Handbook of Human Factors and Ergonomics, Fifth Edition. Gavriel Salvendy and Waldemar Karwowski.

CHAPTER 45

HUMAN FACTORS IN SOCIAL MEDIA

Qin Gao and Yue Chen
Tsinghua University
Beijing, China

1 INTRODUCTION TO SOCIAL MEDIA

The rapid development and vast adoption of social media have dramatically changed the way people work and live. Social media platforms, such as Facebook, Twitter, and YouTube, have become major venues for people to keep updated with news and information, exchange social support, and get connected with others. As of January 2020, there are over 3.8 billion active social media users around the globe; they spend an average of 2 hours and 24 minutes per day on social media (Kemp, 2020). Besides following up and socializing with friends, people use social media to find jobs, collaborate with others, and get recommendations or support for making various decisions in their lives (e.g., choose college majors, destinations for next trip, and movies to watch tomorrow). Social media also change the ways in which private businesses communicate internally (e.g., knowledge sharing, organizational development) and externally (e.g., marketing, branding, customer relationship development), as well as the ways governments interact with the public and perform their functions (e.g., citizen engagement, public opinion analysis and monitoring). However, along with the new possibilities and convenience brought by social media, they are also doubts and fears about possible negative effects of social media on individuals and societies (e.g., detrimental impacts on intimate relationships, political polarization).

This rise of social media and the profound changes it brings have brought new waves of human factor research on the design, the usage, and the impacts of social media. These endeavors are often carried out through interdisciplinary approaches, combining theories and methods from human factors, psychology, sociology, and computer science. The aim of this chapter is to provide an introduction to the major human factor issues of social media and review the major findings related to these issues. The chapter begins by conceptualizing social media by discussing definitions and typologies of social media, followed by the introduction of major features that characterize various types of social media in Section 2. Then, we discuss why people accept, adopt, and use social media in Section 3. Sections 4 and 5 characterize user experiences and use behaviors on social media. Section 6 discusses the long-term effects of social media on individuals' functioning and well-being, interpersonal relationships, and society. Finally, Section 7 proposes future human factors research on social media.

1.1 Brief History and Definition of Social Media

The idea of bringing people and information together via computers can be traced back to the very beginning of the Internet in the 1960s. A number of computer-mediated technologies, such as email, bulletin board systems, and Internet relay chats, had been well established to facilitate communications among Internet users and building virtual communities in 1980s, even before the birth of the World Wide Web. The main purpose of these earlier technologies, however, was still to support information publishing and exchange among users, and other socialization functions were less supported, such as personal profile building and online relationship management. In addition, online content was created mainly by traditional "gatekeepers," such as news agencies, publishers, and professionals. For individuals, who wanted to have an online presence, building a small personal website or web page was the main option at that time. This route was only feasible for those with sufficient technological

skills or resources because these static pages required substantial technological skills and effort to create, update, and maintain. The majority of Internet users acted as passive consumers of information.

It was in the middle of the 1990s when the earliest social networking services (SNSs), such as SixDegrees, emerged to make socialization an explicit and major purpose for going online. SNSs enabled every user to build a personal profile, make friends with others, and manage their real-life social relationships online (e.g., school affiliations). Meanwhile, the advent of blogs, media sharing services (e.g., pictures and YouTube for sharing videos), and collaborative content creation platforms (e.g., wikis) in the 2000s allowed average users to contribute to online media production. In early research and practice, these services and technologies were often referred to as social networking services, social software, and Web 2.0 applications. Later, social media became widely accepted as an umbrella term covering these "web-based services that allow individuals, communities, and organizations to collaborate, connect, interact, and build community by enabling them to create, co-create, modify, share, and engage with user-generated content that is easily accessible" (McCay-Peet & Quan-Haase, 2018).

Due to the diversity and rapid development of technologies and services covered under this term, it is difficult to accurately define it. An early and frequently cited definition was "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content" (Kaplan & Haenlein, 2010). However, the technological foundations, referred to as Web 2.0 technologies at the time, have experienced huge advances since then, powered by the rapid development of mobile network architecture, media compression and transmission, new interactive technologies, and artificial intelligence. Recent studies have attempted to define social media from the desired socialization purposes, such as tools for peer-to-peer communication, information sharing, and relationship maintenance (Ariel & Avidar, 2015). Despite the difficulty in reaching a consensus on a consistent definition of social media, most researchers have agreed that social media services are characterized by the following core features (Kietzmann et al., 2011; McCay-Peet & Quan-Haase, 2018; Obar & Wildman, 2015).

- *Profile and identity building*. Users can create personal profiles to reveal or represent their identities. Some social media sites rely on authentic identities willingly disclosed by users, such as professional networking services (e.g., LinkedIn), but the majority of social media services allow users to develop their own identity strategies (real or virtual). As user-specific profiles are fundamental to social connection and interaction to occur, many social media sites make account registration and profile building a prerequisite for users to access the content.
- *Relationship management*. Users can relate to other users by creating explicit links, which often result in a list of "followers," "friends," or "connections." These relationships can be built upon real-life social networks (e.g., Facebook), or developed mainly online (e.g., Twitter). Nevertheless, these declared relationships, once announced on a social media platform, impose a major influence on users' content consumption and social interaction activities within the platform.
- *Content contribution and participation*. Social media enable and also rely on users to create content or participate in content generation. In a broad sense, user-generated content includes not only media content for others to see, but also users' comments, reviews, annotations, rankings, likings, and other information that is meant to be accessible by other users and can be aggregated by the platform to generate further collective user representations, such as number of views and likes.
- *Communication*. Most social media provide users both public and private communication channels. Whereas the public communication channel (e.g., broadcasting, status change) allow the user to quickly share the message with a wide audience, private communication channels allow one-on-one conversations and relationship building.

1.2 Types and Classifications

It is challenging to provide a comprehensive taxonomy of social media due to the fast innovation speed and ever-increasing diversity. Aichner and Jacob (2015) developed a typology consisting of 13 different types of social media; it has been widely accepted. Recently, Karahanna et al. (2018) added crowdsourcing as new type and produced a list of 14 types of social media services, as shown in Table 1.

These platforms can be classified into groups by various dimensions. A widely adopted framework is from Kaplan and Haenlein's (2010) work, which classified social media based on the level of self-disclosure of content shared through the platform and media richness facilitated by the technical system. The former refers to the extent to which users reveal personal information to others, whereas the latter refers to the capability of communication media to reproduce social cues that help to "change understanding within a time interval" (Daft & Lengel, 1986).

Figure 1 shows social media platforms along the two dimensions. It is interesting to note that the platforms located in the upper half of the chart can be characterized as profile-based platforms, as defined by Zhu and Chen (2015). The focal point of these platforms is the individual member, and users connect with each other mainly because they know or are interested in the user behind the profile. Platforms located in the lower half of the chart can be characterized as content-based platforms, where discussions and conversations are triggered by and centered around shared content (e.g., videos), and users connect with others because they share similar interests about the content.

According to the nature of connections among users and the directedness of communications, Zhu and Chen (2015) classified four types of social media: (1) broadcast self-media; (2) targeted relationship media; (3) collaboration media; and (4) creative outlets. The four categories correspond to the four clusters shown in Figure 1. Broadcast self-media, such as Twitter and Weibo, empower users to broadcast their updates and posts, as well as follow others' broadcasts. Targeted relationship media enable two-way connections and are mainly used for building and maintaining relationships (e.g., Facebook, WeChat, and Line). Collaboration media are content-based and task-oriented platforms where users collaborate to perform tasks, build knowledge, solve problems/seek solutions, and also establish a reputation (e.g., Wikipedia and Quora). Creative outlets are content-sharing broadcast platforms where users generate and share creative media content, such as entertaining and aesthetic videos on YouTube.

The various social media platforms can be characterized by what kind of user actions are enabled by the technology (technological affordance), what type of media content are produced and shared among users (media content), and how social

Table 1 Types of Social Media Platforms

Type of social media	Main features	Examples
Blogs	Informational websites where users post their articles, diaries, or journals, sorted chronologically. The majority of articles are presented as text, but most blogs also support posting pictures, videos, and audios. Readers can discuss with authors via commenting functions.	Blogger, WordPress
Microblogs	A specific form of blogging that restrict users to post smaller content, or content element, such as a piece of text message with less than 140 characters. The limit of content length/size differs among applications.	Twitter, Tumblr, Weibo
SNSs	Online platforms that allow users to create profiles, build a network, and manage relationships with others.	Facebook, WeChat
Business networks	A type of SNS that focuses on managing professional profiles, contacts, and relationships of a business nature.	LinkedIn, ResearchGate
Enterprise social networks	A type of SNS to support communication and cooperation within a specific organization or group. In addition to standard SNS features, collaborative productivity tools (e.g., collaborative documents) are often incorporated.	Yammer, Slack
Collaborative projects	These collaboration platforms bring together distributed users to contribute their knowledge and work on projects. The outcomes of these projects are often published for the public.	Wikipedia, GitHub
Forums	Virtual discussion room where conversations are held in the form of threaded posts. The discussions are usually asynchronous, i.e., there is a time delay between posting and receiving replies. Early Internet forums are also called bulletin board systems.	Reddit, Baidu Tieba
Picture sharing	These sites allow uploading, managing, hosting, sharing, and commenting on pictures.	Flickr, Instagram
Video sharing	These sites allow uploading, sharing, and commenting on videos. Depending on the specific services, the video content can be pre-recorded or live-streamed, loyalty-free or proprietary, limited in length or not.	YouTube, TikTok
Product/service reviews	These platforms allow posting reviews about products, services, content, businesses, etc.	Yelp, TripAdvisor, Dianping
Social bookmarks	These online services that allows users to save, organize, and share bookmarks of Web content.	Pinterest, Delicious
Virtual social worlds	These simulated environments allow users to create their avatars to live, explore, and interact with other users in virtual worlds, often with no specific tasks or goals, as in social gaming. These environments are usually immersive and highly media rich.	Second Life, VRChat
Social gaming	These immersive online games require users in avatars to interact with other users in virtual worlds, such as massively multiplayer online (MMO) role-playing games.	World of Warcraft
Crowdsourcing	These open innovation communities offer users offered challenging tasks to solve and demonstrate their competence.	CouchSurfing, InnoCentive

Note: SNSs, social network sites

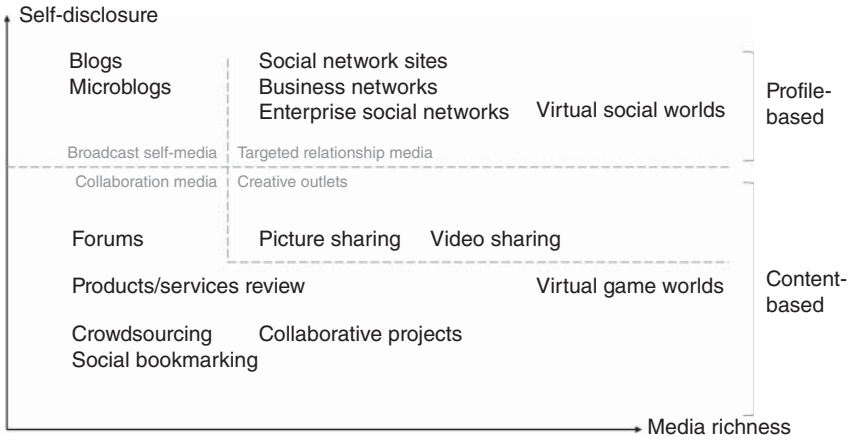

Figure 1 A typology of social media platforms.

connections are enabled and facilitated (socialization facilitation). Section 2 provides an overview of major features of social media from these perspectives.

2 FEATURES OF SOCIAL MEDIA

2.1 Technological Affordances

As it is impossible to list all technological features and possibilities of social media, the concept of technological affordances can be drawn upon to characterize the technological characteristics of social media. The term was developed by Gibson (1979), and later extended by Norman (1988), to refer to the action possibilities offered by a product. The concept has been widely used in human–computer interaction research as it provided researchers a better angle to examine the role of technology in interaction than listing technological attributes or using purely perceptual measures (Hutchby, 2001; Sundar. Jia, Waddell, & Huang, 2015).

Based upon frameworks from the literature, namely Treem and Leonardi (2013) and Karahanna et al. (2018), and observation of popular social media applications, we identify the following clusters of affordances for current social media platforms.

1. *Self-presentation*. Self-presentation refers to the affordance that enables a user to identify the self and represent it into a digital identity in a social media setting. This affordance has also been referred to as identity (Kietzmann et al., 2011), identifiability (Halpern & Gibbs, 2013), and visibility (Bregman & Haythornwaite, 2001; Treem & Leonardi, 2013). The self-representation affordance satisfies users' basic needs for self-identity (Kietzmann et al., 2011), including self-definition, declaration of self-identity to others, and evaluation of self-identity. Social media platforms afford a number of features to allow users to define, modify, elaborate, and declare a digital self-identity to others. Most social media allow users to select usernames and avatars, as well as customize their profile pages. Many social media platforms provide photo retouching functions for users to modify selfies as more satisfying selfies avatars for better impression management (J. Fox & Vendemia, 2016). Some social media platforms allow users to present themselves using highly rich media, such as three-dimensional (3D) avatars with non-verbal visual cues in virtual social games. These virtual representations of self differ in visual realism, including photographic realism (the similarity with the real world), anthropomorphic realism (the extent of humanlike appearance), and behavioral realism (the extent of humanlike behaviors and non-verbal cues; H. Harris et al., 2009; Oh, Bailenson, & Welch, 2018). Such realism has been found to influence communication qualities in terms of social presence, i.e., subjective feeling of interacting with a real person (Biocca, Harms, & Burgoon, 2003; Short, Williams, & Christie, 1976), which in turn affects communication effectiveness in virtual environments (Guadagno et al., 2007; Herrera et al., 2020; S.-H. Kang & Watt, 2013).

   Social media platforms afford more opportunities for self-identity evaluation by making one's self-presentations, together with their behavior preferences and personal networks, visible to others. The convenience of feedback-seeking and monitoring others' opinions related to self (e.g., through the number of likes or comments on one's posts) provides more cues to users to assess their self-identifies projected in social media environments (Nesi, Miller, & Prinstein, 2017; Treem & Leonardi, 2013).

   High self-presentation affordance is not always desirable. When users present their true-self and can be easily identified, they may become more self-conscious and conservative in behaviors of information sharing (Burtch, Ghose, & Wattal, 2015). In some situations, e.g., disclosing sensitive information, a lower level of identifiability of higher level of anonymity can help to loosen social restrictions and inhibitions, which has been described as the online disinhibition effect (Suler, 2004). The disinhibition effect, however, can also lead to negative behaviors, including rude language, hostility, and accessing content related to pornography, crime, and violence on the Internet.

2. *Content sharing*. Social media platforms afford and encourage users to share and distribute content, which can be personally relevant (e.g., personal status) or irrelevant (e.g., news, knowledge). In addition to providing facilities to amateurs to publish content, the content sharing affordance of social media further blurs the boundary between content consumers and producers by encouraging user participation by means of evaluation, reviews, commenting, and open collaboration. The participatory architecture of social media allows users to add value and meta-knowledge to the content as they consume it, i.e., meta-voicing, as termed by Majchrzak et al. (2013). The following technical attributes of social media platforms modify the affordance of content sharing:
   a. *Editability*. Editability, also called rehearsability, refers to the extent to which users can elaborate and modify content or a communicative act before publishing it (Dennis, Fuller, & Valacich, 2008; Rice, 1987). It is related to asynchronicity and a low level of non-verbal cues in a communication environment. Usually, users can carefully craft or recraft their content in asynchronous discussions or synchronous interactions with fewer non-verbal cues (such as text messaging). Some platforms also provide features to improve information quality, such as automatic correction of typographical errors. Besides single users' editing, editability is especially crucial for collaborative projects. Most collaborative platforms also provide high-editability features for version control. For example, Wikipedia users can view history or previous versions of an entry. GitHub users can fork an existing project, contribute, and modify it, and request that the original authors merge the modification.
   b. *Communal visibility*. Users can control the communal visibility of their produced information, which means the extent to which other users can view the content of behaviors, knowledge, preferences, and network connections (Treem & Leonardi, 2013). Most social media platforms afford a number of levels of communal visibility for users to control others' access to their profiles, content, and interactions. For example, SNS users can choose to publicly disclose their profiles, updates, and activities by high-visibility functions such as wall posting or status updates. Alternatively, they can also disclose this information to a small group of users by low-visibility functions such as private messaging. Content shared with visibility, plus the size and the composition of the audience in social media, have an unprecedented reach and publicness to a large-scale audience (Fogg, 2008; Neubaum & Krämer, 2017b; Walther, 2010). Users'

preference of visibility depends on their purposes. To validate self-concept or seek approval or support from others, users may prefer more public functions with higher visibility. The effects of visibility on self-disclosure behaviors will be discussed in detail in Section 5.2.

c. *Persistence*. Social media platforms afford users' expressive actions to persist by recording, archiving, and making them accessible for a short or long period of time. Persistence has also been referred to as reviewability, recordability, or permanence (H. H. Clark & Brennan, 1991; Hancock, Toma, & Ellison, 2007; Whittaker, 2003). The default persistence setting of the majority of social media platforms is permanent, or as long as the storage limit allows. Such high persistence turns previously ephemeral expressions to an enduring form, which can stimulate new communication strategies of users to control the consequence long past the initial point of sharing. On the contrary, a few social media platforms provide the option to reduce or control the length of content persistence to their recipient. WeChat Moments allows users to limit how much of their content is accessible by others for three days, six months, or forever. Some platforms, such as Snapchat, provide the burn-after-reading feature, which makes the content inaccessible shortly after a single viewing. This function is often coupled with end-to-end encryption to create an environment for private communication.

3. *Content consuming*. Social media afford a bazaar of information, entertainment, and social content for users to consume. To facilitate users' perusal and exploration of this huge amount of heterogeneous content, many social media platforms provide social navigation or social search features, by tracing activities of like-minded users, filtering content based on shared interests or indicated relationships (i.e., collaborative filtering), or inviting users to participate in information classification or organization (e.g., collaborative tagging, folksonomy). Many social media platforms provide aggregated content such as trending topics to give users an overview of the content and a clue of where to go next.

   Furthermore, platforms also provide functions that support users to customize their individual diet of information. Users can choose information sources they would like to follow. Although such decisions are completely up to the users, many social media platforms provide suggestions of possible sources to follow based on the analysis of mutual friends or common interests. Some platforms are installed with personalization algorithms that gather users' data, such as clicking behaviors, to predict and offer information that they may be interested in. For example, YouTube recommends videos based on the videos with which users have previously interacted.

4. *Social awareness*. Social media allow users to either indicate their presence or know if other users are accessible, and to be aware of other users' activities (Dourish & Bellotti, 1992; Riedl, Köbler, Goswami, & Krcmar 2013). This affordance is also referred to as presence signaling (Goel, Johnson, Junglas, & Ives, 2013; Junglas, Goel, Abraham, & Ives, 2013; Kietzmann et al., 2011; Schultze, 2010). Awareness of others provides a context for users' expressive acts and is a prerequisite to develop social presence (Biocca et al., 2003; Rettie, 2003). Social awareness can be enriched by enabling more social cues and enhanced synchronicity of information flow. For example, indicating the location or online status of other individuals in the network can raise awareness regarding their availability for communication (Bardram & Hansen, 2004). Most SNS platforms provide users with streams of social news that facilitate passive observation and awareness of others (M. Burke, Marlow, & Lento, 2010).

5. *Relationship management*. Social media platforms enable users to explicitly articulate and publicly declare their social connections, expressed as friends on SNSs or followers on microblogs, and this feature has been recognized as a defining characteristic of SNSs (D. M. Boyd & Ellison, 2007). The visibility of social connections provides a basis for relationship management and social capital development. Users are enabled to maintain existing relationships by keeping virtually connected and updated across temporal and geographical distance. The explicit articulation of social networks also allows users to search, identify, and activate latent ties, for which a connection is theoretically available but has not been activated (e.g., unknown members of the same department; Haythornthwaite, 2005; Mariotti & Delbridge, 2012; Pempek, Yermolayeva, & Calvert, 2009) and to grow their social networks and capital. Relationship management in social media could either center on individuals or groups. The latter often combines individuals' relationship management features with group management and administration features (Karahanna et al., 2018; Kietzmann et al., 2011).

6. *Communication*. Social media afford users direct communication with each other. The capability of a communication medium to facilitate interpersonal communication is often termed media richness, a phrase used to describe how much a medium can reproduce the face-to-face communication experience and how much it can help interactants to change understanding within a time interval, as coined by Daft and Lengel (1986). The media richness of social media is mainly characterized by two features: modality richness and synchronicity.

   Modality richness was originally defined as the "ability to handle multiple information cues simultaneously" (Daft & Lengel, 1986). In practice, it refers to the use of visual, audio, verbal, and other information simultaneously to reproduce social cues as in face-to-face communication (Ramirez & Burgoon, 2004). Modality richness influences the salience of presence signaling and affects users' feelings of actually being communicating with a real person (K. M. Lee, 2004). Most current social media platforms support communication in texts, pictures, audios, and videos. Recent social media platforms are also equipped with more immersive and richer technologies such as virtual reality.

   Synchronicity is the ability of a platform to engage participants concurrently in a communication event (Dennis et al., 2008). Whereas synchronous communications (e.g., video conferencing) are spontaneous and immediate, allowing participants to observe others' responses and modify their understanding in real time, the asynchronous mode allows more time for users to consciously construct communicative messages, and the conversation can be more thought out and organized (Hiltz & Turoff, 1981; Walther, 1996). The theory of media synchronicity (Dennis et al., 2008) suggests that media with higher synchronicity result in better communication performance when the aim is to reach mutual understanding and the information

to transmit is distilled, smaller, and familiar to users. High synchronicity, however, sacrifices editability and is not favored when users transmit diverse and new information. Synchronous media have been found to induce higher social presence than asynchronous media do (K. Burke & Chidambaram, 1999). Most social media platforms provide both synchronous or asynchronous communication channels, though some may favor one mode more, e.g., live streaming sites rely on synchronous communication, and participants of open collaborative projects often communicate in an asynchronous manner. Users' choice of synchronicity depends on the goal and context of the communication, the relationship with the partner, and their own characteristics such as extraversion, social anxiety, and social skills (Hertel, Schroer, Batinic, & Naumann, 2008).

7. *Collaboration*. Collaboration refers to the affordance that enables users to work on interdependent activities and cooperate with others in a collaborative context. Such collaboration can occur in an organization or group setting (e.g., class team working on a document collaboratively, enterprise knowledge base building) or among all participants on open platforms (e.g., editing entries on Wikipedia, contributing codes on GitHub, solving problems on crowdsourcing sites). The collaboration affordance subsumes the aforementioned communication and editability affordances. Besides, it involves features that motivate every member to contribute by, for example, promoting reciprocity and altruism. These features often involve gamification, e.g., users get badges, awards, or better ranking after making contributions (Cudney et al., 2015; Friedrich et al., 2020; Silic & Back, 2017; Suh & Wagner, 2017; Swacha, 2015).

2.2 Media Content

A consequence of social media affordances that enables the general public to contribute and participate in content creation is the massive amount of social media content, which is more diverse than ever. From the perspective of content contributors, Walther and Jang (2012) identified three types of content: (1) proprietor content (i.e., created by one principal author or institution);(2) user-generated content (i.e., reactions to online content by nonproprietary users); and (3) aggregate user representation (i.e., aggregate information to make collective reactions to online content visible, such as the number of likes, trending topics).

It is not an easy task to classify social media content from the perspective of content topics, because such classifications may differ in different applications. To cover this issue as broadly as possible, three general types of media content can be classified as informational (functional or task-oriented), entertainment, and social-emotional content (transformational or social-oriented; Ashley & Tuten, 2015; Hara, Bonk, & Angeli, 2000; Swani et al., 2017; Taylor, 1999).

2.2.1 Informational Content

Networking features allow users to obtain information of practical value to their lives shared by massive numbers of sources. People increasingly use social media to learn about news and events around the world and within their communities (Kwak, Lee, Park, & Moon, 2010; Raacke & Bonds-Raacke, 2008; Shearer, 2018), to learn new skills and knowledge that they may not be able to pick up through formal education (Dougherty & Andercheck, 2014; Weidlich & Bastiaens, 2019), to obtain recommendations about products and content (Bondad-Brown, Rice, & Pearce, 2011; Kim, 2014), and to seek advice on important decisions, such as health diagnosis and job/school applications (S. Fox & Duggan, 2013; Scanfeld, Scanfeld, & Larson, 2010). Examples are the latest news and events, knowledge, reviews and recommendations of products and services, and support in forums. As suggested by Shao (2009), people use social media to learn how to make sense of things for just about any subject. It satisfies users' utilitarian need for information, which is one of the major motivations that drive users to use social media (Leung, 2013; Whiting & Williams, 2013). In the marketing field, empirical research suggests that nearly 90% of brands post informational content on SNSs to engage consumers (Ashley & Tuten, 2015); functional appeals are especially effective when the product is utilitarian (Johar & Sirgy, 1991).

Cognitive features of informational content affect users' processing fluency (Alter & Oppenheimer, 2009), which further influences perceived veracity or credibility, positive attitudes to the content, and engagement, such as liking and sharing (Berridge & Winkielman, 2003; Moreau, Lehmann, & Markman, 2001; Pancer, Chandler, Poole, & Noseworthy, 2019). Researchers have described the cognitive aspects of social media content by the amount of information and readability:

- The amount of information is often represented by the length of text-based information. There are still no consistent results of the effect of length on users' engagement. For example, Sabate et al. (2014) found longer posts yield more likes, whereas Trefzger et al. (2016) suggest posts with one text line received the most likes.
- Readability refers to the ease of understanding or comprehension affected by writing style (Klare, 1963). It can be quantitatively measured by the complexity of words and syntactics (DuBay, 2004). More readable and easy content on SNSs has been found to yield more likes, comments, and shares (Pancer et al., 2019). Furthermore, a study by Pancer et al. (2019) revealed an interactive effect on users' engagement of length and readability. Longer posts result in less engagement of users when the content is complex but more engagement when the content is simple.

Whereas a number of studies have demonstrated algorithms that utilize the wisdom of crowds to make better decisions and predictions (Stieglitz & Dang-Xuan, 2013; Y. Yu, Duan, & Cao, 2013), whether individual users can gain wisdom from crowds has not been confirmed. As noted in the book *The App Generation* (Gardner & Davis, 2013), the younger generation finds it hard to make their own decisions because they become so dependent on others' recommendations and reviews from various apps and social networks.

2.2.2 Entertainment Content

Consuming entertainment content on social media platforms, particularly those featuring high modality richness, such as YouTube, Instagram, and Tiktok, has become a common way to spend leisure time. In addition to traditional media content delivered by professionals, people enjoy content produced by amateur content creators. They have harnessed the technological affordances of social media to create new content forms, such as vlogging, live streaming, and gameplay. Another major source of social media entertainment is first-hand celebrity gossip, which can be obtained quickly via channels such as Twitter, Weibo, or Instagram (Marwick & boyd, 2011). Gossip forums and so-called tea accounts have also emerged; they integrate this breakup and rumor gossip. Some examples are the Shade Room with 20 million followers on Instagram and

Sina Entertainment with nearly 40 million followers on Weibo in 2020. More entertaining content is strongly associated with the higher engagement of users, i.e., more likes, comments, and shares (Cvijikj & Michahelles, 2013; Menon et al., 2019).

