

What is technology's impact on social health?

Background

With the emergence of new technologies, including smart phones and social media platforms, it has never been easier to reach out to others, connect at a moment's notice, or keep in touch over long distances (Plotkin, [2012](#)). Yet, while access to these tools has increased over the last several decades (Spiegelman & Detsky, [2008](#)), some studies suggest that we are becoming less socially connected. In fact, evidence has emerged that we have fewer strong social ties (Cox, [2021](#); Twenge et al., [2019](#); Brashears & Brashears, [2015](#); Brashears, [2011](#); McPherson et al., [2006](#)) and spend less of our time socializing than we did in decades past (Kannan & Veazie, [2023](#)). Reinforcing worries about the harmful health effects of digital technologies, rates of poor mental health (particularly in young people) have increased along with the ubiquity of digital tools, such as the internet, social media, and smartphones (Dykxhoorn et al., [2023](#); Bhattarai et al., [2020](#); Goodwin et al., [2020](#); Marquez & Long, [2020](#); Twenge et al., [2019](#); Knowalek & Wolanczyk, [2018](#); Bor et al., [2014](#)). Of course, an association through time between the emergence of digital technologies and worsening mental health does not necessarily imply that one causes the other (Twenge et al., [2010](#); Maughan et al., [2005](#); Smith & Rutter, [1995](#)). Nevertheless, given the potential for harm and the widespread uptake of digital technologies, it is important for us to understand how these tools impact our wellbeing.

Purpose

The purpose of this evidence brief is to review the impact of digital technologies on our mental and social health. In doing so, we primarily focus on internet-enabled and communication technologies, though recognize that other technological devices and platforms, such as television and video games, also impact our wellbeing.

Evidence from Existing Studies

Uptake and Use of Digital Technologies

Digital technologies are now commonplace and we are exposed to these tools at earlier ages than ever before. The introduction of these technologies has taken place without systematic evidence ensuring their safety (Courage & Troseth, [2016](#); Hirsh-Pasek et al., [2015](#); Meyer et al., [2021](#)). In fact, on average young children now spend several hours a day using digital technologies – representing a considerable shift in processes related to human development (Meyer et al., [2021](#)). Patterns and types of use at early ages are diverse, and include using apps to learn, develop skills and find entertaining content (Meyer et al., [2021](#); Hirsh-Pasek et al., [2015](#); Meyer et al., [2021](#); Ponti et al., [2017](#)). As children age, they branch out and begin using apps, websites, and other communication tools to connect with friends and family (Winstone et al., [2021](#); U.S. Surgeon General, [2023](#); Khalaf et al., [2023](#); Mollborn et al., [2021](#); Villanti et al., [2017](#)). According to available estimates, up to 95% of youth in the United States are using social media to connect with their peers – and similar levels of use are likely in other

countries (U.S. Surgeon General, [2023](#)) and also among adults more generally (Crouch & Gordon, [2019](#); Hamid et al., [2023](#); Vătămănescu et al., [2016](#)). Even older adults who grew up in an era with fewer digital technologies are beginning to adopt these tools at higher and higher rates. As the social networks of older adults shrink (Fingerman et al., [2020](#)) many of them use technology to ward off feelings of loneliness and navigate their social lives (Chopik, [2016](#); Fingerman et al., [2020](#); Mitzner et al., [2010](#)). Of course, uptake of technology is patchwork, being more common among those with higher incomes and education (Crouch & Gordon, [2019](#); Fingerman et al., [2020](#)). People use different technologies with varying levels of intensity to meet different needs, and with varying levels of success (Ruggiero, [2000](#)). Despite these variations in use, it is clear that technology now plays a very important part in our individual and collective social lives.

The Social and Health Impacts of Technology Use

Given the pervasiveness of digital technologies throughout our lives, many studies have investigated the effects these have on our wellbeing. Taken together, these studies have produced mixed effects (U.S. Surgeon General, [2023](#); Yavich et al., [2019](#); Escobar-Viera et al., [2018](#)) – with the balance of evidence suggesting a small to moderate influence on individual wellbeing (Huang et al., [2010](#)). However, even these results must be interpreted with caution. Most studies lack clearly defined theoretical frameworks and fail to describe the specific pathways that might account for observed effects (Bekalu et al., [2023](#)). As well, there are considerable variations in which technologies are studied and how technology use is measured (Escobar-Viera et al., [2018](#)). Given these mixed results and the varying quality of contributing studies, it is necessary to consider both the positive and negative effects to get a full picture of how technology influences our social health.

