

Chapter 15

The Influence of Technology on the Assessment and Conceptualization of Social Support



John F. Hunter, Nickolas M. Jones, Desiree Delgadillo,
and Benjamin Kaveladze

Introduction

Our friends and families define the fabric of our lives, and the supportive network they construct determines much of well-being. Beyond (or perhaps due to) feelings of warmth and belonging, strong social support is related to lower rates of morbidity, mortality, and to better cardiovascular, neuroendocrine, and immune function [1]. The quantity, quality, structure and function of these intricate and dynamic networks is a critical component of quality of life and should be considered carefully when assessing and improving health. Social support is the provision of psychological and material resources from one's social network intended to benefit an individual [2]. There are several ways in which researchers have defined and operationalized social support, but House and colleagues' theoretical framework about the domain of social support is particularly clear and comprehensive [3]. This framework delineates three approaches for understanding the components of social support and aligns well with various assessment techniques.

The simplest and most direct method of assessing social support is to examine the *quantity* of social support. Measuring marital status, number of friends, and community involvement (e.g., church membership) are the most common variables that quantify this concept. Terminology such as social integration, isolation, loneliness, and social embeddedness are used to describe this facet of social support [4]. This type of approach to quantifying social support is relatively objective, reliable and easy to obtain [5]. The Social Network Index (SNI [6]) is the most comprehensive and popular tool for measuring the quantity of social relationships. The SNI is a self-reported questionnaire that quantifies social connections, evaluates the

J. F. Hunter (✉) · D. Delgadillo · B. Kaveladze
Department of Psychological Science, University of California-Irvine, Irvine, CA, USA
e-mail: johnhunter@chapman.edu

N. M. Jones
Department of Psychology, Princeton University, Princeton, NJ, USA

frequency of contact, and categorizes individuals on a continuum from socially isolated to socially integrated. The SNI measures marital status, sociability (how many friends and family members one has and how often they are in contact), participation in a religious group, and participation in other community groups. Some measures, such as the Social Support Questionnaire [7] add another element by assessing both the number of people respondents feel they can count on as sources of social support and their satisfaction with the support they receive from each those people. While this straightforward approach for assessing the existence of social connections is useful and informative, it does not encapsulate the full complexity and variation of social support.

Social support may also be assessed by moving beyond the mere number of social connections and focusing on the *structure* of relationships [3]. A social network analysis approach broadens the range of relationships considered, includes both positive and negative influences of relationships, and analyzes the patterns of relationship structure [8]. This approach provides a richer level of detail because it assumes that not all relationships are created equal, and different facets of social connection may have differential impacts on well-being. There are several characteristics of social networks (e.g., size, density, reciprocity, homogeneity) that should be considered when assessing these social connections [9]. This approach provides detailed insight into the interconnected webs of social relationships and how multiple levels of influence may impact an individual. In the past, this methodology has been limited by a lack of data. However, with the advent of the internet and big data approaches, social network analysis has boomed in recent years.

If one hopes to pinpoint the specific effects of social support on well-being, it may be advisable to adopt a *functional* approach that emphasizes the differing influence of various types of support [3]. While quasi-objective support measures examining the mere number of connections or structure of those connections are valuable [10], it is important to look at whether an individual believes that enough support exists to help them in times of need. The type of support provided, the source of support, and the manner in which it is delivered are key aspects that determine the effects of social support on well-being [11]. One type of social support, emotional support, entails sympathy and love, encouragement, communication or care that may reduce negative psychological states. Informational support is characterized by advice, facts or information that may assist in addressing a problem. Instrumental support is providing tangible assistance such as money, resources or time [12, 13]. Each of these types of support serves its own unique function and it may be informative to delineate the differences when assessing health-relevant impacts.

Many of the most robust and informative social support scales are functional in nature. The Interpersonal Support Evaluation List (ISEL [13]) is the most widely used instrument to assess perceptions and functions of support. This is particularly important because the perception or appraisal of that support is the key element that drives many of the positive health effects found in the literature [4]. Important social support measures also include the Multidimensional Scale of Perceived Social Support [14] (MSPSS), a 12-item instrumental and emotional support scale that measures the degree to which respondents *feel* or perceive that they are supported by friends, family or a significant other. Questions used to assess this include “I

have a special person who is a real source of comfort to me”, *“I can talk about my problems with my family”* and *“I can count on my friends when things go wrong”* to which respondents rate each statement on a 7-point likert scale ranging from 1 = Very Strongly Disagree to 7 = Very Strongly Agree. Similarly, the Duke-UNC Functional Social Support Questionnaire [15] assesses the amount of support respondents receive and categorizes this support into affective, confidant, and instrumental categories. This is an instrument frequently used by medical professionals since higher levels of social support are often tied to better medical adherence. Questions are rated on a 5-point scale ranging from 1 = “Much less than I would like” to 5 = “As much as I would like” and include items such as, *“I get help when I am sick in bed”* and *“I get useful advice about important things in my life”*.