What adds more fun to entertainment content on social media is the possibility of interacting with other viewers or with content creators through a number of ways: commenting, sending gifts, and more innovative interaction methods (E. Yu, Jung, Kim, & Jung, 2018). Event live streaming can also be presented and discussed as real-time posts on Twitter, such as GIFs and pictures with hashtags. To co-view videos with a large online community, a popular way in East Asia is the Danmaku commenting function introduced by Niconico in 2006. Danmaku comments are anonymous, anchored to the timelines of videos, and displayed as moving subtitles overlaid on the video screen. By integrating social content into entertainment content, Danmaku commenting can make an otherwise boring video highly entertaining (Yue Chen, Gao, & Rau, 2017). Another novel entertainment form that has been popular in East Asia since 2017 is virtual YouTuber, or Vtuber for short, which integrates virtual reality technology into video-sharing social media. One of the first Vtubers, Kizuna AI—with millions of followers on YouTube and Bilibili—appears in advertisements, and even helps the Japan National Tourism Organization's promo campaigns (Bloomberg, 2019).

Emotions are essential for the entertainment experience, which can be conceptualized as "an episode of emotions in response to an ongoing guided imagination" (E. S.-H. Tan, 2008). Emotions can capture users' attention, engage them in persistent flow experience, and trigger sharing behavior to further spread emotions online, which enhances emotional contagion and makes the content viral (Brady, Gantman, & Van Bavel, 2019; Ferrara & Yang, 2015; Guadagno, Rempala, Murphy, & Okdie, 2013; Kramer , Guillory, & Hancock, 2014). A number of studies have investigated the impact of emotions on the virality of social media content and have found that content with more positive emotion (e.g., amusement and pleasure) or stimulating emotion (high in emotional arousal, such as anger and surprise) is more likely to be shared and transmitted (Berger, 2011; Berger & Milkman, 2012; Borges-Tiago, Tiago, & Cosme, 2019; A. J. Kim & Johnson, 2016; Stieglitz & Dang-Xuan, 2013). However, there are also exceptions in certain cultural contexts. An example is nostalgia marketing, which intends to promote sales by making consumers recall memories from previous decades and feel nostalgic (not highly arousing or positive), such as the social game Pokémon GO (Vella et al., 2019).

2.2.3 Social-Emotional Content

A core function of social media is online networking and relationship management. People use social media, especially SNSs, to keep obtaining relational information, e.g., to explore, browse, search, and examine activities of other users. Passively consuming such content helps one to keep up with others' lives, to monitor social environments to ensure nothing abnormal or threatening is going to happen, and to draw social comparisons (Kietzmann et al., 2011; Waheed et al., 2017). Consuming social content strengthens the ties of existing relationships, especially those less close relationships (M. Burke & Kraut, 2014; Hall, Kearney, & Xing, 2019; see Section 6.2.1). The social content of strangers can also help users to judge unfamiliar persons and build new relationships (Walther et al., 2008). However, excessive passive consumption of social content may increase anxiety caused by upward social comparisons and the fear of missing out, which will be discussed in Section 6.1.3.

Self-presentation and disclosure in social content provide the basis for developing interpersonal relationships and trust (Altman & Taylor, 1973; P. Sheldon, 2009). Self-disclosure indicates how much personal information the content reveals to others (Altman & Taylor, 1973; Jourard, 1971). Social media platforms vary in technical affordances and social norms to support self-disclosure in social content. Whereas content-focused platforms, such as Wikipedia or customer review sites, involve little personal self-disclosure, relationship-based platforms, such as SNSs, attempt to create a safe and private environment for users to reveal private personal information in certain contexts. To support users in sharing highly intimate and personal information, the environment is often characterized with high anonymity and low persistence.

Another feature that characterizes social content on social media is its high interactivity, which can be conceptualized from functional and contingency points of view. The functional view of interactivity describes the ability of the social media to allow users to influence the content and form of the environment (Bucy & Tao, 2007; McMillan & Hwang, 2002; Sundar et al., 2015), and is often measured by counting the provided communicative features, such as e-mail links, private messaging, and options to share to other platforms. The contingency view of interactivity (Yuping Liu & Shrum, 2002; Sundar, 2012), also called the reciprocity or threadedness of conversations (Rafaeli, 1988), refers to the extent that any later message is related to earlier messages in a given series of information exchanges. Message interactivity can be manipulated by providing more interaction opportunities and channels, actively calling for feedback, and responding to others' comments (Kamboj, Sarmah, Gupta, & Dwivedi, 2018). Message interactivity signals openness to communication and imbues social presence and has been found leading to better control of mutuality and communal relationships, higher perceived credibility of the message sender, and more user engagement behaviors (liking, commenting, and sharing; Go & Bortree, 2017; Kamboj et al., 2018; H. Lee & Park, 2013; Ott et al., 2016; Schreiner, Fischer, & Riedl, 2019; Sundar et al., 2015). Incorporating social media content with proper message interactivity has become an important part of customer and public relationship management strategies for companies, brands, and governments (Briones, Kuch, Liu, & Jin, 2011; Men & Tsai, 2012).

2.3 Sociability and Social Affordances

The availability of technical affordances for social interaction does not guarantee that social interaction will occur in social media environments (Kreijns, Kirschner, & Jochems, 2003). Earlier research on online community development has recognized that what really matters is not the technology, but how the technology is used to serve the shared purposes of a specific group of people in a specific social climate (Preece, 2001). To facilitate social interaction, sociological properties of social media environments play a role that is as important as technological properties. These sociological properties have been referred to as social affordances, sociality, and sociability in prior research. Social affordances, or sociability, can be defined as the extent to which the communication environment mediated by social media is perceived to facilitate pleasant social interaction and to enhance social connectivity (Qin Gao et al., 2010; Kreijns, Kirschner, & Vermeulen, 2013; Preece, 2001; Shin, 2013; Weidlich & Bastiaens, 2017). The following social affordances have been found to contribute to the sociability of online communities and social media:

1. *Purposes and benefits*. Provision of a clear shared focus of interests has been recognized as a key determinant of online communities (Fang & Li, 2020; Kreijns et al., 2013; Preece, 2001; Qin Gao, Dai, Fan, & Kang, 2010). Though social media users may not choose to join any online communities, a statement of purposes and

benefits for potential users of a social media platform is still important because such statements or definitions help to set users' expectations, assess the usefulness and relevance of the technology to oneself, inform and develop social norms and common ground for communication, and reduce conflicts and frustrations due to ambiguous and wrong expectations. A tagline or welcome message is often used to make a strong statement of the purpose and benefits of the site. For example, Twitter's welcoming message for new users is "twitter is what's happening in the world and what people are talking about right now," which implies its core value of real-time news feeds, whereas Facebook's mission statement was "a social utility that connects you with the people around you," which describes what people are expected to do with the tool. The stated purpose and benefits should echo with user motivations and needs to visit a social media site (discussed in Section 3) and be well supported by proper technology affordances and content preparation or regulation. In Twitter's case, the affordance of content sharing is much more highlighted than self-presentation and relationship management.

2. *People and social networks*. As an individual's use of a communication medium is influenced by their communication partners' use (Markus, 1987), sociability of a social media platform is influenced by characteristics of the user population, including the size of active users, the heterogeneity of users, the interpersonal relationships between them, and the structural properties of the network (Qin Gao et al., 2010; W. G. Kim, Lee, & Hiemstra, 2004; N. Wang & Sun, 2016). The number of active users signals "the other is attending"; it is important for promoting socially meaningful interaction, producing adequate content for consuming, and enhancing the usefulness of a social media platform (Qin, Kim, Hsu, & Tan, 2011; Rauniar, Rawski, Yang, & Johnson, 2014). Heterogeneity among users influences user privacy concerns, satisfaction, and loyalty to an online community (Brandtzæg & Heim, 2009). From the interpersonal perspective, users' social behaviors are influenced by the intimacy and confidence levels with other users with whom they connect through the social media tool, and whether or not they know each other in real life (Bazarova, 2012; X. Ma, Hancock, & Naaman, 2016). From the social network analysis perspective, structural properties of the network, such as the degree of individual nodes, symmetry (whether both nodes in a dyad reciprocate a tie) of ties, and tie strength (frequency and depth, indicating the closeness), influence social connectivity and information dissemination capabilities (Kane, Alavi, Labianca, & Borgatti, 2014; N. Wang & Sun, 2016). Different types of social media feature various structural properties. In profile-based and relationship-focused social media, such as Facebook, users build symmetrical and stronger ties, whereas in broadcast-type social media, such as Twitter or Weibo, users build asymmetrical and weaker relationships by following influential users, often unknown to themselves in real life.
3. *Privacy*. Privacy protection has been a major concern for users who adopt social media platforms to communicate and share information. Whereas social media platforms combine interpersonal and mass communication, users often reveal private information in a public or semi-public space, without realizing its potential negative consequences, such as cyberstalking, Internet fraud, or even physical risks (Button. Nicholls, Kerr, & Owen, 2014; Lawler & Molluzzo, 2010). In addition, the explicit social network information can be exploited by an adversary to infer sensitive attributes that users select not to reveal (Zheleva & Getoor, 2009). There is, however, often a discrepancy between users' declared concern for privacy protection and their actual privacy-related behaviors, which has been termed the privacy paradox (Nissenbaum, 2009; Norberg, Horne, & Horne, 2007). When asked, users show high concerns for their privacy, which can explain why the Facebook–Cambridge Analytica data scandal in 2018 led to an 18% drop in Facebook stock in ten days after the investigation report was released (Monica, 2018). Research based on self-reported measures also found that with higher perceived security, users rate the social media platform easier to use, more useful, and more positive (Lorenzo-Romero & Constantinides, 2011; Rauniar et al., 2014). When user behaviors are examined, however, users are often found to easily give out private information in exchange for expected social benefits, such as self-presentation and social capital, as stated in the privacy calculus theory (Dienlin & Metzger, 2016; Gross & Acquisti, 2005; Krasnova, Spiekermann, Koroleva, & Hildebran2010). Numerous attempts have been made to improve privacy protections in social media, including data resistance technologies, privacy-enhancing services, and government intervention and policies, such as the European Union's General Data Protection Regulation (GDPR), which came into effect in 2018. Whereas these interventions are intended to give users more control over their data and consent processes, a major flaw of these policy interventions lies in their assumption that users will be informed about the policy if they choose to check "I agree to these terms and conditions" on the privacy policy and terms of service policy page. Agreeing to such policies without even reading it is a common user behavior, as demonstrated in Obar and Oeldorf-Hirsch's study (2020), in which 98% of 543 participants missed a term about providing a first-born child as payment for a fictitious SNS access. Effective strategies for privacy protection in social media from the human side will continue to be an important topic for research effort. Indeed, a number of studies have already provided implications for improving comprehensibility of privacy policy statements, modularizing the privacy policies to address users' need for flexibility for privacy settings, and safeguarding users' privacy behaviors (Das, Dev, & Srinivasan, 2018; Koohang, 2017; Koohang, Paliszkiewicz, & Goluchowski, 2018).
4. *Social climate*. Users' social behaviors in a social media environment are influenced by the extent to which how users perceive the social climate in the environment is secure, trustworthy, friendly, and comfortable for interaction (Qin Gao et al., 2010). It can be established or reinforced by policies, social norms, and moderations to prohibit flaming and uncivil behaviors, such as banning unfriendly posts (Preece, 2001). In addition, social climates are affected by social norms among users. Reciprocal norms are strongly associated with an active climate, users' perception of the platform, and actual participation (Sun, Rau, & Ma, 2014; C. Yang, Hsu, & Tan, 2010).

3 WHY PEOPLE ACCEPT OR USE SOCIAL MEDIA

Understanding why people accept, adopt, and use certain types of social media, particularly in contexts where such use is

voluntary and personal, is needed to explain and predict user behaviors on social media, and to design and develop features to influence their perceptions, attitudes, and behaviors. A large and growing body of research has been conducted to obtain such understanding for various social media applications (e.g., Bailey, Bonifield, & Arias, 2018; Whiting & Williams, 2013). Two main research paradigms can be identified from this body of research: needs-based and perception-based. The first group of research focuses on innate human needs and motivations, which has a long history in psychological research (Section 3.1). Another group of research explains why people accept or use a social media technology through examining users' perception of the technology—i.e., perceived usefulness and perceived ease of use—and the technology acceptance model (TAM; Davis, Bagozzi, & Warshaw, 1989) is the most widely used framework in this regard (Section 3.2). In addition, research from both groups has found that people's acceptance and usage of social media are moderated by a number of individual differences, such as personality traits, their capability and confidence in using new technology, and the way they prefer to relate to others (Section 3.3).

3.1 Needs, Gratifications, and Motivations

3.1.1 Theoretical Frameworks

Needs-based studies are built upon the psychology literature that suggests innate psychological needs drive people to use certain technology; the basic assumption is that users will be more likely to use certain social media platforms if they have the potential to satisfy their needs (e.g., Y. Kim et al., 2011; Shiau & Chau, 2012). From this perspective, a number of human needs theories are drawn upon. Psychologists have been studying humans' social needs for nearly a century. Maslow (1943) proposed one of the first comprehensive models of human needs; it arranges five levels of needs in a hierarchical order. All four upper level needs, including safety, love/belonging, self-esteem, and self-actualization, are related to social needs. Maslow's pyramid of needs is a comprehensive framework, and other hierarchical needs models can be mapped to it, such as Alderfer's ERG (i.e., existence, relatedness, and growth) perspectives (1972). While those needs are innate and common to everyone, McClelland (1987) proposed three learned needs: achievement, power, and affiliation. Whereas everyone has these needs, their dominance will change according to one's life experience and cultural contexts.

Given that social media platforms are characterized by active user participation and a high-degree of personalization flexibility for users, a theoretical framework that focuses on how users interact with their environment and manage their behaviors in a self-determining manner is of more relevance, as has been argued by a number of researchers (Karahanna et al., 2018; Partala, 2011; Yoon & Rolland, 2012). One of the best-known theories in this regard is the self-determination theory (SDT; Deci & Ryan, 1985), which proposed that needs for autonomy (a feeling of control and agency), competence (a feeling of confidence and effectiveness in dealing with the environment), and relatedness (a feeling of connectedness with others) motivate self-determining behaviors, such as social media use. Furthermore, by generating and contributing to content on social media, users may develop a sense of psychological ownership. According to psychological ownership theory (POT), there are innate needs for having a place, having self-identity, and having efficacy and effectance (Pierce, Kostova, & Dirks, 2001). By synthesizing SDT and POT needs and relating them to social media affordances, Karahanna et al. (2018) proposed the needs–affordances–features framework to explain how psychological needs motivate users to use social media with affordances that can potentially satisfy these needs.

Another general and popular framework of motivations is the intrinsic motivation and extrinsic motivation, also distinguished in SDT (Deci & Ryan, 1985; R. M. Ryan & Deci, 2000a, 2000b). Intrinsic motivation refers to internal enjoyment or pleasure from doing the thing itself. On the contrary, extrinsic motivation refers to external outcomes or rewards as a consequence of the behavior. Social media use behaviors can be driven by intrinsic motivation, extrinsic motivation, or both. For example, research showed that Wikipedia users' knowledge-sharing behaviors are mainly motivated by intrinsic and self-oriented motivations, e.g., a sense of achievement and competence (H.-L. Yang & Lai, 2011). Other studies have found that Facebook use satisfies both intrinsic needs for relatedness (K. M. Sheldon, Abad, & Hinsch, 2011) and extrinsic needs such as reducing the social pressure of the expectation that an individual should use Facebook (Reinecke et al., 2014).

Furthermore, the uses and gratifications theory (UGT), borrowed from the mass communication field, has been widely used in social media studies to explain users' choice of social media platforms (Katz, Blumler, & Gurevitch, 1973; McQuail, Blumler, & Brown, 1972). The theory assumes that the audience actively selects media to satisfy specific needs rather than passively receives media (Katz et al., 1973). Different from studies built upon psychological needs framework, studies that apply the UGT usually follow a bottom-up approach to identify the relevant gratifications. As shown in Table 2, identified gratifications are often unique to the specific social media application being investigated and sometimes specific to the particular population. To provide a common framework of gratifications to facilitate comparisons across applications, Qin Gao and Feng (2016) established and validated an integrated factor structure of social media gratifications, including five dimensions: information seeking, entertainment, social interaction, self-expression, and impression management.

3.1.2 Major Motivations to Use Social Media

By synthesizing theories, their applications in social media studies, and other empirical studies (see Table 2), we classified psychological needs motivating social media use into five categories: (1) need for information; (2) need for entertainment; (3) need for social connection; (4) need for strengthening ego; and (5) need for self-actualization. Whereas the former two underpin more passive and solitary use behaviors, the latter three energize users to express and interact with others:

1. *Need for information*. Information seeking has been found as a major reason for using social media (Leung, 2013; Whiting & Williams, 2013). Users receive up-to-date information about news, events, and sales in their neighborhood or around the world from social media (e.g., Raacke & Bonds-Raacke, 2008; Whiting & Williams, 2013). They can easily find instructions or learning materials, broaden their knowledge and interests, and refine thinking from SNSs, microblogs, or content communities (e.g., Qin Gao & Feng, 2016; Johnson & Yang, 2009; Leung, 2013; Shao, 2009). They can also surf or surveil other users and get social information, such as others' profiles, updates, and thoughts, mainly via SNS and microblog platforms (Brandtzæg & Heim, 2009; Chiu & Huang, 2015; Gan & Wang, 2015).
2. *Need for entertainment*. Most social media applications satisfy users' needs for entertainment, such as having fun, killing time, escaping from reality, and releasing tensions (Brandtzæg & Heim, 2009; Johnson & Yang, 2009; Quan-Haase & Young, 2010; Zolkepli & Kamarulzaman, 2015). This perspective that users adopt social media for entertainment needs is consistent

Table 2 Research on Needs/Motivations of Using Social Media

Study	Context	Theory	Needs/Motivations
Karahanna et al. (2015)	General social media	POT	Need for efficacy and effectance Need for having a place Need for self-identity (coming to know the self, expressing self-identity, and maintaining continuity of self-identity)
Leung (2013)	General social media	UGT	To share affection with others, vent negative feelings, gain recognition, get entertainment, and fulfill cognitive needs
Whiting & Williams (2013)	General social media	UGT	Social interaction, information seeking, passing time, entertainment, relaxation, expression of opinions, communicatory utility, information sharing, surveillance/knowledge about others
Zolkepli & Kamarulzaman (2015)	General social media	UGT	Personal needs (enjoyment and entertainment) Social needs (social interaction and social influence) Needs to release tension (belongingness, companionship, escapism, and playfulness)
Cao et al. (2013)	SNSs	Maslow's hierarchy of needs and expectation-confirmation model	Social needs (social presence, emotion belonging) Self-actualization needs (self-expression, fulfillment of happiness)
Raacke & Bonds-Raacke (2008)	SNSs	UGT	Social motivation (to keep in touch with old/current friends, to make new friends, to locate old friends, to post social functions, to feel connected) Informational motivation (to post/view pictures, to learn about events, to share information about yourself)
Brandtzæg & Heim (2009)	SNSs	-	New relations, friends, socializing, free messaging, profile surfing, family Information, debating, sharing/consuming content Time-killing, unspecified fun
C. M. Cheung et al. (2011)	SNSs	UGT and social influence theory	Group norms Maintaining interpersonal interconnectivity Social enhancement Entertainment value
Chiu & Huang (2015)	SNSs	UGT and MSD	To understand the self and others To solve problems and make decisions about the self and others To entertain by one's self or with others
Y. Kim et al. (2011)	SNSs	UGT	Seeking friends, convenience, social support, information, and entertainment
N. Park et al. (2009)	SNSs	UGT	Socialization, entertainment, self-status seeking
Pai & Arnott (2013)	SNSs	UGT	Belonging, hedonism, self-esteem, reciprocity
Quan-Haase & Young (2010)	SNSs	UGT	Passing time, sociability, social information, fun, relationship maintenance, relationship development
Reinecke et al. (2014)	SNSs	SDT	Intrinsic motivation (need for competence, autonomy, and relevance) Extrinsic motivation (social pressure) affects the satisfaction of competence, autonomy (-), and relevance
Q. Zhao et al. (2016)	SNSs	POT and TAM	Psychological ownership of the system (affected by perceived control of the system, familiarity to the system, self-investigation in the system, and social influence)
Gan & Wang (2015)	Microblogs and SNSs	UGT	Entertainment, convenient information, co-viewing, social interaction
Qin Gao & Feng (2016)	Microblogs and SNSs	UGT	Information seeking, entertainment, social interaction, self-expression, impression management
Johnson & Yang (2009)	Microblogs	UGT	Information motives (get information, give or get advice, learn interesting things, meet new people, share information with others) Social motives (have fun and be entertained, pass the time, keep in touch with friends or family, communicate conveniently, see what others are up to express myself freely)

Table 2 (*continued*)

Study	Context	Theory	Needs/Motivations
Shao (2009)	Content communities	UGT	Information, entertainment, mood management, social interactions, self-expression, and self-actualization
Yoon & Rolland (2012)	Knowledge-sharing virtual communities	SDT	Perceived competence (increased by familiarity with the community) Perceived autonomy (decreased by anonymity) Perceived relatedness (decreased by anonymity but increased by familiarity with the community)
Haridakis & Hanson (2009)	Video sharing	UGT	Entertainment, convenient information, co-viewing, social interaction
Yue Chen et al. (2017)	Video sharing	UGT	Information and entertainment seeking Social interaction Self-expression and actualization
Khan (2017)	Video sharing	UGT	Seeking information, giving information, self-status seeking, social interaction, relaxing entertainment
Y. Lee & Chen (2011)	Virtual social/game worlds	POT	Needs for psychological ownership (affected by cognitive appraisals, perceived control, affective appraisals, and self-investment)
Partala (2011)	Virtual social/game worlds	SDT	Need for competence, autonomy, and relevance
Yee (2006)	Virtual social/game worlds	–	Achievement needs (advancement, mechanics, competition) Social needs (socializing, relationship, teamwork) Immersion needs (discovery, role-playing, customization, escapism)

Note: MSD, medium system dependency; POT, psychological ownership theory; SDT, self-determination theory; SNSs, social network sites; TAM, technology acceptance model; UGT, uses and gratifications theory

with TAM research. It suggests that perceived playfulness and enjoyment strongly affect users' perceived usefulness and intention to use social media (Junglas et al., 2013; Rauniar et al., 2014; Sledgianowski & Kulviwat, 2009).

3. *Need for social connection*. One of the core goals of social media design is to satisfy users' social needs, or the intrinsic need for relatedness in SDT. First, users adopt social media platforms because they provide a convenient way for messaging, commenting, liking, and other social interactions. They can share interests and affections, get social support, and foster teamwork for tasks or projects (Brandtzæg & Heim, 2009; Raacke & Bonds-Raacke, 2008; Yee, 2006). Second, with these functions for interactions, SNS and other platforms with communities help users to maintain and develop relationships, keep in touch with friends, or make new friends and develop networks (Gan & Wang, 2015; Quan-Haase & Young, 2010; Raacke & Bonds-Raacke, 2008). Third, social media satisfy users' needs for belongingness, companionship, and connectedness through processes such as social browsing, interactions, relationship maintenance, and contribution to communities (Pai & Arnott, 2013; Shao, 2009).
4. *Need for strengthening ego*. Social media users have the needs to know and define themselves, present and declare their identities to others, evaluate their identities based on others' feedback, and manage their impressions (Kietzmann et al., 2011). Social media platforms enable rapid feedback from a large number of others, from which users can learn about the self and develop self-definition and self-knowledge (Pierce et al., 2003). The need to understand themselves and others significantly predicts the behaviors of social interactions on SNSs (Chiu & Huang, 2015). In addition, the need to show who they are and what they like, i.e., self-expression, is another need driving social media usage (Shao, 2009), particularly those expressive behaviors, such as posting, reposting, and commenting, as found in a study of Chinese SNS and microblog users (Qin Gao & Feng, 2016). Users can also present selected information via social media (mainly SNS) and give others positive impressions, i.e., impression management (Qin Gao & Feng, 2016; S. Zhao, Grasmuck, & Martin, 2008).
5. *Need for self-actualization*. Users of SNSs and content communities can produce and share useful information with others and contribute to communities. These activities can satisfy users' needs for self-actualization, needs for competence in SDT, and extrinsic motivation, such as seeking recognition and fame (Reinecke et al., 2014; Shao, 2009; Yoon & Rolland, 2012). These self-actualization needs can also be satisfied when users complete tasks, cooperate, or compete with others in virtual-world platforms (Partala, 2011; Yee, 2006).

The studies listed in Table 2 have suggested that different types of social media satisfy users' needs differently. For example, most studies on content communities and virtual-world platforms have emphasized the need for self-achievement, but this need has been rarely reported in the studies on SNSs. A few studies have compared user motivations across social media platforms with the aim to understand why people use one or more applications. Gan and Wang's study (2015) found that over 80% of the participants reported information seeking as a motivation for using microblogs (Weibo), whereas only around half of participants reported information seeking as a motivation for using an SNS (WeChat). Similarly, Qin

Gao and Feng (2016) found that microblog (Weibo) users are more motivated to seek information and entertainment, whereas SNS users are more driven by the need for social connection.

3.2 Perception and Acceptance of Social Media Technology

Due to the rapid development and diffusion of technologies in the past 30 years, a number of theoretical frameworks have been developed specifically to explain users' acceptance and use of new technologies, including the TAM, the combined TAM and theory of planned behavior (c-TAM-TPB), the model of PC utilization (MPCU), innovation diffusion theory (IDT), and social cognitive theory (SCT). Among these models, TAM has been the most widely cited in studies about the acceptance of social media from the perspective of users' experience. TAM was developed based on the theory of reasoned action (TRA) and the TPB (Ajzen, 1985). TAM suggests that the core determinants of technology acceptance (attitudes and behaviors) are *perceived usefulness* (PU), i.e., the degree to which a person believes that job performance would be enhanced by using the technology, and *perceived ease of use* (PEOU), i.e., the degree to which a person believes that they can apply little effort to use the technology (Davis et al., 1989). This original and simple form of TAM has been expanded by various external variables—including design, social, and individual factors—all of which can affect attitude and intention to use directly or be mediated by perceived usefulness and ease of use, to make more complete models, such as the c-TAM-TPB and the unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, Davis, & Davis, 2003).

Table 3 summarizes TAM-based social media studies. While many studies have found that PU and PEOU are significant predictors of use intentions, these studies have examined the impact of a variety of external variables, which can be classified into (1) technological capacity and quality; (2) content quantity and quality; (3) social influence; and (4) users' characteristics and experience.

1. *Technological capacity and quality*. As shown in Table 3, while technological capacity and quality are considered to be mediated by TAM, most studies have investigated its impact on perceived usefulness (Fathema, Shannon, & Ross, 2015; D. Y. Lee & Lehto, 2013; Rauniar et al., 2014). For example, media richness increases perceived usefulness in content-sharing sites such as YouTube (D. Y. Lee & Lehto, 2013). For applications where high technical capacity and quality are required as a basis for meaningful interaction, such as virtual-world social games, technical quality (i.e., higher completeness, accuracy, and better format) influences PEOU (Junglas et al., 2013). In addition, some studies have revealed a direct effect of technological quality on users' intention to use collaborative-project platforms such as Wikipedia (Fathema et al., 2015; H.-L. Yang & Lai, 2011).

