

CHAPTER 21

Old Desires, New Media

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We are social animals. We live, work, and play side by side with other people, constantly communicating, interacting, and connecting. And we take advantage of every opportunity to surround ourselves with yet more social stimuli—the televisions in our homes, computers in our offices, and smartphones in our pockets all serve as portals to social worlds. In fact, the digital social stimuli provided by “new media” seem to dominate our social lives; the average adult American spends over 5 hours of “leisure time” a day watching television, over an hour online, and an additional hour accessing the web via smartphone (Nielsen, 2014). These numbers, particularly those related to Internet use, are growing every year (Rainie, Fox, & Duggan, 2014). Digital supplements to our physical social worlds may even be evolving into replacements for face-to-face social connection. Research shows that time spent online is negatively correlated with going to parties, attending cultural events, and socializing with other people in a variety of offline domains (Wallsten, 2013). As social animals in a digital world, we seem to obsessively log on, tune in, and exchange face-to-face interaction for social content delivered through a screen.

Our insatiable desire to connect with new media may be a product of social minds gone astray. Our social minds, from our most basic to our most advanced neurocognitive processes, encourage us to seek out social connection and enable us to succeed in achieving our social goals. New media offer simple solutions to complex social needs. With the change of a channel, we can connect with our “neighbor” Mr. Rogers or our “friends” on *Friends*; with the tap of a button, we can relive social events through Facebook photos or communicate with relationship partners on the other side of the earth. At times, these solutions may be real. At other times, however, our social minds may motivate behaviors that provide

only the *illusion* of adaptive functioning. They may provide immediate cues of social acceptance, without ever actually increasing social connectedness. New media may allow us to swap family dinner for TV dinners and *Family Matters* reruns, or attend social events by simply viewing the Facebook photos—and may motivate us to continue doing so.

In this chapter, we provide an overview of how our pervasive connection to new media is encouraged by our social minds, and what these digitized social interactions might mean for real-world social outcomes. We explore the bases of our need for social connection, the brain's reward system that motivates us to seek out social stimuli, and the mentalizing system that allows us to succeed in our social endeavors. We then turn to an analysis of how these components of our social minds contribute to our desire to find and create social connection through our screens. Finally, we offer some perspective on what this all might mean—whether our social minds are ruining or enhancing our relationships, both online and off.

Building Blocks of a Social Mind

Our motivation to connect with others is not new; Twitter didn't create our desire to share personal experiences, Facebook didn't create our desire to maintain relationships, and Reddit didn't create our desire to find communities consistent with our interests. Rather, our widespread use of new media as a conduit for social connection may stem from a fundamental need to belong—a core need to feel connected with others as a result of both frequent social interaction and strong interpersonal relationships (Baumeister & Leary, 1995).

The adaptive significance of social connection may seem to pale in comparison to basic biological needs such as food and sex. However, interpersonal connections can provide massive adaptive benefits by increasing the likelihood of meeting more basic biological needs. Groups increase proximity, improving the odds of both reproductive success (access to potential mates) and physical survival (safety in numbers); groups allow for cooperation, enabling more efficient food acquisition via cooperative agriculture and hunting; groups give rise to communication, through which people can bypass costly trial-and-error forms of learning in favor of socially provided secondary knowledge about potential dangers and rewards. Groups increase the potential to not just survive, but also to thrive (Holt-Lunstad, Smith, & Layton, 2010); achieving sufficiently strong social bonds enhances psychological well-being and protects individuals from feelings of loneliness and depression (Helliwell & Putnam, 2004).

The evolutionarily adaptive and psychologically positive implications of connection depend on a social structure that encourages repeated

positive interactions. Communities are defined by connection, a concept distinct from mere social contact. In connected communities, each individual can reasonably infer that other members of the group can be relied on as hunting companions or mates, they can develop shared experiences, they can pay prosocial behavior back (or forward), and so on. These and other benefits associated with consistent positive interactions in early humans may have led to the emergence of the highly social nature of humans today (Dunbar & Shultz, 2007; Nowak & Sigmund, 2005; Tomasello, 1999) and established social connection as one of our most fundamental motives.

Our ability to satisfy this fundamental need to belong is supported by two systems: our most basic neurocognitive structures and some of our most uniquely human cognitive abilities. Our reward system labels social cues as positive stimuli and encourages behaviors consistent with pursuing social acceptance. Our ability to mentalize—or think about the minds of others—enables us to navigate social interactions in ways likely to maximize connection. Importantly, each of these generally adaptive systems may sometimes get off track—they may motivate us to engage in behaviors that *feel* social, but in fact do nothing to increase our social connectedness.

Social Motivation, and Social Motives Led Astray

Over the last few decades, the emergence of cognitive neuroscience has enabled the identification and exploration of the neural cytoarchitecture and computations involved in motivation and reward processing. One group of structures in particular—the dopaminergic reward system—has been implicated in both identifying rewards and motivating reward-consistent behavior (see also Kringelbach & Berridge, Chapter 6, this volume; Lopez, Wagner, & Heatherton, Chapter 7, this volume). This system plays a fundamental role in motivating goal-directed behavior. It connects instrumental behaviors and cues of reward with experienced outcomes, increasing the likelihood of performing behaviors that result in rewarding outcomes and decreasing the likelihood of performing behaviors likely to result in aversive outcomes. The neural regions (e.g., ventral tegmental area [VTA], ventral striatum [VS]) and neurotransmitters (e.g., dopamine) that compose this system have been implicated in motivating goal-directed behavior related to everything from basic physical needs such as food acquisition (Berridge, 1996) to more complex—but no less adaptive—needs such as social cooperation (Rilling et al., 2002).

Our motivation to connect with others, much like the motivation to pursue basic physiological needs such as food or sex, is associated with activity in the brain's reward system. Social interactions and social stimuli (e.g., faces) recruit these reward-related neural substrates (Aharon et al., 2001; Meshi, Morawetz, & Heekeren, 2013; Mobbs, Greicius, Abdel-Azim,

Menon, & Reiss, 2003; Mobbs et al., 2009; Tricomi, Rangel, Camerer, & O'Doherty, 2010). These regions are also implicated in the formation of intimate attachments: the early stages of romantic love are typified by dopaminergic activity in the VTA (Aron et al., 2005), and analogous dopaminergic systems are implicated in the coupling behavior of a wide range of species that form long-lasting relationships, including (but not limited to) monogamous prairie voles (Gingrich, Liu, Cascio, Wang, & Insel, 2000). Importantly, activity in reward-related neural systems during interpersonal interactions is not just signaling the possibility of sex (a primary reinforce), it is also associated with engaging in cooperative interactions more generally (Rilling et al., 2002). Taken together, this evidence suggests that the reward system motivates a broad range of social behaviors, from the pursuit of acceptance in initial social encounters to the selection of a long-term mate.

The reward system both *labels* and *predicts* rewards. When a particular positive stimulus is encountered for the first time, reward activity serves to call our attention to the presence of this stimulus (“something good is happening”); over repeated experiences, this activity shifts forward in time to call our attention to the *possibility* of encountering this stimulus (“something good is about to happen”). For example, a comedian telling a joke may experience a surge in dopaminergic activity not when the joke “lands” and the audience bursts into laughter, but when the joke is told—when the possibility of laughter is first created. However, unfulfilled expectations of reward result in depressed dopaminergic activity, encouraging the correction of misguided anticipations of reward. If a comedian’s joke is met with silence rather than laughter, the silence in the audience—and corresponding depression of dopaminergic activity—will ensure that the joke is never told again.