Social Benefits of Technology

Individuals report a wide variety of benefits from digital technologies (Sun, [2023](#); Dietz-Uhler & Bishop-Clark, [2001](#)). For example, it is evident that they have considerable potential to make some aspects of life easier and more enjoyable (Hirsh-Pasek et al., [2015](#); Ponti et al., [2017](#); U.S. Surgeon General, [2023](#)). With respect to the social benefits of technology use, researchers have hypothesized that social media and communication technologies can facilitate social interactions and support – providing opportunities to meet new people and stay connected (Winstone et al., [2021](#); Nick et al., [2018](#)). Exemplifying this, Cole et al., ([2017](#)) showed that young people with weaker in-person social support are able to strategically leverage social media to get the support they otherwise lacked. Some studies even suggest that technology may facilitate greater levels of social interaction and social support. For example, Wang & Wellman ([2010](#)) reported that heavy internet users actually had the most friends of any group. However, researchers also note that the forms of social connection facilitated online appear to preference weak ties, rather than strong ones (Patulny & Seaman, [2017](#); Twenge et al., [2013](#); Robinson & Martin, [2010](#); Hampton et al., [2009](#); Shklovski et al., [2006](#)) – perhaps leading to lesser social embeddedness overall despite an increase in diverse social interactions.

However, while it's unclear whether these platforms actually help individuals form meaningful relationships with a greater number of people (Dunbar, [2016](#)), it is clear that people use them to connect and that such connection is beneficial (Hall et al., [2023](#); Burholt et al., [2020](#); Chopik, [2016](#); Best et al., [2015](#); Mitzner et al., [2010](#); Baym et al., [2004](#)). One way these platforms assist with this is by helping people find communities who share their interests or life experiences



(Arky, [2023](#); Hamid et al., [2023](#); Khalaf et al., [2023](#); U.S. Surgeon General, [2023](#); Woo & Chase, [2022](#); Dienlin & Johannes, [2020](#); Crouch & Gordon, [2019](#); DeHoff et al., [2016](#); Vătămănescu et al., [2016](#)). For isolated individuals, such as older adults, the internet can help them overcome physical and geographic barriers that contribute to isolation (Petersen et al., [2023](#); Kusumota et al., [2022](#); Chopik et al., [2016](#)). In these instances, technology use can be lifeline.

More generally, people use technology to stay in touch with each other. In fact, to some extent, it may even be necessary to use digital forms of social connection in order to maintain relationships and connections with other people (Venter et al., [2019](#); Turkle et al., [2012](#)). Underscoring this reality, one experimental study found that participants asked to abstain from social media use actually experienced lower wellbeing as a result (Vally & D'Souza, [2019](#)) – likely because abstaining from social media leads to isolation as individuals are cut off from their friends and family. In sum, it is clear that technology is widely used to facilitate social connections and maintain relationships and that such use of technology has many benefits (Patulny & Seaman, [2017](#)).

Harms of Technology

Without discounting the potential benefits and social uses of technology, research also suggest that digital technologies can cause harm. For example, researchers have sought to understand whether computer-mediated social interaction *replaces* in-person, face-to-face social activities. For example, Rosenfeld et al. ([2019](#)) found that online dating platforms began displacing other ways of meeting romantic partners in the mid-1990s. Despite evidence for displacement, studies have generally found that internet use does not have a particularly strong influence on levels of social interaction at the individual level (Hall et al., [2017](#)). While researchers have documented declines in face-to-face contact that coincide with rises in technology-mediated contact, social technologies are generally associated with greater, not less perceived social support (Patulny & Seaman, [2017](#)). Importantly, however, even if at the individual-level technology use is not associated with being less socially connected, at a group level the pervasive presence of technology could make social connections more difficult. This viewpoint is supported by Twenge et al. ([2019](#)), who noted that technological displacement of social interactions occurs at the cohort level across generations, but not at the individual level. Providing additional support for this, Kushlev et al., ([2017](#)) conducted an intriguing study by asking participants to find an unfamiliar building and participate in a problem-solving task. Participants were randomly assigned to either use their smart phone or not. Those who used their smartphones, experienced benefits to their mood (because the task was easier) but overall felt less connected. This study highlights the ways in which relying on technology displaces our reliance on others – leading to potentially harmful outcomes (Rushkoff, [2021](#); Turkle, [2012](#); Pickett, [2004](#)). Thus, while difficult to detect – due to the positive associations between technology use and social connectedness on an individual-level – technology does appear to displace social connections at least to some extent.