   Technical capacity and quality have been found to influence other predictors, besides PE and PEOU, of acceptance for a specific social media type. SNS users' attitudes and intention to use SNSs is affected by how safe they think the platform is with regard to directly posting personal data or mediated by PU and PEOU (Hansen, Saridakis, & Benson, 2018; Lorenzo-Romero & Constantinides, 2011; Rauniar et al., 2014; Sledgianowski & Kulviwat, 2009). Perceived playfulness and enjoyment have been found to influence users' intention to use SNSs or virtual-world platforms directly or mediated by perceived usefulness (Junglas et al., 2013; Rauniar et al., 2014; Sledgianowski & Kulviwat, 2009), and enjoyment can be supported by technical affordances, such as media richness and social awareness (i.e., providing a sense of others; Junglas et al., 2013; Rauniar et al., 2014).
2. *Content quantity and quality*. Content quantity and quality influence the PU of content-based platforms, such as media-sharing sites, collaborative-project platforms, and virtual-world platforms. Research has shown that the PU of media-sharing sites is influenced by content quantity and qualities, including richness and the relevance between the content and users' needs and the timeliness (the up-to-date extent; D. Y. Lee & Lehto, 2013). For platforms that are highly focused on content, such as collaborative-project platforms, the quality of content has been a direct predator of users' attitudes to the platform (H.-L. Yang & Lai, 2011).
3. *Social influence*. Social influence strongly affects users' perceived usefulness and acceptance of social media (Bailey et al., 2018), especially for SNSs and content sharing sites. On the one hand, opinions from others around the user—either from those known by the user via word-of-mouth (i.e., interpersonal norm) or from the general public via mass communication media (i.e., social norms)—influence the intention to use social media, either directly (C. Yang et al., 2010) or mediated by perceived usefulness (Qin et al., 2011). Early researchers (Sledgianowski & Kulviwat, 2009) found a slightly negative direct effect of social norms on intention to use SNSs; the authors explained this result by a boomerang effect, i.e., the participants (students) probably received pressure from parents who attempted to dissuade them from using SNSs. Later research has indicated that social norms increase the PU of SNSs, partly due to the fact that SNSs have become common tools for social connection (Qin et al., 2011; Yoon & Rolland, 2015). On the other hand, users' expectation of how broadly the platform can facilitate their ability to share content or connect with others, i.e., critical mass and perceived network externality, also influences the intention to use SNSs and content sharing sites, either directly (Sledgianowski & Kulviwat, 2009; C. Yang et al., 2010) or mediated by PU (Qin et al., 2011; Rauniar et al., 2014).
4. *Users' characteristics and needs*. The PU and the PEOU are also influenced by the relevance or consistency between the affordances and users' needs or goals, as discussed in Section 3.1, and by individual differences in abilities and use experience, which are discussed in Section 3.3.

   The original TAM has been criticized by some scholars for directly investigating the relationship between external variables of the PU and the PEOU without considering the moderating role of experience of actual usage of the technology (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2016; Šumak, Pušnik, Heričko, & Šorgo, 2017; Tsai, Chao, Lin, & Cheng, 2018). Some TAM-based research has expanded the model by incorporating psychological moderators that describe user experience during social media usage, including emotions (W. Lee, Xiong, & Hu, 2012), perceived enjoyment (Junglas et al., 2013; Rauniar et al., 2014; Sledgianowski & Kulviwat, 2009), cognitive absorption, or flow experience (Lin, 2009). Significant influences of these moderators have been found for virtual social/game worlds (Junglas et al., 2013; Lin, 2009) and SNSs (Rauniar et al., 2014; Sledgianowski & Kulviwat, 2009). The definition, measurement, and influencing factors of these moderators are introduced and discussed in Section 4.

Table 3 Research Applying Technology Acceptance Models (TAM) in Social Media

Study	Context	Factors affecting perceived ease of use	Factors affecting perceived usefulness	Factors affecting attitudes, intentions, or actual use
Bailey et al. (2018)	General social media		Social influence Facilitation of daily social interaction Perceived enjoyment	Perceived enjoyment
Alenazy et al. (2019)	SNSs			Perceived enjoyment
Hansen et al. (2018)	SNSs	Perceived risk Trust in SNSs		Perceived risk Trust in SNSs Behavioral control
B. Kim (2011)	SNSs		Confirmation of expectation	Confirmation of expectation Perceived enjoyment Interpersonal influence
W. Lee et al. (2012)	SNSs	Emotion arousal and valence	Emotion arousal and valence	Perceived enjoyment
Lorenzo-Romero et al. (2011)	SNSs	Trust in SNSs	Trust in SNSs	Trust in SNSs Perceived risk (-)
Qin et al. (2011)	SNSs		Subjective norm Critical mass	
Rauniar et al. (2014)	SNSs		Critical mass Capability of the system Perceived playfulness	Trust in SNSs
Sledgianowski & Kulviwat (2009)	SNSs			Playfulness Critical mass Trust in SNSs Normative pressure
Q. Zhao et al. (2016)	SNSs			Perceived control of the system Familiarity to the system Self-investigation in the system Social influence Psychological ownership of the system
Shiau & Chau (2012)	Blogs and microblogs		Confirmation of expectation	Confirmation of expectation
Doleck et al. (2017)	Picture/video sharing		Need for self-expression	Need for self-expression
D. Y. Lee & Lehto (2013)	Picture/video sharing		Content richness (relevance, timeliness, sufficiency) Vividness Self-efficacy	
C. Yang et al. (2010)	Picture/video sharing			Social influences (perceived network externality, interpersonal norms, social norms)
Xun Liu (2010)	Collaborative projects	Self-efficacy		
H.-L. Yang & Lai (2011)	Collaborative projects			System quality Information quality Motivation (internal self-concept)
Fathema et al. (2015)	Learning management systems (collaborative projects/ SNSs)	Self-efficacy	System quality Self-efficacy	System quality
Lin (2009)	Virtual social/ game worlds	Cognitive absorption	Cognitive absorption	
Junglas et al. (2013)	Virtual social/ game worlds	System quality (affected by completeness, accuracy, format, and currency)	Information quality (affected by reliability, flexibility, integration, accessibility, and timeliness)	Satisfaction of social needs (affected by activity support, context support, representation support, insight support) Enjoyment

Note: SNSs, social network sites.

3.3 Influences of Individual Differences

Users' social psychological characteristics impact their acceptance and use of social media. Some of these psychological characteristics are relatively stable and hardly change, whereas others vary in different situations or are learned through users' previous experience with the technology. We will discuss the former in Section 3.3.1 and the latter in Section 3.3.2.

3.3.1 Personality, Orientation of Attachment, and Social Comparison Orientation

Personality refers to a set of behaviors, cognitions, and emotional patterns developed from an individual's biological and environmental factors (Corr & Matthews, 2009). Personality is the most studied construct in psychology. Among numerous personality models available in the literature, the five-factor model (FFM; e.g., Goldberg, 1993) is perhaps the most widely used in social media studies. This fact can be attributed to its simplicity and well-established reliability and validity. FFM describes personality from five traits: (1) extraversion; (2) openness to new experience; (3) neuroticism; (4) conscientiousness; and (5) agreeableness:

1. *Extraversion* is the extent of how a person is sociable, talkative, and ambitious. Whereas extraverts are more likely to engage in real-life social interactions, the impact of extraversion on online social interaction is influenced by anonymity in a social media setting. In settings where most people know each other in daily life, such as SNSs, the real-life behavioral patterns will transfer. Extraverts tend to contact others and broadcast their activities and thoughts on SNSs, i.e., higher self-disclosure (Correa, Hinsley, & De Zuniga, 2010; D. J. Hughes, Rowe, Batey, & Lee, 2012; K. Wilson, Fornasier, & White, 2010). In settings where people are largely unknown to each other and anonymity is deliberately protected, introverts are more engaged because the environment allows them to express themselves and develop a sense of belonging without social pressure and communication apprehension in face-to-face communication (Correa et al., 2010; Hamburger & Ben-Artzi, 2000). For example, Chen et al. (2017) found that introvert users are more likely to watch Danmaku videos because this action allows passive socialization in an anonymous collective (Yue Chen et al., 2017).
2. *Openness to new experience* is the flexibility of thought and receptivity of novelty. People with higher openness are willing to accept new technologies in general (Devaraj, Easley, & Crant, 2008; Svendsen et al., 2013) and social media technologies, e.g., SNSs, microblogs, media sharing sites (Yue Chen et al., 2017; Correa et al., 2010; D. J. Hughes et al., 2012). They also seek information more frequently (McElroy, Hendrickson, Townsend, & DeMarie, 2007) and are more likely to perceive new products as easy to use (Svendsen et al., 2013).
3. *Neuroticism* is emotional instability, i.e., higher neuroticism is related to less stable emotions. People with higher neuroticism are more likely to have regrets after posting on social media (Moore & McElroy, 2012). Online communication technologies featuring high edibility, asynchronicity, and/or anonymity allow more time and opportunity for users to contemplate what will be expressed, and can make it easier for neurotic users to express themselves, especially regarding emotional or private aspects (Amichai-Hamburger & Vinitzky, 2010; Seidman, 2013). Empirical research has suggested that people with higher neuroticism more frequently use chatrooms (Hamburger & Ben-Artzi, 2000), instant messaging (Correa et al., 2010) and Facebook (T. Ryan & Xenos, 2011).
4. *Conscientiousness* is the extent to which a person is reliable, responsible, organized, and self-disciplined. People with higher conscientiousness prefer to keep working on their main tasks and responsibilities; thus, their social media use may depend on the purpose. Research on the relationship between conscientiousness and social media use yields conflicting results, with more evidence for negative associations but also some evidence for positive or no significant associations (Moore & McElroy, 2012; Özgüven & Mucan, 2013; C. Ross et al., 2009; Seidman, 2013; Yee et al., 2011). The impact of conscientiousness seems to depend on whether individuals view social media as an efficient means for relationship development and maintenance, or a procrastination or distraction that hinders them from focusing on their main goals. In addition, Seidman et al. (2013) found that conscientiousness is a prominent negative predictor of self-presentation on social media; these data indicate that conscientious individuals are cautious in their online self-presentations.
5. *Agreeableness* is the extent of compassion or accommodation in interpersonal relationships. People with higher agreeableness tend to avoid conflicts or rejection to maintain friendships. Agreeableness positively affects the PEOU of technologies (Özbek et al., 2014), but most studies have found no significant effect of agreeableness on social media use or Internet use (Amichai-Hamburger & Vinitzky, 2010; Correa et al., 2010; C. Ross et al., 2009). Further research has suggested that the relationship between agreeableness and social media use may be mediated by the specific behaviors to perform on social media platforms. A study of Facebook users reported that agreeableness is positively related to communication and connection behaviors, but negatively related to information-seeking behaviors (Seidman, 2013).

Besides these personality traits, social media use is affected by individual differences in orientation toward social relationships, or *attachment orientation*, which is often described with two dimensions: attachment anxiety and attachment avoidance (Brennan, Clark, & Shaver, 1998). Attachment anxiety is the extent of fear of rejection or abandonment from others. Social media afford more means for fostering intimacy and strengthening bonds, and these are particularly important for those with high attachment anxiety. As a result, positive associations have been found between attachment anxiety and SNS use, even SNS addiction (Blackwell et al., 2017; A. Chen, 2019; Hart. Nailling, Bizer, & Collins, 2015). Attachment avoidance is the extent to which an individual is afraid of being dependent on or intimate with others and distrusts others' goodwill. Research on the association between attachment avoidance and social media use provide contradictory findings, and A. Chen (2019) argued that the relationship is mediated by how SNS use satisfies users' needs for relatedness, self-presentation, and autonomy. Users with higher attachment avoidance have a higher need for autonomy but lower need for relatedness and self-presentation. Social media affordances related to these needs determine users' social media use.

Social comparison orientation, i.e., the tendency to compare themselves with others, also affects users' SNS use (Vogel et al., 2015). Users with higher social comparison orientation recognize that social media provide more information about

others and facilitate social comparison. The authors found that Facebook users with high social comparison orientation spend more time on Facebook and are more negatively influenced by brief social comparisons on Facebook. The relationship between social comparison behaviors and social media use will be discussed in more detail in Section 5.

3.3.2 Self-Efficacy and Self-Regulatory Capacity

In addition to psychological dispositions, users' abilities, or their confidence in their abilities, to use social media also influence social media use. Users' confidence in their capabilities to manipulate technologies is referred to as self-efficacy; research has shown that this concept is positively associated with PU, PEOU, and attitudes toward technological systems (Fathema et al., 2015; Venkatesh & Davis, 1996). More self-efficacious users are more likely to continue using social media (Bright, Kleiser, & Grau, 2015). A related construct is perceived behavioral control, which is the extent to which users perceive that they actually control their behaviors of interest. The more controllable a social media setting is, the more likely users perceive the technology as easy to use. Thus, perceived behavioral control positively affects users' intention to use social media, either directly or mediated by PEOU (Hansen et al., 2018).

Excessive social media use is affected by individuals' self-regulatory capability, which refers to the ability to monitor themselves, control feelings and behaviors, and maintain continued efforts to achieve goals (Bandura, 2001). Deficient self-regulatory capability is associated with a habitual mind-set, psychological dependence on social media, and problematic overuse of social media (Khang, Han, & Ki, 2014; C. Wang, Lee, & Hua, 2015). We will discuss social media overuse in Section 6.1.4 in detail.

4 USER EXPERIENCES IN SOCIAL MEDIA

As the use of social media continues to increase across the world, the interaction with social media shapes users' daily emotional and social experiences. Emotional and social experiences are central to individuals' expressions of ideas and opinions and, in turn, influence one's attitudes and behaviors as well as those of others. The relationship between the use of social media and users' emotional and social experiences has become a popular topic in public discussion, as evidenced by the large number of online posts, talks, and best-selling books. In academia, a large body of research has investigated this relationship with the aim of explaining specific social phenomena (e.g., Ferrara & Yang, 2015; Riedl, Köbler, Goswami, & Krcmar, 2013); to elucidate technological design and development, content preparation and representation, and social facilitation and policy development for social media sites (e.g., Bardram & Hansen, 2004; Oh et al., 2018; Weidlich & Bastiaens, 2019); and to enable the design and development of persuasive and affective technologies (e.g., Borges-Tiago et al., 2019; Song, Cho, & Kim, 2017).

Among a wide variety of emotional and social experiences with social media, the following experiences and phenomena have attracted the most research attention: emotion, flow, social presence, and social connectedness. Researchers with different purposes have investigated these experiences from different perspectives. Some have focused on how a specific experience influences users' attitudes and behaviors as individuals and as a whole, and others have focused on what factors shape and modify these experiences.

The rest of this section will review issues related to each experience in social media by first providing definitions and measurement of the experience, then reviewing the related major issues, addressing both the impact of the experience on users' attitudes and behaviors and how this experience can be modified in social media environments.

4.1 Emotional Experience

4.1.1 Definitions and Measurement

Emotion can be generally described in two dimensions: valence and arousal (J. A. Russell, 1979). Valence is the level of pleasantness evoked by stimuli, ranging from negative to positive. Arousal is the intensity or the level of autonomic activation evoked by stimuli. Low arousal means a calm emotional state, whereas high arousal means an excited state. Emotion in social media use can be measured by self-report, physiological methods, and sentiment analysis of social media content.

1. *Self-report measures*. Self-report measures are the most widely used tools in user research due to their convenience and cost benefits. There are two main groups of self-report scales to measure emotion. The first group is based on the valence and arousal model of emotion. The Pleasure-Arousal-Dominance (PAD) Emotion Scale (Mehrabian & Russell, 1974) is a representative instrument in this school. It measures three dimensions—including valence (or pleasure), arousal, and dominance (feelings of control, varying from dominance to submissive)—and each dimension is measured by a six-item, nine-point semantic differential scale (e.g., "happy-unhappy" and "pleased-annoyed" for valence, "excited-calm" and "stimulated-relaxed" for arousal). Another widely used scale is the Self-Assessment Manikin (SAM; Hodes, Cook, & Lang, 1985), which measures the same three dimensions as PAD, but each dimension was measured with a humanoid-pictorial nine-point scale. Given the non-verbal pictures of emotional states, SAM is convenient to use in cross-cultural studies.

   The other group measures emotions by asking participants to rate the experienced strength of a group of discrete specific emotion descriptions. This approach can measure subtle and complex feelings such as "shame" and "pride" that may be hard to accurately portray by the two or three emotional dimensions in the first group. The Geneva Emotions Wheel (Scherer, 2005) is a representative tool of this kind. It visually aligns 16 discrete emotional descriptions on a circle and participants can rate the extent of each emotion they feel. Another widely used instrument is the Product Emotion Measurement Instrument (PrEmo; Desmet, 2003), which presents 14 discrete emotions by a cartoon character with different facial and body expressions. Similar to SAM, the non-verbal instrument can be easily used in cross-cultural research.
2. *Psychophysiological measures*. Emotion involves a series of physiological activities, and researchers have attempted to map these physiological activities with the valence and arousal dimensions of emotion (Mauss & Robinson, 2009). Neurobiological research has suggested that emotion is associated with the central nervous system, including the cortex and limbic system with structures such as the hypothalamus, cingulate cortex, and hippocampus. Therefore, electroencephalography (EEG) and neuroimaging can be used to monitor these activities and areas to assess emotion. Whereas the activation level of brains indicates emotional arousal, the asymmetry of activation between left and right hemispheres is used as an indicator of emotional valence. Generally, left frontal inactivation indicates a withdrawal response and a negative emotion, whereas right frontal inactivation indicates an approach response and a positive emotion (Yue Chen et al., 2018; Schmidt & Trainor, 2001).

In addition, emotion is associated with activities in the peripheral nervous system, including cardiac and exocrine organs. Some research has measured emotion (mainly the arousal dimension) using cardiovascular measures (blood volume pulse, heart rate, and heart rate variability), depth and frequency of respiration, and skin conductance (Appelhans & Luecken, 2006; Yue Chen et al., 2018; Kreibig, 2010).

Emotion can also be expressed by facial activities, which involve the contraction of facial muscles. For example, frowning is associated with the activities of corrugator muscles and smiling with the activities of zygomatic muscles (Cacioppo, Petty, Losch, & Kim, 1986). Therefore, emotion can be measured using facial expression capture and recognition algorithms (e.g., FaceReader by Noldus) or electromyography (EMG) measures of facial muscles.

Physiological methods need to be used in laboratory settings with rigid experimental control, a factor that limits their use in social media studies. However, they provide a continuous measurement of emotion, and they are less susceptible to subjective biases. A few laboratory studies of social media users have employed this method for continuous emotion monitoring (Kuan, Zhong, & Chau, 2014; Mauri et al., 2011).

3. *Sentiment analysis of social media content*. The content posted on social media provides a new source for researchers to learn about users' emotional experience in social media. Sentiment analysis methods and tools have been developed to process natural language and to identify affective feelings. Two frequently used approaches are lexicon-based and machine-learning methods (Mozetič, Grčar, & Smailović, 2016). Both of them infer users' emotion based on texts pre-labeled with specific emotions. For an individual user, sentiment analysis of their posts and activities on social media can be useful for monitoring long-term emotion and mood problems, such as depression (De Choudhury, Gamon, Counts, & Horvitz, 2013). When applied to a large scale of users, sentiment analysis can assess and predict the general public's emotional responses to public events, such as presidential elections (Stieglitz & Dang-Xuan, 2013). In the business field, user-generated content about firms, brands, and products on social media can be processed with sentiment analysis to infer mass users' emotional feelings with the entity, monitor word-of-mouth, and even predict firm stock (Y. Yu et al., 2013).

4.1.2 Emotional Contagion in Social Media

User-generated content charged with the author's emotions can trigger other users' emotion in both valence and arousal. This phenomenon that people share and synchronize emotions is called emotional contagion. Initial research had studied this eventuality in face-to-face interactions where people share emotion by voice or non-verbal cues such as facial expressions (Hatfield, Cacioppo, & Rapson, 1993). However, empirical research has suggested that face-to-face condition and non-verbal cues are not strictly necessary to cause emotional contagion. People can detect emotions from written text-based messages with limited social cues (R. B. Harris & Paradice, 2007) and computer-mediated chatroom interactions (Hancock, Gee, Ciaccio, & Lin, 2008). These studies have suggested emotional contagion can occur through the Internet. This conclusion is supported by a 20-year longitudinal study, which showed that long-term moods such as depression and happiness can be spread via online networks (Fowler & Christakis, 2008).

Large-scale experiments involving social media users found that emotion contagion occurs in social media without users' awareness and even without direct interpersonal interaction (Ferrara & Yang, 2015; Kramer et al., 2014). Ferrara and Yang's study on Twitter found a strong linear relationship between the valence of the stimuli and that of the responses (Ferrara & Yang, 2015). Kramer et al.'s (2014) experiment found that Facebook users produce fewer positive posts and more negative posts when positive expressions presented to them were reduced. A study on Instagram found that positive emotions can be spread by seeing pictures posted by strangers, although this phenomenon depended on users' social comparison orientation, i.e., users lower in social comparison orientation reported positive emotion after viewing positive posts on Instagram (de Vries et al., 2018).

Emotional contagion on social media can promote information diffusion. Emotional content can capture social media users' attention more than other content (Brady et al., 2019) and motivate them to share and transmit the content more than other types of content (Berger, 2011). A large-scale study on Twitter (involving collection and analysis of 165,000 tweets) suggested that messages that evoke higher emotional arousal are retweeted more often and quickly than those with neutral emotions (Stieglitz & Dang-Xuan, 2013). Marketing research has found that emotional arousal has a strong positive association with users' attitudes toward sharing viral content and advertisements via social media (Borges-Tiago et al., 2019). Both pleasure and arousal further increased the intention to share brand-related contents and impulsive purchases, and the effects of arousal were stronger than the effects of pleasure (A. J. Kim & Johnson, 2016). Furthermore, negative emotions can also be contagious on social media. In times of catastrophe or natural disasters, people may feel anxious or other highly aroused emotion and rumors may flourish, which can lead to serious consequences (Heath, Bell, & Sternberg, 2001).

The phenomenon that emotion increases social transmission can be explained from the perspectives of emotion regulation, impression management, social bonding, and persuasion (Berger, 2014). First, sharing one's emotion can help regulate or manage one's own emotion (Rimé, 2009). By sharing negative experiences, people may receive more social support and feel better. By sharing pleasant experiences, people can recall and re-consume positive feelings. High arousal emotions, which activate the autonomic nervous system, are believed to boost sharing to regulate emotion. Second, from the perspective of impression management, people generally share more positive emotions than negative ones to avoid associating themselves with negative things and make a good impression (Berger & Milkman, 2012). Third, users share emotional information to increase the possibility of emotionally resonating with others and strengthen social bonding and cohesiveness (Barsade & Gibson, 2007). Finally, emotionally arousing information is more persuasive if the audience has little motivation or ability to process the information (Petty & Cacioppo, 1986). This potential motivates users to share emotionally arousing information to persuade others to change their behaviors or decisions, such as health-related behaviors, purchase decisions, or political opinions (Berger, 2014).

4.1.3 Positive and Negative Emotions of Social Media Use

Social media platforms have been designed to evoke high enjoyment and arousal. According to the aforementioned SDT, social media can bring users enjoyment if they can satisfy their intrinsic needs, i.e., autonomy, competence, and relatedness (Tamborini, Bowman, Eden, Grizzard, & Organ, 2010). Besides,

from the perspective of eudemonism, users enjoy social media more if they meet their needs of personal growth and meaningfulness (Oliver & Bartsch, 2011). Mauri et al. (2011) measured emotions evoked by Facebook use by a series of physiological measures, e.g., EEG, respiration, and skin conductance, and found that Facebook use evokes highly positive and stimulating emotions. Kuan et al. (2014) explored how social influence affects the emotion of users of group-buying sites with EEG measures of emotion; they found that the presence of the number of "likes" on product pages evokes more positive emotion captured by EEG signals.

On the other hand, being constantly connected to a live stream of others' life updates may bring social pressure, which impedes enjoyment. A typical social pressure on SNSs is the fear of missing out (FOMO), which has been associated with lower levels of perceived autonomy and enjoyment (Reinecke, Vorderer, & Knop, 2014). In addition, upward social comparisons, i.e., to compare oneself with more successful others, has been found to lead to negative emotions, such as envy, shame, and even burnout (Lim & Yang, 2015). Long-term experience of these negative emotions may influence users' psychological well-being, as further discussed in Section 6.1.

4.2 Flow Experience

4.2.1 Definitions and Measurements

Users may be intensely engaged in social media with a distorted sense of time, loss of self-consciousness, and exclusion of all other thoughts. This enjoyable and intrinsically optimal state is often referred to as flow (Csikszentmihalyi, 1975). Flow is commonly considered "a psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy" (Moneta & Csikszentmihalyi, 1996) and can be experienced in various activities, e.g., movie watching, gaming, and painting. It has been found to be a critical determinant of online experiences (Hoffman & Novak, 1996; Novak, Hoffman, & Yung, 2000).

Early research had suggested that flow occurs when users perceive a balance of challenge and skill, i.e., in the situations with low levels of both challenge and skill, or high levels of both (Csikszentmihalyi, 1975). The later quadrant model and fluctuation model have indicated that flow occurs only when both challenge and skill are perceived in high levels (Massimini, Csikszentmihalyi, & Carli, 1987). In this situation, users naturally use their skill to process the current task and put all their attention on it without conscious focus of attention. Researchers have also identified the latent facets or components of flow, including the intense and focused concentration on the present moment, the sense of control over one's actions, the merging of action and awareness, the intrinsically rewarding or autotelic experience, the loss of self-consciousness, and distorted sense of time (Nakamura & Csikszentmihalyi, 2009).

The flow experience can be measured in the following ways:

1. *Self-report measures*. Flow research has adopted two types of self-report measures: post hoc questionnaire and experience sampling. Post hoc questionnaires are distributed to interrogate participants about their flow experience after the flow-inducing activity. Csikszentmihalyi, who coined the concept of flow, developed the Flow Questionnaire (Csikszentmihalyi & Csikszentmihalyi, 1992), which is one of the most cited instruments of this concept. The questionnaire first provides three standard descriptions of flow experience derived from Csikszentmihalyi's earlier work, then asks users to recall and describe any similar experiences and corresponding activities, and to rate associated feelings of flow, e.g., involvement and effort. It allows users to freely express their flow experiences and is more suitable for exploratory qualitative research. Later research without exploratory goals has applied simplified questionnaires that directly asks the general frequency of flow experiences (Novak et al., 2000). The cons of the method are that most of the collected data are qualitative and not well-prepared for quantitative analysis, and the measurement is time- and effort-demanding for participants

   Later research has endeavored to develop tools that collect quantitative data using standard scales. Examples of frequently used scales are Flow State Scale-2, developed by T.W. Jackson and Eklund (2002), and Flow Short Scale (Engeser & Rheinberg, 2008). They measure the intensity of flow by ratings on flow dimensions or components, such as concentration, control, and self-consciousness. Kaur et al. (2016) developed a scale to specifically measure flow experience in SNSs; it comprises the sub-dimensions of skill, machine interaction, social interaction, playfulness, concentration, and enjoyment. The reliability and validity of these standardized scales have been verified statistically, e.g., by confirmatory factor analysis.