However, the threshold for positive feedback—for getting the sense that a goal-directed behavior has “landed”—may not always coincide with the actual achievement of a desired outcome. Not all goals are as cut and dried as food acquisition, where one can be reasonably sure that one has or has not eaten a piece of chocolate cake; neither are all social goals as straightforward as moving an audience to laughter. More ambiguous goals, such as those involved in day-to-day social interactions, may rely on “proxy” cues to signal successful goal pursuit. For example, it can often be difficult to know how liked or accepted one is by one’s peers, but it’s much easier to know whether or not a remark has elicited a smile. In this way, the reward system response may not actually provide any direct insight into the desired outcome (e.g., social acceptance), only the existence of an easily identifiable proxy cue (e.g., a smiling face, or a virtual “like”). These signals commonly co-occur with the desired outcomes, but importantly, they are not perfect indicators. An acquaintance’s smile could be no more than a social nicety and a “like” on Facebook may represent only an illusory cue of social acceptance.

The brain's reward system can also be stimulated by cues even further dissociated from actual goal achievement. Research on imagination indicates that positive fantasies about future outcomes allow individuals to simulate goal achievement, and these simulations allow them to experience positive feedback based on imagined—rather than actual—success (see also Andrade, May, Van Dillen, & Kavanagh, Chapter 1, this volume). As a result, positive fantasies undermine motivation and reduce the likelihood of meeting goals related to everything from weight management to relationship acquisition to professional advancement (Oettingen & Mayer, 2002). The reward system motivates us to engage with the social world, but because this system is sensitive to proxy cues of social connection—smiles, “likes,” or even imagined acceptance—it may often reinforce behaviors that elicit these cues, even when the cues no longer predict meaningful social connection.

Mentalizing, and Mentalizing Led Astray

Our brain's reward system supports our basic motivations to pursue social connection. Our capacity for *actually* connecting with others depends upon our ability to mentalize, or to think about others' internal thoughts and feelings (Waytz, Zaki, & Mitchell, 2012). This mentalizing system supports a sophisticated and perhaps even uniquely human set of cognitive processes and neural structures (Buckner & Krienen, 2013; Dunbar & Shultz, 2007). Thinking about others' mental states allows us to infer their intentions, make sense of their behaviors, and respond in ways that build trust and demonstrate understanding.

Our capacity for mentalizing is not just an ability, but an overwhelming tendency; the minds of others pervade our own thoughts. When we encounter other people, we automatically think about their mental states, make inferences about their beliefs, and intuit their intentions (Malle, 2005; Malle & Hodges, 2005). These inferences and intuitions grease the wheels of interaction, communication, and connection. Our social orientation is active even in the absence of others. When our minds are not directed toward pursuing specific goals or completing externally imposed tasks, they often turn toward the social world—ruminating about the mental states of relationship partners, replaying and analyzing past social encounters, and imagining future interactions from the banal to the fantastical (Buckner & Carroll, 2007; Mars et al., 2012; Schilbach, Eickhoff, Rotarska-Jagiela, Fink, & Vogeley, 2008a, 2008b). Our dedication of vast amounts of temporal and cognitive resources to mentalizing about others is yet another indication of the extent to which the social world permeates our mental lives.

This remarkable ability to infer others' thoughts, beliefs, and intentions could be devoted to staying one step ahead of those around us, always engaging in some sort of high-stakes rock-paper-scissors. More

often than not, however, we use our social minds to form and maintain social connections. While affiliation seems to stand at odds with competition, the bedrock of evolutionary theory, a long history of psychological research suggests that the motivation to maximize social connection is often more powerful than competitive motives. Competitors will unite around a common cause with minimal resistance; mere social contact can trump long-standing prejudices and tensions (Sherif, Harvey, White, Hood, & Sherif, 1961; Wilder & Thompson, 1980). Indeed, the mere presence of subtle social cues prompts people to forgo selfish behaviors for more prosocial ones (Bohnet & Frey, 1999; Ward et al., 2014). Prosociality may even be a more intuitive strategy than selfishness. Recent research has demonstrated that people make more prosocial decisions when forced to make these decisions quickly (Rand, Greene, & Nowak, 2012; Rand et al., 2014; Zaki & Mitchell, 2013)—evidence that cooperation and generosity in our daily lives may represent our default response, rather than a result of effortful control over selfish impulses. Although the dynamics of interpersonal behavior are complex, one motivation seems to stand the strongest and shine the brightest: the motivation to connect with those around us.

Like the brain's reward system, our proclivity for mentalizing may sometimes lead us away from, rather than toward, social connection. The tendency to think in social terms may cause us to see social stimuli (or minds) even where they do not exist. We see faces in the clouds, anthropomorphize invisible deities, accuse malfunctioning computers of intentional sabotage, and treat our pets as confidants, children, and best friends (Epley, Waytz, & Cacioppo, 2007). In the extreme, this ability to imagine alternate realities, combined with our tendency to devote our daydreams to social interactions, allows us to not just imagine social stimuli, but to interact with these stimuli—to communicate with invisible deities, marry animals (Matthews, 1994), and create fantastical relationships with celebrities, characterized by intimacy, acceptance, and belonging (Greenwood & Long, 2010). People are most apt to create their own social worlds at the times when they need actual social connection the most, suggesting that this ability functions to serve our need for social connection and stave off feelings of loneliness (Epley, Akalis, Waytz, & Cacioppo, 2008; Waytz et al., 2010).

Motivation, Mentalizing, and Media

Our brains seem built for social connection. Our reward system encourages us to seek out social interactions and our ability to mentalize enables us to successfully connect with others. These two mechanisms for motivating and maximizing social connection often work in tandem to help us achieve evolutionarily adaptive goals. However, they may also lead us

astray: the motivation to pursue social connection may be satisfied by illusory proxy cues of connection—cues that we unwittingly overendow with social significance.

Many of our interactions with new media may present cases of this type, in which these mechanisms for maximizing social connection are redirected not toward actual social connection but merely toward the cues typically associated with connection. The motivation we have for engaging with new media may be remarkably similar to the motivation we have for forming and developing face-to-face relationships. This is because media—even in its most rudimentary forms—presents a perfect environment for social-seeking minds. Humans have the unique ability to drastically reshape their environment, just as much as they are shaped by it (Kareiva, Watts, McDonald, & Boucher, 2007; Pani, 2000), and our desires are now shaping the environment. Our desire for calorie-rich food is exemplified by the proliferation of fast-food joints and an obesity epidemic, and our desire for social connection may be best exemplified by the rapid rise of media. New media put our social minds into overdrive by providing near constant social cues and opening up myriad new avenues of human interaction without the same constraints imposed by offline realities. Here we discuss these two ways in which media capitalize upon our mentalizing and motivational systems, in turn.