Researchers assert that functional measures are more informative because they target the specific influences provided by one’s social connections [16]. For example, adequate functional support may be derived from one very good relationship, but may not be available to those with multiple superficial relationships. This is particularly important to consider in the digital age because we have so many platforms of communication and many “weak” online relationships. A functional operationalization helps to clarify the psychosocial impacts of the many constantly-evolving ways in which people exchange support online.

How Does Social Support Influence Health?

Provision and perception of social support has been linked to a variety of positive well-being outcomes, particularly in the realm of health [17]. Social support predicts physical health [18] and each type of support (instrumental, informational, emotional) offers a unique blend of benefits [19]. Social support serves as a protective factor against stress and chronic illness, and confers numerous benefits on an individual’s psychological and physiological well-being [1]. However, it is important that the type of support properly aligns with the needs of the individual. If the type of support offered matches the type of support desired, then it will most likely lead to positive health outcomes [11].

How does this support actually influence well-being and health? One theory is that social support influences health outcomes primarily through its ability to buffer stress. A strong social support system may reduce the negative effects of stressful experiences by providing a less threatening interpretation of a stressor and allowing the individual to feel that they have the proper resources to cope with the situation [2]. Since high levels of stress are linked to negative physical health outcomes (e.g., allostatic load), reduction of stress through reliance on social support systems may ultimately be beneficial for a variety of health outcomes. Another theory posits that social support may be beneficial in all situations, regardless of whether stress is involved. This main-effect theory states that social integration may directly influence health through things such as social control and normative behavior [16]. Most likely these theories operate in tandem, and both partially explain how social support may promote positive outcomes.

Assessing and Conceptualizing Social Support in the Digital Age

The advent of the internet and smartphone culture has fundamentally transformed the nature of social support. Technological change has altered (1) The ways in which we assess social support, (2) The perception and effects of social support. In the following chapter, we will discuss these two areas at the intersection of technology, social support, and health.

In the first part, we will examine how recent technological innovations have allowed for much more detailed, objective, and accurate assessments of social support. A large portion of one's social interactions are conducted online, and since online activity can be tracked and analyzed, we are able to peer into the window of one's life and gain a better understanding of how their social relationships unfold. In addition, we have developed tools that allow us to capture more fine-grained and real-time data about social interactions that can better inform our understanding of in-vivo social connections.

In the second part, we will discuss how the concept of social support has changed in the age of digital communication. We will focus on how the presence and use of technological devices influences face-to-face interactions, online groups, and family dynamics. To conclude the chapter, we will summarize the current research from a variety of domains about the assessment of social support via digital technology. We will identify gaps in the literature, challenges for researchers and practitioners, and important areas for future directions. Taken together, this chapter will recognize the changes in social assessment afforded by technology and consider several important areas in which technological tools have transformed social support.

How Has Technology Altered Our Assessment of Social Support?

New technologies represent an immense opportunity for clinicians and researchers to study social support's links to well-being and health, as well as the dynamic social interactions that underpin these relationships. Researchers today have access to more data than ever before. The potential for gaining theoretical and actionable insights abound. By leveraging *big data* across several accessible technological platforms, researchers can begin to understand how social support processes unfold in real time and the myriad ways technology can be used to measure meaningful aspects of social support.

But First: What Are Big Data?

In the social sciences, big data typically represent large-scale data comprised of many thousands of people and sometimes hundreds of data points about any single person. In essence, these data are long and wide. A single row could represent one

person, or sometimes, a single measurement of one person among thousands of other people. Big data are typically longitudinal, and the granularity of measurement depends on the source from which the data come. Although big data manifest in many forms, there are two types that may be particularly useful for studying social support. The first is to use big *social media* data scraped from platforms like Twitter (est. 2006, 330 million users worldwide) or Facebook (est. 2004, 2.6 billion users worldwide). These data are longitudinal, naturalistic, and involve millions of social interactions, by design. The other is via big *personal* data captured on a device with which most people in the world are now intimately familiar: the smartphone.

Big Social Media Data

Harvesting data from social media platforms to learn about social support in the wild makes good sense. These platforms are social by design. We “friend” and “follow” people we know (or are attracted to or have interest in). Using features of these platforms, we interact with people in our close circles and with people who are far outside the reaches of our immediate friend group, sometimes with complete strangers across the country or the world. We post messages and media to our timelines and walls, sometimes making those posts searchable and visible to anyone who is willing to attend to them. We pour ourselves into a networked digital social sphere, sometimes hoping for connection, sometimes seeking advice, and in any case, because we believe someone will read or listen to the content we post and respond in kind. Because of the accessibility of their data, most researchers study user posts and interactions on Facebook and Twitter. Below, we offer a flavor of possible ways to use data from these platforms to study social support.

