Title

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Publication Date

2020-02-01

DOI

10.1016/j.copsyc.2019.06.022

Peer reviewed

Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Psychology

Two social lives: How differences between online and offline interaction influence social outcomes

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For hundreds of thousands of years, humans only communicated in person, but in just the past fifty years they have started also communicating online. Today, people communicate more online than offline. What does this shift mean for human social life? We identify four structural differences between online (versus offline) interaction: (1) fewer nonverbal cues, (2) greater anonymity, (3) more opportunity to form new social ties and bolster weak ties, and (4) wider dissemination of information. Each of these differences underlies systematic psychological and behavioral consequences. Online and offline lives often intersect; we thus further review how online engagement can (1) disrupt or (2) enhance offline interaction. This work provides a useful framework for studying the influence of technology on social life (119/120).

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Current Opinion in Psychology 2020, **31**:16–21

This review comes from a themed issue on **Privacy and disclosure, online and in social interactions**

Edited by **Leslie John, Diana Tamir,** and **Michael Slepian**

https://doi.org/10.1016/j.copsyc.2019.06.022

Introduction

'For hundreds of thousands of years, humans have primarily communicated and connected in person. But social life has dramatically changed in recent decades—starting when the first email was sent in 1965—shifting from fewer *offline* (in-person) interactions to more *online* (technology-mediated) interactions. Now, one out of every four American adults report being online 'almost constantly' [1]. The majority of Americans now socialize online; 68% of U.S. adults are Facebook users, 75% of whom report checking the platform daily [2]. Among teenagers, 95% report using smartphones and 45% report being online 'constantly' [2]. This shift from offline to online socializing has meaningful and measurable consequences for every aspect of human interaction, from how people form impressions of one another, to how they treat each other, to the breadth and depth of their connection. The current article proposes a new framework to identify, understand, and study these consequences, highlighting promising avenues for future research.

Structural differences between online and offline interaction

To more clearly understand the consequences of these different interaction media, we propose four key structural differences between them. Relative to offline communication, online interactions provide (1) fewer nonverbal cues, (2) greater potential for anonymity, (3) more opportunity to form new social ties and to bolster existing weak ties, and (4) wider dissemination of information. These structural differences lead to systematic psychological and behavioral consequences that are functionally changing the landscape of social life. Below, we consider each in turn.

Fewer nonverbal cues online

Most in-person interaction involves communicating nonverbally—from exchanging a smile, to touching, to modulating the sound of one's voice to convey emotions (e.g., humor or sarcasm). In contrast, many online interaction platforms (e.g. Facebook, Twitter, WhatsApp) are primarily text-based, lacking visual (e.g. facial expression), physical (e.g. touching), and auditory (e.g. voice) nonverbal cues.[3] The loss of these nonverbal cues has at least two consequences.

First, reading a communicator's opinions via text (e.g. in an email) compared to hearing exactly the same message via speech (e.g. a voice message), decreases observers' ability to accurately assess the communicator's true (self-reported) thoughts and feelings [4,5]. However, seeing a communicator in addition to hearing her does not further improve accuracy. This suggests that hearing communicators' voices uniquely provides insight into their mental states—perhaps more so than watching them speak [6]. There are even circumstances under which observers may be *more* accurate

[3] Interestingly, online communication can contain 'textual paralanguage' (textual representations of nonverbal expressions, e.g. sigh, eye roll) which approximate the nonverbal cues of an in-person interaction [3].

when hearing a communicator speak than when hearing and seeing her [7]. One consequence of communicating via text online, therefore, is that it can reduce people's understanding of others' thoughts and feelings (compared to communicating in speech offline), provoking possible miscommunication. Another consequence is that losing access to vocal paralinguistic cues can reduce feelings of social connection [8].

Second, reading, versus hearing, ones' opinions also makes the communicator appear less mentally capable—less thoughtful and emotional [9,10•]. This suggests that text-based interaction may be dehumanizing, since derogating a person's mental capacities is a form of dehumanization [11]. Directly supporting this possibility, one set of experiments demonstrates that observers are more likely to believe an ambiguous agent is a human (versus a machine) when hearing a human voice—compared to reading human-created text or seeing a human communicator [9]. These experiments also provide early insight into why a person's voice is humanizing: the nonverbal variance in speech (e.g. variance in pitch, pace) is associated with judgments of communicators' mental capacities; therefore, communicators with voices which lack such variance (and therefore sound machine-like) are not judged differently from communicators whose opinions are read via text.