Social Connection through a TV Screen

Research on *parasocial interaction*—the illusory “give and take” between media users and media personalities—suggests that people often form interpersonal attachments with media persona (Horton & Wohl, 1956). Even though the viewer may be separated from politicians, performers, and the characters they play by a pane of glass, a thousand miles, or a dozen years, attachments with these people mimic the experience of relationships one might have with a close friend. These attachments can feel significant and intimate, leaving the viewer with a sense that he or she knows and understands a media personality as only a true friend could; in fact, research indicates that people think about media personalities and face-to-face interaction partners in very similar ways (Reeves & Greenberg, 1977; Reeves & Lometti, 1979; Reeves & Nass, 1996). Consistent with the idea that social connection grows from repeated interactions, parasocial relationships seem to form automatically as the viewer spends more time engaging with media; the more hours viewers spend watching television, the more likely they are to develop parasocial relationships, and the more significant these relationships become (Greenwood, 2008). Although these relationships may seem impoverished from the outside, the individuals seeking social connection don’t always differentiate between the social and the parasocial.

The similarities between physical and digital social connection suggest that some individuals might use media as a source of social

connection in place of face-to-face interaction. Indeed, individuals who feel especially in need of social connection often turn to parasocial relationships to fill this need (Russell, Cutrona, Rose, & Yurko, 1984). That is, individuals who are lonely, introverted, or have low self-esteem experience an increased desire for companionship, and this desire often leads them to seek connection through a TV screen (Finn & Gorr, 1988; Jonason, Webster, & Lindsey, 2008; Rubin, Perse, & Powell, 1985; Tsao, 1996; Weaver, 2003). The resulting strong parasocial attachments to television characters allow these individuals to compensate for their lack of actual social connections by forming imaginary connections with relationship partners they can call up any time, “on demand” (Derrick, Gabriel, & Hugenberg, 2009; Knowles, 2007). Importantly, people would not be able to find social comfort in TV were it not for our ability to mentalize. Research on anthropomorphization suggests that the feeling of loneliness makes people more likely to see social cues and minds even where there are none (Epley et al., 2008; Waytz et al., 2010). When applied to TV characters, this process allows individuals who feel particularly in need of social connection to more readily endow television characters with the social and mental properties with which they so desperately need to interact. These individuals often find the companionship they are seeking. Parasocial relationships decrease loneliness and feelings of exclusion, at least in the short term. Thinking about a favorite television character provides a buffer against feelings of exclusion, much like the buffer provided by thinking about a “real life” friend. Indeed, people who feel lonely or excluded often choose to think about television characters rather than other social figures in their lives as a way regaining a subjective sense of connection (Gardner, Pickett, & Knowles, 2005). Though parasocial relationships may be easy to criticize from the outside, they seem to serve an important function for those seeking connection: the sense of companionship offered by these relationships may protect the formerly disconnected from future feelings of loneliness and isolation (Horton & Wohl, 1956). Even in the absence of loneliness or exclusion, thinking about a favorite TV character causes people to feel a greater sense of global belonging (Derrick et al., 2009).

Television does not simply rely on viewers’ tendency to see the world in social terms or fabricate social connection based on subtle cues. Rather than waiting for viewers to create immersive relationships with fabricated minds, broadcasting practices have evolved to intentionally engender this sense of social connection, seducing the viewer into a relationship that remains, at its core, unidirectional. From the earliest days of broadcast journalism, media personalities were instructed to create feelings of friendliness and intimacy (Scannell, 1996), and the hallmarks of their methods—for example, patterns of verbal communication and body language, just the right amount of eye contact, and an informal style—have been shown to increase the intensity of parasocial connections (Hartmann & Goldhoorn, 2011). As the format grew, television personalities

became more explicit in their intention to connect with audiences, with Mr. Rogers famously asking every viewer to be his friend, his companion, his “neighbor.” More recently, the advent of “reality television” has transformed media personalities from idealized figures to “people like us”; this sense of “hyperauthenticity” (Rose & Wood, 2005) further amplifies the intimacy people feel with the characters on their screens (Rubin et al., 1985).

The evolution of television programming serves as an example of people crafting a world tailor-made to fulfill their social desires. Television media can route our desire for social connection—usually achieved through relationships with our families, friends, or acquaintances—into experiences of connection through a screen. Indeed, these parasocial relationships offer many of the same intrapsychic benefits as real relationships. But interactions offered by television are necessarily limited. Television viewers and media personas remain separated from each other by glass, distance, and time. Even the best attempts at creating a sense of intimacy or reality cannot offer “true” interactions. The efforts of broadcasters and imaginations of viewers notwithstanding, viewers may feel like they are connected to their favorite media personalities—but they might not always feel like these personalities are connected to them.

Social Connection through a Computer Screen

The evolution of media over the past hundred or so years reveals an attempt, whether conscious or not, to create a world consistent with our social desires; formal newsreels gave way to informal broadcasts, informal broadcasts evolved into talk shows with sets inviting viewers to insert themselves into the conversation (e.g., *The Tonight Show*), invitations to public conversation paved the way for invitations into private living rooms (e.g., *Mr. Rogers’ Neighborhood*), and these simulations of intimacy ultimately gave way to real (or “real”) intimacy (e.g., *The Real World*). The Internet takes this evolution to the extreme and, in doing so, expertly capitalizes on people’s desire for social connection. The Internet builds upon the strengths of television to feed our desire for social cues, while also addressing some of the inherent limitations in earlier media’s capacity for offering seemingly meaningful interaction.

Although the Internet was originally conceived of as an “information management system” (Leiner et al., 2012), it has quickly transformed into a tool for social connection. The Internet in its current form is capable of satisfying our desire for social connection by providing more extensive, more immersive, and more interactive opportunities to engage with others around the world. And people are taking advantage of this tool in ever-growing numbers. From 2005 to 2014, the number of American adults using the Internet rose at a steady clip, climbing from 66% to 87%, and nearly reaching full saturation (Rainie et al., 2014). In this

same time span, adults' use of online social networking sites has risen from just 8% to 67%—an increase of 738% (Brenner, 2013). As a result of this widespread and rapid adoption of digital tools for social connection, social networking has become the number one activity on the web (Tancer, 2008). More and more people are spending more and more time online—and they're dedicating the majority of this time to the pursuit of social connection.

One way in which the Internet has built upon earlier forms of media is by providing users opportunities to “know” others in ways that would not otherwise be possible. Through sites such as Facebook and Twitter, performers, personalities, and political figures can now send their thoughts *directly* to their audiences, unhindered by temporal delays or carefully managed scripts. Social media break down the walls between individuals and media personalities, creating the illusion of direct, unmediated social interaction and communication (Lee & Jang, 2013). Even when the Internet is used for this type of unidirectional communication (much like television), people perceive this communication as being more interactive—as if it were part of an ongoing, real-time, intimate conversation (Pempek, Yermolayeva, & Calvert, 2009). And people value simply receiving information from others in a social context (Tamir & Mitchell, 2014), suggesting that the perceived interactive intimacy afforded by social media may act as a rewarding cue of social connection.

Not only does the Internet allow for more intimate connections with famous media personalities, it also vastly expands the number of nonfamous individuals we can “know” and interact with. In the days of television, parasocial relationships with famous personalities were one of the few options people had for fulfilling the desire for social connection outside the bounds of face-to-face interactions. Creating a connection with nonfamous individuals was not a viable option simply because our ability to connect with others outside of our neighborhoods and television screens was limited. However, the advent of the Internet has created a fundamental change in the scale of our connective abilities. We can now connect with *anyone*, from long-lost relatives to anonymous message board users. In this regard, the Internet trumps not only television, but real life as well, by providing users unparalleled access to others' lives.