Facebook

Facebook is a platform for personal online diary-like posts, containing text, images, and GIFs, organized in timelines, where some of the content is strictly private and by default is shared only with members of an individual’s social network of approved friends. In some cases, personal profile posts can be shared publicly such that anyone in the world who navigates to a user’s profile can see public content. One critical feature of the Facebook platform is the ability to form groups based on common interests and experiences. For example, cancer survivors who use Facebook can search the platform for existing groups of other survivors and join those groups to connect with strangers who have experienced similar struggles with fighting their particular type of cancer. If the group is designated as public, a researcher can scrape posts and replies on the group’s main page to evaluate the provision of social support in this context. Analyzing the content of posts makes it possible to differentiate the provision of emotional, informational, or instrumental support across users, explore the dynamics of support provision over time, and quantitatively analyze the

popularity of posts to gauge which types of support are most valued in the group. Moreover, there are tens of thousands of groups on Facebook. This provides a unique opportunity to determine how the provision of social support varies by context. Extending this example a bit further, it would be possible to explore how cancer survivors from different groups across the country provide social support; alternatively, one could compare the provision of social support among groups formed around other health issues, identities, social statuses, political ideologies, etc.

Although there are many opportunities to study the provision of social support on Facebook, there are some important drawbacks to consider. The first is that researchers typically cannot link the receipt of social support from group members to psychological or health outcomes associated with any single user. For example, if a user posted a message about seeking prayers or advice for a loved one in the hospital, there is no way to link the level of emotional or informational support expressed in responses to this post to any outcomes related to the original poster (there are exceptions to this that are not worth mentioning here). The second is that it is difficult to get general user profile information (e.g., Facebook timeline posts) that allow for analyses of long-term outcomes. For example, if support was provided in one moment on a public Facebook page, researchers cannot evaluate how that provision of support predicts a user's positivity in their posts to their personal timeline 6 months later. Without explicit permission from the Facebook user, no access to a personal timeline is granted. Thus, Facebook data are excellent for understanding *how* groups of users interact with one another to provide support to each other through the messages they post. These data present an opportunity to unpack underlying processes in support provision, but unfortunately do not allow us to easily link this provision to important outcomes.

Twitter

Twitter is a social media platform on which users can create micro-diary posts (i.e., tweets) limited to 288 characters but can contain pictures, videos, and links. By default, Twitter profiles are public, meaning that anyone who accesses a profile can see a user's posts. If the user desires, they can convert their profile to private such that only approved followers have access to a timeline content. The ubiquity of Twitter data makes it possible to link support provision with indicators of psychological well-being. This is the case because Twitter data are comprised of user profile information and tweet generated *over time*. Thus, they are more flexible for not only describing social support provision at specific intervals, but potentially delineating short- and long-term outcomes associated with its provision. This can be achieved by using natural language processing (NLP) tools like latent Dirichlet allocation or latent semantic analysis in R (<https://www.r-project.org/>) or Python (python.org) to explore important topics that emerge over time; alternatively one could use the Linguistic Inquiry and Word

count program (LIWC [20]) to explore psychological constructs that appear in a user's tweets (e.g., positive emotion, social words). Several studies reveal that when traumatic events like terrorist attacks [21–23], natural disasters [24, 25], school shootings [26–28], and other large-scale distressing events (i.e. mass communications of impending threats [29]) occur in communities, people express their emotions on Twitter. In such contexts, there is ample opportunity to explore how community members provide social support and ultimately link the receipt of social support to psychological functioning in the weeks and months that follow.

It is also possible to examine the provision of social support in the networked communications between Twitter users. Users engage with each other in conversation by explicitly tagging members of the conversation, or by tweeting to users contained in lists which are user-created and curated for specific purposes. As long as the tweets and lists are public, researchers can scrape these data from the platform. This network of tweets linked between users can give rise to analyses that explore whether receiving social support (via tweets from others) functions to bolster the wellbeing of the users who are targets of support. Using this information in conjunction with user-level profile information (e.g., number of followers, baseline engagement with others in a particular context) can also illuminate how outcomes related to support provision differ by users with a robust social network versus those with a meager network.

Other Social Media Platforms

Facebook and Twitter are only two social networking sites in a sea of hundreds; however, data on most platforms are not accessible to researchers. One exception is Reddit, which has garnered some popularity, as a target for social science research. Reddit is a public message-board platform that is organized into general and user-moderated topical areas (subreddits) in which users post an array of content including text, images and links. As a more traditional topic-related message board platform, there are opportunities for analyzing posts for support provision that mirror much of what has been discussed above.

Big Personal Data

Big data are not exclusive to social media platforms. They are generated moment-to-moment, every day, by many of the internet-enabled devices individuals use regularly. These data are passively logged on a device most of us carry around with us: a smartphone. Hundreds of times each day, individuals pick up their smartphone and engage with it in many ways—they text and call friends and family; interact with strangers and acquaintances on social media applications; map their routes and coordinate all the logistics of their lives. By their very nature, smartphone metrics

can serve as proxies for social information about people. The number of phone calls one makes, the number of times a text or messaging application is opened, the characteristics of the physical locations one inhabits when opening a mapping application, all tell a story about how much people interact with others every day and can characterize the type of environments people tend to be in (crowded public spaces versus private homes). Recently, researchers have begun to tap into the information embedded in smartphones to understand daily human sociability [30] but they have not yet linked this information to the experience or perception of social support in peoples' lives.