Greater anonymity online

Online interaction allows for *passive browsing*, whereby one can look at others' social profiles or read their opinions without their awareness. As such, people are able to anonymously observe others more frequently and easily than ever before. Greater anonymity is associated with disinhibition and aggressive behavior—potentially because anonymity reduces accountability and thereby licenses bad behavior [12,13]. Online environments—which cater to anonymity and weakened social norms—may serve as a breeding ground for such behaviors [14,15]. Indeed, recent research suggests that social media can serve as a catalyst for moral outrage and social conflict [16•,17]. Relatedly, cyberbullying and online victimization has become a public health concern [18] and psychologists have called for closer examination of the consequences of digital communication among adolescents [19].

Online anonymity can also inhibit meaningful social connection. For example, in one field experiment, Bapna *et al.* [20] randomized 100 000 online daters to view others' profiles anonymously (versus not anonymously, where a record remained of the profile view). They found that while anonymized users were less inhibited in the number and type of profiles they viewed, they also ended up with fewer matches. By leaving a record of profile views, the non-anonymous viewers sent a weak signal of interest, increasing their match outcomes.

Forming, maintaining, and strengthening ties online

Online technology allows millions of people worldwide to communicate effortlessly, making it easier to expand and maintain social networks, and eliminating barriers posed by geographical distance. Has the advent of online media increased humans' social networks? In some ways, it has: the average number of 'Friends' among Facebook users is 338 [21], and many users have thousands of Friends listed. But perhaps these high numbers are misleading.

One study of Facebook users found that despite social media's explosion, the number of significant contacts that people report remains similar to before the rise of social media: around 5 intimate friends, 15 close friends, 50 general friends, and 150 acquaintances [22]. This threshold, Dunbar suggests, is imposed by brain size and chemistry, as well as the time it takes to maintain meaningful relationships. Moreover, the larger a person's network (>40), the less time they spend engaging with each contact [23]. Thus, cognitive and temporal constraints may limit the number of friends a person can maintain.

The sheer amount of opportunity to form connections may also have some negative consequences. In one set of laboratory experiments, people who made online partner selections from a large (versus small) choice set were less satisfied with their decision the following week [24].

Finally, people may use different methods for selecting their relationships online. For one, although homophily drives relationship-formation both online and offline, it may be a bigger predictor of reaching out to individuals online [25]. Some suggest that this tendency to primarily affiliate with similar others can create online 'filter bubbles' in which people become intellectually isolated [26,27].

Wider dissemination of content online

In offline interactions, the size of one's audience is limited by the physical size of the room; in online interactions, there is hardly any limit to audience size. Sharing content online is easier and more accessible than sharing it via mass media (e.g. television, radio), allowing a greater number of people to broadcast more content to more people (e.g. posting, tweeting, and live-streaming as much and as often as they choose). As a result, many individuals can access a significantly larger audience more easily and quickly online than offline (consider, for instance, celebrity Katy Perry who only needs to write a single statement on Twitter to reach her 107 million Twitter followers[4]).

The sheer size of one's audience can increase the effectiveness of persuasive appeals and make crowd-sourcing

[4] 107 095 161 followers as of April 2019.

feedback quicker and more efficient. This is one reason why social media can operate as a tool for political persuasion [28,29]. But the rapid dissemination of information can also be problematic, depending on the content: in one analysis of ~126 000 stories from 2006 to 2017, false stories spread more widely and more quickly than true stores [30•]. Similarly, in the final months leading up to the 2016 election, there was more engagement with fake news on Facebook than with articles from major news outlets [31].

People often 'follow' celebrities online, getting a glimpse into their daily personal lives in a manner unique to online content and social media, in particular. Connecting with someone online (e.g. following or friending a celebrity) provides fertile ground to form parasocial relationships (one-sided psychological relationships). As a result, people may view these parasocial online connections as 'friends,' and be less guarded to persuasion attempts, thus enhancing celebrity influence [32–34]. Further, people may not naturally consider celebrity posts to be sponsored endorsements. In one experiment, individuals viewed a post by a celebrity (versus a brand/endorser) either with or without sponsorship disclosure. They were only influenced by the disclosure when the post was made by a celebrity, suggesting that people assumed sponsorship when a post was made by a brand, but not when made by a celebrity [32].

Individuals and firms can also learn about their audience's preferences and tailor messages specifically to them. For example, machine learning models can estimate social media users' personal attributes with surprising accuracy (under one model, correctly identifying Democrat or Republican 85% of the time [35]); and matching a message to an audience's personality improves its effectiveness [36•]. Although people tailor messages offline as well, the process of tailoring is larger scale and more data-driven online. Ad campaigns can be designed to increase the likelihood that they are shared (i.e. go viral [37]) and firms often leverage social media to connect with consumers and increase purchase intentions [32]. When using social media, both a firm's communication style and an advertisement's fit with consumers can influence the degree to which consumers trust [38] and feel socially connected to the brand [39].