As outlined above, the Internet allows for a dramatic increase in the intimacy and access that allow one to “know” others compared to older forms of media. However, fulfilling the need to belong entails much more than just observing others' lives. In order to experience a sense of belonging, people need meaningful social interactions, and the Internet affords users just that: the opportunity to not just observe, but share—to broadcast their own lives and draw others into their personal experiences. By opening up a passageway from the lives of individuals to the outside social world, the Internet marks a fundamental advance over previous forms of media.

In everyday life, people often try to attain the adaptive outcomes associated with social connection by sharing information about themselves with others. Talking about oneself engenders affinity between conversation partners and increases the likelihood of forming strong social bonds (Cozby, 1972, 1973). Much as the level of intimacy conveyed by talk-show hosts determines the intensity of our parasocial relationships, the level of intimacy conveyed through our own speech has a large impact on the intensity and quality of our interpersonal connections. Disclosing personal information may be the most intimate of all forms of communication. Further, when we share information with others, we increase the likelihood of others sharing information with us in the future, a positive feedback loop enabling greater and greater cohesion (Bowles & Gintis, 2002). The immense importance of self-disclosure to our social lives is borne out in analyses of human conversational patterns, where researchers find that approximately 30–40% of our conversations are devoted to talking about our own personal experiences (Dunbar, Marriott, & Duncan, 1997; Dunbar & Shultz, 2007; Emler, 1990, 1994; Landis & Burt, 1924).

As with other means to adaptive ends, sharing information with others is associated with activity in the reward system (Tamir & Mitchell, 2012; Tamir, Zaki, & Mitchell, 2014). In these studies, not only did sharing information result in activity in the brain's reward system, participants were also willing to give up significant sums of money for opportunities to disclose information with others. Sharing information specifically about the *self*—or engaging in self-disclosure—trumps all other forms of communication in terms of both subjective reward and the level of activity in the reward system (Tamir & Mitchell, 2012; Yamaguchi et al., 2007). This research supports the idea that people are highly motivated to self-disclose.

The Internet has hijacked this extreme desire to self-disclose. Social media platforms such as Facebook, YouTube, and Twitter are built entirely upon user-generated content. People's unusually high drive to provide content has contributed to the remarkable success of these social sharing sites (ranked the number two, three, and nine most visited websites in the world, respectively). However, the Internet does not simply provide a venue for fulfilling our desire to disclose; rather, it exploits these desires by continuously evolving into an environment unconstrained by factors that limit this self-disclosure in offline social interactions. First, whereas face-to-face interactions often necessitate small audiences, the audience for social media is virtually limitless. When sharing information we can choose to tell a few close friends . . . or we can tell hundreds of Facebook friends and Twitter followers in just a fraction of the time. We are no longer constrained by proximity, and larger audiences mean greater opportunities for far-reaching self-disclosure. Second, Internet users don't have to abide by social norms that define face-to-face interactions. For example,

in everyday conversation, disclosers must listen to information shared by others in between sharing information about themselves. The Internet releases individuals from this “norm of reciprocity.” No longer are individuals limited by social norms such as waiting your turn, or self-disclosing in only limited doses. Instead, people can share unlimited quantities of information, gluttonously feeding their desire to self-disclose without restraint. And while the interactions enabled by new media may still be somewhat impoverished when compared to face-to-face experiences, this has not stymied self-disclosure on the Internet in the least. Instead, this new online social environment built around our self-disclosure desires has allowed this behavior to flourish: self-disclosure is so pervasive online that researchers estimate over 80% of activity on social media sites consists simply of announcing one’s own immediate experiences (Naaman, Boase, & Lai, 2010). The Internet allows us to share information with the world to an extent previously unimaginable.

We have a deeply rooted desire to maximize social connection. As we have shaped the Internet, we have created a system uniquely tailored to fulfill our desires. Our habitual use of this system suggests that we have been successful. With its ever-growing and ever-evolving suite of social networking websites, communities, and applications, the Internet appears to provide access to endless venues for our social connection desires.

But are we *really* connecting? Do our mediated social interactions truly fulfill the *need* to belong, a need previously fulfilled only through face-to-face social interactions? Or do they merely fulfill our *desires*, providing an internal sense that we have taken meaningful strides toward achieving our social goals without actually providing any long-term, substantive benefit? Our dopaminergic reward system motivates adaptive behavior by moving rewards forward in time; we experience reward not necessarily when long-term adaptive outcomes are achieved, but when we receive cues suggesting that our actions in the here-and-now are consistent with these more distal outcomes. This focus on short-term cues over long-term outcomes allows for flexible and environment-sensitive behavior, often increasing the chance that we will achieve the desired long-term outcomes; however, this short-term focus also creates the possibility that our behavior may be motivated by short-term cues even when these cues become divorced from long-term adaptive functioning. In the context of face-to-face interactions, self-disclosure often increases our chances of reaping the adaptive rewards offered by increased social connection and group belonging (Cozby, 1973); for much of human existence—indeed, until the last 25 years—the short-term rewards associated with self-disclosure signaled that we were en route to achieving more long-term adaptive goals. However, when we channel our motivation to self-disclose through new media, we may often swap face-to-face conversations for a series of Tweets, or catching up over coffee for a session of Facebook “stalking.” In this new world, is the connection between

self-disclosure and social connection real, or does it exist only in the mind of the Tweeter, blogger, or chronically oversharing Facebook user?

Consequences of Mediated Connection

The Internet may encourage us to seek out illusory cues related to goal completion without actually moving us any closer to achieving these goals—most notably, the long-term adaptive goal of maximizing social cohesion; we may mistake “likes” and “retweets” for actual social connection. On the other hand, the Internet may allow us to truly expand our social worlds; our online behaviors may still serve as means to an adaptive end—and the ends we can achieve may be greater than we could have ever imagined just twenty-five years ago. As is often the case, the true effects of the Internet on the connection between “social” behavior and long-term social outcomes likely lies somewhere between these two extremes, and may be different for different people in different situations.

Enhancing Social Connection

The types of interactions enabled by social media can both improve pre-existing offline relationships and allow for the formation and maintenance of relationships that may not have been possible without these new forms of communication. Much like the telephone or the postal service, the Internet expands the circle of individuals with whom one can realistically stay in contact. By reducing temporal, spatial, and social barriers to communication, social networking sites allow us to expand our relationship circles beyond close friends and family to include more distant friends and acquaintances (Steijn & Schouten, 2013), and can transform the task of maintaining long-distance relationships from the arduous to the effortless, replacing obligation with enjoyment (Wellman, Haase, Witte, & Hampton, 2001). This ability to reduce social and geographical distance may explain the association between using social network sites (e.g., Facebook) and improvements in both offline friendships and general social capital (Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008). Online social interactions can *augment* our offline relationships, increasing the quantity and improving the quality of our social interactions; in these instances, the Internet seems to have overwhelmingly positive effects for both our social lives and our well-being more generally (Ahn & Shin, 2013; Valkenburg, Peter, & Schouten, 2006). Time spent online does reduce time spent face to face (Wallsten, 2013), but this tradeoff may still result in net positive social outcomes (Bargh & McKenna, 2004).