How, then, can smartphone data be leveraged to understand anything substantive about social support? The answer is muddy at best, but exciting nonetheless. By focusing on contextual factors that can be gleaned from passive sensors on our smartphones (e.g., GPS locations, recorded conversational elements), we can attempt to operationalize certain elements of social support. For example, if a researcher wanted to operationalize the question on the MSPSS that states, "I can talk about my problems with my friends", they could potentially use smartphone sensors to determine proximal locations and linguistic tendencies during social interactions that would provide information about whether the individual of interest does indeed talk to their friends about problems. This type of approach for operationalizing social support is promising for future development, but is limited in its scope by the complexities of social behavior. Smartphone data cannot stand on their own for the simple reason that they are approximations of social behavior and connection. For example, just because someone spends a lot of time using social messaging apps does not inherently signal that they have a lot of social support. In fact, those digital social interactions could potentially be mostly negative. Without explicit access to messages in order to analyze the content or tone of the exchange, relying solely on logged texting behavior could be misleading. The same is true for leveraging smartphones' Bluetooth capabilities to detect nearby people to gauge how often people are around other people. Without more information from the individual about whether an exchange occurred, and the nature of that exchange, not much can be gleaned from looking at these data without supplementing with self-report data.

To remedy this, smartphones do, however, offer a powerful way to reveal social support processes in real time through *ecological momentary assessment* (EMA; [31]), a method that allows researchers to reach people directly through their smartphone. This method involves pinging participants a few times a day (via a notification), at fixed or random intervals, to obtain a snapshot of their emotions, social interactions, and other psychological information of interest to the researcher. Before smartphones, researchers would have to acquire funds to provide participants with handheld devices (e.g., palm pilots) to survey their experiences throughout the day. However, the ubiquity of smartphones today has made it easier than ever to measure the quantity and quality of daily social interactions by prompting individuals to complete brief daily surveys. Imagine, then, coupling EMA data with smartphone (or other wearables) sensor data. When paired, these data can allow researchers to untangle the complexities of daily life in analytic frames that help us understand biopsychosocial processes that unfold in real time. Tapping into the

bountiful cornucopia of big personal and social media data represents an exciting opportunity for researchers to quantify social support with unparalleled detail and accuracy.

How Does Technology Influence Our Conceptualization of Social Support?

Technology has fundamentally altered the way we interact with others. We are increasingly using internet-mediated communication platforms as the primary mode of interacting with others. This shift to online social interactions has transformed our conceptualization of social support. We understand social support differently and it impacts our lives differently as we continue to intertwine our lives with technology. In the following sections, we will highlight three areas in which social support is evolving due to technology adoption. We will examine how smartphones can exert positive and negative influences on face-to-face social interaction. Next, we will peer into online communities and explore how social support garnered online is influencing the dynamics of health and social support. Finally, we will focus on how family parent-child relationships are different in the digital age, and what this means for quality of life.

The Effect of Technology on Interpersonal Communications

Personal technological devices, such as smartphones, have become a constant companion in most people's lives and subsequently influence the dynamics of face-to-face social interactions. These devices are cognitively distracting, even when not actively used [32] and often lead to a state of *absent presence* [33] in which an individual is physically present, but their mind is wandering elsewhere. This distraction induced by smartphones is particularly influential during social situations because people tend to associate their devices with external social networks [34] likely because we use smartphones to call, text, message, share, and communicate with our wider social support system. Thus, the mere presence of a smartphone may orient someone to think of people outside the context of their face-to-face conversation and divert their attention away from a conversational partner. Indeed, qualitative evidence has demonstrated that smartphones make social networks more salient and direct attention away from face-to-face conversations [35]. Interestingly, this type of activation of relational schema may take place without a person's awareness [36]. The simple presence of a device, consciously or unconsciously, distracts us and activates representations of social networks that may exert positive and/or negative influences on in-person communication depending on the context of the interaction.

Several psychological experiments have demonstrated that when an individual is distracted from their immediate face-to-face conversation partner(s) due to smartphone presence, the quality of that interaction suffers. Researchers found that the presence of a phone can have a negative influence on closeness, connection, and conversation quality between dyads [37]. In a naturalistic experiment, people in a coffee shop who conversed together without smartphones present reported higher levels of empathetic concern for their partner than those who had phones present [38]. Similarly, groups of friends who ate a meal together without phones present reported less distraction and more enjoyment than those who had phones with them [39]. Finally, using objective assessments of smiling behavior, researchers found that conversation partners who were in the presence of a phone were less likely to smile than those who had no phone present [40]. The detrimental effects of having a smartphone present during potentially positive social interactions have implications for social support and quality of life. By lowering the quality of the interaction, phones may interfere with the formation of new relationships and disrupt the maintenance of existing relationships. In this way, smartphones themselves, even when not used, may have a negative influence on social support in our modern world.

