maximize their smartphone use felt less socially connected ($d = -0.73$) and reported lower feelings of meaning ($d = 0.30$). Parents assigned to maximize smartphone use also felt more distracted ($d = -0.63$), which mediated the effects on social connectedness and meaning. Thus, by providing a source of distraction in a potentially rewarding social context, smartphones interfered with the well-established benefits of spending time with children (Nelson, Kushlev, & Lyubomirsky, 2014).

An important limitation of this study was that, ethically, we had to tell parents in advance that they might be asked to minimize or maximize their smartphone use, so they could decide whether they felt comfortable following either instruction while caring for their children. Because parents knew that our study was about smartphone use, their responses to our questionnaire may have been influenced by their own theories about smartphones or by their assumptions about our hypotheses.

To minimize demand characteristics while extending our research to another important social activity, we conducted a preregistered field experiment at a local café (Dwyer, Kushlev, & Dunn, 2018; Study 1). We invited 304 participants to dine out with several friends or family members at the café, while concealing that the study had anything to do with smartphones. To manipulate smartphone use, we told participants in half the groups that after the food order, we would need them to complete a one-item survey via text message; we asked them to keep their phones on the table in ring or vibrate mode so they could receive the survey. The remaining groups were told they would complete this survey on paper; we asked participants in these groups to put their phones in a basket on the table, an instruction we embedded within other minor procedural details about the study. After their meal, all participants completed a questionnaire about their experience during the meal. Participants who had access to their phones reported enjoying the experience less compared with participants who did not have access to their phones ($d = -0.56$). Participants also reported feeling more distracted when they had access to their phones ($d = -0.71$), and distraction partially mediated the negative effect of phones on enjoyment.

Beyond enjoyment, we also measured a variety of other aspects of participants' subjective experience, including pleasant affect, social connection, and boredom; although we did not observe significant effects on these variables, combining across all our outcome variables revealed that participants' overall subjective experience was reliably diminished when they had access to their phones. Thus, in this rewarding social environment, phones produced feelings of distraction and undercut the well-being benefits of sharing a meal with friends or family.

To test this idea across a broader range of situations, we conducted a preregistered experience-sampling study, sending surveys to 123 students multiple times a day for 5 days (Dwyer et al., 2018, Study 2). Each time, participants were asked to report how they had been feeling over the preceding 15 min and to check off all the activities they had engaged in, including socializing face-to-face, eating, studying, and other common activities. In addition, they reported whether they had been using their smartphones. We captured over 1,200 episodes in which participants reported socializing face-to-face, and we compared episodes that included smartphone use with those that did not. When participants reported socializing while using their phones, they felt more distracted than when socializing without their phones ($d = 0.52$). They also reported enjoying themselves less ($d = -0.25$), feeling less socially connected ($d = -0.22$), and, overall, being in a worse mood ($d = -0.20$). Consistent with the café experiment, the negative effects of smartphone use on each of these outcomes was mediated by distraction.

Taken together, our café and experience-sampling studies provide initial evidence that smartphone use may undercut the benefits people derive from face-to-face social interactions, at least in part by increasing feelings of distraction. Of course, we relied on mediation analysis in documenting the role of distraction, and this approach does not provide conclusive evidence for the existence of causal chains (Spencer, Zanna, & Fong, 2005). Thus, it would be worthwhile to conduct further research to confirm how distraction accounts for the detrimental effects of smartphone use in social situations.

Supplanting Social Interactions

In addition to undermining the benefits of interactions with friends and family, smartphones may reduce the likelihood that we will interact with strangers and acquaintances (i.e., those with whom they have weak ties) in our immediate environment (Fig. 1, Path 3). Eliminating these interactions might seem trivial, but even fleeting social interactions with weak ties can contribute to day-to-day feelings of happiness and belonging (Epley & Schroeder, 2014; Sandstrom & Dunn, 2014). For example, when adults heading into Starbucks were randomly assigned to chat with the barista, they left Starbucks in a better mood compared with participants who were assigned to place their order without extended interaction (Sandstrom & Dunn, 2014). The Starbucks app now enables customers to order coffee using their phones, eliminating the need to speak to the barista at all; this is just one example of how smartphones can obviate the need for social interactions. Perhaps more importantly, smartphones provide a readily available source of entertainment, potentially reducing people's inclination to chat with those around them.