Creating Social Connection

Online social media may be particularly helpful in creating social opportunities for individuals who lack sufficiently fulfilling face-to-face relationships. For example, research suggests that social anxiety leads to deficits in both companionship and intimacy (Vernberg, Abwender, Ewell, & Beery, 1992), but the Internet seems to offer a solution for socially anxious individuals by providing a safe environment in which to practice social interactions and form interpersonal connections—connections that may never have been established if not for the anxiety-ameliorating environment offered by computer-mediated communication (Hughes, Rowe, Batey, & Lee, 2012). In these cases, social media may not simply *enhance* preexisting relationships, but potentially lead to the *creation* of new ones. Online platforms that allow for anonymous interaction provide the least social pressure, but even non-anonymous interactions may reduce anxiety by allowing individuals the time and space to carefully craft messages. As a result, individuals who are shy, socially anxious, or generally avoidant of face-to-face interactions often turn to the Internet as a functional avenue for self-disclosure and social interaction (Orr et al., 2009; Papacharissi & Rubin, 2000; Sheldon, 2008; Valkenburg & Peter, 2007).

Similarly, individuals who are lonely, upset, or otherwise unsatisfied with their face-to-face relationships often turn to online social networks in an attempt to gain social support (Park, Kee, & Valenzuela, 2009). Though most Facebook users generally report feeling less lonely than non-users (Ryan & Xenos, 2011), the Internet may offer lonely users a source of social interaction left unfulfilled by face-to-face interactions. For some, it may provide their first chance to display themselves as they truly are—or as who they wish to be; for others, it may provide the promise of social support, interpersonal understanding, or simply an escape from unsatisfying day-to-day and face-to-face interactions. For these individuals in particular need of social connection, the Internet may serve as an accessible alternative to face-to-face interactions—and may provide some of the benefits missing from their offline relationships, such as increases in self-esteem and perceived social support (Shaw & Gant, 2002).

Replacing Social Connection

For some, the Internet may appear to be a social paradise, one in which myriad barriers to social connection—the confines of time and space, the limitations created by social anxiety, the biases imposed by surface-level characteristics such as age, gender, or ethnicity, and so on—fall by the wayside. In this light, it is unsurprising that some may use computer-mediated interactions as replacements for face-to-face relationships. Unfortunately, however, evidence suggests that relying on online relationships for social

connection—that is, using these interactions not to supplement or augment face-to-face interactions, but to *replace* them altogether—generally fails to result in the positive outcomes associated with more intimate face-to-face relationships (Papacharissi & Rubin, 2000).

Use of social media may have positive effects in the short term (Shaw & Gant, 2002), but getting one “like” on Facebook may not offer the same *sustained* meaning as a real compliment in real life (Forest & Wood, 2012). These opportunities for social connection offered by social media do not seem to fully satisfy the need for meaningful social connection provided by offline relationships. Individuals who feel like they *need* to go online for social support may be more likely to experience the short-term benefits of online social connection; however, in the long run, exchanging face-to-face for computer-mediated interactions often increases feelings of depression and loneliness (Kraut et al., 1998). Individuals who live a life online are particularly vulnerable to these potential costs of online interactions; when attempts to find social support online backfire—when the social “paradise” of the Internet turns out to be no more than a mirage—individuals who depend on the Internet for this support experience even less social support, report a lower quality of life, and exhibit more symptoms of depression than before turning to online sources of social connection (Korkeila, Kaarlas, Jääskeläinen, Vahlberg, & Taiminen, 2010; Weidman et al., 2012). For individuals who have nowhere else to go, the “solution” to these failures of social connection (turning to the Internet) simply exacerbates the problem (feelings of loneliness), potentially creating a self-defeating and self-reinforcing cycle of dependence on impoverished online relationships (Kim, LaRose, & Peng, 2009).

This cycle may explain why a need for social connection and dependence on media for social relationships is associated with addiction to online social networks (Baek, Bae, & Jang, 2013). Research suggests that, just like gambling or alcohol, Internet use can become a destructive addiction (Young, 1996). Internet addiction, also known as problematic Internet use (Morrison & Gore, 2010), can result in significant impairment in daily functioning (Hsu, Wen, & Wu, 2009; Lo, Wang, & Fang, 2005; Mitchell, Becker-Blease, & Finkelhor, 2005; Young, 2009). As with many other addictions, disconnecting from the Internet only enhances desire. Daily users who abstain from Facebook for just 48 hours report feeling an absence of social connection, and these feelings of missing out predict increases in subsequent Facebook use (Sheldon, Abad, & Hinsch, 2011)—much like the cravings of an addict in withdrawal may lead to subsequent overcompensation and overdose. This may explain, for example, why students who use Facebook spend less time studying than those who do not and, as a consequence, tend to have significantly lower GPAs (Kirschner & Karpinski, 2010). Despite the negative consequences for social, academic, and general well-being, individuals suffering from social problems persist

in their preference for online over face-to-face interactions (Caplan, 2002, 2005). Taken together, the data paint a troubling picture for individuals who look online for solutions to their social problems (Kim et al., 2009).

Long-Term Consequences

Despite the gloom and doom suggested for those who use the Internet as a replacement for face-to-face social interactions, the full body of research conducted thus far paints a nuanced picture of the relationship between online connections, offline relationships, social well-being, and adaptive functioning. Across the board, it seems clear that we are motivated to pursue online social interactions; we post, tweet, and otherwise disclose information about ourselves, and we also attend to the information provided by others—although not always in the ways that typify face-to-face interactions. However, these online social interactions seem to create different outcomes for those who use online interactions to *augment* well-functioning offline relationships versus those who use online interactions to *replace* unsatisfying (or missing) offline relationships. Online social interactions that serve as extensions of offline relationships can help individuals increase social capital—for example, by maintaining connections with geographically or relationally distant friends and family. These interactions can be enjoyed for what they are without being criticized for what they are not. However, when online interactions are used as a replacement for offline relationships, the effects seem overwhelmingly negative (Kraut et al., 2002, 1998). People who expect online interactions to fulfill the need to connect often end up sorely disappointed when these expectations exceed reality. The impoverished nature of online interactions not only fails to fulfill the need to connect, but often exacerbates the feelings of social exclusion that motivate many people to seek digital connection in the first place. Online social interactions seem to make the rich richer, and the poor poorer.

A longitudinal study of social media mirrors these conclusions: individuals who used the Internet to connect with friends and family experienced positive effects of social media use on well-being, while individuals who used the Internet to meet new people experienced decreases in well-being (Bessière, Kiesler, Kraut, & Boneva, 2008). These negative consequences of misguided social media use may affect even casual users. For example, recent studies showed that Facebook use leads to increased feelings of loneliness and decreased life satisfaction (Kross et al., 2015; Verduyn, Lee, Park, Shablack, Orvell, et al., 2015). These studies are not simply indicative of a link between one specific social media site and one specific outcome; as indicated by a meta-analysis of 40 studies (Huang, 2010), the preponderance of evidence to date suggests that social media use undermines well-being.

Though social media use has both positive and negative implications for well-being, some of these data paint a bleak picture of its long-term consequences. Research in this area is still in its infancy, but the potential long-term consequences of social media for human welfare highlight a pressing need for further inquiry into this area; people are unlikely to suddenly turn away from social media as a form of interpersonal connection. Further research may at least allow us to ensure that the positive outcomes associated with this new way of communicating, connecting, and belonging outweigh the negatives.