However, the presence of a smartphone may not always lead to negative consequences. In undesirable social situations, such as stressful or isolating interactions, smartphones may actually provide benefits. People can rely on smartphones as an avoidant coping mechanism, as demonstrated by an experiment that showed how the presence of a smartphone can lower an individual's initial reaction to social stress [41]. Another experiment demonstrated that the mere presence of a phone can aid in recovery from a socially stressful situation. Individuals who had their phones with them, but were restricted from using the devices, exhibited sharper declines in physiological stress after they were exposed to a stressful social exclusion paradigm compared to those who had no phone or used their phone [42]. The representational image of our smartphone may increase feelings of perceived support and provide a reminder of the social resources available to cope with a stressor at hand. As discussed earlier, perceived social support is a key predictor of health because of its ability to help us handle stress. So if smartphones symbolize perceived social support, they may be relied upon to help us overcome stressful situations. In this way, phones can be health-protective by serving as something akin to a *digital security blanket* that offers comfort in uncomfortable circumstances.

The distracting pull of smartphones on our attentional awareness is responsible for both the positive and negative effects mentioned above. Specifically, distraction caused by the symbolic connections offered by phones can shift attention away from negative environmental stressors and provide a sense of security. On the other hand, the salience of social networks represented by a phone can pull attention away from a potentially positive interaction and lower the quality of that conversation. In both cases, the key element that allows the mere presence of a phone to exert these positive or negative influences is the symbolic social connections represented by a smartphone. The way we conceptualize social support has altered significantly due to the widespread adoption of smartphones. The digital threads that connect us to

our wider social support system are in our pockets at all times, and carrying that symbolic network of friends and families with us can be positive or negative depending on the circumstances of our face-to-face interactions.

Online Social Support

Online communities, such as the aforementioned Facebook groups, provide abundant opportunities for users to give and receive social support. These online interactions—and the support and strain users derive from them—is similar but distinct from that exchanged offline. Much like support exchanged in offline groups like Alcoholics Anonymous and hobby clubs, giving and receiving online social support can be a source of validation contributing to an improved quality of life. Online support can take the form of advice written in a reply to a weight loss forum post, a “like” on an Instagram photograph, or banter amongst high school friends in a groupchat. Likewise, norms around social support exchange differ across online locales; for example, social networking sites (SNSs) like Facebook can be contrasted with anonymous online support groups (OSGs) composed of strangers facing a shared challenge, like the subreddits/depression. Despite the challenge of defining online social support, seeking social support it is one of the foremost reasons that individuals choose to participate in online communities.

The unique dynamics of Internet-mediated social interactions shape the ways that users exchange support. The relatively low stakes of online interactions minimize typical in-person impediments to conversation and relationship formation (e.g., shame, stigma, appearance, and physical inability) [43]. Online interactions enable users to express their ‘true selves’ more than they would in person [44–46], creating the potential for “hyperpersonal interactions” [47] featuring high openness and liking between parties. Even relationships that exist entirely online can be meaningful sources of social support [48]. However, loosened social norms online also facilitate the misinformation and bullying for which online communities are notorious [49].

Numerous positive impacts of OSGs have been identified, although their impacts on “hard” health outcomes need to be more rigorously investigated [50]. Perceived social support from an OSG is mediated by identification with the community and interpersonal bonds with other members [51]. Similarly, identification with other forum members is a key moderator of the link between positive psychosocial outcomes and participation in online discussion forums [52]. Research has also demonstrated that Facebook-based social support generally improves physical and mental health, and reduces symptomatology related to mental illness [53].

Online sources of social support are particularly crucial for people who struggle to find support offline [54, 55]. One study found that typical inequities in support availability related to race and age are minimized among those that have access to the internet and SNSs [56]. Using massive social networking sites like Twitter, people facing rare or understudied health issues can rapidly connect to exchange

first-hand experiences and expert insights. For example, after he was diagnosed with COVID-19 early in the pandemic, the digital health speaker Maneesh Juneja used his twitter to publicly share frequent updates on his recovery and recommend digital resources to others. Another unique benefit of OSGs is that they provide forms of support that are specific to the needs of their users. For example, members of Mood Disorder communities offer one another primarily emotional support, while Compulsive Disorder community members tend to exchange instrumental support in the form of tips for dealing with symptoms [57].

Providing support to others, while often fulfilling, can also be quite taxing. Some SNS users feel overwhelmed by the inundation of support requests they encounter from other members of their online communities (i.e. a Facebook status asking for help moving or a Twitter post venting about a difficult breakup). This feeling of “social overload” is particularly common for users who feel they are obliged to respond to SNS support requests, as well as those who have a greater number of online-only friends, as compared to friends with whom they have offline relationships as well [58]. Similarly, mental-health OSG users often complain of “endless grief loops” from encountering an excess of disheartening stories from other users [59]. These concerns, as well as the prevalence of trolling, bullying, and misinformation under anonymity, present substantial downsides to participation in online spaces for some [60].