   The experience sampling method (ESM) has been designed to remove the delay between the flow experience and the measurement of flow (Larson & Csikszentmihalyi, 1983) and to capture flow experience in real life. Participants are given a pager or, nowadays, mobile applications, and asked to report their flow experience at randomly chosen time points in a day. The questions are similar to those in Flow Questionnaire, including both open-ended questions and a rating scale involving items such as concentration and mood.
2. *Physiological measurements*. A challenge of self-report methods for measuring the flow experience is that they are retrospective in nature and the intrusiveness of the ESM may pull participants out of a flow state during measurement. To develop unobtrusive and continuous measurement of the flow experience, physiological correlates of flow experiences have been examined. Although it is still in an exploratory stage, flow states have been found to involve optimal and moderate mental effort that arises through the increased parasympathetic modulation of sympathetic activity (Tian et al., 2017). Thus, flow experiences are associated with a moderate level of physiological arousal between anxiety/stress and relax/boredom, indicated by a moderate level of heart rate variability, heart rate, respiratory depth, and skin conductance (Harmat et al., 2015; Peifer et al., 2014; Tian et al., 2017).

4.2.2 Impacts of Flow in Social Media

Flow experience in social media positively influences users' engagement, attitudes toward the platforms, and intention to use. Research has shown that certain characteristics of flow experience, e.g., increased telepresence and time distortion, are associated with more exploratory behaviors, such as browsing new contents or platform features (Hoffman & Novak, 1996; Novak et al., 2000). Flow experience has also been found to promote users' behaviors of blogging (Lu, Hsiao, & Cheng, 2010) and discussing and sharing opinions on SNSs (Song et al., 2017). It also leads to higher intention of purchase and impulsive buying behaviors when shopping on SNSs (Hsu, Chang, Kuo, & Cheng, 2017). Further, people who experience flow will attempt to replicate that state later (Csikszentmihalyi, 2014) and, thus, the number of revisits will increase. It has been verified that higher flow leads to a higher frequency of use

and a stronger intention to revisit in SNSs, microblogs, content sharing sites, and social games (Chang, 2013; L.-Y. Huang, Hsieh, & Wu, 2014; Pelet, Ettis, & Cowart, 2017).

4.2.3 Antecedents of Flow Experience in Social Media

Antecedents of flow had been studied long before the rise of social media. Hoffman and Novak (1996) proposed one of the most cited models. Their model suggested following necessary elements of flow (Hoffman & Novak, 1996): (1) skills to use the Internet and a sense that the system is under the user's control; (2) a feeling that the Internet is challenging and emotionally arousing; (3) focused attention or concentration; and (4) interactivity (mainly refers to the system speed) and telepresence (a feeling that the virtual environment is more real than the actual physical environment). Many later studies, however, have treated these constructs as dimensions or characteristics of flow experience. For example, concentration and sense of control have been treated as components or dimensions of flow in a number of studies (Koufaris, 2002; Novak et al., 2000).

Though the technological antecedents of flow are not thoroughly documented, telepresence and related affordances (such as media richness) are believed to induce flow experience. A high level of telepresence means that users are immersed in the computer-mediated environment and more concentrated, phenomena that support flow experience. The positive effect of telepresence on flow experience has been empirically verified in computer-mediated environments (Z. Guo et al., 2016) and also social media (Pelet et al., 2017; Rodríguez-Ardura & Meseguer-Artola, 2019).

Users' personal traits also influence their flow experience in social media. First, users differ in their desired levels of simulation in life, i.e., their optimum stimulation level (OSL). Users with high OSL have more non-functional, novel, and exploratory behaviors driven by curiosity (Zuckerman, 1979). Therefore, OSL is a driving force of online hedonic consumption (Mahatanankoon, 2007) and is positively associated with flow experience in Facebook (Rodríguez-Ardura & Meseguer-Artola, 2019). Second, extraverts are more often involved in social interactions through social media and thus are more likely to experience flow states. Empirical research has verified that extraversion is positively associated with flow experience on user-generated-content sites such as YouTube and Wikipedia (Moon, Kim, & Armstrong, 2014). Related to extraversion is another trait of exhibitionism: the tendency to show off to gain attention and admiration. Exhibitionism is positively associated with users' propensity of opinion leadership, which is a key determinant of flow experience during discussion and persuasion via social media (Song et al., 2017). Third, flow can be affected by users' immersive tendency, i.e., a disposition that determines how easily a user can become immersed or involved in media (Witmer & Singer, 1998). Users with higher immersive tendency are more likely to experience flow-related experience, including focus on current activities, greater emotional involvement and absorption of time, and greater enjoyment of game-type media (Weibel, Wissmath, & Mast, 2010; Witmer & Singer, 1998).

4.3 Social Presence

4.3.1 Definitions and Measurements

There have been considerable variations in definitions of "social presence" among studies. Biocca et al. (2001) summarized definitions from three perspectives: (1) co-presence and mutual awareness, which is similar to social awareness; (2) a feeling of psychological involvement, including immediacy, intimacy, and mutual understanding; and (3) behavioral engagement, such as immediacy behaviors. To distinguish it from social awareness and social behaviors, here we adopt the second perspective and define social presence as the salience of the interactions among users and the psychological connection perceived by users (Biocca et al., 2003).

Social presence research usually measures the construct by self-report measures, and the scales have been developed from a variety of conceptualization and rationale, as described below:

- *Social presence as a characteristic of the medium*. Early research had defined social presence as a characteristic of the medium, i.e., perceived social richness (Short et al., 1976). Thus, the social presence scales in this research comprise semantic differential pairs of items, such as "the medium is perceived to be unsociable/sociable."
- *Social presence as awareness and perceived closeness of others*. As social presence is positively associated with the feelings of immediacy, i.e., the closeness in psychological distance (Wiener & Mehrabian, 1968), and intimacy, i.e., the interpretation of interpersonal interactions (Argyle & Dean, 1965; Gunawardena, 1995), some social presence scales have been developed from the perspectives of immediacy and intimacy, including the frequently cited scale Social Presence Scale (Gunawardena & Zittle, 1997). Recently, Kreijns et al. (2020) developed a scale of social presence by using the Rasch measurement model as a rigid construct validation method. The Rasch analyses revealed two dimensions of social presence: proximity and awareness of others and interactions.
- *Social presence as a group/community perception*. Some social presence scales conceptualize the construct as users' perception of the community. One perspective in this cluster suggests that people with higher homophily, i.e., the perceived similarity in attitudes, behaviors, or emotions, are more likely to form a community and other, which lead to higher social presence. A frequently cited scale is the Social Presence and Privacy Questionnaire (Tu, 2002), which measures social presence in three dimensions: social context, communication language, and interactivity or engagement. Another scale used in online learning is the Community of Inquiry (CoI) survey instrument (Arbaugh et al., 2008). It measures social presence in terms of open communication, group cohesion, and affective projection.

4.3.2 Impacts of Social Presence on Users

Social presence is generally considered a desirable experience for social media users. It is associated with a series of positive outcomes in the social media context, including trust, attraction, enjoyment, perceived usefulness, and satisfaction (Bulu, 2012; Hassanein & Head, 2007; K. M. Lee et al., 2006). Increased social presence brings a sense of companionship with others (Hwang & Lim, 2015) and further benefits the development of online communities (Aragon, 2003).

However, there are exceptions when a higher level of social presence is not as appreciated compared with a lower level. First, less socially oriented people (e.g., introverts or people with high social anxiety) may feel discomfort or not enjoy the presence of others during interactions. They may prefer media with lower richness and social presence (Allmendinger, 2010; Hertel et al., 2008), such as text messaging. Second, users may prefer a lower level of social presence of partners they dislike. Higher social presence of disliked partners can amplify the negative attitudes

(E.-J. Lee & Shin, 2014). Third, the desired level of social presence also depends on users' motivations or goals. Research of online learning has suggested that learners who focus on efficiently gaining knowledge prefer less social presence of other learners (Yue Chen et al., 2019).

4.3.3 Antecedents of Social Presence in Social Media

The prevalent early computer-mediated communication (CMC) theories, such as media richness theory (Daft & Lengel, 1986) and "cures-filtered-out" theory (see a review by Walther & Parks, 2002), had emphasized the importance of technological capabilities on mediated social experiences; they had even assumed social presence as a quality of the medium itself (Short et al., 1976). This rather technological deterministic perspective, however, has been criticized by Walther (1992) and other researchers (e.g., So & Brush, 2008), who found that the selection of a communication medium depends not only on technological affordance of the medium, but also on situational and relational goals of the communication parties. Through relatively long-term examinations of mediated social interaction, Walther (1992) proposed the social information processing (SIP) theory, which asserts that individuals seek to develop relationships with others via any medium, and they can adapt their communication strategies to communication media to exchange social contextual information effectively (Hian et al., 2004; J. M. Wilson et al., 2006).

Accumulating research on social media has shown that social presence experienced by social media users is influenced by both the technological capabilities to deliver social context cues and individual factors, such as users' characteristics and how users employ such capabilities. Regarding technological capabilities, a recent review (Oh et al., 2018) systematically summarized how social presence is affected by technological affordances and qualities in virtual environments. First, the most frequently studied technological affordance is modality richness. The claim that users experience higher social presence when using more vivid platforms that support richer modalities (e.g., videos or even immersive technologies) has been supported by empirical research (Bente et al., 2008; H. Kim et al., 2013; Pittman & Reich, 2016). Second, as mentioned in Section 2.1, social presence can be increased by visual realism, especially the behavioral realism, of representations, which can be operationalized by non-verbal behaviors, such as facial expressions and eye contact (Astrid et al., 2010). Third, synchronous or real-time interactions induce higher social presence than asynchronous interactions (K. Burke & Chidambaram, 1999). Fourth, the identification affordance of social media, such as presentation of identity cues (e.g., user name and portrait pictures), enhances social presence (Feng et al., 2016; Schumann, Klein, Douglas, & Hewstone, 2017). Finally, social presence is influenced by peer users' communication behaviors. When using text-based media for social purposes, using more emoticons or emojis to express emotion helps to develop social presence (Derks et al., 2007). Privately transmitted self-disclosures by others make Facebook users perceive higher intimacy than those publicly shared disclosures (Bazarova, 2012).

Social presence is also affected by a number of individual factors. First, users with greater immersive tendency (mentioned in Section 4.2) are more likely to experience greater social presence (K. J. Kim et al., 2013) and telepresence (Ling et al., 2013). A special type of immersive tendency is transportability, which is the proclivity to be absorbed into a narrative or identify with characters in the story. Research has suggested that Twitter users with higher transportability perceive higher social presence of politicians who tweet narratively and further espouse positive attitudes about the politicians (E.-J. Lee & Shin, 2014). Second, perceived social presence is affected by users' attitudes toward social interaction, as well as their social capabilities (Jin, 2010). When the same number of social cues are presented in an online environment, more social-oriented users perceive higher social presence because they have less communication apprehension and are more skilled to attend to these cues (Cortese & Seo, 2012; Jin, 2010).

4.4 Social Connectedness

4.4.1 Definitions and Measurement

To feel connected with others is a fundamental human need (Deci & Ryan, 1985; Maslow, 1943). Social connectedness is a positive feeling of staying in touch with ongoing social relationships (IJsselsteijn, van Baren, & van Lanen, 2003). The objects of social relationships can be a partner/spouse, family/friends, or a larger community/organization (Hawkley, Browne, & Cacioppo, 2005). The feeling or belief of being connected with a community is also defined as the sense of community, the sense of belonging, or belongingness, which is positively associated with life meaningfulness and life satisfaction (Stavrova & Luhmann, 2016; Sum et al., 2009).

The term social connectedness has been conceptualized as either a long-term or a short-term experience in different studies. Long-term social connectedness is a chronic and developing feeling that people feel comfortable in the society and able to identify their social roles in life (R. M. Lee & Robbins, 1995). Short-term social connectedness is an acute experience of belonging and relatedness based on users' current perceived social appraisals and relationship salience (T. Ryan, Allen, Gray, & McInerney, 2017; van Bel et al., 2009).

Some research has conceptualized social connectedness as the antonym of social isolation and loneliness (Hawthorne, 2006). Social isolation usually refers to a long-term psychological state, whereas loneliness may be either long-term or short-term. Loneliness is characterized by low-social-connectedness situations where one perceives insufficient personal relationships, dissatisfaction with relationships, difficulty accepting social roles, and frustration by others' failure to understand the person (Hawkley et al., 2005; R. M. Lee & Robbins, 1995).

In most studies on social connectedness, the construct has been measured via self-report measures. One the most frequently cited scales is the UCLA Loneliness Scale (D. Russell, Peplau, & Cutrona, 1980), which measures relatively long-term loneliness and social isolation with a 20-item four-point Likert scale. A three-item short version of this scale has also been developed (M. E. Hughes et al., 2004) and has often been adopted in subsequent research. Another frequently used scale to measure long-term social connectedness is the Social Connectedness Scale (R. M. Lee & Robbins, 1995) and its revised version (R. M. Lee et al., 2001) with 20 items. This scale has been revised to fit the situation of Facebook use in a couple of studies (Grieve et al., 2013; Sinclair & Grieve, 2017). To measure social connectedness as a short-term experience, van Bel et al. (2009) developed a 22-item 7-point Likert scale involving awareness of others' experiences, satisfaction with contact quantity and quality, relationship salience, and shared understanding.

4.4.2 Impacts of Social Connectedness

Social connectedness is positively associated with social media usage. Empirical research has suggested that stronger connectedness is associated with more frequent self-disclosures and updates on Facebook (Deters & Mehl, 2013; Köbler et al., 2010) and more frequent tweeting (Riedl et al., 2013). A study

of college students also suggested an association between more frequent Facebook use and decreasing feeling of loneliness (Lou, Yan, Nickerson, & McMorris, 2012). Social connectedness increases intimacy with others, a sense of sharing, and a stronger group attraction (IJsselsteijn et al., 2003), and thus promotes community development. In the long term, it strengthens social integration and is beneficial to users' mental health and social capital (M. Burke et al., 2010; Cornwell, Laumann, & Schumm, 2008).

4.4.3 Factors Influencing Social Connectedness in Social Media

Social connectedness can be promoted by increasing social awareness and social presence, even without direct social interactions (Yue Chen et al., 2017; Nardi, Whittaker, & Bradner, 2000; Riedl et al., 2013). Although social cues in social media may not be as rich as the co-located situation, social media allow users to be aware of others' availability across temporal and geographic divides, such as status information (e.g., locations or whether online) that signals one's availability for social interaction (Bardram & Hansen, 2004). Most SNS platforms provide users with streams of social news that facilitate passive observation and awareness of others (M. Burke et al., 2010). Such constant social awareness and connectedness have become so common that people want to create them when they are unavailable. Another example is the second-screen viewing activity. While watching a TV program, viewers use various social media backchannels (e.g., WhatsApp, Facebook, and Twitter) to discuss with other viewers to stay socially connected (Cohen & Lancaster, 2014; Han & Lee, 2014; Krämer et al., 2015). In Eastern Asia, many young people watch online videos with Danmaku comments (mentioned in Section 2.2.2); this modality allows them to experience a sense of being socially connected with other viewers without the need to interact with others (Yue Chen et al., 2017). In addition, the increasing effect of social awareness on social connectedness is moderated by the network size. A study on Twitter suggested that the effect is stronger when users perceive a larger network (Riedl et al., 2013). Finally, facilitators of social presence, such as enhanced non-verbal cues, can promote social connectedness.

Social connectedness is affected by how users participate in interactions with others. Researchers found that directed communication on SNSs benefit social connectedness, social capital, and relationships more than passive social behaviors, such as pure consumption of content from others (M. Burke et al., 2010; Stepanikova, Nie, & He, 2010). More details of users' behaviors will be discussed in Section 5.

5 USER BEHAVIORS AND PATTERNS IN SOCIAL MEDIA

Driven by different motivations and influenced by various technological affordances enabled by social media platforms, users exhibit marked variety in the way they make use of social media, e.g., how frequently they access social media, how much time they spend on it, and what kind of activities and behaviors they perform. Over half (51%) of the Facebook users in the United States check the site several times a day, whereas 26% of users check it less often (Perrin et al., 2019). Most (87%) social media users interact with others or contribute content at least once in a month, but the rest almost never engage in social media interactions (Kemp, 2020). Although active media snackers may visit social media apps nearly constantly during the day and actively post or repost content, a substantial proportion of social media users are lurking, i.e., remaining silent in public discussion but reading or exchanging information with others to satisfy their information and socialization needs (Qin Gao & Feng, 2016; Sun et al., 2014).

Social media use behaviors can be examined from two perspectives: interaction with media content and interaction with others. From the content perspective, three types of use behaviors are important: content consumption, content sharing and recommending, and content production. The interpersonal perspective is more complicated, influenced by the complexity of social relationships, the subtlety of interpersonal contact, and the ever-evolving conventions, norms, and etiquette of online socializations. Nevertheless, there are two major phenomena in social media usage: self-disclosure and impression management.

5.1 Consuming Content

Seeking and consuming informational and entertaining content are probably the major form of users' participation in social media. Pew Center research (Shearer, 2018) found that one in five U.S. adults reports that they often get news via social media; this number is higher than those who often get news from print newspapers. For young adults aged 18–29 years old, social media has even become the major source of news (Shearer, 2018). Young SNS users seem to spend most of their time browsing peers' profiles and photos rather than posting or updating (Pempek et al., 2009). Social media such as video-sharing sites also afford various content for entertainment. YouTube is the second most-used social platform after Facebook worldwide (Kemp, 2020). A report (TikTok, 2020) from TikTok, a short-video site released in 2017, showed that over 400 million users actively watched videos on TikTok every day in 2019. Individuals' patterns of content consumption behaviors, such as viewing and liking, are influenced by their motivations (e.g., utilitarian, hedonic, and social needs, discussed in Section 3.1.2), characteristics of media content (e.g., readability and message interactivity, discussed in Section 2.2), and technological affordances (e.g., customization, discussed in Section 2.1).

Consumption of others' updates also serves an important social function for many social media users. An early survey (Lampe, Ellison, & Steinfield, 2006) found that the primary use of Facebook among college students was for social searching—that is, using Facebook to find out more about people whom they have met offline, or with whom they attend class or share a dormitory. Another recent study (Hall, 2018) reported that participants estimated they spent over 50% of social media time passively consuming information others had shared. M. Burke and Kraut (2014) found that reading a tie's news helps to develop tie strength as effectively as receiving a directed message from that tie. In addition, passive consumption of social media allows users to conveniently and anonymously keep track of the activities, events, beliefs, and interests of larger groups. This social surveillance function has been found attractive to less active users, i.e., lurkers, as well as to those with high tendency to express "true self" in social media, who may consider it an opportunity to gather social information that would otherwise be difficult to collect (Tosun, 2012).

Most platforms automatically feed users with content that they are interested in by personalization algorithms. Frequently used personalization approaches are knowledge-based filtering, content-based filtering, collaborative filtering, and hybrid filtering (Anandhan, Shuib, Ismail, & Mujtaba, 2018; Felfernig et al., 2013). Knowledge-based filtering intends to recommend content based on predefined knowledge about items, users' articulated preferences, and other explicit recommendation criteria. It can give more accurate suggestions but is not scalable. Content-based filtering aims to feed content based on users' past behaviors and implied preferences (e.g., data on viewing,

clicking, and posting). For example, most content-sharing sites such as YouTube and Bilibili recommend videos to a user, based on videos that they previously viewed or commented on. Collaborative filtering aims to recommend content to a user based on the activities of other users who have similar interests or behavioral patterns. Most platforms adopt hybrid methods of these approaches (Anandhan et al., 2018).

These features bring concerns of filtering bubble effects (Pariser, 2011), also called echo chambers (Halper & Clarke, 2004) and information cocoons (Sunstein, 2006). The effect refers to the phenomenon that users are mainly exposed to opinions from like-minded people that confirm their pre-existing biases and singular viewpoints. A more diverse content diet brings more moderate conversations between users with different backgrounds and opinions, whereas decreasing cognitive diversity can lead to biased worldviews and even ideological segregation (Flaxman, Goel, & Rao 2016; Pariser, 2011). An often-discussed example is the results of the 2016 U.S. presidential election, during which many users' opinions and predictions were narrowed to their existing perspectives. A recent study (Auxier & Vitak, 2019) suggested that users actively diversify their content consumption from other viewpoints when users are less anxious about the current events, whereas younger, less educated, and more conservative users who experience greater information overload have been found to adopt more behaviors that increase filtering bubbles.

5.2 Sharing and Recommending Others' Content

Social media platforms are designed to make sharing and recommending content created by others effortless: Users can repost content on their social network homepage, send content to specific others, or simply click the "like" button to indicate a recommendation. The ease of sharing and the networking structure make information diffusion on social media extremely fast and increase the connectivity of the online space more than ever. By examining the social network graphs of the 1.59 billion people active on Facebook, Bhagat et al. (2016) found that people are connected to each other by on average of 3.57 intermediary social connections. This is much lower than the popular notion of six-degrees-of-separation, which suggests the number is six (Watts, 2004).

Social media users share content for different purposes. As summarized by Berger (2014), these purposes include impression management, emotion regulation, social bonding, and information acquisition. First, users share entertaining, useful, or self-concept content to build their own image in others' eyes, to look good and special, and to communicate identities to themselves and others (Berger & Milkman, 2012). Second, as discussed in Section 4.1, users share emotional or common ground content to regulate their emotion (Rimé, 2009) and to bond their social relationships, reinforce shared views, and stay socially connected with others (Barsade & Gibson, 2007; A. E. Clark & Kashima, 2007). Third, social media users share informative content to provide useful information or solutions to problems for themselves and others (M. Zhao & Xie, 2011).

Certain types of content are more likely to be spread, as mentioned in Sections 2.2 and 4.1. Besides, in social media, the dissemination of content is also affected by whether influential users appear in the dissemination route. A common approach to identify influential users is social network analysis (as introduced in Section 2.3). A recent review (Al-Garadi et al., 2018) summarized relevant algorithms, such as degree algorithms or closeness algorithms, and their influences on information dissemination potentials. It has been found that users with a large number of weak ties or a fan base are likely to be influencers (Bakshy et al., 2011; Cha, Haddadi, Benevenuto, & Gummadi, 2010). They can spread content and extraordinarily influence weak-tie followers' sharing behaviors (Bakshy et al., 2011; Cha et al., 2010).

5.3 Generating and Broadcasting New Content

User-generated new content, including feed stories, blog posts, photo/video uploads, and editing wiki entries, is considered the blood of social media platforms, and the new content is made accessible to the public via broadcasting, the wider-audience posting on social media platforms. Users generate and broadcast new content, and social media platforms can offer other users with utilitarian or entertaining information, knowledge, and social support (Khan, 2017; Shao, 2009; Yoon & Rolland, 2012). On the other hand, content contributors can satisfy various needs, including self-achievement, altruism, a better reputation, and social connectedness (Ahmed, Ahmad, Ahmad, & Zakaria, 2019; W. W. Ma & Chan, 2014; Rolls, Hansen, Jackson, & Elliott, 2016).

Identifiability or anonymity affect users' content-producing behaviors. As mentioned in Section 2.1, less anonymity may make users more conservative in sharing content (Burtch et al., 2015), especially personal information. However, when the content is irrelevant to oneself and useful or informative to others, such as users' reviews, users usually know that their contributions are beneficial and can positively affect their reputations (X. M. Zhang & Zhu, 2011). In this situation, less anonymity or higher identifiability can promote content-producing behaviors (N. Huang, Hong, & Burtch, 2016). In addition, by analyzing the review texts on Yelp and TripAdvisor, N. Huang et al. (2016) suggested that users generate more content with positive emotion and less cognitive processes when they log in platforms with increased identifiability, such as Facebook.

A common behavior on social media is lurking, i.e., regularly viewing content but posting almost nothing. A "1% rule" (Jakob Nielsen, 2006) suggests that only 1% of users actively create new content and 9% contribute or edit content, whereas the remaining 90% only view content without active participation in online communities. A study on knowledge-sharing social networks (including blogging, social bookmarking, and question answering platforms) suggested roughly 20% of users contribute 80% of the total content on the network (L. Guo et al., 2009).

It remains debatable whether lurking benefits or hinders the development of communities. Some studies (e.g., Van Mierlo, 2014) have suggested lurking behaviors hinder the development of knowledge-based communities, such as Wikipedia. However, other researchers have argued that lurking is a normal behavior and valuable to the community. Lurkers may also think of themselves as community members, learners, or important audiences to creators, and they can increase the influence of the community (Edelmann, 2013).

Lurking can occur for various reasons. First, from the perspective of gratification and motivation, a major reason is that content consumption is enough to satisfy lurkers' needs or goals, e.g., to gain information (Preece, Nonnecke, & Andrews, 2004; Sun et al., 2014) and to experience emotional intimacy (Rau, Gao, & Ding, 2008). Second, social interaction anxiety can lead to lurking behaviors (E. T. Higgins, 1987; McCord, Rodebaugh, & Levinson, 2014). If users are concerned about the discrepancy between actual and ideal selves—and worry that their posted content can be awkward or not meeting their expectation—they will be more likely to lurk (Xiaodan Liu et al., 2019; McCord et al., 2014). Third, lurking is affected by personal characteristics, and bashful introverts with less self-efficacy lurk more (Nonnecke, Andrews, & Preece, 2006; Sun et al., 2014). Finally, lurking is affected by the technological and social characteristics of platforms. Users are more likely to lurk if the community

or the platform has defects in information quality, interaction design, and privacy protection, as well as a lack of reciprocity and pro-sharing norm (Sun et al., 2014).

5.4 Interpersonal Interactions

Across studies, social interactions on social media platforms have been defined as loosely as any social media use (Jensen, 2015), such as passively observing others' activities, or as strictly as meaning-making interactions with mutual acknowledgment and shared focus of attention by both partners of a shared relationship (Hall, 2018). The broad definition would include interaction behaviors without mutual acknowledgment between two or more users, such as content consumption and broadcasting behaviors, which have been discussed in previous sections, whereas the latter perspective limits the scope of social interaction to focused and directed communication only. Thus, in this section we adopt a perspective between the two ends. We limit our discussion to interaction behaviors that require mutual acknowledgment between partners involved in the interaction, but a shared focus of attention is not required.

The following social interaction behaviors are common among social media users:

- *Unfocused interaction* refers to the mutual acknowledgment among users, such as exchanging nods and smiles in face-to-face interactions. Typical unfocused interaction behaviors on social media include one-click interactions on social media platforms, such as "like," "thumb up/down," or "poke."
- *Impersonal routine interaction* also involves scripted routine interaction, usually with casual or acquaintance relationships, such as "Happy Birthday" or "Happy New Year" messages to others (Bryant & Marmo, 2012). In addition, Hall (2018) found that re-posting others' content without composing comments is considered to be impersonal and should be classified in this category.
- *Focused interaction* refers to the directed conversation among relational users who share a mutual focus of attention. It consists of targeted, one-on-one exchange between partners, such as chatting, commenting, private messaging, and photo tagging (M. Burke & Kraut, 2014).

A number of studies have examined the extent to which social interactions in social media influence social relationships (M. Burke & Kraut, 2014; N. B. Ellison, Steinfield, & Lampe, 2007; Hall, 2018). Focused directed communication is reportedly effective in building relationships, whereas unfocused interaction and impersonal routine interaction do not contribute (M. Burke & Kraut, 2014; Hall, 2018). Furthermore, social interaction via social media has a greater impact on relationships who do not frequently interact via other channels than closer relationships (e.g., family members; M. Burke & Kraut, 2014).