The Future

We are social creatures, driven by a desire for social connection. Elements of our social minds, from the dopaminergic reward system to our unique ability to mentalize about others, serve to motivate and maximize our social connectedness. Our modern world encourages us to use these systems not only in face-to-face interactions, but also in interactions mediated by television, Facebook, Twitter, and other digital media. These opportunities to connect through a screen feed our social desires, but they may not truly satiate our hunger for connection.

This concept—that “old” adaptive systems acting in “new” technological environments can result in previously unseen and possibly maladaptive outcomes—suggests media may be a prime example of a “supernormal” stimulus. Supernormal stimuli are exaggerated versions of the stimuli that shaped our neural structures and cognitive tendencies over the course of evolution. They are products of the modern world that hijack adaptive systems and set them on a path toward unexpected ends (Barrett, 2010; Ward, 2013). In the case of new media, our social-seeking minds allow television programs and computer screens to serve up readily available social stimulation without the dangers of rejection or the costs of effort. Instead of an easy solution, they have the potential to become an easy escape with a high price.

The disconnection between adaptive systems and adaptive outcomes created by the application of “old” systems in “new” environments raises a deeper philosophical question about what it truly means for a behavior or an outcome to be “adaptive.” The adaptive functions of social connection—and processes supporting these functions—are largely tied to issues of mate choice, food acquisition, and resistance to predation that are significantly less applicable in New York City than in the African savannahs of the Pleistocene (Tooby & Cosmides, 1990). True, failure to achieve social connection may result in feelings of loneliness or depression (Kraut et al., 1998; Weidman et al., 2012); but these feelings may be yet more cues leading us to achieve outcomes that no longer

hold any essential adaptive qualities. The overall trend toward negative outcomes of social media use suggests that the majority of social media users may be using these potentially positive sources of social connection maladaptively—they are not augmenting offline relationships, but replacing them. As the social landscape continues to change—as older individuals continue to adopt social media as a form of interpersonal communication and as new generations are born into a world in which these sites, apps, and services are the norm—there is a distinct possibility that more people will not only be using social media, but that they will be doing so in ways that undermine social connection, quality of life, and general well-being.

At the same time, as new media continue to evolve to produce more abundant and more realistic stimuli to fulfill our own desires, these stimuli may become more capable of satiating our social urges. If this is the case—if mediated social “connection” develops such that the internal, psychological effects of engaging with these forms of connection are *identical* to those offered by face-to-face connection, even if the external effects remain vastly different—is this connection still impoverished? Or is a social life filtered through television screens, computer applications, or immersive virtual environments just as valid as one lived through birthday parties and barbecues?

Whatever the answer, the question is one that must be considered. As social networks continue to grow in popularity (Brenner, 2013; Tancer, 2008), leaving less time for and perhaps less interest in face-to-face communication (Wallsten, 2013), they will become an ever-increasing aspect of our daily lives. And as we glue ourselves to screens, huddle around monitors, and cradle mobile devices, we do not just affect our own social worlds—we model these behaviors for children (Turkle, 2013), a new generation growing up in a world where “new media” are not new at all, and where mediated communication is not an alternative but the norm.

We suggest that our most appropriate response may simply be awareness. Our desire to connect via social media stems from adaptive urges, but may lead us to maladaptive outcomes—or at least outcomes inconsistent with maximizing actual social capital. Our social minds are not likely to change course and revolt against mediated connection overnight; nor are social media likely to disappear in the blink of an eye. Our task, then, is not to fight the future, but to recognize what is happening—to know why we are drawn to our television screens and smartphones, and to manage our use of these devices such that we do not lose sight of the people around us, do not exchange our family at the dinner table for a rerun of *All in the Family*, do not replace face-to-face communication with another hour on Facebook, and do not allow social media to replace social connection.

REFERENCES

- Aharon, I., Etcoff, N., Ariely, D., Chabris, C. F., O'Connor, E., & Breiter, H. C. (2001). Beautiful faces have variable reward value: fMRI and behavioral evidence. *Neuron*, *32*(3), 537–551.
- Ahn, D., & Shin, D.-H. (2013). Is the social use of media for seeking connectedness or for avoiding social isolation?: Mechanisms underlying media use and subjective well-being. *Computers in Human Behavior*, *29*(6), 2453–2462.
- Aron, A., Fisher, H., Mashek, D. J., Strong, G., Li, H., & Brown, L. L. (2005). Reward, motivation, and emotion systems associated with early-stage intense romantic love. *Journal of Neurophysiology*, *94*(1), 327–337.
- Baek, Y. M., Bae, Y., & Jang, H. (2013). Social and parasocial relationships on social network sites and their differential relationships with users' psychological well-being. *Cyberpsychology, Behavior, and Social Networking*, *16*(7), 512–517.
- Bargh, J. A., & McKenna, K. Y. A. (2004). The Internet and social life. *Annual Review of Psychology*, *55*(1), 573–590.
- Barrett, D. (2010). *Supernormal stimuli: How primal urges overran their evolutionary purpose*. New York: Norton.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529.
- Berridge, K. C. (1996). Food reward: Brain substrates of wanting and liking. *Neuroscience and Biobehavioral Reviews*, *20*(1), 1–25.
- Bessièrè, K., Kiesler, S., Kraut, R., & Boneva, B. S. (2008). Effects of Internet use and social resources on changes in depression. *Information, Community and Society*, *11*(1), 47–70.
- Bohnet, I., & Frey, B. S. (1999). Social distance and other-regarding behavior in dictator games: Comment. *American Economic Review*, 335–339.
- Bowles, S., & Gintis, H. (2002). Prosocial emotions. *The Economy as a Evolving Complex System*, *3*, 339–364.
- Brenner, J. (2013). *Instagram, Vine, and the evolution of social media*. Washington, DC: Pew Research Center.
- Buckner, R. L., & Carroll, D. C. (2007). Self-projection and the brain. *Trends in Cognitive Sciences*, *11*(2), 49–57.
- Buckner, R. L., & Krienen, F. M. (2013). The evolution of distributed association networks in the human brain. *Trends in Cognitive Sciences*, *17*(12), 648–665.
- Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive behavioral measurement instrument. *Computers in Human Behavior*, *18*(5), 553–575.
- Caplan, S. E. (2005). A social skill account of problematic Internet use. *Journal of Communication*, *55*(4), 721–736.
- Cozby, P. C. (1972). Self-disclosure, reciprocity and liking. *Sociometry*, 151–160.
- Cozby, P. C. (1973). Self-disclosure: A literature review. *Psychological Bulletin*, *79*(2), 73–73.
- Derrick, J. L., Gabriel, S., & Hugenberg, K. (2009). Social surrogacy: How favored television programs provide the experience of belonging. *Journal of Experimental Social Psychology*, *45*(2), 352–362.
- Dunbar, R. I. M., Marriott, A., & Duncan, N. D. C. (1997). Human conversational behavior. *Human Nature*, *8*(3), 231–246.
- Dunbar, R. I. M., & Shultz, S. (2007). Evolution in the social brain. *Science*, *317*(5843), 1344–1347.

- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook friends: Social capital and college students, use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), 1143–1168.
- Emler, N. (1990). A social psychology of reputation. *European Review of Social Psychology*, 1(1), 171–193.
- Emler, N. (1994). Gossip, reputation, and social adaptation. In R. F. Goodman & A. Ben-Ze'ev (Eds.), *Good gossip* (pp. 117–133). Lawrence: University Press of Kansas.
- Epley, N., Akalis, S., Waytz, A., & Cacioppo, J. T. (2008). Creating social connection through inferential reproduction: Loneliness and perceived agency in gadgets, gods, and greyhounds. *Psychological Science*, 19(2), 114–120.
- Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review*, 114(4), 864–885.
- Finn, S., & Gorr, M. B. (1988). Social isolation and social support as correlates of television viewing motivations. *Communication Research*, 15(2), 135–158.
- Forest, A. L., & Wood, J. V. (2012). When social networking is not working: Individuals with low self-esteem recognize but do not reap the benefits of self-disclosure on Facebook. *Psychological Science*, 23(3), 295–302.
- Gardner, W. L., Pickett, C. L., & Knowles, M. (2005). Social snacking and shielding. In K. D. Williams, J. P. Forgas, & W. Von Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp. 227–241). New York: Psychology Press.
- Gingrich, B., Liu, Y., Cascio, C., Wang, Z., & Insel, T. R. (2000). Dopamine D₂ receptors in the nucleus accumbens are important for social attachment in female prairie voles (*Microtus ochrogaster*). *Behavioral Neuroscience*, 114(1), 173–183.
- Greenwood, D. N. (2008). Television as escape from self: Psychological predictors of media involvement. *Personality and Individual Differences*, 44(2), 414–424.
- Greenwood, D. N., & Long, C. R. (2010). Attachment, belongingness needs, and relationship status predict imagined intimacy with media figures. *Communication Research*, 38(2), 278–297.
- Hartmann, T., & Goldhoorn, C. (2011). Horton and Wohl revisited: Exploring viewers' experience of parasocial interaction. *Journal of Communication*, 61(6), 1104–1121.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions—Royal Society of London, Series B: Biological Sciences*, 1435–1446.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS Medicine*, 7(7). Horton, D., & Wohl, R. R. (1956). Mass communication and para-social interaction: Observations on intimacy at a distance. *Psychiatry*, 19(3), 215–229.
- Hsu, S. H., Wen, M.-H., & Wu, M.-C. (2009). Exploring user experiences as predictors of MMORPG addiction. *Computers and Education*, 53(3), 990–999.
- Huang, C. (2010). Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking*, 13(3), 241–249.
- Hughes, D. J., Rowe, M., Batey, M., & Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior*, 28(2), 561–569.
- Jonason, P. K., Webster, G. D., & Lindsey, A. E. (2008). Solutions to the problem of diminished social interaction. *Evolutionary Psychology*, 6(4), 637–651.
- Kareiva, P., Watts, S., McDonald, R., & Boucher, T. (2007). Domesticated nature:

- Shaping landscapes and ecosystems for human welfare. *Science*, 316(5833), 1866–1869.
- Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psychological well-being. *CyberPsychology and Behavior*, 12(4), 451–455.
- Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, 26(6), 1237–1245.
- Knowles, M. L. (2007). *The nature of parasocial relationships*. Unpublished doctoral dissertation, Northwestern University, Evanston, IL.
- Korkeila, J., Kaarlas, S., Jääskeläinen, M., Vahlberg, T., & Taiminen, T. (2010). Attached to the web: Harmful use of the Internet and its correlates. *European Psychiatry*, 25(4), 236–241.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58(1), 49–74.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 1017–1031.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., et al. (2013). Facebook use predicts declines in subjective well-being in young adults. *PLoS One*, 8(8).
- Landis, M. H., & Burt, H. E. (1924). A study of conversations. *Journal of Comparative Psychology*, 4(1), 81–89.
- Lee, E.-J., & Jang, J.-w. (2013). Not so imaginary interpersonal contact with public figures on social network sites: How affiliative tendency moderates its effects. *Communication Research*, 40(1), 27–51.
- Leiner, B. M., Cerf, V. G., Clark, D. D., Kahn, R. E., Kleinrock, L., Lynch, D. C., et al. (2009). A brief history of the Internet. *ACM SIGCOMM Computer Communication Review*, 39(5), 22–31.
- Lo, S.-K., Wang, C.-C., & Fang, W. (2005). Physical interpersonal relationships and social anxiety among online game players. *CyberPsychology and Behavior*, 8(1), 15–20.
- Malle, B. F. (2005). Folk theory of mind: Conceptual foundations of human social cognition. In R. R. Hassin, J. D. Uleman, & J. A. Bargh (Eds.), *The new unconscious* (pp. 225–255). New York: Oxford University Press.
- Malle, B. F., & Hodges, S. (2005). *Other minds*. New York: Guilford Press.
- Mars, R. B., Neubert, F.-X., Noonan, M. P., Sallet, J., Toni, I., & Rushworth, M. F. S. (2012). On the relationship between the “default mode network” and the “social brain.” *Frontiers in Human Neuroscience*, 6.
- Matthews, M. (1994). *The horseman: Obsessions of a zoophile*. Amherst, NY: Prometheus Books.
- Meshi, D., Morawetz, C., & Heekeren, H. R. (2013). Nucleus accumbens response to gains in reputation for the self relative to gains for others predicts social media use. *Frontiers in Human Neuroscience*, 7.
- Mitchell, K. J., Becker-Blease, K. A., & Finkelhor, D. (2005). Inventory of problematic internet experiences encountered in clinical practice. *Professional Psychology: Research and Practice*, 36(5), 498–509.
- Mobbs, D., Greicius, M. D., Abdel-Azim, E., Menon, V., & Reiss, A. L. (2003). Humor modulates the mesolimbic reward centers. *Neuron*, 40(5), 1041–1048.
- Mobbs, D., Yu, R., Meyer, M., Passamonti, L., Seymour, B., Calder, A. J., et al. (2009). A key role for similarity in vicarious reward. *Science*, 324(5929), 900.
- Morrison, C. M., & Gore, H. (2010). The relationship between excessive Internet

- use and depression: A questionnaire-based study of 1,319 young people and adults. *Psychopathology*, 43(2), 121–126.
- Naaman, M., Boase, J., & Lai, C. H. (2010, February). *Is it really about me?: Message content in social awareness streams*. Paper presented at the Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work, New York, NY.
- Nielsen. (2014). An era of growth. Retrieved from www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2014/Reports/nielsen-cross-platform-report-march-2014.pdf.
- Nowak, M. A., & Sigmund, K. (2005). Evolution of indirect reciprocity. *Nature*, 437(7063), 1291–1298.
- Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: expectations versus fantasies. *Journal of Personality and Social Psychology*, 83(5), 1198–1212.
- Orr, E. S., Susic, M., Ross, C., Simmering, M. G., Arseneault, J. M., & Orr, R. R. (2009). The influence of shyness on the use of Facebook in an undergraduate sample. *CyberPsychology and Behavior*, 12(3), 337–340.
- Pani, L. (2000). Is there an evolutionary mismatch between the normal physiology of the human dopaminergic system and current environmental conditions in industrialized countries? *Molecular Psychiatry*, 5(5), 467–475.
- Papacharissi, Z., & Rubin, A. M. (2000). Predictors of Internet use. *Journal of Broadcasting and Electronic Media*, 44(2), 175–196.
- Park, N., Kee, K. F., & Valenzuela, S. N. (2009). Being immersed in social networking environment: Facebook groups, uses and gratifications, and social outcomes. *CyberPsychology and Behavior*, 12(6), 729–733.
- Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, 30(3), 227–238.
- Rainie, L., Fox, S., & Duggan, M. (2014). *The web at 25 in the U.S.* Washington, DC: Pew Research Center.
- Rand, D. G., Greene, J. D., & Nowak, M. A. (2012). Spontaneous giving and calculated greed. *Nature*, 489(7416), 427–430.
- Rand, D. G., Peysakhovich, A., Kraft-Todd, G. T., Newman, G. E., Wurzbacher, O., Nowak, M. A., et al. (2014). Social heuristics shape intuitive cooperation. *Nature Communications*, 5.
- Reeves, B., & Greenberg, B. S. (1977). Children's perception of television characters. *Human Communication Research*, 3(2), 113–127.
- Reeves, B., & Lometti, G. E. (1979). The dimensional structure of children's perceptions of television characters: A replication. *Human Communication Research*, 5(3), 247–256.
- Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. New York: SLI Publications and Cambridge University Press.
- Rilling, J. K., Gutman, D. A., Zeh, T. R., Pagnoni, G., Berns, G. S., & Kilts, C. D. (2002). A neural basis for social cooperation. *Neuron*, 35(2), 395–405.
- Rose, R. L., & Wood, S. L. (2005). Paradox and the consumption of authenticity through reality television. *Journal of Consumer Research*, 32(2), 284–296.
- Rubin, A. M., Perse, E. M., & Powell, R. A. (1985). Loneliness, parasocial interaction, and local television news viewing. *Human Communication Research*, 12(2), 155–180.
- Russell, D., Cutrona, C. E., Rose, J., & Yurko, K. (1984). Social and emotional lone-