Online communities’ scale and accessibility enable users to bypass common barriers to giving and receiving social support. These spaces hold particular appeal for people who lack the in-person networks to openly discuss the topics they care about. At their best, online communities offer empowerment through genuine human connection. Yet, because people interact online in such diverse ways, more research is necessary to fully understand how online social support contributes to users’ broader social lives.

Parent-Child Relationships

Frank Lloyd Wright’s well-known quote, “the hearth is the psychological center of the home” conjures images of quiet reflection, children cuddling with parents, storytelling, and bonding with loved ones. Today’s switch to an electronic epicenter of the home may seem abrupt but it has been happening incrementally in many cultures across the globe for decades. Indeed, the popularization of television in the 1950s marked the beginning of the screen as a replacement for the hearth, followed by the rise of the desktop computer in the 1980s, the mobile phone in the 1990s, smartphones in the 2010s, and more recently, social media and online gaming fiercely vies for attention at the family dinner table. Yet, as tempting as it may be to romanticize times passed, it is likely that the drive for social connection has not changed from one generation to the next, rather, it is the vehicle of connection that has radically transformed. Research on the impact of this technological shift on family relationships is quite mixed with some studies suggesting that it is

detrimental to the family bond while other studies show that technology, in its various forms, promotes healthy connection. Benefits and detriments alike, most families have invited this virtual guest into the home and technology has established a firm seat at the table.

An electronic third-party is now in near constant attendance, at times enhancing interactions with close loved ones and at other times, detracting from them. Many children are raised by parents tied to mobile devices with popular media and large portions of society expressing concerns regarding the repercussions on children's well-being due to distracted parenting. These concerns are not completely unfounded. Some research has shown that screen time is detrimental to the parent-child relationship. Specifically, distracted parenting due to mobile device use is linked to more child behavior problems, increased risky-behaviors in children, reduced parent-child interaction, and reduced parental sensitivity [61]. Further, children notice parents' use of mobile devices and report feeling excluded and emotionally dissatisfied during these occurrences [62]. However, this evidence should not be over-simplified and is only one piece of a much larger body of literature. Research also shows that a brief distraction may help parents to recharge and re-engage with their children more effectively. For example, one study found that following approximately 15-min of focused mobile device use; parents often initiated exuberant and joyful play with their children [63]. In this sample, parents first ensured that children were engaged in safe play prior to using their mobile phones. It was only then that most parents began smartphone use. After this well-placed distraction, parents re-engaged with more enthusiasm and interest than they displayed pre-distraction. The researchers described an ebb and flow between engagement and disengagement and suggest that the cycle between interactions may provide relational benefits. While mobile phones may foster a type of disengaging recharge for parents, other technologies appear to facilitate parent-child engagement.

The majority of American homes have a television as the focal point of the family room and the TV is one screen designed to host a group experience. Research has found that parental co-use of technology may have advantages [64], for example, co-viewing of television is linked with gains in preschoolers comprehension [65], attenuated fear and aggression among school-aged children [66], direct positive effects on language development in low-income immigrant families [67] and may help with young children's verbal development in well-designed programming [68, 69]. Beyond television, there is also evidence supporting the benefits of parent-child co-use of mobile phones, gaming systems and computers. Research shows that teenagers benefit from parental help with computers and this may promote self-efficacy and technological expertise [70–72]. Further, parents that played video games with teenage daughters had daughters that reported higher parental connection, fewer internalizing problems, and increased prosocial behaviors than those that did not [73].

Advantages and disadvantages alike, technology is a firmly entrenched presence in most homes with the number of smartphone subscriptions surpassing the world population [74]. Even still, parents who use technology with children present bear the brunt of heavy criticism and regular shaming from the popular media. But

parental distraction is not a new phenomena and is certainly not unique to the current generation. In times past, parental heads might have been buried in a newspaper or absorbed in home projects, hobbies or social clubs. The fact that the new distraction is digital does not make it inherently harmful and undivided attention from parents to children is not necessarily beneficial for either party. The challenge is found in the ability to discern how to calibrate and modify technological use, so that it facilitates familial well-being. Technology can be used as a vessel that helps to hold relationships in the same space or it can be used to divide. It is neither good nor bad until the user gives it its purpose. One could argue that parents who use mobile devices to play games with their children, photograph memorable moments, and connect with other parents *better* serve their children. Further, the co-use of technology gives parents an opportunity to influence how children navigate their way through virtual networks. Indeed, school-aged children that co-use the internet with parents are more likely to seek out educational websites when compared to children who co-used the internet less [75] and respected organizations are adjusting recommendations based on emerging evidence. In 2013, the American Academy of Pediatrics changed its recommendation from strictly limiting media for young children to encouraging parents to co-use media with their children [76]. Taken together, the collection of information we have discussed suggests that the influence of the digital presence on familial relationships fluxuates based on contextual cues and is more likely a reflection of the psychology of the user rather than the influence of the tool itself.