5.4.1 Impersonal vs. Hyperpersonal Interaction through Social Media

Whether technological affordances of social media reduce or enhance the quality of social interaction follows the debate over the impact of CMC on relationship development. Social media, as with other CMC tools, are limited by their bandwidth, synchronicity, and richness of conveyed media to deliver non-verbal social cues, to provide social presence, and to include personal focus. However, as suggested by Walther's SIP theory (1992), social media users adjust their strategies to offset the lack of non-verbal cues and eventually develop long-term relationships as deep as those they make with richer media (face-to-face). This perspective is supported by abundant social media research (Choi, 2019; Derks et al., 2007; Tong et al., 2008; Walther et al., 2008). On the one hand, information senders leverage cues and features available to transmit rich meaning, actions that have led to the popular use of emoticons, emojis, and stickers. In fact, the meaning of emoticons are so enriched that they convey not only a specific emotion as designed, but also social-cultural norms (J. Park, Baek, & Cha, 2014). On the other hand, information receivers may "fill in the blanks" of unknown information based on available information, which is often associated with idealization (i.e., users may idealize their partners if they have positive attitudes to the partners) and stereotyping. For example, social media users who post more emotional support with more sympathy are thought of as more likely to be female (Spottswood, Walther, Holmstrom, & Ellison, 2013).

In circumstances when the interactions are time-constrained and partners expect no future contact or long-term associations with others, the lack of social cues may result in a higher level of interpersonal anonymity and individual identity vacuum, as suggested by the social identity model of deindividuation effects (SIDE) model (Postmes, Spears, & Lea, 1998; Sundar et al., 2015). This identity vacuum makes people judge a certain user by the characteristics of the group to which the user belongs, i.e., deindividuation, which may bring negative effects, such as unfriendly behaviors. Halpern and Gibbs (2013) used this theory to explain the phenomenon they found: Messages on YouTube were more impolite than messages on Facebook. A likely reason was that comments on YouTube are generally less identifiable and thus more anonymous than the messages on Facebook. In other circumstances, however, the increased anonymity may reduce social pressure and promote self-disclosure, which will be discussed in Section 5.4.2.

5.4.2 Self-Disclosure in Social Media

Self-disclosure is the behavior of revealing personal information to others (Jourard, 1971). It can satisfy people's needs for social connectedness and release of stress. Self-disclosure on social media platforms facilitates relationship development, social validation (i.e., to validate self-concept or seek approval or support from others), social resources gain, release of feelings and stress, and identity clarification (Bazarova & Choi, 2014; K. M. Sheldon et al., 2011). Users motivated by self-disclosure have been found to use social media more frequently (Qin Gao & Feng, 2016). They take different strategies and functions of self-disclosure to balance the social benefits and the risks of privacy exposure. Therefore, this section introduces how self-disclosure behaviors and desired technological affordances are affected by users' purposes, audience, content to disclose, and social context.

Whereas self-disclosure in offline settings are often reciprocal interactions and reflect the level of mutual confiding between partners (Archer & Berg, 1978; Cozby, 1973; Jourard, 1971), this often is not the case in social media. Social media users can broadcast personal information to their entire social network, but often only a few of their friends or followers will engage with a broadcast. The overall level of reciprocity is lower in social media than in face-to-face interactions. Hence, there are questions as to whether previous knowledge of antecedents and consequences of self-disclosure behaviors applies to social media interaction (Ledbetter et al., 2011; Mesch & Beker, 2010). Below, we summarize factors that have been found to influence self-disclosure behaviors on social media:

- *Users' socialization goals*. Social media users with different socialization goals deliberately choose different self-disclosure channels (e.g., broadcast or directed

communication to a targeted audience) with expected proper levels of communal visibility and expected audience. Bazarova and Choi's study (2014) found that Facebook users with strong relational development goals disclosed more by directed communication with specific audiences, e.g., private messaging. Users with strong social validation goals, however, disclosed more by public broadcasting, such as status updating.

- *Anonymity*. Face-to-face communication research has suggested that people are generally more willing to disclose to either close and trusted recipients (Pearce & Sharp, 1973) or total strangers who do not have access to their social circle and will not further interact with them in the future, e.g., the stranger on the train phenomenon (Rubin, 1975). Social media facilitate both types of self-disclosure, but the impact may be larger for the latter than for the former. Whereas social media users can use the directed-communication function of social media for the former purpose, an experience sampling study (Hall, 2018) found that the majority (74.6%) of close social interaction occurred through face-to-face. Among these close social interactions mediated by technology, users preferred text and chatting the most (16.8%), followed by voice calls (6.5%) and other social media use, e.g., posting updates (2.1%). The percentages resembled what van den Berg et al. (2012) reported. This data implies that intimate self-disclosure between close relationships mainly occurs through traditional channels rather than through social media. Self-disclosure to strangers, however, can be greatly supported by the increased anonymity of platforms. Empirical research in the social media context has also verified positive association between users' self-disclosure and how they perceive the anonymity of platforms (X. Chen, Li, Hu, & Li, 2016; X. Ma et al., 2016), which is influenced by anonymity protection features, such as tracker-free browsing and anonymous commenting. Some platforms are designed specifically for discussing or posting anonymously, such as 4chan, Whisper, and PostSecret.
- *Data persistence*. Despite the strategies to carefully balance the benefits and risks of self-disclosure, social media users, especially neurotic users, are still likely to have regrets after self-disclosure, and sometimes even cancel their accounts (Moore & McElroy, 2012). Therefore, social media platforms provide features with lower data persistence, e.g., Snapchat to decrease the possibility of regret and the barrier to self-disclosure, as discussed in Section 2.1.
- *Reciprocity of the community/network*. When users disclose some personal information, their partners may tend to follow it and also disclose information of similar value. This phenomenon is called the "dyadic effect" or reciprocity and has been found to exist in both face-to-face and online contexts (Barak & Gluck-Ofri, 2007; Gouldner, 1960; D. Yang, Yao, Seering, & Kraut, 2019). This reciprocity effect is stronger when users disclose negative things via private communication channels than when disclosing positive things via public channels (D. Yang et al., 2019).

Self-disclosure behaviors themselves do not strengthen relationships, but the perception of the self-disclosure determines relationship outcomes. The norms concerning appropriate self-disclosure in social media share similarities with the norms in offline interaction, but there are also differences. Self-disclosure on social media can be read by a much larger audience, including weak ties, to whom people normally disclose more peripheral personal information (e.g., favorite foods; Altman & Taylor, 1973). SNS users have been found to be more likely to share peripheral personal information or content of lower intimacy (X. Ma et al., 2016). High self-disclosure intimacy, though considered helpful in promoting trust and strengthening relationships in offline or private reciprocal interaction (Altman & Taylor, 1973; Bazarova, 2012; Jourard, 1971), has been found to decrease the social attractiveness of the new friends people make on Facebook (Bazarova, 2012; Orben & Dunbar, 2017). Such content, if posted with a high frequency, is considered "oversharing" behaviors and perceived as inappropriate, narcissistic, and annoying (Orben & Dunbar, 2017; Radovic, Gmelin, Stein, & Miller, 2017).

5.4.3 Impression Management and Selective Presentation

As much as social media afford users the ability to disclose their true self (i.e., self-disclosure), they also afford users the chance to present an edited version of themselves, which they may believe is more attractive and helpful to increase social capital in certain social contexts (Schlosser, 2020). Although self-presentation and impression management have long been recognized as a social strategy (Goffman, 1959), three affordances of social media make such behaviors both more convenient and more influential than before (Chou & Edge, 2012; Schlosser, 2020), as discussed below:

- *Asynchronicity and editability*. Careful and selective self-presentation can be facilitated by the editability in an asynchronous interaction. In addition, reduced nonverbal cues in the CMC environment can hide undesirable behaviors (Walther, 1996). A notable phenomenon among many social media users is that they edit and select their photos before posting on their SNSs to achieve an idealized impression. Research has found more editing behaviors among the users with more negative body image of themselves and higher body comparison tendency (Chae, 2017; J. Fox & Vendemia, 2016).
- *Broadcasting to multiple audiences*. Social media platforms allow users to easily broadcast to multiple audiences, e.g., both real and virtual relationships (Crabtree & Pillow, 2018), or both personal and professional relationships (Dutta, 2010). To avoid creating a bad impression in front of this large and diverse audience and to keep public consistencies in how one appears to others, a common tackling strategy is to present one's self with generally desirable characteristics, i.e., an ideal self or even a false self (Michikyan, Dennis, & Subrahmanyam, 2015; S. Zhao et al., 2008). Intriguingly, Facebook users can receive higher levels of respect if they post more positive or self-enhancing messages (Batenburg & Bartels, 2017).
- *Easy to seek feedback*. Social media afford users an easy ability to seek immediate feedback from a large audience by functions such as liking and commenting (Bareket-Bojmel, Moran, & Shahar, 2016). Such feedbacks are useful for self-validation, but they may also cause concerns of self-image. Users with higher needs for self-validation have been found to disclose their true selves more on SNSs (Seidman, 2014), whereas users with strong impression goals may reduce self-disclosure due to concerns of being judged and make more selective self-presentation behaviors to increase positive feedback such as the number of likes (Bareket-Bojmel et al., 2016).

Whereas positive self-presentation is associated with higher self-esteem (Gonzales & Hancock, 2011), more honest self-presentation allows presenters to receive social support (Junghyun Kim & Lee, 2011). As a result, social media users attempt to balance the accuracy and desirability of self-presentation, i.e., to show a more desirable version of self without departing too much from realities (Back et al., 2010; N. Ellison et al., 2006; Schlenker & Wowra, 2003). From the perspective of information receivers, biased self-presentation and impression management have been found increasing upward social comparisons (Jang, Park, & Song, 2016). The impacts of social comparison will be discussed in Section 6.1.3.

6 LONG-TERM IMPACTS OF SOCIAL MEDIA USAGE

As of January 2020, it is estimated that over 3.8 billion active social media users spend an average of 2 hours and 24 minutes per day on social media (Kemp, 2020). In China, users spend an average of 145 hours per month on mobile applications, and the use of social media is a big part of this time (Quest Mobile, 2020). As social media have become a common part of daily life among hundreds of millions of users around the world, the wide and long-term use of social media inevitably affects the way individuals function, the way interpersonal relationships are developed, and the way the society is wired and organized. This section first discusses the impacts of social media use on individuals' cognitive function and psychological well-being. Then the debate on how social media change the development and quality of interpersonal relationships is presented. Finally, we discuss the long-term impacts of social media on people's civic participation, public opinion perceptions and expressions, and other impacts on society.

6.1 Impacts on Individuals' Functions and Well-Being

6.1.1 Cognitive Control and Attention

Cognitive Control and Attention of Youth

The constant availability of social media through mobile devices and the convenient notifications of updates have been found to lead to more media multitasking behaviors (Q. Chen & Yan, 2016; Judd, 2014). There have been concerns that heavy media multitaskers may become accustomed to constantly switching among tasks, are less capable of filtering irrelevant information, and are unable to focus on a single activity (e.g., sustained attention). On the contrary, some researchers have argued that frequent media multitasking may have a positive effect on cognitive control by training the control process through repeatedly practicing coping with multiple streams of information (Alzahabi & Becker, 2013; Ophir et al., 2009). A number of studies have been conducted to examine the relationship between media use and attention functions. There have been mixed findings, but the results have demonstrated more negative effects of media than positive effects (Brooks, 2015; Cain & Mitroff, 2011; May & Elder, 2018; van Der Schuur et al., 2015). In particular, higher levels of multitasking are related to poor sustained attention (Cain & Mitroff, 2011; Wei, Wang, & Klausner, 2012). Furthermore, a number of recent studies have shown a positive association between heavy media use and attention-deficit/hyperactivity disorder (ADHD)-related behaviors among children and adolescents (Froehlich et al., 2011; Nikkelen et al., 2014; Ra et al., 2018). More research, however, is needed to determine whether this association is causal.

Response inhibition

As social media provide instant access to highly stimulating experiences and rapid feedback to user input, there has been concern about the negative effects of heavy use of social media on inhibitory control, which refers to the ability to control impulses and avoid inappropriate behaviors in order to successfully perform a task (Diamond, 2013). The associations between media multitasking and inhibitory control have been studied. Laboratory experiments with performance-based measures usually show no significant association (Qiufeng Gao et al., 2019; Murphy, McLauchlan, & Lee, 2017; Ophir et al., 2009). However, people's self-reported everyday experience suggests associations between media multitasking and problems in inhibitory responses (Baumgartner et al., 2014; Magen, 2017). Besides, recent evidence of brain activities also supports the claim that excessive social media users have lower levels of inhibitory control (Qiufeng Gao et al., 2019).

Memory

Often used as a tool to record and share one's life, social media serve the users as an externalization of information so that they no longer need to memorize it. Although such externalized cognition allows users to later reflect on these experiences—which may benefit learning and education (Chugh & Ruhi, 2018)—it may diminish users' ability to keep memories of these detailed experiences. The impact of social media on memory has also been verified by empirical research (Barasch, Diehl, Silverman, & Zauberman, 2017; Henkel, 2014; Tamir, Templeton, Ward, & Zaki, 2018). Those authors have reported that memory can be impaired if the experience is externalized and recorded (e.g., by taking photos), regardless of whether it is actually shared. This impairment of memory can be attributed to, on the one hand, the interruption effect introduced by the use of social media during the activity, and on the other hand, the Google effect (or digital amnesia), which suggested that people use digital technologies as a mnemonic device so that they can offload information (Sparrow, Liu, & Wegner, 2011).

6.1.2 Information Overload, Filtering, and Over-filtering

Whereas social media connect users to a sheer number and variety of information sources, including both peer-produced and peer-curated sources, the amount of information from these sources may exceed users' cognitive capacity and result in information overload (Eppler & Mengis, 2004; Koroleva, Krasnova, & Günther, 2010; Pentina & Tarafdar, 2014). In addition to the sheer volume of information, the unorganized, unverified, diversified nature of information on social media also adds to information overload (Jackson & Farzaneh, 2012; Pentina & Tarafdar, 2014).

Information overload can lead to poor sense-making from acquired information. Excessive and ineffective attempts to process all the information also cause information anxiety, cognitive strain, and the feeling of loss of control (Eppler, 2015; Eppler & Mengis, 2004). The inability to cope with the information overload and media multitasking may lead to negative attitudes toward the information, technostress, and fatigue (Brooks, 2015; Oppenheim, 1997; Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007).

Social media platforms, however, also enable a number of approaches to reduce the amount of information though

socially mediated information selection and organization. This phenomenon can be achieved either through system-initiated personalization or user-initiated customization (Sundar & Marathe, 2010). The former refers to approaches to automatically tailor information for social media users, such as the personalization algorithms introduced in Section 5.1 (Anandhan et al., 2018; Felfernig et al., 2013). Other system-initiated approaches to reduce information overload include providing short excerpts for long stories and reducing the complexity of information processing by properly tagging, organizing, and sorting information, as well as clues for prioritizing information, such as "verified" labels to indicate the credibility of sources (Pentina & Tarafdar, 2014; Wathen & Burkell, 2002). The latter refers to users' active customization, i.e., the system does not automatically tailor content but provides features for users to tailor by themselves (Sundar & Marathe, 2010). The features of user-initiated customization are offered by most social media platforms, such as connecting or following only with sources they find interesting, relevant, or important. Though requiring more users' efforts than automatic algorithms, users' active customization allows them to control content consumption and increase their self-identity and positive attitudes to the content (H. Kang & Sundar, 2016).

It is worth noting that such socially mediated information tailoring, whether initiated by the system or users, may over-filter and narrow information inputs for users. It can increase their dependence on limited like-minded others, reduces cognitive diversity, and leads to a biased worldview, i.e., filtering bubbles, which is discussed in more detail in Section 6.3.2.

6.1.3 Social Stress, FOMO, and Social Comparisons

Whereas proper social media use satisfies social needs, such as bridging and bonding of social capital that further promote psychological well-being (H.-T. Chen & Li, 2017), problematic and excessive use of social media is associated with social stress and anxiety, and the relationship is mediated by individual differences (Van Deursen, Bolle, Hegner, & Kommers, 2015). First, being connected to an endless stream of constant updates of social activities in which users may not get involved may result in FOMO, which refers to an individual's pervasive apprehension that they are missing social events, experiences, and interactions (Przybylski et al., 2013). FOMO is associated with the social pressure to always be available, lower self-perception and self-esteem (Buglass, Binder, Betts, & Underwood, 2017), negative social and emotional experiences (e.g., boredom and loneliness; Oberst et al., 2017), and lower life satisfaction (Przybylski et al., 2013). It is also a significant predictor of compulsive checking behaviors (Chotpitayasunondh & Douglas, 2016).

Second, the prevalence of positive self-presentation can lead to social comparisons. The effect of positive social presentation and social comparison is double-sided and moderated by users' characteristics, such as mood, self-esteem, and social status. On the one hand, positive self-presentation and upward assimilative comparisons can bring benefits, such as better social capital (Junghyun Kim & Lee, 2011), higher self-esteem, and subjective well-being (Gonzales & Hancock, 2011), and inspiration and motivation for self-improvement (Lewis, 2020). On the other hand, excessive social comparisons can increase negative social experiences, e.g., envy, shame, anxiety, fatigue, and burnout, all of which reduce self-esteem and life satisfaction (Jang et al., 2016; Krasnova, Wenninger, Widjaja, & Buxmann, 2013; Lim & Yang, 2015). A number of studies on Facebook have suggested that more social comparisons, especially upward contrastive comparisons, are associated with more negative feelings and poor mental health (Jang et al., 2016; S. Y. Lee, 2014; Lewis, 2020). Empirical research has also suggested that Facebook users experience higher social anxiety when they use Facebook with the stronger motivation of impression management (S. Y. Lee & Jang, 2019).

The effects of social media use on psychological well-being is moderated by the ways in which users interact with others. More active, focused, and directed interaction behaviors are associated with higher social psychological well-being, such as higher satisfaction with life and lower loneliness (M. Burke & Kraut, 2016). Unfocused interaction behaviors (e.g., broadcasting and one-click interactions), however, do not contribute to psychological well-being (M. Burke & Kraut, 2016). Furthermore, passive content consumption behaviors on Facebook are associated with more upward social comparisons (Krasnova et al., 2013).

6.1.4 Social Media Addiction

The addictive use of social media has attracted much research attention over the past ten years (see T. Ryan, Chester, Reece, & Xenos, 2014, for a review). Social media addiction is the compulsive use of social media that manifests addiction symptoms. Early research on behavioral addictions had suggested six core symptoms, namely salience/preoccupation, tolerance, conflict, withdrawal, relapse, and mood modification (Brown, 1993; Griffiths, 2005). Though these criteria originated from the gambling field, later research has suggested that these criteria also fit the situation of the Internet and gaming, and additional criteria have been identified: deception/hiding use, escape, and displacement of other activities (American Psychiatric Association, 2013; D. L. King et al., 2013; Kuss et al., 2014). Based on these criteria, van den Eijnden et al. (2016) developed a validated Social Media Disorder Scale that provides a clear diagnostic cut-off to identify social media addiction. van den Eijnden et al. (2016) surveyed over 2,000 Dutch adolescents and identified around 10% of teenagers who met these criteria of social media addiction.

Empirical research has found that social media addiction leads to various negative and unhealthy impacts on daily activities, offline relationships, and both mental and physical health in the real world. First, a symptom of addiction is the displacement of daily activities (Rehbein et al., 2010; van den Eijnden et al., 2016). This displacement can distract from other activities, such as hobbies and work, crowd out the time of other activities, promote procrastination, and reduce task performance (Durak, 2018; Moqbel & Kock, 2018; Przepiorka et al., 2016). Excessive SNS use has been found to reduce physical workouts and rest and thus further cause sleep difficulties (Koc & Gulyagci, 2013) and poorer self-reported physical health (Xue et al., 2018). Second, users with social media addiction also spend much time on browsing or interacting with online relationships especially those with weak ties. As a result, addiction is associated with better relationships with acquaintances and less close friends (Tang et al., 2016) but dissatisfaction with and disengagement from intimate relationships (Abbasi, 2019). Third, social media addiction causes a series of negative emotions, including envy, anxiety, and even depression (Keles, McCrae, & Grealish, 2020; C. Liu & Ma, 2018; Moqbel & Kock, 2018; Tandoc Jr, Ferrucci, & Duffy, 2015).

The development of social media addiction, as with other addictive behaviors, is influenced by individual differences and behavioral reinforcement factors (Andreassen, 2015). First, as suggested by SDT and UGT in Section 3.1, users choose to use social media when it satisfies their needs. The gratification can reinforce behaviors and, thus, the satisfaction of basic needs in SDT that is positively associated with social media addiction (Koc & Gulyagci, 2013; Pelling & White, 2009). Social media addiction is also affected by the individual trait of attachment orientation (see details in Section 3.2).

On the other hand, social media addiction is influenced by behavioral reinforcement. If the past excessive use of social media has been rewarding (e.g., high in enjoyment and flow state), users may repeat it in the future (Turel & Serenko, 2012). In addition, users with FOMO can aggravate that feeling by frequently checking social media and obtaining information. The aggravation also serves as a reward and strengthens social media addiction (Blackwell et al., 2017; A. Chen, 2019; Hart et al., 2015).

6.2 Impacts on Interpersonal Relationships

The impacts of social media use on interpersonal relationships can be viewed from the bonding and bridging perspectives of social capital development (Putnam, 2000). The bonding perspective examines how social media strengthen users' connections with strongly tied relationships, who act as important sources of emotional support (Putnam, 2000; Williams & Galliher, 2006). The bridging perspective focuses on how social media influence users' reach to others outside of strongly tied networks, who help to widen users' exposure to more diverse information and resources.

6.2.1 Strong Ties: Displacement, Supplement, and Media Multiplexity

From the bonding perspective, social media provide greater opportunities for communication and connection with close relationships via a number of ways, e.g., awareness development, unfocused interaction, and focused interaction (as discussed in Section 5.4), compared with traditional media. Researchers have debated whether these affordances of social media help users to get closer or displace more meaningful interaction, as predicted by the social displacement hypothesis (Kraut et al., 1998). That premise states that the more time people spend with media, the less time they devote to face-to-face interactions with close friends and family (Nie, 2001). The hypothesis echoes public concerns about the negative impact of social media use, and it has received both support and disapproval from a number of cross-sectional studies investigating the association between social media use and the frequency of interactions with friends and family. Whereas some studies have found a negative association, which is consistent with the social media displacement hypothesis (Ahn & Shin, 2013; Dunbar, 2016), others have found no significant or positive associations, which suggests that social media use may only reflect one's social activeness and people include social media in their social life instead of displacing social activities (Domahidi et al., 2018; Endestad et al., 2011).

A major criticism about these studies is that the cross-sectional research methodology cannot provide enough evidence to indicate the causal direction of the associations. For this purpose, longitudinal methods and experience sampling methods have been utilized in a number of recent studies. Through the analysis of a two-year longitudinal study of 1774 American youth, Hall found that although there was a negative association between social media adoption in 2009 and social contact in 2011, increased social media use between 2009 and 2011 positively predicted well-being. The results from their later experience sampling method study, in which the participants reported their social interaction and social media use five times a day, indicated that social media use at prior times of the day does not influence future social interaction with close friends and face-to-face interaction. Burke and Kraut (2014) conducted longitudinal surveys on 3649 Facebook users to measure month-to-month changes in tie strength and their relationship with social media use, which was measured through server log analysis. The results showed that interaction through social media, both active communicating and passive reading, contribute to tie strength development, and its contribution is even greater than effects attributable to more traditional media, such as face-to-face contact. The impact of social media on tie strength, however, seems greater for less close relationships compared with strong relationships such as family members (M. Burke & Kraut, 2014). Similarly, Hall et al. (2019) found that abstaining from social media for a week decreases social interaction with people at work or school, but not close friends or family. This outcome can be explained by the media multiplexity theory (Haythornthwaite, 2005), which posits that people strive to use multiple media outlets to maintain strongly tied relationships, but they are less motivated to do so for weak ties.

6.2.2 Weak Ties in Social Media: Serendipity

From the bridging perspectives, social media provide an incomparable venue to meet new people, to develop and manage larger-than-before social networks, and to turn previously latent ties explicit (H.-T. Chen & Li, 2017; Manago, Taylor, & Greenfield, 2012). In particular, social media afford the ability to recommend or match people who are strangers based on similarities in their profiles, social networks, media consumption preferences, and physical locations. Such social serendipity exposes social media users to more opportunities for exchanging support, finding collaborations, and developing intimate relationships. For example, players of massively multiplayer online games (MMOs) develop both loose and close relationships and social capital in MMO communities, from which they get offline social support (Trepte, Reinecke, & Juechems, 2012). One of the most popular Chinese MMORPG, *JX3 Online*, has been so successful in matching players and supporting relationship development that players call it a "massive online dating application" (W. Chen et al., 2016; Pei, 2019). Emerging research has started to examine the process and user experience of social serendipity, key technological affordances, and user interaction design considerations that support social serendipity (Olshannikova et al., 2020; Olsson, Huhtamäki, & Kärkkäinen, 2020).

6.3 Impacts on Society

6.3.1 Information Credibility and Fake News

Social media lower the barrier for publishing news events and speed up information dissemination. The lack of professional gatekeepers and the high information dissemination capacity, however, may facilitate the diffusion of erroneous information and rumors just as much as truthful and helpful information. An unverified piece of information can quickly be circulated by thousands of peer users, and repetitive exposure can make the information sound familiar and credible to the users, a phenomenon that can be explained by the illusory-truth effect (Hasher, Goldstein, & Toppino, 1977; Pennycook, Cannon, & Rand, 2018).

Widespread erroneous information and rumors can lead to serious consequences when the public uses the information to make important decisions, particularly in crisis situations (Castillo, Mendoza, & Poblete, 2011; Mendoza, Poblete, & Castillo, 2010; Schwarz & Morris, 2011). Numerous algorithms and mechanisms have been developed to automatically detect fake news or rumors; they are often based on content and social contexts (Shu et al., 2017). Content-based approaches include: (1) fact-checking approaches based on knowledge from expert or crowdsourcing (Vlachos & Riedel, 2014), and (2) stylometric approaches that identify fake news by deceptive or persuasive writing styles, such as clickbait titles (Yimin Chen et al., 2015). Social-context approaches include: (1) stance-based approaches based on, e.g., relevant posts, comments, and numbers of likes (Tacchini et al., 2017), and (2) propagation-based approaches (e.g., Yang Liu & Wu, 2018).

From the human side, researchers have identified the following factors that influence users' perception of credibility of social media content:

- *Initial source*. Initial sources refer to users who first post the information on social media. In addition to direct credibility cues, such as verification credentials of authenticity and qualifications of specific users provided by social media platforms, social media users also use indirect cues, such as gender, name style, and the use of an avatar image to assess the initial source credibility (Qin Gao et al., 2015; Morris et al., 2012; Westerman, Spence, & Van der Heide, 2012). The impact of source credibility is more pronounced when the information receiver has insufficient knowledge about the topic (Qin Gao et al., 2015). However, a major challenge in social media is that it is often difficult to judge who is the initial source and who should be responsible for the credibility of a certain message (Jiang, Tong, & Tan, 2012; Schmierbach & Oeldorf-Hirsch, 2012).
- *Selecting sources*. Selecting sources refer to those who repost or recommend a story to others. Sundar and Nass (2001) found that selecting sources influence perceived information credibility as much as initial sources do. Their ratings and reviews serve as important social cues for information receivers to judge information credibility (Flanagin & Metzger, 2013; Metzger Flanagin, & Medders, 2010).
- *Content appeal and extremity*. The elaboration likelihood model (Petty. Cacioppo, & Schumann, 1983) suggests that people rely on peripheral cues, such as look and feel, to assess credibility when their involvement with the issue is low. When their involvement with the issue is high, the central processing route is used to judge credibility based on message content, particularly whether the content presents objective (i.e., actual descriptions of tangible features that can be verified) or subjective claims (impressionistic descriptions of intangible aspects that are subject to individual interpretations) and how extreme the claim is. There is an interaction effect of content appeal and extremity: When the claim is low, objective claims are perceived as more credible; when the claim extremity is high, however, objective claims receive more skepticism due to the feelings of "too good/bad to be true" (Qin Gao et al., 2015; S. J. Tan, 2002).