To understand whether the displacement of face-to-face social connections is a problem, researchers have sought to compare in-person face-to-face social interactions with computer-mediated ones. While it is impossible to say that face-to-face connections are universally beneficial in all situations and for all peoples (Rhoads, [2010](#)), the existing literature does support the idea that face-to-face interactions are generally superior to computer-mediated ones across a wide variety of measures (Dhakai et al., [2023](#); Hall et al., [2023](#); Stieger et al.,



[2023](#); Gruber et al., [2022](#); Hadley et al., [2022](#); Marinucci et al., [2022](#); Ransom et al., [2022](#); Behrens et al., [2019](#); Simone et al., [2019](#); Sacco & Ismail et al., [2014](#); Okdie et al., [2011](#); Lee et al., [2010](#)). For example, Petrova & Schulz et al., ([2022](#)) found that following engagement in less life-like social interactions, individuals report feeling more lonely, sadder, less affectionate, less happy, and less supported. Explaining the superiority of in-person social connection, studies have shown that they better facilitate non-verbal communications (which make up a substantial component of human social behaviour; Beyan et al., [2022](#); Eddy, [2019](#)) and self-disclosure (which is key to the development of intimacy; Ruppel et al., [2016](#)). As well, emerging evidence indicates that physical touch and presence are fundamentally beneficial to individuals (Packheiser et al., [2023](#); Taneja et al., [2021](#); Field, [2010](#)). These and other advantages of in-person connection are important to consider when determining the format of social interactions.

Importantly, however, computer-mediated interactions are better than having no interactions at all (Kroencke et al., [2023](#)) and people with better mental health are seen to engage in a greater variety of social contexts (both online and in-person; Simone et al., [2019](#)). This logic has led to researchers examining whether digital mediated social interactions can be used to support people who are socially isolated – though the results of studies evaluating these interventions have shown mixed results and the positive effects tend to be small (Doring et al., [2022](#); Macdonald et al., [2021](#); Noone et al., [2020](#)).

In addition to displacing social connections with inferior digitally-mediated ones, new technologies can also cause direct harms. For example, the internet is full of harmful content, including misinformation, divisive posts, scams, and communications from mean-spirited individuals (Diomidous et al., [2016](#); Leist et al., [2013](#)). As well, even in the absence of negative stimuli, the carefully curated nature of content online can lead to unfavorable social comparisons, which have been linked to worse body image, poorer self-esteem, and greater levels of loneliness (Gregory et al., [2023](#); McComb et al., [2023](#); Dibb & Foster, [2021](#)). Similarly, the abundant entertainment online can serve as attractive escapes – leading to engagement in less effective forms of coping that can lead to the deterioration of relationships and trap people in isolation (Hoge et al., [2017](#)) – lowering the quality of our social interactions and our attention to others (Rotondi et al.; [2017](#)). Even when people are not using technologies to displace in-person social connection or engage in cognitive escape, studies indicate that even the mere presence of a smartphone during a social interaction can deteriorate the quality of the interaction (Dwyer et al.; [2017](#); Ward et al., [2017](#); McDaniel & Coyne et al., [2016](#); Katz & Aakhus et al., [2002](#)) – though here too study findings are mixed (Sprecher et al., [2016](#)). Compounding all of these problems, technology use is often sedentary – leading to poorer physical and mental health, which can further deteriorate our ability to meaningfully connect with others (Diomidous et al., [2016](#); Harvard Health, [2018](#); Johnson, [2023](#)).

Differentiating Between Harmful and Beneficial Technology Use

Recognizing that technology use is associated with both harms and benefits, researchers have begun to distinguish between healthy and unhealthy patterns of use (U.S. Surgeon General, [2023](#); Lippke et al., [2021](#); European Parliament, [2020](#); Gao et al., [2016](#); Diomidous et al., [2016](#)). Indeed, it is increasingly recognized that not all forms of digital technology use are harmful (Seabrook et al., [2016](#)). Supporting this assertion, meta-analyses suggest that “active” forms of social engagement, including one-to-one communication, self-disclosing mutual online friendships, and uplifting online social engagements, are associated with lesser loneliness and



stress (Marciano et al., [2022](#)). Meanwhile, “passive” (e.g., content consumption) forms of technology use appear to be less beneficial and more harmful (Ozimek et al., [2023](#); Keum et al., [2022](#); Valkenburg et al., [2021](#); Whitley, [2020](#)). Of course, these relationships are nuanced and ongoing research continues to highlight important mediators and moderators. For example, Bonsaksen et al., ([2023](#)) demonstrates that greater time on social media is associated with greater loneliness – but primarily for those who use social media for social purposes. This suggests that for some individuals, striving to use social media in an “active” style may backfire. Highlighting this, it’s also important to recognize that individuals are not entirely in control of how they interface with technologies. For example, Gao et al. ([2016](#)) showed that social anxiety and loneliness was more strongly associated with the distribution of incoming calls than it was with outgoing calls. In other words, lonely individuals did not differ with respect to how many calls or texts they sent, but received fewer in-coming calls. This highlights how the broader social context in which individuals exist plays an important role in shaping their experience using internet and communication technologies.