- liness: An examination of Weiss's typology of loneliness. *Journal of Personality and Social Psychology*, 46(6), 1313–1321.
- Ryan, T., & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27(5), 1658–1664.
- Scannell, P. (1996). *Radio, television, and modern life: A phenomenological approach*. New York: Blackwell.
- Schilbach, L., Eickhoff, S. B., Rotarska-Jagiela, A., Fink, G. R., & Vogeley, K. (2008b). Minds at rest? Social cognition as the default mode of cognizing and its putative relationship to the default system of the brain. *Consciousness and Cognition*, 17(2), 457–467.
- Shaw, L. H., & Gant, L. M. (2002). In defense of the Internet: The relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *CyberPsychology and Behavior*, 5(2), 157–171.
- Sheldon, K. M., Abad, N., & Hinsch, C. (2011). A two-process view of Facebook use and relatedness need-satisfaction: Disconnection drives use, and connection rewards it. *Psychology of Popular Media Culture*, 1, 2–15.
- Sheldon, P. (2008). The relationship between unwillingness-to-communicate and students' Facebook use. *Journal of Media Psychology: Theories, Methods, and Applications*, 20(2), 67–75.
- Sherif, M., Harvey, O. J., White, B. J., Hood, W. R., & Sherif, C. W. (1961). *Intergroup conflict and cooperation: The Robbers Cave experiment* (Vol. 10). Norman, OK: University Book Exchange.
- Steijn, W. M. P., & Schouten, A. P. (2013). Information sharing and relationships on social networking sites. *Cyberpsychology, Behavior, and Social Networking*, 16(8), 582–587.
- Steinfeld, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology*, 29(6), 434–445.
- Tamir, D. I., & Mitchell, J. P. (2012). Disclosing information about the self is intrinsically rewarding. *Proceedings of the National Academy of Sciences*, 109(21), 8038–8043.
- Tamir, D. I., & Mitchell, J. P. (2014). [Receiving social information]. Unpublished raw data.
- Tamir, D. I., Zaki, J., & Mitchell, J. P. (2014). *Informing others is associated with behavioral and neural signatures of value*. Unpublished working paper.
- Tancer, B. (2008). *Click: What millions of people are doing online and why it matters*. New York: Hyperion.
- Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.
- Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, 11(4), 375–424.
- Tricomi, E., Rangel, A., Camerer, C. F., & O'Doherty, J. P. (2010). Neural evidence for inequality-averse social preferences. *Nature*, 463(7284), 1089–1091.
- Tsao, J. (1996). Compensatory media use: An exploration of two paradigms. *Communication Studies*, 47(1–2), 89–109.
- Turkle, S. (2013). What should we be worried about? *Edge* website, retrieved from <http://edge.org/response-detail/23795>.
- Valkenburg, P. M., & Peter, J. (2007). Preadolescents' and adolescents' online com-

- munication and their closeness to friends. *Developmental Psychology*, 43(2), 267–277.
- Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *CyberPsychology and Behavior*, 9(5), 584–590.
- Verduyn, P., Lee, D., Park, J., Shablack, H., Orvell, A., Bayer, J., et al. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General*.
- Vernberg, E. M., Abwender, D. A., Ewell, K. K., & Beery, S. H. (1992). Social anxiety and peer relationships in early adolescence: A prospective analysis. *Journal of Clinical Child Psychology*, 21(2), 189–196.
- Wallsten, S. (2013). *What are we not doing when we're online* (NBER Working Paper No. 19549). Cambridge, MA: National Bureau of Economic Research.
- Ward, A. F. (2013). Supernormal: How the Internet is changing our memories and our minds. *Psychological Inquiry*, 24(4), 341–348.
- Ward, A. F., Leimgruber, K., Norton, M. I., Olson, K., Gray, K., & Santos, L. (2014). *Paying forward prosocial behavior: People are selfish, but only in secret*. Unpublished working paper.
- Waytz, A., Morewedge, C. K., Epley, N., Monteleone, G., Gao, J.-H., & Cacioppo, J. T. (2010). Making sense by making sentient: The neural bases of seeking understanding through anthropomorphism. *Journal of Personality and Social Psychology*, 99(3), 410–435.
- Waytz, A., Zaki, J., & Mitchell, J. P. (2012). Response of dorsomedial prefrontal cortex predicts altruistic behavior. *Journal of Neuroscience*, 32(22), 7646–7650.
- Weaver, J. B. (2003). Individual differences in television viewing motives. *Personality and Individual Differences*, 35(6), 1427–1437.
- Weidman, A. C., Fernandez, K. C., Levinson, C. A., Augustine, A. A., Larsen, R. J., & Rodebaugh, T. L. (2012). Compensatory Internet use among individuals higher in social anxiety and its implications for well-being. *Personality and Individual Differences*, 53(3), 191–195.
- Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the Internet increase, decrease, or supplement social capital? Social networks, participation, and community commitment. *American Behavioral Scientist*, 45(3), 436–455.
- Wilder, D. A., & Thompson, J. E. (1980). Intergroup contact with independent manipulations on in-group and out-group interaction. *Journal of Personality and Social Psychology*, 38(4), 589–603.
- Yamaguchi, S., Greenwald, A. G., Banaji, M. R., Murakami, F., Chen, D., Shiomura, K., et al. (2007). Apparent universality of positive implicit self-esteem. *Psychological Science*, 18(6), 498–500.
- Young, K. S. (1996). Psychology of computer use: XL. Addictive use of the Internet: a case that breaks the stereotype. *Psychological Reports*, 79(3), 899–902.
- Young, K. S. (2009). Internet addiction: Diagnosis and treatment considerations. *Journal of Contemporary Psychotherapy*, 39(4), 241–246.
- Zaki, J., & Mitchell, J. P. (2013). Intuitive prosociality. *Current Directions in Psychological Science*, 22(6), 466–470.