6.3.2 Social Filtering, Echo Chambers, and Political Polarization

Besides the spread of misinformation, social media may bias users' view of public opinions due to socially mediated information filtering and sorting. The concern that social media users may be selectively exposed to a limited range of views confirming their existing views has been discussed under a number of terms, such as filter bubble (Pariser, 2011), echo chambers (Halper & Clarke, 2004), and information cocoons (Sunstein, 2006), as discussed in Sections 5.1 and 6.1.2. Whether echo chambers really exist and divide public opinion—particularly political polarization and ideological segregation—has been a topic of ongoing debate, with empirical evidence for both sides. Using behavioral tracking and content analysis methods, some researchers have found that social media expose users to narrower sets of information sources (Auxier & Vitak, 2019; Bechmann & Nielbo, 2018). By contrast, there has also been evidence that social media increase users' exposure to information they disagree with (Auxier & Vitak, 2019; Cardenal, Aguilar-Paredes, Cristancho, & Majó-Vázquez, 2019; Flaxman et al., 2016).

Investigations on the association between social media use and political polarization have also yielded mixed results (Cardenal et al., 2019; Flaxman et al., 2016; C. Lee et al., 2018; Nguyen & Vu, 2019; Zuiderveen Borgesius et al., 2016). The association is moderated by a number of factors, including individuals' political engagement and interests, news consumption behaviors outside of social media, and network properties. Social media users who have higher political engagement and interests are more likely to become polarized (Cardenal et al., 2019; C. Lee et al., 2018); core users with a high degree of centrality are more likely to exhibit evidence of polarization (Auxier & Vitak, 2019); network homophily—individuals' tendency to rely on strong-tie social networks or people who are similar to them as major information sources—is associated with the development of this phenomenon (Bechmann & Nielbo, 2018; Pentina & Tarafdar, 2014); and the impact of social media use is tempered by users' other news consumption behaviors, such as visiting the home pages of mainstream new outlets (Flaxman et al., 2016).

6.3.3 Civic Engagement and Public Opinion Climate

Social media blur the boundaries between mass media and interpersonal communication by juxtaposing and interweaving interpersonal debates with mass media messages. Such mass interpersonal communication, as coined by (Neubaum & Krämer, 2017b), has been found to foster users' online expression on public issues and promote their civic engagement and political participation (Gil de Zúñiga, Molyneux, & Zheng, 2014). In particular, the following affordances of social media greatly influence the way users gauge, form, and express their opinions on public issues.

- The ease of monitoring others' opinions, including those outside one's personal network, allows individuals to infer the opinion climate and make sense of the current issue (Kekki, 2020; Neubaum & Krämer, 2017b). Compared with traditional mass media, social media offer new cues for monitoring the opinion environment, such as user-generated comments and aggregate information, e.g., the number of likes and pageviews (Von Sikorski & Hänelt, 2016). G. King et al. (2017) found that pageviews of news media caused Americans to express their opinions on broad national policy issues.
- The ease of expressing an opinion, as facilitated by the platform, greatly reduces the effort to join a public conversation. Users can show their public stand on issues as easily as liking or sharing a message, with little effort of reflection or composition.
- The unprecedented reach of messages allows one's opinion to be quickly disseminated to a greater and more diverse audience (Fogg, 2008; Walther et al., 2010).

The use of various social media (e.g., SNSs, social virtual games) is associated with offline civic participation (Valenzuela, Park, & Kee 2009; Zhong, 2011). In emergency situations, such as natural disasters, social media enable individual users to serve as main and active sources of information, whereas official organizations or agencies help to connect different communities (Jooho Kim & Hastak, 2018). Governments and corporations have recognized the value of social media both as a news outlet to attract public attention and its potential in public opinion monitoring and management (Graham & Avery, 2013; Kaiser, Ahuvia, Rauschnabel, & Wimble, 2019; Lariscy, 2009).

On the other hand, these affordances may exert negative influences on public opinion expression and lead to the spiral of silence effect, i.e., people hold back their opinions when they perceive that the opinion climate is opposite to their own opinions (Noelle-Neumann, 1974). The highly public spaces with a wide audience provided by social media, combined with the fact that the boundaries between online and offline communication are increasingly blurred, may heighten the fear of being negatively judged and reduce people's likelihood to publicly express their opinion, which may not be compatible with the opinions of the entire audience (Neubaum & Krämer, 2017a). People may perceive greater accountability about their expression through social media due to the greater persistence of such expressions: The expressions are recorded by the technical system and others can trace back and access the message for a long time (D. Boyd, 2010). Furthermore, the increased anonymity of some social media environments makes impolite and hostile communications more likely to appear in public conversations (Barlett & Gentile, 2012; Halpern & Gibbs, 2013; Ooi, Lee, Hew, & Lin, 2019; Tokunaga, 2010). That factor may reduce users' public expression of opinions dissenting from the opinions they believe are shared by the majority.

Whether the spiral of silence effect remains or disappears in social media environments has received much research attention. Whereas theoretical premises exist for both sides, most empirical studies have concluded that the spiral of silence still works in social media environments (Gearhart & Zhang, 2015; Hampton et al., 2014; Hoffmann & Lutz, 2017). Matthes et al. (2018) performed a meta-analysis on the strength between opinion climate perceptions and political opinion expression reported in 66 studies. They observed a significant association, indicating the existence of the silencing effect, which was not weaker in social media as compared to offline opinion environments. An online experiment with 8800 participants found that the more people fear social isolation, the greater attention they paid to cues about majority views (Neubaum & Krämer, 2017a). Whereas user-generated comments shape social media users' perception of public opinion, such an effect has not been found for aggregate information (e.g., or number of views or likes; E.-J. Lee & Jang, 2010; Neubaum & Krämer, 2017a). This result can be attributed to the interpretational ambiguity of pallid numbers. Furthermore, people tend to project the opinions obtained from Facebook comments onto the rest of the population, even to national groups (Neubaum & Krämer, 2017b).

The existence of the spiral of silence effect in social media leads to the concern that opinion climates in social media may become distorted by the most strongly represented opinions, which may not be the actual majority views. Such concern echoes criticisms on "slacktivism" triggered by the technological ease of sharing on social media (Cappella, 2017; Christensen, 2011). The technical ease of expressing through one-click gestures can facilitate unreflective participation in public discussions and result in inconsistencies between users' attitude and their behavior. In the long run, it may develop distorted opinion climates that do not reflect real opinion distributions. These effects can render opinion environments in social media easily distorted by manipulative content and social bots. In a highly polarized situation, as Ross et al. (2019) found, participation of a social bot by as little as 2–4% of a communication network can alter the opinion climate.

In summary, social media provide both opportunities and challenges for healthy public opinion formation. More studies and effort are needed to understand and regulate the opinion climate in social media, as well as to educate and inform users about the cognitive biases (Neubaum & Krämer, 2017b; B. Ross et al., 2019).

7 APPLICATION AND FUTURE TRENDS

Social media is continuously expanding to more and more areas, and technological affordances and novel human use behaviors continuously shape and modify each other. The use of social media has become, or is emerging as, a common practice that alters the traditional way of working in numerous areas:

- *Marketing and branding*. Social media have become one of the major venues for companies to promote advertisements and marketing campaigns, to develop and maintain long-term relationships with consumers and among consumers, and to co-create products and brands with customer communities. With the aim of guiding proper marketing design and branding strategy development, numerous studies have investigated the roles played by social media technologies (e.g., technological affordances, platform sociability), content and delivery design (e.g., content appeal, visual design, delivery timing), and users and communities (e.g., demographic differences, motivations, social network properties, collective dynamics) in harnessing the power of electronic word-of-mouth for business goals (Ashley & Tuten, 2015; Qin Gao & Feng, 2016; Kamboj et al., 2018; D. Lee et al., 2018). Furthermore, user-generated content on social media sites provide a rich source for data mining to monitor brand perception, to gauge and predict success of marketing campaigns and electronic word-of-mouth, to inform critical marketing decisions, such as performing competitive analysis, and identify influential users for message propagation (Culotta & Cutler, 2016; He et al., 2013; Kennedy, Elgesem, & Miguel, 2017; Lahuerta-Otero & Cordero-Gutiérrez, 2016; Moro, Rita, & Vala, 2016).
- *User involvement and innovation*. The proliferation of social media provides companies with new opportunities to allow consumers to participate in product design and co-creation activities. One major approach is through mining user feedbacks, reviews, and complaints about launched products to measure customer preference, develop improvement strategies, and offer inspiration to designers (Hu & Chen, 2016; Ying Liu et al., 2013; McIlroy, Ali, Khalid, & Hassan, 2016; Xiao et al., 2016). Another approach is to actively engage customers in the design phase through crowdsourcing design ideas and examples, skills and knowledge, and other resources that contribute to the design and development of products or services through social media platforms (M. F. Y. Cheung & To, 2016; Hajli et al., 2017; Kamboj et al., 2018; Lorenzo-Romero, Constantinides, & Brünink, 2014; Pacauskas, Rajala, Westerlund, & Mäntymäki, 2018; Piller, Vossen, & Ihl, 2012; Simula, Töllinen, & Karjaluoto, 2013; H. Zhang, Lu, Wang, & Wu, 2015).
- *Health care*. Social media offer new possibilities for improving health care from both proactive (i.e., preventing, monitoring, and detection of health issues before they evolve into major medical problems) and reactive (i.e., medical treatment and interventions after diagnosis) routes. From the proactive perspective, social media has been used to shape user behaviors related to health and fitness via various persuasive design techniques and gamification features (Alahäivälä & Oinas-Kukkonen, 2016; Allam, Kostova, Nakamoto, & Schulz, 2015; Fogg, 2009). A recent review (Petersen, Prichard, & Kemps, 2019) compared the effectiveness of physical activity mobile apps with and without the incorporation of social media; the authors found that those incorporating social media increase engagement with

physical activity more than those who did not. Typical approaches include encouraging users to share health and fitness information on social media, facilitating buddy finding and community building, and leveraging the effect of both social support and social comparison to motivate more healthy lifestyle (J. P. Higgins, 2016; Lyson et al., 2019; J. Zhang et al., 2016). An example of such efforts is *Pokémon Go*, a geo-mapping social game; this game markedly increased physical activity and reached low-activity populations (Althoff et al., 2016). User-generated content or activity patterns on social media also provide clues for observing symptoms of mental illness, such as depression and other psychological well-being problems (De Choudhury et al., 2013; Guntuku et al., 2017; Shen et al., 2017; X. Wang et al., 2013). From the reactive perspective, social media can support medical interventions by facilitating social support exchange, providing related knowledge, and reinforcing necessary behavioral changes (Naslund, Aschbrenner, Marsch, & Bartels, 2016; Welch et al., 2018). Anecdotal evidence of the effectiveness of health intervention through social media has been reported in a number of studies, but more research with rigorous study design and larger sample sizes is needed to improve the validity of the findings (Pope et al., 2018, 2019; Tengstedt, Fagerstrøm, & Mobekk, 2018; Willems et al., 2020).

This list of domains actuated by social media is by no means exhaustive. In fact, social media have permeated into nearly every aspect of life. As the term "social media" blurs the boundaries between social development, communication media, and technology, the use of social media blurs many boundaries that previously set the order of how the world works, such as the boundaries between virtual and real, between private and public, between professional and amateur, and between work and play. With more technological development and improvements (e.g., virtual reality, wearable devices) incorporated into social media environments and the ever-increasing accessibility for broader populations, the use of social media will continue to change the way we live and experience as individuals and as collectives. To understand how the physical, psychological, social, and cultural characteristics of humans affect and are affected by the design of social media technologies and environments is a challenging task that requires highly interdisciplinary effort. This chapter outlines and introduces major issues in this interdisciplinary literature from the human perspective, including major features defining various social media, user motivations to accept or use social media, typical user experience and behaviors in social media environments, and long-term impacts on individuals, relationships, and societies. The body of research has identified both positive and negative impacts, as well as opportunities and challenges of social media. These findings highlight the need for more research to understand these technologically mediated human phenomena and to design guidelines that shape the technology for better human use.

REFERENCES

Abbasi, I. S. (2019). Social media addiction in romantic relationships: Does user's age influence vulnerability to social media infidelity? *Personality and Individual Differences, 139*, 277–280.

Ahmed, Y. A., Ahmad, M. N., Ahmad, N., & Zakaria, N. H. (2019). Social media for knowledge-sharing: A systematic literature review. *Telematics and Informatics, 37*, 72–112.

Ahn, D., & Shin, D.-H. (2013). Is the social use of media for seeking connectedness or for avoiding social isolation? Mechanisms underlying media use and subjective well-being. *Computers in Human Behavior, 29*(6), 2453–2462.

Aichner, T., & Jacob, F. (2015). Measuring the degree of corporate social media use. *International Journal of Market Research, 57*(2), 257–276. https://doi.org/10.2501/IJMR-2015-018

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin: Springer.

Alahäivälä, T., & Oinas-Kukkonen, H. (2016). Understanding persuasion contexts in health gamification: A systematic analysis of gamified health behavior change support systems literature. *International Journal of Medical Informatics, 96*, 62–70. https://doi.org/10.1016/j.ijmedinf.2016.02.006

Alderfer, C. P. (1972). *Existence, relatedness, and growth: Human needs in organizational settings*. New York: Free Press.

Alenazy, W. M., Mugahed Al-Rahmi, W., & Khan, M. S. (2019). Validation of TAM model on social media use for collaborative learning to enhance collaborative authoring. *IEEE Access, 7*, 71550–71562. https://doi.org/10.1109/ACCESS.2019.2920242

Al-Garadi, M. A., Varathan, K. D., Ravana, S. D., Ahmed, E., Mujtaba, G., Khan, M. U. S., & Khan, S. U. (2018). Analysis of online social network connections for identification of influential users: Survey and open research issues. *ACM Computing Surveys (CSUR), 51*(1), 1–37.

Allam, A., Kostova, Z., Nakamoto, K., & Schulz, P. J. (2015). The effect of social support features and gamification on a Web-based intervention for rheumatoid arthritis patients: Randomized controlled trial. *Journal of Medical Internet Research, 17*(1), e14.

Allmendinger, K. (2010). Social presence in synchronous virtual learning situations: the role of nonverbal signals displayed by avatars. *Educational Psychology Review, 22*(1), 41–56. https://doi.org/10.1007/s10648-010-9117-8

Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and Social Psychology Review, 13*(3), 219–235.

Althoff, T., White, R. W., & Horvitz, E. (2016). Influence of Pokémon Go on physical activity: study and implications. *Journal of Medical Internet Research, 18*(12), e315. https://doi.org/10.2196/jmir.6759

Altman, I., & Taylor, D. A. (1973). *Social penetration: The development of interpersonal relationships*. New York: Holt, Rinehart & Winston.

Alzahabi, R., & Becker, M. W. (2013). The association between media multitasking, task-switching, and dual-task performance. *Journal of Experimental Psychology: Human Perception and Performance, 39*(5), 1485.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. Washington, DC: American Psychiatric Association.

Amichai-Hamburger, Y., & Vinitzky, G. (2010). Social network use and personality. *Computers in Human Behavior, 26*(6), 1289–1295.

Anandhan, A., Shuib, L., Ismail, M. A., & Mujtaba, G. (2018). Social media recommender systems: review and open research issues. *IEEE Access, 6*, 15608–15628. https://doi.org/10.1109/ACCESS.2018.2810062

Andreassen, C. S. (2015). Online social network site addiction: A comprehensive review. *Current Addiction Reports, 2*(2), 175–184.

Appelhans, B. M., & Luecken, L. J. (2006). Heart rate variability as an index of regulated emotional responding. *Review of General Psychology, 10*(3), 229.

Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education, 2003*(100), 57–68.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The Internet and Higher Education, 11*(3), 133–136.

Archer, R. L., & Berg, J. H. (1978). Disclosure reciprocity and its limits: A reactance analysis. *Journal of Experimental Social*

Psychology, 14(6), 527–540. https://doi.org/10.1016/0022-1031(78)90047-1

Argyle, M., & Dean, J. (1965). Eye-contact, distance and affiliation. *Sociometry,* 289–304.

Ariel, Y., & Avidar, R. (2015). Information, interactivity, and social media. *Atlantic Journal of Communication, 23*(1), 19–30.

Ashley, C., & Tuten, T. (2015). Creative strategies in social media marketing: An exploratory study of branded social content and consumer engagement. *Psychology & Marketing, 32*(1), 15–27.

Astrid, M., Krämer, N. C., Gratch, J., & Kang, S.-H. (2010). "It doesn't matter what you are!" Explaining social effects of agents and avatars. *Computers in Human Behavior, 26*(6), 1641–1650.

Auxier, B. E., & Vitak, J. (2019). Factors motivating customization and echo chamber creation within digital news environments. *Social Media+ Society, 5*(2), 2056305119847506.

Back, M. D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S. D. (2010). Facebook profiles reflect actual personality, not self-idealization. *Psychological Science, 21*(3), 372–374. https://doi.org/10.1177/0956797609360756

Bailey, A. A., Bonifield, C. M., & Arias, A. (2018). Social media use by young Latin American consumers: An exploration. *Journal of Retailing and Consumer Services, 43*, 10–19. https://doi.org/10.1016/j.jretconser.2018.02.003

Bakshy, E., Hofman, J. M., Mason, W. A., & Watts, D. J. (2011). Everyone's an influencer: Quantifying influence on Twitter. In *Proceedings of the Fourth ACM International Conference on Web Search and Data Mining* (pp. 65–74).

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52*(1), 1–26.

Barak, A., & Gluck-Ofri, O. (2007). Degree and reciprocity of self-disclosure in online forums. *CyberPsychology & Behavior, 10*(3), 407–417.

Barasch, A., Diehl, K., Silverman, J., & Zauberman, G. (2017). Photographic memory: the effects of volitional photo taking on memory for visual and auditory aspects of an experience: *Psychological Science*. https://doi.org/10.1177/0956797617694868

Bardram, J. E., & Hansen, T. R. (2004). The AWARE architecture: Supporting context-mediated social awareness in mobile cooperation. In *Proceedings of the 2004 ACM Conference on Computer Supported Cooperative Work* (pp. 192–201).

Bareket-Bojmel, L., Moran, S., & Shahar, G. (2016). Strategic self-presentation on Facebook: Personal motives and audience response to online behavior. *Computers in Human Behavior, 55*, 788–795. https://doi.org/10.1016/j.chb.2015.10.033

Barlett, C. P., & Gentile, D. A. (2012). Attacking others online: The formation of cyberbullying in late adolescence. *Psychology of Popular Media Culture, 1*(2), 123.

Barsade, S. G., & Gibson, D. E. (2007). Why does affect matter in organizations? *Academy of Management Perspectives, 21*(1), 36–59.

Batenburg, A., & Bartels, J. (2017). Keeping up online appearances: How self-disclosure on Facebook affects perceived respect and likability in the professional context. *Computers in Human Behavior, 74*, 265–276.

Baumgartner, S. E., Weeda, W. D., van der Heijden, L. L., & Huizinga, M. (2014). The relationship between media multitasking and executive function in early adolescents. *The Journal of Early Adolescence, 34*(8), 1120–1144.

Bazarova, N. N. (2012). Public intimacy: Disclosure interpretation and social judgments on Facebook. *Journal of Communication, 62*(5), 815–832.

Bazarova, N. N., & Choi, Y. H. (2014). Self-disclosure in social media: Extending the functional approach to disclosure motivations and characteristics on social network sites. *Journal of Communication, 64*(4), 635–657.

Bechmann, A., & Nielbo, K. L. (2018). Are we exposed to the same "news" in the news feed? *Digital Journalism, 6*(8), 990–1002. https://doi.org/10.1080/21670811.2018.1510741

Bente, G., Rüggenberg, S., Krämer, N. C., & Eschenburg, F. (2008). Avatar-mediated networking: Increasing social presence and interpersonal trust in net-based collaborations. *Human Communication Research, 34*(2), 287–318.

Berger, J. (2011). Arousal increases social transmission of information. *Psychological Science, 22*(7), 891–893.

Berger, J. (2014). Word of mouth and interpersonal communication: A review and directions for future research. *Journal of Consumer Psychology, 24*(4), 586–607.

Berger, J., & Milkman, K. L. (2012). What makes online content viral?: *Journal of Marketing Research*. https://doi.org/10.1509/jmr.10.0353

Berridge, K., & Winkielman, P. (2003). What is an unconscious emotion? (The case for unconscious "liking"). *Cognition & Emotion, 17*(2), 181–211.

Bhagat, S., Burke, M., Diuk, C., Filiz, I. O., & Edunov, S. (2016, February 4). Three and a half degrees of separation. *Facebook Research*. https://research.fb.com/blog/2016/02/three-and-a-half-degrees-of-separation/

Biocca, F., Burgoon, J., Harms, C., & Stoner, M. (2001). Criteria and scope conditions for a theory and measure of social presence. *Presence: Teleoperators and Virtual Environments, 10*.

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments*, *12*(5), 456–480.

Blackwell, D., Leaman, C., Tramposch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences, 116*, 69–72. https://doi.org/10.1016/j.paid.2017.04.039

Bloomberg. (2019, September 29). How the 'VTuber' mania is gathering pace. *Livemint*. https://www.livemint.com/mint-lounge/mint-on-sunday/how-the-vtuber-mania-is-gathering-pace-1569582161900.html

Bondad-Brown, B., Rice, R., & Pearce, K. E. (2011). A uses and gratifications and social media approach to understanding online video use and content recommendations. *Annual National Meeting of the International Communication Association*.

Borges-Tiago, M. T., Tiago, F., & Cosme, C. (2019). Exploring users' motivations to participate in viral communication on social media. *Journal of Business Research, 101*, 574–582.

Boyd, D. (2010). Social network sites as networked publics: Affordances, dynamics, and implications. In Z. Papacharissi (Ed.), *A networked self: Identity, community, and culture on social network sites* (pp. 39–58). New York: Routledge.

Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210–230.

Brady, W. J., Gantman, A. P., & Van Bavel, J. J. (2019). Attentional capture helps explain why moral and emotional content go viral. *Journal of Experimental Psychology: General*.

Brandtzæg, P. B., & Heim, J. (2009). Why people use social networking sites. In *International Conference on Online Communities and Social Computing* (pp. 143–152).

Bregman, A., & Haythornwaite, C. (2001). Radicals of presentation in persistent conversation. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences,* 10 pp.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford.

Bright, L. F., Kleiser, S. B., & Grau, S. L. (2015). Too much Facebook? An exploratory examination of social media fatigue. *Computers in Human Behavior, 44*, 148–155. https://doi.org/10.1016/j.chb.2014.11.048

Briones, R. L., Kuch, B., Liu, B. F., & Jin, Y. (2011). Keeping up with the digital age: How the American Red Cross uses social media to

build relationships. *Public Relations Review, 37*(1), 37–43. https://doi.org/10.1016/j.pubrev.2010.12.006

Brooks, S. (2015). Does personal social media usage affect efficiency and well-being? *Computers in Human Behavior, 46*, 26–37.

Brown, R. I. F. (1993). Some contributions of the study of gambling to the study of other addictions. *Gambling Behavior and Problem Gambling, 1*, 241–272.

Bryant, E. M., & Marmo, J. (2012). The rules of Facebook friendship: A two-stage examination of interaction rules in close, casual, and acquaintance friendships. *Journal of Social and Personal Relationships, 29*(8), 1013–1035.

Bucy, E. P., & Tao, C.-C. (2007). The mediated moderation model of interactivity. *Media Psychology, 9*(3), 647–672.

Buglass, S. L., Binder, J. F., Betts, L. R., & Underwood, J. D. (2017). Motivators of online vulnerability: The impact of social network site use and FOMO. *Computers in Human Behavior, 66*, 248–255.

Bulu, S. T. (2012). Place presence, social presence, co-presence, and satisfaction in virtual worlds. *Computers & Education, 58*(1), 154–161. https://doi.org/10.1016/j.compedu.2011.08.024

Burke, K., & Chidambaram, L. (1999). How much bandwidth is enough? A longitudinal examination of media characteristics and group outcomes. *MIS Quarterly, 46*, 557–579.

Burke, M., & Kraut, R. E. (2014). Growing closer on Facebook: Changes in tie strength through social network site use. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,* 4187–4196.

Burke, M., & Kraut, R. E. (2016). The relationship between Facebook use and well-being depends on communication type and tie strength. *Journal of Computer-Mediated Communication, 21*(4), 265–281.

Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1909–1912).

Burtch, G., Ghose, A., & Wattal, S. (2015). The hidden cost of accommodating crowdfunder privacy preferences: A randomized field experiment. *Management Science, 61*(5), 949–962.

Button, M., Nicholls, C. M., Kerr, J., & Owen, R. (2014). Online frauds: Learning from victims why they fall for these scams. *Australian & New Zealand Journal of Criminology, 47*(3), 391–408.

Cacioppo, J. T., Petty, R. E., Losch, M. E., & Kim, H. S. (1986). Electromyographic activity over facial muscle regions can differentiate the valence and intensity of affective reactions. *Journal of Personality and Social Psychology, 50*(2), 260.

Cain, M. S., & Mitroff, S. R. (2011). Distractor filtering in media multitaskers. *Perception, 40*(10), 1183–1192.

Cao, H., Jiang, J., Oh, L.-B., Li, H., Liao, X., & Chen, Z. (2013). A Maslow's hierarchy of needs analysis of social networking services continuance. *Journal of Service Management, 24*(2), 170–190.

Cappella, J. N. (2017). Vectors into the future of mass and interpersonal communication research: Big data, social media, and computational social science. *Human Communication Research, 43*(4), 545–558.

Cardenal, A. S., Aguilar-Paredes, C., Cristancho, C., & Majó-Vázquez, S. (2019). Echo-chambers in online news consumption: Evidence from survey and navigation data in Spain. *European Journal of Communication, 34*(4), 360–376. https://doi.org/10.1177/0267323119844409

Castillo, C., Mendoza, M., & Poblete, B. (2011). Information credibility on Twitter. In *Proceedings of the 20th International Conference on World Wide Web* (pp. 675–684).

Cha, M., Haddadi, H., Benevenuto, F., & Gummadi, K. P. (2010). Measuring user influence in twitter: The million follower fallacy. Paper presented at Fourth International AAAI Conference on Weblogs and Social Media.

Chae, J. (2017). Virtual makeover: Selfie-taking and social media use increase selfie-editing frequency through social comparison. *Computers in Human Behavior, 66*, 370–376. https://doi.org/10.1016/j.chb.2016.10.007

Chang, C.-C. (2013). Examining users′ intention to continue using social network games: A flow experience perspective. *Telematics and Informatics, 30*(4), 311–321. https://doi.org/10.1016/j.tele.2012.10.006

Chen, A. (2019). From attachment to addiction: The mediating role of need satisfaction on social networking sites. *Computers in Human Behavior, 98*, 80–92. https://doi.org/10.1016/j.chb.2019.03.034

Chen, H.-T., & Li, X. (2017). The contribution of mobile social media to social capital and psychological well-being: Examining the role of communicative use, friending and self-disclosure. *Computers in Human Behavior, 75*, 958–965.

Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A review. *Computers in Human Behavior, 54*, 34–42.

Chen, W., Shen, C., & Huang, G. (2016). In game we trust? Coplay and generalized trust in and beyond a Chinese MMOG world. *Information, Communication & Society, 19*(5), 639–654.

Chen, X., Li, G., Hu, Y., & Li, Y. (2016). How anonymity influence self-disclosure tendency on sina weibo: An empirical study. *The Anthropologist, 26*(3), 217–226.

Chen, Yimin, Conroy, N. J., & Rubin, V. L. (2015). Misleading online content: Recognizing clickbait as "false news." In *Proceedings of the 2015 ACM on Workshop on Multimodal Deception Detection* (pp. 15–19).

Chen, Yue, Gao, Q., Lv, Q., Qian, N., & Ma, L. (2018). Comparing measurements for emotion evoked by oral care products. *International Journal of Industrial Ergonomics, 66*, 119–129.

Chen, Yue, Gao, Q., & Rau, P.-L. P. (2017). Watching a movie alone yet together: Understanding reasons for watching Danmaku videos. *International Journal of Human–Computer Interaction, 33*(9), 731–743. https://doi.org/10.1080/10447318.2017.1282187

Chen, Yue, Gao, Q., Yuan, Q., & Tang, Y. (2019). Discovering MOOC learner motivation and its moderating role. *Behaviour & Information Technology, 0*(0), 1–19. https://doi.org/10.1080/0144929X.2019.1661520

Cheung, C. M., Chiu, P.-Y., & Lee, M. K. (2011). Online social networks: Why do students use facebook? *Computers in Human Behavior, 27*(4), 1337–1343.

Cheung, M. F. Y., & To, W. M. (2016). Service co-creation in social media: An extension of the theory of planned behavior. *Computers in Human Behavior, 65*, 260–266. https://doi.org/10.1016/j.chb.2016.08.031

Chiu, C.-M., & Huang, H.-Y. (2015). Examining the antecedents of user gratification and its effects on individuals' social network services usage: The moderating role of habit. *European Journal of Information Systems, 24*(4), 411–430.

Choi, S. (2019). The roles of media capabilities of smartphone-based SNS in developing social capital. *Behaviour & Information Technology, 38*(6), 609–620. https://doi.org/10.1080/0144929X.2018.1546903

Chotpitayasunondh, V., & Douglas, K. M. (2016). How "phubbing" becomes the norm: The antecedents and consequences of snubbing via smartphone. *Computers in Human Behavior, 63*, 9–18. https://doi.org/10.1016/j.chb.2016.05.018

Chou, H.-T. G., & Edge, N. (2012). "They are happier and having better lives than I am": The impact of using Facebook on perceptions of others' lives. *Cyberpsychology, Behavior, and Social Networking, 15*(2), 117–121.

Christensen, H. S. (2011). Political activities on the Internet: Slacktivism or political participation by other means? *First Monday, 16*(2).

Chugh, R., & Ruhi, U. (2018). Social media in higher education: A literature review of Facebook. *Education and Information Technologies, 23*(2), 605–616.

Clark, A. E., & Kashima, Y. (2007). Stereotypes help people connect with others in the community: A situated functional analysis of the stereotype consistency bias in communication. *Journal of Personality and Social Psychology, 93*(6), 1028.

Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives*

on socially shared cognition. Washington, DC: American Psychological Association.

Cohen, E. L., & Lancaster, A. L. (2014). Individual differences in in-person and social media television coviewing: the role of emotional contagion, need to belong, and coviewing orientation. *Cyberpsychology, Behavior, and Social Networking, 17*(8), 512–518.

Cornwell, B., Laumann, E. O., & Schumm, L. P. (2008). The social connectedness of older adults: A national profile. *American Sociological Review, 73*(2), 185–203.

Corr, P. J., & Matthews, G. (2009). *The Cambridge handbook of personality psychology*. Cambridge: Cambridge University Press.

Correa, T., Hinsley, A. W., & De Zuniga, H. G. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247–253.

Cortese, J., & Seo, M. (2012). The role of social presence in opinion expression during FtF and CMC discussions. *Communication Research Reports, 29*(1), 44–53.

Cozby, P. C. (1973). Self-disclosure: A literature review. *Psychological Bulletin, 79*(2), 73.

Crabtree, M. A., & Pillow, D. R. (2018). Extending the Dual Factor Model of Facebook use: Social motives and network density predict Facebook use through impression management and open self-disclosure. *Personality and Individual Differences, 133*, 34–40. https://doi.org/10.1016/j.paid.2017.06.017

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.

Csikszentmihalyi, M. (2014). Toward a psychology of optimal experience. In *Flow and the foundations of positive psychology* (pp. 209–226). Berlin: Springer.

Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (1992). *Optimal experience: Psychological studies of flow in consciousness*. Cambridge: Cambridge University Press.

Cudney, E. A., Murray, S. L., Sprague, C. M., Byrd, L. M., Morris, F. M., Merwin, N., & Warner, D. L. (2015). Engaging healthcare users through gamification in knowledge sharing of continuous improvement in healthcare. *Procedia Manufacturing, 3*, 3416–3423. https://doi.org/10.1016/j.promfg.2015.07.613

Culotta, A., & Cutler, J. (2016). Mining brand perceptions from Twitter social networks. *Marketing Science, 35*(3), 343–362. https://doi.org/10.1287/mksc.2015.0968

Cvijikj, I. P., & Michahelles, F. (2013). Online engagement factors on Facebook brand pages. *Social Network Analysis and Mining, 3*(4), 843–861.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571.

Das, S., Dev, J., & Srinivasan, K. (2018). Modularity is the key: A new approach to social media privacy policies. In *Proceedings of the 7th Mexican Conference on Human-Computer Interaction - MexIHC '18* (pp. 1–4). https://doi.org/10.1145/3293578.3293589

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003.

De Choudhury, M., Gamon, M., Counts, S., & Horvitz, E. (2013). Predicting depression via social media. Paper presented at Seventh International AAAI Conference on Weblogs and Social Media.

de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2018). Social comparison as the thief of joy: Emotional consequences of viewing strangers' Instagram posts. *Media Psychology, 21*(2), 222–245.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Springer US. http://link.springer.com/10.1007/978-1-4899-2271-7

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *MIS Quarterly, 32*(3), 575–600.

Derks, D., Bos, A. E., & Von Grumbkow, J. (2007). Emoticons and social interaction on the Internet: The importance of social context. *Computers in Human Behavior, 23*(1), 842–849.

Desmet, P. (2003). Measuring emotion: Development and application of an instrument to measure emotional responses to products. In *Funology* (pp. 111–123). Berlin: Springer. http://link.springer.com/content/pdf/10.1007/1-4020-2967-5_12.pdf

Deters, F. G., & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science, 4*(5), 579–586.

Devaraj, S., Easley, R. F., & Crant, J. M. (2008). Research note—how does personality matter? relating the five-factor model to technology acceptance and Use. *Information Systems Research, 19*(1), 93–105. https://doi.org/10.1287/isre.1070.0153

Diamond, A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dienlin, T., & Metzger, M. J. (2016). An extended privacy calculus model for SNSs: Analyzing self-disclosure and self-withdrawal in a representative US sample. *Journal of Computer-Mediated Communication, 21*(5), 368–383.

Doleck, T., Bazelais, P., & Lemay, D. J. (2017). Need for self-expression on instagram: A technology acceptance perspective. In *2017 3rd International Conference on Computational Intelligence & Communication Technology (CICT)* (pp. 1–3).

Domahidi, E., Breuer, J., Kowert, R., Festl, R., & Quandt, T. (2018). A longitudinal analysis of gaming-and non-gaming-related friendships and social support among social online game players. *Media Psychology, 21*(2), 288–307.

Dougherty, K. D., & Andercheck, B. (2014). Using Facebook to engage learners in a large introductory course. *Teaching Sociology, 42*(2), 95–104.

Dourish, P., & Bellotti, V. (1992). Awareness and coordination in shared workspaces. In *Proceedings of the 1992 ACM Conference on Computer-Supported Cooperative Work* (pp. 107–114).

DuBay, W. H. (2004). The principles of readability. Online Submission.

Dunbar, R. I. (2016). Do online social media cut through the constraints that limit the size of offline social networks? *Royal Society Open Science, 3*(1), 150292.

Durak, H. Y. (2018). Modeling of variables related to problematic internet usage and problematic social media usage in adolescents. *Current Psychology.* https://doi.org/10.1007/s12144-018-9840-8

Dutta, S. (2010). What's your personal social media strategy? *Harvard Business Review, 88*(11), 127–30.

Edelmann, N. (2013). Reviewing the definitions of "lurkers" and some implications for online research. *Cyberpsychology, Behavior, and Social Networking, 16*(9), 645–649.

Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*(4), 1143–1168.

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing Impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, *11*(2), 415–441.

Endestad, T., Heim, J., Kaare, B., Torgersen, L., & Brandtzæg, P. B. (2011). Media user types among young children and social displacement. *Nordicom Review, 32*(1), 17–30.

Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion, 32*(3), 158–172.

Eppler, M. J. (2015). Information quality and information overload: The promises and perils of the Information Age. In L. Cantoni & J. A. Danowski (Eds.), *Communication and technology* (pp. 215–232). Berlin: de Gruyter Mouton.

Eppler, M. J., & Mengis, J. (2004). The concept of information overload: A review of literature from organization science, accounting,

marketing, MIS, and related disciplines. *The Information Society, 20*(5), 325–344.

Fang, Y.-H., & Li, C.-Y. (2020). Leveraging sociability for trust building on social commerce sites. *Electronic Commerce Research and Applications, 40*, 100907. https://doi.org/10.1016/j.elerap.2019.100907

Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the Technology Acceptance Model (TAM) to examine faculty use of Learning Management Systems (LMSs) in higher education institutions. *Journal of Online Learning & Teaching, 11*(2).

Felfernig, A., Jeran, M., Ninaus, G., Reinfrank, F., & Reiterer, S. (2013). Toward the next generation of recommender systems: Applications and research challenges. In *Multimedia services in intelligent environments* (pp. 81–98). Berlin: Springer. http://link.springer.com/chapter/10.1007/978-3-319-00372-6_5

Feng, B., Li, S., & Li, N. (2016). Is a profile worth a thousand words? How online support-seeker's profile features may influence the quality of received support messages. *Communication Research, 43*(2), 253–276.

Ferrara, E., & Yang, Z. (2015). Measuring emotional contagion in social media. *PloS One, 10*(11), e0142390.

Flanagin, A. J., & Metzger, M. J. (2013). Trusting expert-versus user-generated ratings online: The role of information volume, valence, and consumer characteristics. *Computers in Human Behavior, 29*(4), 1626–1634.

Flaxman, S., Goel, S., & Rao, J. M. (2016). Filter bubbles, echo chambers, and online news consumption. *Public Opinion Quarterly, 80*(S1), 298–320.

Fogg, B. J. (2008). Mass interpersonal persuasion: An early view of a new phenomenon. *International Conference on Persuasive Technology,* 23–34.

Fogg, B. J. (2009). A behavior model for persuasive design. *Proceedings of the 4th International Conference on Persuasive Technology*, 1–7.

Fowler, J. H., & Christakis, N. A. (2008). Dynamic spread of happiness in a large social network: Longitudinal analysis over 20 years in the Framingham Heart Study. *BMJ, 337*, a2338.

Fox, J., & Vendemia, Megan. A. (2016). Selective self-presentation and social comparison through photographs on social networking sites. *Cyberpsychology, Behavior, and Social Networking, 19*(10), 593–600. https://doi.org/10.1089/cyber.2016.0248

Fox, S., & Duggan, M. (2013). Health online 2013 (Pew Internet & American Life Project). Pew Research Center. http://pewinternet.org/Reports/2013/Health-online.aspx

Friedrich, J., Becker, M., Kramer, F., Wirth, M., & Schneider, M. (2020). Incentive design and gamification for knowledge management. *Journal of Business Research, 106*, 341–352. https://doi.org/10.1016/j.jbusres.2019.02.009

Froehlich, T. E., Anixt, J. S., Loe, I. M., Chirdkiatgumchai, V., Kuan, L., & Gilman, R. C. (2011). Update on environmental risk factors for Attention-Deficit/Hyperactivity Disorder. *Current Psychiatry Reports, 13*(5), 333–344. https://doi.org/10.1007/s11920-011-0221-3

Gan, C., & Wang, W. (2015). Uses and gratifications of social media: A comparison of microblog and WeChat. *Journal of Systems and Information Technology*.

Gao, Qin, Dai, Y., Fan, Z., & Kang, R. (2010). Understanding factors affecting perceived sociability of social software. *Computers in Human Behavior, 26*(6), 1846–1861. https://doi.org/10.1016/j.chb.2010.07.022

Gao, Qin, & Feng, C. (2016). Branding with social media: User gratifications, usage patterns, and brand message content strategies. *Computers in Human Behavior, 63*, 868–890. https://doi.org/10.1016/j.chb.2016.06.022

Gao, Qin, Tian, Y., & Tu, M. (2015). Exploring factors influencing Chinese user's perceived credibility of health and safety information on Weibo. *Computers in Human Behavior, 45*, 21–31. https://doi.org/10.1016/j.chb.2014.11.071

Gao, Qiufeng, Jia, G., Zhao, J., & Zhang, D. (2019). Inhibitory control in excessive social networking users: Evidence from an ERP-based Go-Nogo task. *Frontiers in Psychology, 10*, 1810.

Gardner, H., & Davis, K. (2013). *The app generation: How today's youth navigate identity, intimacy, and imagination in a digital world*. New Haven, CT: Yale University Press.

Gearhart, S., & Zhang, W. (2015). "Was it something I said?" "No, it was something you posted!" A study of the spiral of silence theory in social media contexts. *Cyberpsychology, Behavior, and Social Networking, 18*(4), 208–213. https://doi.org/10.1089/cyber.2014.0443

Gibson, J. J. (1979). The theory of affordances. In *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Gil de Zúñiga, H., Molyneux, L., & Zheng, P. (2014). Social media, political expression, and political participation: Panel analysis of lagged and concurrent relationships. *Journal of Communication, 64*(4), 612–634.

Go, E., & Bortree, D. S. (2017). What and how to communicate CSR? The role of CSR fit, modality interactivity, and message interactivity on social networking Sites. *Journal of Promotion Management, 23*(5), 727–747. https://doi.org/10.1080/10496491.2017.1297983

Goel, L., Johnson, N., Junglas, I., & Ives, B. (2013). Predicting users' return to virtual worlds: A social perspective. *Information Systems Journal, 23*(1), 35–63.

Goffman, E. (1959). *The presentation of self in everyday life*. New York: Doubleday.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, *48*(1), 26–34. https://doi.org/10.1037/0003-066X.48.1.26

Gonzales, A. L., & Hancock, J. T. (2011). Mirror, mirror on my Facebook wall: Effects of exposure to Facebook on self-esteem. *Cyberpsychology, Behavior, and Social Networking, 14*(1–2), 79–83.

Gouldner, A. W. (1960). The norm of reciprocity: A preliminary statement. *American Sociological Review, 89*, 161–178.

Graham, M., & Avery, E. (2013). Government public relations and social media: An analysis of the perceptions and trends of social media use at the local government level. *Public Relations Journal, 7*(4), 1–21.

Grieve, R., Indian, M., Witteveen, K., Tolan, G. A., & Marrington, J. (2013). Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behavior, 29*(3), 604–609.

Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use, 10*(4), 191–197.

Gross, R., & Acquisti, A. (2005). Information revelation and privacy in online social networks. In *Proceedings of the 2005 ACM Workshop on Privacy in the Electronic Society* (pp. 71–80).

Guadagno, R. E., Blascovich, J., Bailenson, J. N., & Mccall, C. (2007). Virtual humans and persuasion: The effects of agency and behavioral realism. *Media Psychology, 10*(1), 1–22. https://doi.org/10.1080/15213260701300865

Guadagno, R. E., Rempala, D. M., Murphy, S., & Okdie, B. M. (2013). What makes a video go viral? An analysis of emotional contagion and Internet memes. *Computers in Human Behavior, 29*(6), 2312–2319. https://doi.org/10.1016/j.chb.2013.04.016

Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications, 1*(2), 147–166.

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education, 11*(3), 8–26.

Guntuku, S. C., Yaden, D. B., Kern, M. L., Ungar, L. H., & Eichstaedt, J. C. (2017). Detecting depression and mental illness on social media: An integrative review. *Current Opinion in Behavioral Sciences, 18*, 43–49. https://doi.org/10.1016/j.cobeha.2017.07.005

Guo, L., Tan, E., Chen, S., Zhang, X., & Zhao, Y. (2009). Analyzing patterns of user content generation in online social networks. In *Proceedings of the 15th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining – KDD '09*, 369. https://doi.org/10.1145/1557019.1557064

Guo, Z., Xiao, L., Van Toorn, C., Lai, Y., & Seo, C. (2016). Promoting online learners' continuance intention: An integrated flow framework. *Information & Management, 53*(2), 279–295. https://doi.org/10.1016/j.im.2015.10.010

Hajli, N., Shanmugam, M., Papagiannidis, S., Zahay, D., & Richard, M.-O. (2017). Branding co-creation with members of online brand communities. *Journal of Business Research, 70*, 136–144. https://doi.org/10.1016/j.jbusres.2016.08.026

Hall, J. A. (2018). When is social media use social interaction? Defining mediated social interaction. *New Media & Society, 20*(1), 162–179. https://doi.org/10.1177/1461444816660782

Hall, J. A., Johnson, R. M., & Ross, E. M. (2019). Where does the time go? An experimental test of what social media displaces and displaced activities' associations with affective well-being and quality of day. *New Media & Society, 21*(3), 674–692. https://doi.org/10.1177/1461444818804775

Hall, J. A., Kearney, M. W., & Xing, C. (2019). Two tests of social displacement through social media use. *Information, Communication & Society, 22*(10), 1396–1413. https://doi.org/10.1080/1369118X.2018.1430162

Halper, S., & Clarke, J. (2004). *America alone: The neo-conservatives and the global order*. Cambridge: Cambridge University Press.

Halpern, D., & Gibbs, J. (2013). Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression. *Computers in Human Behavior, 29*(3), 1159–1168.

Hamburger, Y. A., & Ben-Artzi, E. (2000). The relationship between extraversion and neuroticism and the different uses of the Internet. *Computers in Human Behavior, 16*(4), 441–449.

Hampton, K. N., Rainie, H., Lu, W., Dwyer, M., Shin, I., & Purcell, K. (2014). Social media and the 'spiral of silence'. Pew Research Center. https://www.pewinternet.org/2014/08/26/social-media-and-the-spiral-of-silence/

Han, E., & Lee, S.-W. (2014). Motivations for the complementary use of text-based media during linear TV viewing: An exploratory study. *Computers in Human Behavior, 32*, 235–243. https://doi.org/10.1016/j.chb.2013.12.015

Hancock, J. T., Gee, K., Ciaccio, K., & Lin, J. M.-H. (2008). I'm sad you're sad: Emotional contagion in CMC. In *Proceedings of the 2008 ACM Conference on Computer Supported Cooperative Work* (pp. 295–298). https://doi.org/10.1145/1460563.1460611

Hancock, J. T., Toma, C., & Ellison, N. (2007). The truth about lying in online dating profiles. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 449–452).

Hansen, J. M., Saridakis, G., & Benson, V. (2018). Risk, trust, and the interaction of perceived ease of use and behavioral control in predicting consumers' use of social media for transactions. *Computers in Human Behavior, 80*, 197–206. https://doi.org/10.1016/j.chb.2017.11.010

Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional Science, 28*(2), 115–152.

Haridakis, P., & Hanson, G. (2009). Social interaction and co-viewing with YouTube: Blending mass communication reception and social connection. *Journal of Broadcasting & Electronic Media, 53*(2), 317–335.

Harmat, L., de Manzano, Ö., Theorell, T., Högman, L., Fischer, H., & Ullén, F. (2015). Physiological correlates of the flow experience during computer game playing. *International Journal of Psychophysiology, 97*(1), 1–7. https://doi.org/10.1016/j.ijpsycho.2015.05.001

Harris, H., Bailenson, J. N., Nielsen, A., & Yee, N. (2009). The evolution of social behavior over time in Second Life. *Presence: Teleoperators and Virtual Environments, 18*(6), 434–448. https://doi.org/10.1162/pres.18.6.434

Harris, R. B., & Paradice, D. (2007). An investigation of the computer-mediated communication of emotions. *Journal of Applied Sciences Research, 3*(12), 2081–2090.

Hart, J., Nailling, E., Bizer, G. Y., & Collins, C. K. (2015). Attachment theory as a framework for explaining engagement with Facebook. *Personality and Individual Differences, 77*, 33–40. https://doi.org/10.1016/j.paid.2014.12.016

Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. *Journal of Verbal Learning and Verbal Behavior, 16*(1), 107–112.

Hassanein, K., & Head, M. (2007). Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *International Journal of Human-Computer Studies, 65*(8), 689–708.

Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1993). Emotional contagion. *Current Directions in Psychological Science, 2*(3), 96–100.

Hawkley, L. C., Browne, M. W., & Cacioppo, J. T. (2005). How can I connect with thee? Let me count the ways. *Psychological Science, 16*(10), 798–804.

Hawthorne, G. (2006). Measuring social isolation in older adults: Development and initial validation of the friendship scale. *Social Indicators Research, 77*(3), 521–548.

Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Communication & Society, 8*(2), 125–147. https://doi.org/10.1080/13691180500146185

He, W., Zha, S., & Li, L. (2013). Social media competitive analysis and text mining: A case study in the pizza industry. *International Journal of Information Management, 33*(3), 464–472. https://doi.org/10.1016/j.ijinfomgt.2013.01.001

Heath, C., Bell, C., & Sternberg, E. (2001). Emotional selection in memes: The case of urban legends. *Journal of Personality and Social Psychology, 81*(6), 1028.

Henkel, L. A. (2014). Point-and-shoot memories: The influence of taking photos on memory for a museum tour. *Psychological Science, 25*(2), 396–402.

Herrera, F., Oh, S. Y., & Bailenson, J. N. (2020). Effect of behavioral realism on social interactions inside collaborative virtual environments. *Presence: Virtual and Augmented Reality, 27*(2), 163–182. https://doi.org/10.1162/pres_a_00324

Hertel, G., Schroer, J., Batinic, B., & Naumann, S. (2008). Do shy people prefer to send e-mail? Personality effects on communication media preferences in threatening and nonthreatening situations. *Social Psychology, 39*(4), 231–243.

Hian, L. B., Chuan, S. L., Trevor, T. M. K., & Detenber, B. H. (2004). Getting to know you: Exploring the development of relational intimacy in computer-mediated communication. *Journal of Computer-Mediated Communication, 9*(3), JCMC935.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319.

Higgins, J. P. (2016). Smartphone applications for patients' health and fitness. *The American Journal of Medicine, 129*(1), 11–19. https://doi.org/10.1016/j.amjmed.2015.05.038

Hiltz, S. R., & Turoff, M. (1981). The evolution of user behavior in a computerized conferencing system. *Communications of the ACM, 24*(11), 739–751.

Hodes, R. L., Cook, E. W., & Lang, P. J. (1985). Individual differences in autonomic response: Conditioned association or conditioned fear? *Psychophysiology, 22*(5), 545–560.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing, 60*(3), 50–68.

Hoffmann, C. P., & Lutz, C. (2017). Spiral of silence 2.0: Political self-censorship among young Facebook users. In *Proceedings of the 8th International Conference on Social Media & Society* (pp. 1–12).

Hsu, C.-L., Chang, K.-C., Kuo, N.-T., & Cheng, Y.-S. (2017). The mediating effect of flow experience on social shopping behavior. *Information Development, 33*(3), 243–256. https://doi.org/10.1177/0266666916651918

Hu, Y.-H., & Chen, K. (2016). Predicting hotel review helpfulness: The impact of review visibility, and interaction between hotel stars and review ratings. *International Journal of Information Management, 36*(6, Part A), 929–944. https://doi.org/10.1016/j.ijinfomgt.2016.06.003

Huang, L.-Y., Hsieh, Y.-J., & Wu, Y.-C. J. (2014). Gratifications and social network service usage: The mediating role of online experience. *Information & Management, 51*(6), 774–782.

Huang, N., Hong, Y., & Burtch, G. (2016). Social network integration and user content generation: Evidence from natural experiments. *MIS Quarterly,* 17–001.

Hughes, D. J., Rowe, M., Batey, M., & Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior, 28*(2), 561–569.

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655–672.

Hutchby, I. (2001). Technologies, texts and affordances. *Sociology, 35*(2), 441–456. Scopus. https://doi.org/10.1017/S0038038501000219

Hwang, Y., & Lim, J. S. (2015). The impact of engagement motives for social TV on social presence and sports channel commitment. *Telematics and Informatics, 32*(4), 755–765. https://doi.org/10.1016/j.tele.2015.03.006

IJsselsteijn, W., van Baren, J., & van Lanen, F. (2003). Staying in touch: Social presence and connectedness through synchronous and asynchronous communication media. *Human-Computer Interaction: Theory and Practice (Part II), 2*, 924–928.

Jackson, S. A., & Eklund, R. C. (2002). Assessing flow in physical activity: The flow state scale-2 and dispositional flow scale-2. *Journal of Sport & Exercise Psychology, 24*(2).

Jackson, T. W., & Farzaneh, P. (2012). Theory-based model of factors affecting information overload. *International Journal of Information Management, 32*(6), 523–532.

Jakob Nielsen. (2006, October 8). Participation inequality: The 90-9-1 rule for social features. Nielsen Norman Group. https://www.nngroup.com/articles/participation-inequality/

Jang, K., Park, N., & Song, H. (2016). Social comparison on Facebook: Its antecedents and psychological outcomes. *Computers in Human Behavior, 62*, 147–154. https://doi.org/10.1016/j.chb.2016.03.082

Jensen, K. B. (2015). What's social about social media? *Social Media + Society*. https://doi.org/10.1177/2056305115578874

Jiang, J., Tong, Y., & Tan, S. S.-L. (2012). Do you retweet health advice on microblogging platforms? The effects of health topic and website design on credibility assessment. Paper presented at ICIS 2012.

Jin, S.-A. A. (2010). Parasocial interaction with an avatar in second life: A typology of the self and an empirical test of the mediating role of social presence. *Presence, 19*(4), 331–340.

Johar, J. S., & Sirgy, M. J. (1991). Value-expressive versus utilitarian advertising appeals: When and why to use which appeal. *Journal of Advertising, 20*(3), 23–33.

Johnson, P. R., & Yang, S. (2009). Uses and gratifications of Twitter: An examination of user motives and satisfaction of Twitter use. Paper presented at Communication Technology Division of the Annual Convention of the Association for Education in Journalism and Mass Communication, Boston.

Jourard, S. M. (1971). *Self-disclosure: An experimental analysis of the transparent self*. Hoboken, NJ: Wiley-Interscience.