Given these dichotomies, it is clear that technology use does not necessarily result in harms to users. However, in some cases, harmful patterns of use can cross into addiction or dependence (American Psychological Association, [2023](#); Dienlin & Johannes, [2020](#); Garrido et al., [2021](#); Tang et al., [2021](#); U.S. Dept Health and Human Services, [2022](#); U.S. Surgeon General, [2023](#)) – and in such cases the harmful associations with adverse health and social outcomes have been readily demonstrated (Cai et al., [2023](#); Ge et al., [2023](#); Huang, [2022](#); Masaeli & Billieux, [2022](#); Saadati et al., [2021](#); Meshi et al., [2020](#); Weinstein & Lejoyeux, [2010](#)). Importantly, however, the relationship between technology use and loneliness is observed to be bidirectional (Zhang et al., [2024](#); Pera, [2020](#)) – suggesting that technology use not only contributes to higher loneliness, but that lonely people engage in more harmful patterns of technology use as a result of their loneliness (Nowland et al., [2018](#)).

Of course, vulnerability to internet addiction depends on a wide variety of individual-level and social factors – but is also the product of certain elements that the majority of users are exposed to, include the contestant pressure to be accessible online, the attractive allure of complex stimuli, and other compelling elements (Kraut et al., [1998](#); U.S. Surgeon General, [2023](#); Winstone et al., [2021](#)).

In order to prevent harms arising from technology use, it is recommended individuals monitor their screen time, thoughtfully consider the impact of technology on their wellbeing, and set appropriate restrictions around use (U.S. Surgeon General, [2023](#); U.S. Dept Health and Human Services, [2022](#); CMHA BC, [2019](#); APA, [2017](#); Rosen et al., [2014](#)). In addition to setting restrictions, individuals should strive for healthy forms of engagement, including those that expose individuals to positive messaging, engender positive feelings, and help individuals engage in positive activities (Villamil & Heshmati, [2023](#)).

Analyses from the Canadian Social Connection Survey

Using data from the 2023 Canadian Social Connection Survey we asked participants to report on their relationships with 10 other people and examined whether increasing frequency of online and in-person communication were associated with levels of relationship closeness (Scored 0 to 10). Participants reported on an average of 7.6 relationships. Linear mixed effects regression results showed that higher relationship closeness was associated with longer



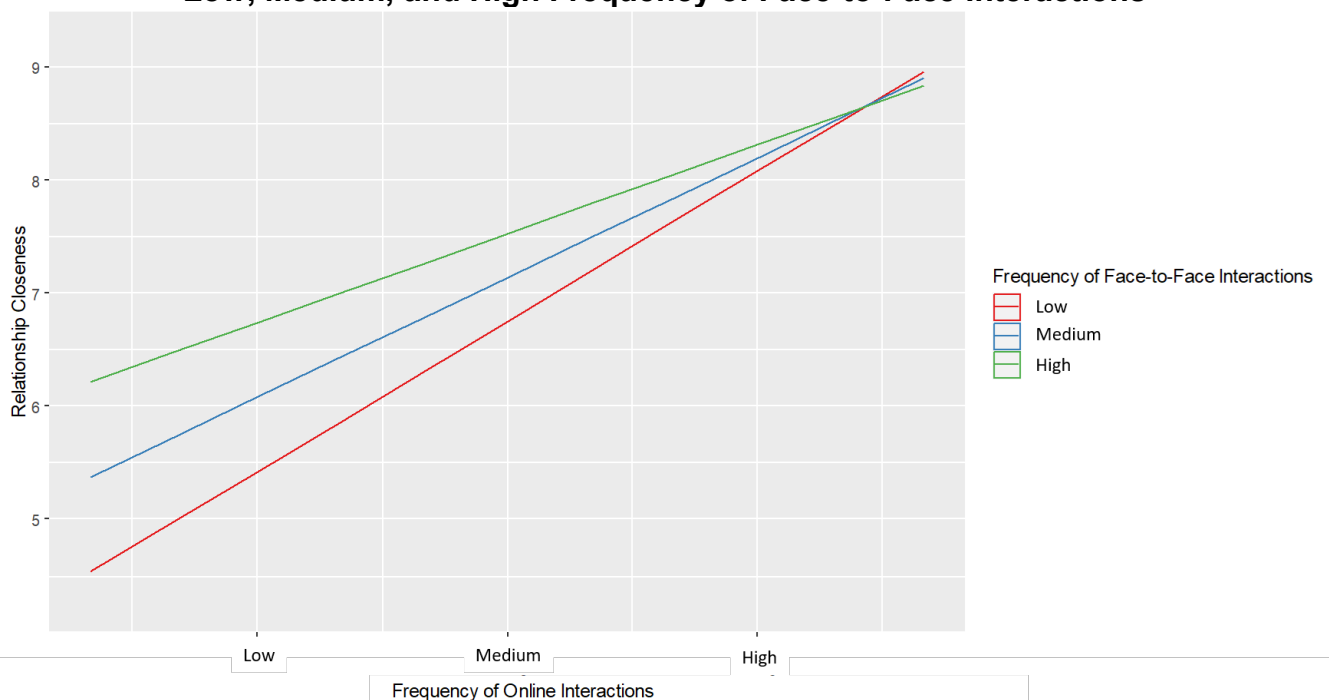
duration relationships (in years), greater frequency of face-to-face interactions, and greater frequency of online interactions. Notably, in the model, the effect of online interaction was stronger than that of face-to-face interaction – underscoring that close relationships are characterized by a high frequency of online interaction.