To test whether smartphones decrease the likelihood that people will exhibit friendly behavior toward strangers, we randomly assigned 90 pairs of students to wait together for 10 min either with or without access to their smartphones (Kushlev, Hunter, Proulx, Pressman, & Dunn, 2019). When participants were left phoneless, only 6% of them chose not to interact with each other. But when participants had access to their phones, nearly 30% chose not to interact. To take a closer look at the interactions that did occur, we coded participants' facial expressions, counting how often they exhibited genuine Duchenne smiles. When people had their phones, they exhibited Duchenne smiles 30% less frequently compared with people who interacted without their phones ($d = -0.59$). These findings suggest that people may be less likely to engage in positive interactions with strangers around them when they can pass the time by turning to their phones.

In addition to providing a way to pass the time, smartphones enable people to accomplish tasks without relying on other people. In a preregistered experiment, we gave students ($N = 182$) 30 min to find a campus building that was unfamiliar to them, enabling us to examine a prototypical situation in which phones provide valuable information (Kushlev, Proulx, & Dunn, 2017). Half the students left all their belongings—including their phones—in our lab's locked cabinet, while the others were allowed to keep their phones with them.

Stripped of their phones, participants spent 4 min longer searching for the building, and they rated this task as being much more difficult than did participants with phones ($d = -1.14$). In the absence of phones, participants tended to rely on other people to find the building, typically talking to two or three other people during their search; in contrast, participants who had their phones typically talked to no one ($d = -1.93$). Although eliminating these brief conversations might seem trivial, participants who had their phones reported feeling less socially connected compared with

participants who did not have their phones ($d = -0.43$); specifically, they were less likely to agree with statements like, "I felt close to people" and "I saw people as friendly and approachable." Thus, smartphones offered clear benefits by making the task much easier and faster—but at the same time, this technology exerted a subtle cost by supplanting casual social interactions.

Overall, people who had their phones reported being in a slightly better mood by the end of the study compared with people who did not have their phones. Notably, the overall positive effect on mood was small ($d = 0.25$) because the benefits of making the task easier were partially undercut by the loss of social connection that people experienced. These results provide the clearest evidence for the countervailing effects of smartphones on well-being proposed in Figure 1: Smartphones boosted well-being by making it easier to solve an everyday problem (Path 1), but some of the benefits of this convenience were offset by the missed opportunities to feel more connected with other people (Path 3). These countervailing pathways point to the conclusion that when opportunities for social interactions are unavailable (e.g., looking for a building late at night on a deserted campus), smartphone use may have considerable positive effects on well-being.

What We Have Learned

Whereas past research has shown that smartphone use can impede learning (Chen & Yan, 2016) and increase the risk of traffic accidents (Fitch, Hanowski, & Guo, 2015), our research shows that it can also interfere with everyday social life. However, in contrast to attention-grabbing headlines about the devastating effects of smartphone use on the fabric of society, our research shows that the social and emotional costs of smartphones are fairly subtle. For example, in our café study, the difference in enjoyment between participants with phones compared with participants without phones was less than half a point on a 7-point scale (Dwyer et al., 2018). Smartphone use also led to a half-point decrease in the meaning that parents derived from spending time with their kids at a science museum (Kushlev & Dunn, 2019). Although the detrimental effects of smartphone use in a specific social setting may be fairly minimal, the fact that we have so many opportunities to use our phones in daily life could lead to more substantial cumulative consequences for well-being (cf. Abelson, 1985).

What We Still Need to Learn

Our research suggests that the benefits of being constantly connected are offset when smartphone use distracts people during social interactions or supplants social interactions altogether. Of course, these effects may be moderated by a variety of individual differences, which should be investigated in future research and meta-analyses potentially drawing on our freely available data sets. Although we have not observed any consistent effects of age or gender, our studies were underpowered to detect such effects and did not utilize representative samples; this fact highlights the need for work with bigger, broader samples.