Discussion

The integration of technology into our daily lives has broadened the scope of interaction with our social networks and expanded the ways in which we can assess the influence of social support on health and quality of life. The abundant and detailed data produced by our online activity and technology-infused lifestyles represents a fertile ground for exploration into the intricacies of social interactions. Since social support is such a critical aspect of quality of life, it is imperative that we continue to develop innovative methods for assessing social interactions. A focus on Quality of Life Technologies (QoLT), the software and hardware that allow us to assess and monitor well-being [77], may allow us to take this next step forward in capturing and disseminating social information about our lives. By leveraging these QoLT, such as the social data recorded on our smartphones, we can hope to better understand social interactions and draw upon the multitude of opportunities for improvement of well-being. The omnipresence in social circles coupled with the hardware and software capabilities of QoLT allow for an unprecedented level of insight into the dynamics of social well-being that can be drawn upon to assess and improve social support. Traditionally, researchers would solely rely on self-report measures to assess social support and its related constructs. And while this data is certainly valuable and important, the objective and unbiased information gathered from technology-enabled methods

provides an unprecedented level of detail and insight that uncovers the dynamic and complex nature of how social support unfolds. In tandem with social implications, mobile technologies offer us the ability to track and measure health indices such as sleep, exercise, nutrition, and cardiovascular function. Together, these tools can be employed as electronic observers providing insight into the various ways social behaviors (on and off-line) may impact important health behaviors and outcomes.

By drawing on a multitude of technological resources, researchers are able to leverage big data to examine the complex ways in which social support transpires in the modern age. By focusing on social media activity of groups and individuals via platforms like Facebook and Twitter, researchers can begin to understand how social interactions manifest online. This data can be linked to important individual psychosocial outcomes or health-relevant group concepts that may inform how online social support influences health. Furthermore, the plethora of technological devices that pervade our daily lives can be harnessed to provide big personal data that informs our understanding of social support. Researchers can glean information from smartphone behavior or wearable devices to passively track socially-relevant factors that occur in real-time in the real-world. We can also utilize techniques such as ecological momentary assessment to gather in-vivo measurements of daily social and well-being variables. This information may be used by researchers to update theories and ideas about the biopsychosocial effects of social support, and may also be relied upon to inform health practitioner recommendations or interventions. Additionally, individuals can analyze their own digital social metrics to better quantify their social wellness and recognize areas for potential improvement or change. By engaging in this way in the Quantified Self movement, individuals may be able to augment their quality of life by creating data-driven goals for behavior change. Taken together, the advent of internet-enabled technological devices has opened a never-before-seen window into the intricacies of individuals social lives and health behaviors that allow us to capture a wide array of biopsychosocial information that can be leveraged to better our understanding of these quality of life indicators.

When considering the meaning of this technology derived social data, it is critical that researchers and practitioners also keep in mind the ways in which technology has altered our understanding about the conceptualization, meaning, and influence of social support in the digital age. The intrusion of technology into our social interactions has innumerable positive and negative effects on the quantity, quality and function of social support. Social support is increasingly taking place in the realm of internet-mediated communications, and this transition to virtual communication alters the applicability of and relevance of the traditional ways in which we understand the impact social support on well-being. In this chapter, we focused on three areas in which technology has changed our conceptualization of social support, namely in regard to face-to-face conversations, social support groups, and family interactions.

As smartphones have come to symbolize social networks, due to their use as social communication devices, the presence and/or use of these devices has altered

the dynamics of face-to-face conversations. The symbolic social support represented by smartphones distracts us from in-person interactions by unconsciously or consciously drawing our attention away from the present situation. This absent presence often decreases the quality of our face-to-face interactions, especially when that interaction is potentially positive. On the other hand, that same social distraction can be beneficial in aversive situations when the symbolic connections provided by our smartphone provide a temporary *digital security blanket* crutch on which we can rely on to buffer the stress experienced in the undesirable circumstance.

Similarly, our interactions in online communities introduce an extra layer of complexity into how group-level social support influences well-being. Online communities, ranging from massive social media platforms to niche hobby forums, are an evolving and influential social phenomenon. These spaces enable interactions distinct from real-world groups, presenting unique opportunities and challenges. For some, online communities can be a gateway into progressively darker mindsets, yet for others they are a lifeline, offering hope in the form of genuine human interaction and social support. Our online activity deeply influences our lives and society on a global scale, and as such deserves careful attention.