Table 1. Linear Mixed-Effects Model predicting Relationship Closeness Between Participants (n = 292) and Their 10 Closest Ties (n = 2241)

Term	Estimate	SE	df	t value	P-value
Duration of Relationship	0.03		0	2228.54	14.4 < .0001
Frequency of Online Interaction	0.55	0.04	2212.65	14.88	< .0001
Frequency of Face-to-Face Interaction	0.34	0.04	2215.67	8.64	< .0001
Interaction Online*Face-to-Face	-0.03	0.01	2203.82	-6.33	< .0001

An interaction term was also include, and the effect indicated a nuanced relationship between face-to-face social connection, online social connection, and relationship closeness. Several possible explanations may explain this interaction: First, there may be an optimal balance between these two types and when one is favored over the other, relationship closeness declines. Second, individuals may substitute one form of interaction for another and this substitution may lead to less closeness. For example, as people spend more time online, they may spend less time in-person – leading to lower closeness. However, the correlation in our data between the two types of interaction is actually positive ($r = 0.284$, $p < 0.0001$). Third, the quality of interactions may differ depending on the level of the other type of interaction. For example, perhaps as people spend more time face-to-face, the importance of online interactions declines or vice versa. Regardless of the nature of this interaction, closeness appears to be predicted by higher frequency of social interactions, both online and in-person.

Figure 1. Relationship Closeness and Frequency of Online Interactions, Stratified by Low, Medium, and High Frequency of Face-to-Face Interactions



In addition to examining the effect of digital technology on relationship closeness, we also looked at the effect of time spent on social media in predicting DeJong Emotional and Social Loneliness Scores. Results indicated that greater time spent on social media was associated with higher levels of loneliness ($\beta = 0.108$, $SE = 0.117$, $p < 0.0001$) – though the model had very weak explanatory power with less than 0.3% of the variation in loneliness scores explained by frequency of social media use ($R^2 = 0.003$). As well, greater time spent on social media was associated with spending more time with friends ($\beta = 0.409$, $SE = 0.165$, $p = 0.013$) – though again the explanatory power of the model was very weak with less than one tenth of one percent of time spent with friends explained by social media use ($R^2 = 0.001$).

Discussion

The weight of existing evidence indicates that technology plays an important part in our social lives. However, the empirical research examining its effects has produced mixed results, indicating that technology likely contributes to both beneficial and harmful effects. This finding highlights the need to use digital technologies carefully – striving for active and well-regulated use and avoiding technology when it causes distress or harm. Continued research is needed to understand the impacts of technology use, particularly with respect to specific mechanisms that may create benefit or harm across varied technologies. Finally, researchers should identify what effective resources are needed to support individuals in recognizing harms from technology use and in helping them achieve their goals for how they want to use technologies.

Conclusion

Based on the available evidence and our analyses of the Canadian Social Connection Survey, we recommend that individuals use technology actively to facilitate social connection while carefully monitoring for how their use makes them feel. When technology use displaces social interaction, distracts, or causes emotional distress, users should avoid continued use of that technology. Public health efforts can support lower-risk use of the internet and educate individuals on how to appropriately monitor and self-regulate their use of potentially harmful forms or patterns of technology use.

Suggested Citation: Simran Lail, Adam Frost, Jocelle Refol, Kiffer Card. (2024) “*Evidence Brief – What is technology’s impact on social health?*” Canadian Alliance for Social Connection and Health.