A key tenet of our model is that the costs of smartphone use should depend on the rewards available in an individual's immediate social environment. Thus far, we have focused on examining potentially rewarding social contexts, such as a restaurant or a science museum, where people have opportunities for meaningful interactions with close others; in these contexts, we consistently observe negative effects of smartphone use on individuals' subjective experience. Perhaps more surprising is the finding that after searching for an unfamiliar building, people experienced lower feelings of social connection when they relied on their phones than when they turned to the strangers around them; this suggests that smartphone use may lead people to miss out on rewarding social interactions in a diverse array of contexts, even when no close friends or family members are around. When the environment offers little or no opportunity for positive social interactions, however, our model predicts that smartphone use should, on average, promote well-being (Fig. 1, Path 1).

At the extreme end of the spectrum—when the immediate social environment is uncomfortable or hostile—smartphone use should be especially beneficial, because a smartphone can both provide a source of distraction and reduce the need to engage with unfriendly people. Providing initial support for this prediction, researchers have shown that smartphones can act as a buffer against social exclusion: After being socially excluded, people who did not have access to their smartphones showed a gradual increase in a salivary hormone associated with stress, whereas people assigned to use their smartphones during this time showed no increase in stress hormones (Hunter, Hooker, Rohleder, & Pressman, 2018).

The net effects of smartphone use on well-being should, of course, depend not only on the immediate social environment but also on how people use their phones. For example, recent research has shown that using Facebook to actively engage with friends can provide emotional benefits, whereas scrolling passively through others' posts may be emotionally costly (for a review, see Verduyn, Ybarra, Résibois, Jonides, & Kross, 2017). Our model assumes that smartphone use would supplant and distract from social interactions regardless of whether people are using Facebook passively or

actively—or using a different app altogether. Accordingly, our studies manipulated whether or not people used their phones rather than how they used their phones. Our model does imply, however, that if phones are used to complement social interactions (e.g., watching funny videos together), then no distraction should occur (eliminating Path 2 in Fig. 1). Indeed, in our museum study, we found preliminary evidence that using phones to enhance the visit to the museum was beneficial (Kushlev & Dunn, 2019). Further, some types of smartphone use (e.g., playing games such as Pokémon Go) may generate additional face-to-face interactions that would not otherwise occur.

By considering how smartphone use affects the quality and quantity of face-to-face social interactions, our model offers a practical approach for designing and evaluating new forms of mobile computing technology. Smartphones may be only the foot soldiers of the revolution in pervasive computing technology; global sales of smart watches, for example, have increased exponentially, with sales projected to double in the near future (IDC, 2018). Meanwhile, people in Sweden are already inserting microchips under their skin—designed, much like smartphones, to make daily tasks easier (Savage, 2018). Our research suggests that developers and users of these new technologies should consider not only the obvious benefits that mobile devices bring but also their subtle costs in detracting from social interactions or supplanting them altogether.

Recommended Reading

Dunn, E. W., & Dwyer, R. (2018). Technology and the future of happiness. In J. P. Forgas & R. F. Baumeister (Eds.), *The social psychology of living well*. New York, NY: Psychology Press. Discusses how the findings of happiness research can be used to understand current technologies and create plans for a future in which connected machines may largely replace human labor.

Kushlev, K. (2018). Media technology and well-being: A complementarity-interference model. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. Salt Lake City, UT: DEF Publishers. Provides a broad complementarity-interference framework of the effects of media technology on well-being, exploring mediators and moderators in depth.

Kushlev, K., & Heintzelman, S. J. (2018). Put the phone down: Testing a complement-interfere model of computer-mediated communication in the context of face-to-face interactions. *Social Psychological and Personality Science*, *9*, 702–710. doi:10.1177/1948550617722199. Provides further evidence that computer-mediated social interactions may be interfering with the benefits of in-person interactions.

Okdie, B. M., Ewoldsen, D. R., Muscanell, N. L., Guadagno, R. E., Eno, C. A., Velez, J. A., . . . Smith, L. R. (2014). Missed programs (you can't TiVo this one): Why psychologists should study media. *Perspectives on Psychological Science*, *9*, 180–195. doi:10.1177/1745691614521243. Argues that psychological science needs to play a more central role in understanding the human effects of current and future media technology.

Sbarra, D. A., Briskin, J. L., & Slatcher, R. B. (2019). Smartphones and close relationships: The case for an evolutionary mismatch. *Perspectives on Psychological Science*. doi:10.1177/1745691619826535. Explores how smartphones can interfere with everyday social interactions, specifically in the context of close relationships.

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