Family dynamics are also undoubtedly shifting due to the widespread adoption of smartphones and the internet. The digital presence in many households can often drive a virtual wedge between family members and lead to developmental or relational problems when devices are overused. Further, whether technology is used to promote the quality of family relationships or not, any overuse of screens could promote sedentary behavior ultimately impacting health and well-being. On the other hand, technology can be used to bring families together, foster communal experiences, and increase familial engagement. As technology cements its seat at the dinner table, it will be critical for parents (and children) to be aware of the positive and/or negative ways in which their digital behavior influences family well-being. Families will need to learn to use technology in moderation and operate this electronic tool with the purpose of fostering positive health behaviors. In sum, a verdict cannot be assigned as to whether technology is “good” or “bad” for families. Like any tool, it can be abused and misused or it can become an instrument boosting the quality of life for many.

Future Directions

There are innumerable possibilities for how technology will influence our assessment and conceptualization of social support in the coming years. Technological change is occurring at a blistering pace and it is nearly impossible to predict exactly how it will impact our society and individual well-being. We remain optimistic that the breadth and depth of our knowledge and understanding of social support will continue to expand.

Technology-enabled methods and techniques for objectively assessing social support will likely flourish in the coming years and provide an unprecedented level of detail about our social lives. Researchers can leverage passive sensors to capture behavioral observations like facial expression, tone of voice, or body posture along with location or usage information to further understand the nature of social interactions. Of course, there are privacy issues that will need to be considered with such approaches. But individuals who are willing to provide this access to their information will help researchers and practitioners capture more fine-grained details about the nature of social support. The amount of data accumulated through online activity, smartphone behavior, wearables, and yet-to-be invented technological devices will paint a complex picture of social life, and the social interactions therein. These data will be leveraged by researchers and practitioners in order to find ways of improving our social relationships and long-term wellbeing through rigorous research methodologies, data mining, and targeted interventions. There are so many different streams of data, some on the individual level and others on the group level, that will accrue information about social happenings across the globe. As wearable technology and smart devices become ever more integrated into our lives, the moment-to-moment details of our existence will inevitably leave a digital trace. If researchers can find a way to funnel this information together to develop comprehensive social profiles of individuals or groups, then that information could be used to provide unprecedented insight into the manifestation of social support.

As seen in the sections above about the influence of technology on social support, the intersection of these devices with our traditionally understood reality can produce mixed results. Depending on contextual factors, individual characteristics, motivational reasons, and conscious or unconscious behaviors, technology can either wreak havoc on the quality of social relationships or supplement our connections and enrich social activity. One factor that seems to be overwhelmingly positive in regard to the use of technology and well-being is when technology is used communally (i.e., watching a video or playing a game together) rather than solitarily. While this kind of shared experience does not necessarily promote conversation in the moment (depending on the viewing choice) it can promote touch, warmth, shared suspense, and excitement when users choose to utilize it this way.

One possible trend of interest to researchers and practitioners that could continue to develop is the displacement of the functions of social support with internet-mediated support. Traditionally, we think of social support providing benefits by offering emotional, informational, or instrumental resources that aid an individual in times of need. For most of human existence, if someone had a stressful problem to deal with they would most likely rely on significant others for advice, comfort or resources. But what if technology itself, rather than another human being, provided this support? Indeed, many people already rely on technology to provide support in times of need. Googling a question about a novel health concern may provide more useful information than asking your neighbor, interacting with a caring avatar in a video game (or a caretaker robot) may be able to give someone a sense of comfort and security that busy friends cannot provide, soliciting strangers to crowdfund for a personal cause may be more effective than asking a family member for a loan. In

these instances, direct human contact has been taken out of the equation. As people become more reliant on digital means of communication, individuals may reap the benefits of instrumental, emotional, and tangible support through Internet use, rather than through face-to-face social relationships. By considering this possibility, we can see how technology has opened up the doors to a whole new network of possibilities for support sources that could conceivably replace the traditionally understood social support.

Yet, we do not believe that society will evolve (or devolve) into a place where face-to-face human connection has been subsumed by virtual environments. It is a frightening thought to imagine a future where individuals do nothing more than sit alone and stare endlessly into a glowing screen that seamlessly provides for all their needs and desires. I believe that even as we climb ever higher up the ladder of technological innovations, humankind will always be at the core of it all. People have an innate desire to seek social connection [78], and that desire will ensure that we never stray too far from reliance on our place-based social networks. Even as we rely more heavily on non-human sources of support (i.e., Internet), it is important to remember that *people* are the ones who create the content of the Internet. While attempting to reduce your stress or receive support by asking Google a question might seem like an entirely non-social activity, a human-being was the one who actually wrote the answer that you seek. So instead of thinking about technology replacing social relationships, it may be more appropriate to view technology as a medium that can supplement and broaden the ways in which social connections play out. We can use the Internet to strengthen our current social bonds, to expand our social networks, and most importantly to draw on the worldwide human experience to provide the support that will allow us to flourish.

Conclusions

Technology-enabled methods have allowed for more accurate and detailed quantification of social support. By analyzing the digital traces of individual and group behavior, we are able to better understand the complex dynamics of social interactions and its influence on well-being. Continued advancements in technological approaches will likely further enhance our comprehension of social support and equip individuals, researchers, and practitioners with the necessary knowledge and tools to improve quality of life.

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