The interplay between online and offline social life

Despite the many differences in the structure and psychology of online and offline communication, these interactions often bleed into one another. A person may interact with a friend via social media one minute and then see her in person the next. We document ways in which online interaction can (1) disrupt or (2) enhance offline interaction.

Disruption

The *mere presence* of having one's smartphone is distracting (e.g. [40]) and can reduce the effectiveness of offline connection. Phone use during social interaction can reduce feelings of social connection [41,42••,43,44], the perceived quality of the interaction [45,46], enjoyment gained from the interaction [47•], and even frequency of smiling at others [48].

To highlight one example, parents who were assigned to use their smartphones frequently (versus infrequently) while with their children reported feeling less attentive and consequently less socially connected to them [43]. As another example, individuals assigned to navigate to a new location using their smartphone (versus no phone) were able to find the location more easily but also felt less socially connected [42••]. Further, feeling snubbed as a result of someone else using a phone during a face-to-face interaction ('phubbed') can lead to feelings of social exclusion and increase motivation to seek out social connection other ways, such as online [41].

Other forms of online engagement, such as taking photos, can impact offline experiences as well. Specifically, when taking photos increases experiential engagement, it can enhance enjoyment [49], but taking photos with the intention of sharing them can increase self-presentation concerns and thus decrease experiential engagement and subsequent enjoyment [50].

Digital technology can also disrupt social connection depending on the way it is used. Online interaction can harm well-being and reduce sociality if it displaces in-person connections [51,52,53•,54•]. Further, the passive use of social media, in particular (e.g. lurking behaviors; scrolling through others' feeds without actually engaging), has been associated with increased loneliness and lowered well-being [51,52,53•,54•,55].

Enhancement

Despite the disruptive potential of online interaction, there are at least three ways in which online interaction can also enhance offline interaction. First, the Internet provides opportunity for developing new offline relationships. For example, 57% of teenagers report having made at least one new friend online and 29% report having made more than five friends online (Lenhart, 2015). Further, in America, one-third of marriages began online [56] and 27% of adults ages 18-24 report using some form of online dating website or app [57]. These relationships may begin online, but often continue offline or in mixed-media. Online interactions can not only build new connections, but they can also complement and strengthen existing personal connections [51,52,54•,58].

Second, online interaction can provide support when offline interaction is impossible or scarce [54•]. In one

experiment, text messaging reduced anxiety during a negative experience: Patients who text messaged during surgery felt more socially supported and required less pain medication than patients who did not [59].

Third, the internet can be used as a tool to collaborate with others and organize social groups or movements (e.g. [60]). The internet also provides an avenue for social interaction through multiplayer games (games in which multiple people play together in the same gaming environment). Internet gaming is now a multibillion-dollar industry [61]. While the majority of attention has focused on the potential negative consequences of internet gaming (e.g. addiction [62];), it can also serve as a tool for social connection. Among teens who play games, the vast majority report playing with others (83% in person and 75% online) and say it makes them feel more connected to others, both friends they already know and people they only know through gaming [1].

Summary and future directions

The recent shift from offline to online interactions has fundamentally changed the way humans socialize and communicate, creating controversy about the impact of digital technology on well-being [63,64•,65]. This paper provides a new framework for organizing the extant literature. The consequences of digital technology can be categorized based on the structural differences between online (versus offline) platforms—fewer nonverbal cues, more anonymity, more flexible network selection, and wider audience—and the ways in which technologies harm or enhance offline connection.

Our framework also identifies many remaining research questions. Here we highlight some of the most ambitious questions that future work could pursue. First, if online interactions increase misunderstanding and dehumanization (because they lack nonverbal cues), how might different communication technologies reduce civility and increase conflict more broadly? Second, to the extent that online engagement is 'globalizing' (without geographic or audience-size boundaries), how might it change the development of universal norms and languages across the world? Third, because online interactions are more anonymous and data-driven, might they encourage the commodification or objectification of interaction partners? Consider, for example, the revolution of online dating, in which people are reduced to a single photo and selected or rejected with a mere swipe right or left (i.e. Tinder). Fourth, as technology continues to evolve, how might online interaction start to more closely resemble in-person interaction? For example, video chat is now highly accessible (e.g. Google hangouts, skype), allowing people to virtually connect in a way that maintains many nonverbal cues (e.g. voice, gestures). Online gamers will soon be able to select customizable voices, allowing them to choose how they sound while maintaining their own vocal inflection, simultaneously increasing both realism and anonymity [66]. A final fruitful area for investigation is the interplay between people's online and offline personas. As time spent with online communities continues to grow, how might online and offline personas differ, converge, and affect one another?

The future of human sociality lies in understanding, and consequently shaping, online interaction. It is more important than ever for science to maintain pace with this social evolution.

Conflict of interest statement

Nothing declared.

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- •• of outstanding interest

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