Judd, T. (2014). Making sense of multitasking: The role of Facebook. *Computers & Education, 70*, 194–202. https://doi.org/10.1016/j.compedu.2013.08.013

Junglas, I., Goel, L., Abraham, C., & Ives, B. (2013). The social component of information systems: How sociability contributes to technology acceptance. *Journal of the Association for Information Systems, 14*(10), 1.

Kaiser, C., Ahuvia, A., Rauschnabel, P. A., & Wimble, M. (2019). Social media monitoring: What can marketers learn from Facebook brand photos? *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2019.09.017

Kamboj, S., Sarmah, B., Gupta, S., & Dwivedi, Y. (2018). Examining branding co-creation in brand communities on social media: Applying the paradigm of Stimulus-Organism-Response. *International Journal of Information Management, 39*, 169–185. https://doi.org/10.1016/j.ijinfomgt.2017.12.001

Kane, G. C., Alavi, M., Labianca, G., & Borgatti, S. P. (2014). What's different about social media networks? A framework and research agenda. *MIS Quarterly, 38*(1), 275–304.

Kang, H., & Sundar, S. S. (2016). When self is the source: Effects of media customization on message processing. *Media Psychology, 19*(4), 561–588.

Kang, S.-H., & Watt, J. H. (2013). The impact of avatar realism and anonymity on effective communication via mobile devices. *Computers in Human Behavior, 29*(3), 1169–1181. https://doi.org/10.1016/j.chb.2012.10.010

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons, 53*(1), 59–68.

Karahanna, E., Xu, S. X., Xu, Y., & Zhang, N. A. (2018). The needs–affordances–features perspective for the use of social media. *Management Review, 26*(2), 298–310.

Karahanna, E., Xu, S. X., & Zhang, N. A. (2015). Psychological ownership motivation and use of social media. *Journal of Marketing Theory and Practice, 23*(2), 185–207. https://doi.org/10.1080/10696679.2015.1002336

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *Public Opinion Quarterly, 37*(4), 509–523.

Kaur, P., Dhir, A., Chen, S., & Rajala, R. (2016). Flow in context: Development and validation of the flow experience instrument for social networking. *Computers in Human Behavior, 59*, 358–367.

Kekki, M.-K. (2020). Authentic encountering of others and learning through media-based public discussion: A phenomenological analysis. *Journal of Philosophy of Education*. https://doi.org/10.1111/1467-9752.12405

Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth, 25*(1), 79–93. https://doi.org/10.1080/02673843.2019.1590851

Kemp, S. (2020, January 30). Digital 2020: Global digital overview. DataReportal – Global Digital Insights. https://datareportal.com/reports/digital-2020-global-digital-overview

Kennedy, H., Elgesem, D., & Miguel, C. (2017). On fairness: User perspectives on social media data mining. *Convergence, 23*(3), 270–288. https://doi.org/10.1177/1354856515592507

Khan, M. L. (2017). Social media engagement: What motivates user participation and consumption on YouTube? *Computers in Human Behavior, 66*, 236–247. https://doi.org/10.1016/j.chb.2016.09.024

Khang, H., Han, E.-K., & Ki, E.-J. (2014). Exploring influential social cognitive determinants of social media use. *Computers in Human Behavior, 36*, 48–55.

Kietzmann, J. H., Hermkens, K., McCarthy, I. P., & Silvestre, B. S. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business Horizons, 54*(3), 241–251.

Kim, A. J., & Johnson, K. K. (2016). Power of consumers using social media: Examining the influences of brand-related user-generated content on Facebook. *Computers in Human Behavior, 58*, 98–108.

Kim, B. (2011). Understanding antecedents of continuance intention in social-networking services. *Cyberpsychology, Behavior, and Social Networking, 14*(4), 199–205.

Kim, H., Suh, K.-S., & Lee, U.-K. (2013). Effects of collaborative online shopping on shopping experience through social and relational perspectives. *Information & Management, 50*(4), 169–180. https://doi.org/10.1016/j.im.2013.02.003

Kim, Jooho, & Hastak, M. (2018). Social network analysis: Characteristics of online social networks after a disaster. *International Journal of Information Management, 38*(1), 86–96.

Kim, Junghyun, & Lee, J.-E. R. (2011). The Facebook paths to happiness: Effects of the number of Facebook friends and self-presentation on subjective well-being. *CyberPsychology, Behavior, and Social Networking, 14*(6), 359–364.

Kim, K. J., Park, E., & Sundar, S. S. (2013). Caregiving role in human–robot interaction: A study of the mediating effects of perceived benefit and social presence. *Computers in Human Behavior, 29*(4), 1799–1806.

Kim, W. G., Lee, C., & Hiemstra, S. J. (2004). Effects of an online virtual community on customer loyalty and travel product purchases. *Tourism Management, 25*(3), 343–355.

Kim, Won. (2014). Scan and click: The uses and gratifications of social recommendation systems. *Computers in Human Behavior, 33*, 184–191.

Kim, Y., Sohn, D., & Choi, S. M. (2011). Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Computers in Human Behavior, 27*(1), 365–372.

King, D. L., Haagsma, M. C., Delfabbro, P. H., Gradisar, M., & Griffiths, M. D. (2013). Toward a consensus definition of pathological video-gaming: A systematic review of psychometric assessment tools. *Clinical Psychology Review, 33*(3), 331–342. https://doi.org/10.1016/j.cpr.2013.01.002

King, G., Schneer, B., & White, A. (2017). How the news media activate public expression and influence national agendas. *Science, 358*(6364), 776–780. https://doi.org/10.1126/science.aao1100

Klare, G. R. (1963). *Measurement of readability*. Ann Arbor, MI: UMI Research Press.

Köbler, F., Riedl, C., Vetter, C., Leimeister, J. M., & Krcmar, H. (2010). Social connectedness on Facebook: An explorative study on status message usage. In *Proceedings of 16th Americas Conference on Information Systems*.

Koc, M., & Gulyagci, S. (2013). Facebook addiction among Turkish college students: The role of psychological health, demographic, and usage characteristics. *Cyberpsychology, Behavior, and Social Networking, 16*(4), 279–284.

Koohang, A. (2017). Social media sites privacy concerns: Empirical validation of an instrument. *Online Journal of Applied Knowledge Management, 5*(1), 14–26. https://doi.org/10.36965/OJAKM.2017.5(1)14-26

Koohang, A., Paliszkiewicz, J., & Goluchowski, J. (2018). Social media privacy concerns: Trusting beliefs and risk beliefs. *Industrial Management & Data Systems, 118*(6), 1209–1228. https://doi.org/10.1108/IMDS-12-2017-0558

Koroleva, K., Krasnova, H., & Günther, O. (2010). 'Stop spamming me!': Exploring information overload on Facebook. In *AMCIS*.

Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research, 13*(2), 205–223.

Kramer, A. D., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences, 111*(24), 8788–8790.

Krämer, N. C., Winter, S., Benninghoff, B., & Gallus, C. (2015). How "social" is Social TV? The influence of social motives and expected outcomes on the usage of Social TV applications. *Computers in Human Behavior, 51*, 255–262. https://doi.org/10.1016/j.chb.2015.05.005

Krasnova, H., Spiekermann, S., Koroleva, K., & Hildebrand, T. (2010). Online social networks: Why we disclose. *Journal of Information Technology, 25*(2), 109–125.

Krasnova, H., Wenninger, H., Widjaja, T., & Buxmann, P. (2013). Envy on Facebook: A hidden threat to users' life satisfaction? Paper presented at International Conference on Wirtschaftsinformatik, Leipzig.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*(9), 1017.

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. *Biological Psychology, 84*(3), 394–421.

Kreijns, K., Bijker, M., & Weidlich, J. (2020). A Rasch analysis approach to the development and validation of a social presence measure. In *Rasch Measurement* (pp. 197–221). Cham: Springer.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior, 19*(3), 335–353. https://doi.org/10.1016/S0747-5632(02)00057-2

Kreijns, K., Kirschner, P. A., & Vermeulen, M. (2013). Social aspects of CSCL environments: A research framework. *Educational Psychologist, 48*(4), 229–242. https://doi.org/10.1080/00461520.2012.750225

Kuan, K. K., Zhong, Y., & Chau, P. Y. (2014). Informational and normative social influence in group-buying: Evidence from self-reported and EEG data. *Journal of Management Information Systems, 30*(4), 151–178.

Kuss, D. J., Shorter, G. W., van Rooij, A. J., Griffiths, M. D., & Schoenmakers, T. M. (2014). Assessing internet addiction using the parsimonious internet addiction components model: A preliminary study. *International Journal of Mental Health and Addiction, 12*(3), 351–366.

Kwak, H., Lee, C., Park, H., & Moon, S. (2010). What is Twitter, a social network or a news media? In *Proceedings of the 19th International Conference on World Wide Web* (pp. 591–600).

Lahuerta-Otero, E., & Cordero-Gutiérrez, R. (2016). Looking for the perfect tweet: The use of data mining techniques to find influencers on Twitter. *Computers in Human Behavior, 64*, 575–583. https://doi.org/10.1016/j.chb.2016.07.035

Lampe, C., Ellison, N., & Steinfield, C. (2006). A Face (book) in the crowd: Social searching vs. social browsing. In *Proceedings of the 2006 20th Anniversary Conference on Computer Supported Cooperative Work* (pp. 167–170).

Lariscy, R. W. (2009). Monitoring public opinion in cyberspace: How corporate public relations is facing the challenge. *Public Relations Journal, 3*(4), 17.

Larson, R., & Csikszentmihalyi, M. (1983). The experience sampling method. In H. T. Reis (Ed.), *Naturalistic approaches to studying social interaction: New directions of methodology in social and behavioral science* (pp. 1–15). San Francisco: Jossey-Bass.

Lawler, J. P., & Molluzzo, J. C. (2010). A study of the perceptions of students on privacy and security on social networking sites (SNS) on the internet. *Journal of Information Systems Applied Research, 3*(12), 3–18.

Ledbetter, A. M., Mazer, J. P., DeGroot, J. M., Meyer, K. R., Mao, Y., & Swafford, B. (2011). Attitudes toward online social connection and self-disclosure as predictors of Facebook communication and relational closeness. *Communication Research, 38*(1), 27–53.

Lee, C., Shin, J., & Hong, A. (2018). Does social media use really make people politically polarized? Direct and indirect effects of social media use on political polarization in South Korea. *Telematics and Informatics, 35*(1), 245–254. https://doi.org/10.1016/j.tele.2017.11.005

Lee, D., Hosanagar, K., & Nair, H. S. (2018). Advertising content and consumer engagement on social media: Evidence from Facebook. *Management Science, 64*(11), 5105–5131.

Lee, D. Y., & Lehto, M. R. (2013). User acceptance of YouTube for procedural learning: An extension of the Technology Acceptance Model. *Computers & Education, 61*, 193–208.

Lee, E.-J., & Jang, Y. J. (2010). What do others' reactions to news on internet portal sites tell us? Effects of presentation format and readers' need for cognition on reality perception. *Communication Research, 37*(6), 825–846.

Lee, E.-J., & Shin, S. Y. (2014). When the medium is the message: How transportability moderates the effects of politicians' Twitter communication. *Communication Research, 41*(8), 1088–1110.

Lee, H., & Park, H. (2013). Testing the impact of message interactivity on relationship management and organizational reputation. *Journal of Public Relations Research, 25*(2), 188–206. https://doi.org/10.1080/1062726X.2013.739103

Lee, K. M. (2004). Presence, explicated. *Communication Theory, 14*(1), 27–50. https://doi.org/10.1111/j.1468-2885.2004.tb00302.x

Lee, K. M., Jung, Y., Kim, J., & Kim, S. R. (2006). Are physically embodied social agents better than disembodied social agents?: The effects of physical embodiment, tactile interaction, and people's loneliness in human–robot interaction. *International Journal of Human-Computer Studies, 64*(10), 962–973.

Lee, R. M., Draper, M., & Lee, S. (2001). Social connectedness, dysfunctional interpersonal behaviors, and psychological distress: Testing a mediator model. *Journal of Counseling Psychology, 48*(3), 310.

Lee, R. M., & Robbins, S. B. (1995). Measuring belongingness: The social connectedness and the social assurance scales. *Journal of Counseling Psychology, 42*(2), 232.

Lee, S. Y. (2014). How do people compare themselves with others on social network sites?: The case of Facebook. *Computers in Human Behavior, 32*, 253–260. https://doi.org/10.1016/j.chb.2013.12.009

Lee, S. Y., & Jang, K. (2019). Antecedents of impression management motivations on social network sites and their link to social anxiety. *Media Psychology, 22*(6), 890–904. https://doi.org/10.1080/15213269.2019.1580588

Lee, W., Xiong, L., & Hu, C. (2012). The effect of Facebook users' arousal and valence on intention to go to the festival: Applying an extension of the technology acceptance model. *International Journal of Hospitality Management, 31*(3), 819–827.

Lee, Y., & Chen, A. N. (2011). Usability design and psychological ownership of a virtual world. *Journal of Management Information Systems, 28*(3), 269–308.

Leung, L. (2013). Generational differences in content generation in social media: The roles of the gratifications sought and of narcissism. *Computers in Human Behavior, 29*(3), 997–1006.

Lewis, N. (2020). Experiences of upward social comparison in entertainment contexts: Emotions, state self-esteem, and enjoyment. *The Social Science Journal,* 1–16.

Lim, M., & Yang, Y. (2015). Effects of users' envy and shame on social comparison that occurs on social network services. *Computers in Human Behavior, 51*, 300–311. https://doi.org/10.1016/j.chb.2015.05.013

Lin, H.-F. (2009). Examination of cognitive absorption influencing the intention to use a virtual community. *Behaviour & Information Technology, 28*(5), 421–431.

Ling, Y., Nefs, H. T., Brinkman, W.-P., Qu, C., & Heynderickx, I. (2013). The relationship between individual characteristics and experienced presence. *Computers in Human Behavior, 29*(4), 1519–1530.

Liu, C., & Ma, J. (2018). Social media addiction and burnout: The mediating roles of envy and social media use anxiety. *Current Psychology*. https://doi.org/10.1007/s12144-018-9998-0

Liu, Xiaodan, Min, Q., Wu, D., & Liu, Z. (2019). How does social network diversity affect users' lurking intention toward social network services? A role perspective. *Information & Management,* 103258. https://doi.org/10.1016/j.im.2019.103258

Liu, Xun. (2010). Empirical testing of a theoretical extension of the technology acceptance model: An exploratory study of educational wikis. *Communication Education, 59*(1), 52–69.

Liu, Yang, & Wu, Y.-F. B. (2018). Early detection of fake news on social media through propagation path classification with recurrent and convolutional networks. *Thirty-Second AAAI Conference on Artificial Intelligence*.

Liu, Ying, Jin, J., Ji, P., Harding, J. A., & Fung, R. Y. K. (2013). Identifying helpful online reviews: A product designer's perspective. *Computer-Aided Design, 45*(2), 180–194. https://doi.org/10.1016/j.cad.2012.07.008

Liu, Yuping, & Shrum, L. J. (2002). What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness. *Journal of Advertising, 31*(4), 53–64. https://doi.org/10.1080/00913367.2002.10673685

Lorenzo-Romero, C., Constantinides, E., & Alarcón-del-Amo, M. (2011). Consumer adoption of social networking sites: Implications for theory and practice. *Journal of Research in Interactive Marketing, 5*(2/3), 170–188.

Lorenzo-Romero, C., Constantinides, E., & Brünink, L. A. (2014). Co-creation: Customer integration in social media based product and service development. *Procedia - Social and Behavioral Sciences, 148*, 383–396. https://doi.org/10.1016/j.sbspro.2014.07.057

Lou, L. L., Yan, Z., Nickerson, A., & McMorris, R. (2012). An examination of the reciprocal relationship of loneliness and Facebook use among first-year college students. *Journal of Educational Computing Research, 46*(1), 105–117.

Lu, H.-P., Lin, J. C.-C., Hsiao, K.-L., & Cheng, L.-T. (2010). Information sharing behaviour on blogs in Taiwan: Effects of interactivities and gender differences. *Journal of Information Science, 36*(3), 401–416.

Lyson, H. C., Le, G. M., Zhang, J., Rivadeneira, N., Lyles, C., Radcliffe, K., Pasick, R. J., Sawaya, G., Sarkar, U., & Centola, D. (2019). Social media as a tool to promote health awareness: results from an online cervical cancer prevention study. *Journal of Cancer Education, 34*(4), 819–822. https://doi.org/10.1007/s13187-018-1379-8

Ma, W. W., & Chan, A. (2014). Knowledge sharing and social media: Altruism, perceived online attachment motivation, and perceived online relationship commitment. *Computers in Human Behavior, 39*, 51–58.

Ma, X., Hancock, J., & Naaman, M. (2016). Anonymity, intimacy and self-disclosure in social media. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 3857–3869).

Magen, H. (2017). The relations between executive functions, media multitasking and polychronicity. *Computers in Human Behavior, 67*, 1–9.

Mahatanankoon, P. (2007). The effects of personality traits and optimum stimulation level on text-messaging activities and M-commerce intention. *International Journal of Electronic Commerce, 12*(1), 7–30.

Majchrzak, A., Faraj, S., Kane, G. C., & Azad, B. (2013). The contradictory influence of social media affordances on online communal knowledge sharing. *Journal of Computer-Mediated Communication, 19*(1), 38–55.

Manago, A. M., Taylor, T., & Greenfield, P. M. (2012). Me and my 400 friends: The anatomy of college students' Facebook networks, their communication patterns, and well-being. *Developmental Psychology, 48*(2), 369.

Mariotti, F., & Delbridge, R. (2012). Overcoming network overload and redundancy in interorganizational networks: the roles of potential and latent ties. *Organization Science, 23*(2), 511–528. https://doi.org/10.1287/orsc.1100.0634

Markus, M. L. (1987). Toward a "critical mass" theory of interactive media: Universal access, interdependence and diffusion. *Communication Research, 14*(5), 491–511.

Marwick, A., & boyd, d. (2011). To see and be seen: Celebrity practice on Twitter: *Convergence*. https://doi.org/10.1177/1354856510394539

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370.

Massimini, F., Csikszentmihalyi, M., & Carli, M. (1987). The monitoring of optimal experience: A tool for psychiatric rehabilitation. *Journal of Nervous and Mental Disease.*

Matthes, J., Knoll, J., & von Sikorski, C. (2018). The "spiral of silence" revisited: a meta-analysis on the relationship between perceptions of opinion support and political opinion expression. *Communication Research, 45*(1), 3–33. https://doi.org/10.1177/0093650217745429

Mauri, M., Cipresso, P., Balgera, A., Villamira, M., & Riva, G. (2011). Why is Facebook so successful? Psychophysiological measures describe a core flow state while using Facebook. *Cyberpsychology, Behavior, and Social Networking, 14*(12), 723–731.

Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition & Emotion, 23*(2), 209–237. https://doi.org/10.1080/02699930802204677

May, K. E., & Elder, A. D. (2018). Efficient, helpful, or distracting? A literature review of media multitasking in relation to academic performance. *International Journal of Educational Technology in Higher Education, 15*(1), 13. https://doi.org/10.1186/s41239-018-0096-z

McCay-Peet, L., & Quan-Haase, A. (2018). What is social media and what questions can social media research help us answer? In *The SAGE handbook of social media research methods* (pp. 13–26). Thousand Oaks, CA: SAGE Publications.

McClelland, D. C. (1987). *Human motivation*. Cambridge: CUP Archive.

McCord, B., Rodebaugh, T. L., & Levinson, C. A. (2014). Facebook: Social uses and anxiety. *Computers in Human Behavior, 34*, 23–27. https://doi.org/10.1016/j.chb.2014.01.020

McElroy, J. C., Hendrickson, A. R., Townsend, A. M., & DeMarie, S. M. (2007). Dispositional factors in internet use: Personality versus cognitive style. *MIS Quarterly,* 809–820.

McIlroy, S., Ali, N., Khalid, H., & E. Hassan, A. (2016). Analyzing and automatically labelling the types of user issues that are raised in mobile app reviews. *Empirical Software Engineering, 21*(3), 1067–1106. https://doi.org/10.1007/s10664-015-9375-7

McMillan, S. J., & Hwang, J.-S. (2002). Measures of perceived interactivity: An exploration of the role of direction of communication, user control, and time in shaping perceptions of interactivity. *Journal of Advertising, 31*(3), 29–42.

McQuail, D., Blumler, J. G., & Brown, J. R. (1972). The television audience: A revised perspective. In *Sociology of mass communications* (pp. 135–165). Harmondsworth: Penguin.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. Cambridge, MA: MIT Press.

Men, L. R., & Tsai, W.-H. S. (2012). How companies cultivate relationships with publics on social network sites: Evidence from China and the United States. *Public Relations Review, 38*(5), 723–730. https://doi.org/10.1016/j.pubrev.2011.10.006

Mendoza, M., Poblete, B., & Castillo, C. (2010). Twitter under crisis: Can we trust what we RT? In *Proceedings of the First Workshop on Social Media Analytics* (pp. 71–79).

Menon, R. G. V., Sigurdsson, V., Larsen, N. M., Fagerstrøm, A., Sørensen, H., Marteinsdottir, H. G., & Foxall, G. R. (2019). How to grow brand post engagement on Facebook and Twitter for airlines? An empirical investigation of design and content factors. *Journal of Air Transport Management, 79*, 101678. https://doi.org/10.1016/j.jairtraman.2019.05.002

Mesch, G. S., & Beker, G. (2010). Are norms of disclosure of online and offline personal information associated with the disclosure of personal information online? *Human Communication Research, 36*(4), 570–592.

Metzger, M. J., Flanagin, A. J., & Medders, R. B. (2010). Social and heuristic approaches to credibility evaluation online. *Journal of Communication, 60*(3), 413–439.

Michikyan, M., Dennis, J., & Subrahmanyam, K. (2015). Can you guess who I am? Real, ideal, and false self-presentation on Facebook among emerging adults. *Emerging Adulthood, 3*(1), 55–64.

Moneta, G. B., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality, 64*(2), 275–310.

Monica, P. R. L. (2018, March 27). Facebook has lost $80 billion in market value since its data scandal. CNNMoney. https://money.cnn.com/2018/03/27/news/companies/facebook-stock-zuckerberg/index.html

Moon, Y. J., Kim, W. G., & Armstrong, D. J. (2014). Exploring neuroticism and extraversion in flow and user generated content consumption. *Information & Management, 51*(3), 347–358.

Moore, K., & McElroy, J. C. (2012). The influence of personality on Facebook usage, wall postings, and regret. *Computers in Human Behavior, 28*(1), 267–274.

Moqbel, M., & Kock, N. (2018). Unveiling the dark side of social networking sites: Personal and work-related consequences of social networking site addiction. *Information & Management, 55*(1), 109–119.

Moreau, C. P., Lehmann, D. R., & Markman, A. B. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research, 38*(1), 14–29.

Moro, S., Rita, P., & Vala, B. (2016). Predicting social media performance metrics and evaluation of the impact on brand building: A data mining approach. *Journal of Business Research, 69*(9), 3341–3351. https://doi.org/10.1016/j.jbusres.2016.02.010

Morris, M. R., Counts, S., Roseway, A., Hoff, A., & Schwarz, J. (2012). Tweeting is believing? Understanding microblog credibility perceptions. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work* (pp. 441–450).

Mozetič, I., Grčar, M., & Smailović, J. (2016). Multilingual Twitter sentiment classification: The role of human annotators. *PLoS ONE, 11*(5). https://doi.org/10.1371/journal.pone.0155036

Murphy, K., McLauchlan, S., & Lee, M. (2017). Is there a link between media-multitasking and the executive functions of filtering and response inhibition? *Computers in Human Behavior, 75*, 667–677. https://doi.org/10.1016/j.chb.2017.06.001

Nakamura, J., & Csikszentmihalyi, M. (2009). Flow theory and research. In C.R/ Snyder (Ed.), *Handbook of positive psychology* (pp. 195–206). New York: Oxford University Press.

Nardi, B. A., Whittaker, S., & Bradner, E. (2000). Interaction and outeraction: Instant messaging in action. In *Proceedings of the 2000 ACM Conference on Computer Supported Cooperative Work* (pp. 79–88).

Naslund, J. A., Aschbrenner, K. A., Marsch, L. A., & Bartels, S. J. (2016). The future of mental health care: Peer-to-peer support and social media. *Epidemiology and Psychiatric Sciences, 25*(2), 113–122. https://doi.org/10.1017/S2045796015001067

Nesi, J., Miller, A. B., & Prinstein, M. J. (2017). Adolescents' depressive symptoms and subsequent technology-based interpersonal behaviors: A multi-wave study. *Journal of Applied Developmental Psychology, 51*, 12–19. https://doi.org/10.1016/j.appdev.2017.02.002

Neubaum, G., & Krämer, N. C. (2017a). Monitoring the opinion of the crowd: Psychological mechanisms underlying public opinion perceptions on social media. *Media Psychology, 20*(3), 502–531.

Neubaum, G., & Krämer, N. C. (2017b). Opinion climates in social media: Blending mass and interpersonal communication. *Human Communication Research, 43*(4), 464–476. https://doi.org/10.1111/hcre.12118

Nguyen, A., & Vu, H. T. (2019). Testing popular news discourse on the "echo chamber" effect: Does political polarisation occur among those relying on social media as their primary politics news source? *First Monday, 24*(5).

Nie, N. H. (2001). Sociability, interpersonal relations, and the Internet: Reconciling conflicting findings. *American Behavioral Scientist, 45*(3), 420–435.

Nikkelen, S. W. C., Valkenburg, P. M., Huizinga, M., & Bushman, B. J. (2014). Media use and ADHD-related behaviors in children and adolescents: A meta-analysis. *Developmental Psychology, 50*(9), 2228–2241. https://doi.org/10.1037/a0037318

Nissenbaum, H. (2009). *Privacy in context: Technology, policy, and the integrity of social life*. Stanford, CA: Stanford University Press.

Noelle-Neumann, E. (1974). The spiral of silence a theory of public opinion. *Journal of Communication, 24*(2), 43–51.

Nonnecke, B., Andrews, D., & Preece, J. (2006). Non-public and public online community participation: Needs, attitudes and behavior. *Electronic Commerce Research, 6*(1), 7–20.

Norberg, P. A., Horne, D. R., & Horne, D. A. (2007). The privacy paradox: Personal information disclosure intentions versus behaviors. *Journal of Consumer Affairs, 41*(1), 100–126.

Norman, D. (1988). *The design of everyday things*. New York: Basic Books.

Novak, T. P., Hoffman, D. L., & Yung, Y.-F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science, 19*(1), 22–42.

Obar, J. A., & Oeldorf-Hirsch, A. (2020). The biggest lie on the Internet: Ignoring the privacy policies and terms of service policies of social networking services. *Information, Communication & Society, 23*(1), 128–147. https://doi.org/10.1080/1369118X.2018.1486870

Obar, J. A., & Wildman, S. (2015). Social media definition and the governance challenge: An introduction to the special issue. *Telecommunications Policy, 39*(9), 745–750. https://doi.org/10.1016/j.telpol.2015.07.014

Oberst, U., Wegmann, E., Stodt, B., Brand, M., & Chamarro, A. (2017). Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. *Journal of Adolescence, 55*, 51–60.

Oh, C. S., Bailenson, J. N., & Welch, G. F. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Frontiers in Robotics and AI, 5*, 114.

Oliver, M. B., & Bartsch, A. (2011). Appreciation of entertainment. *Journal of Media Psychology*, *89*.

Olshannikova, E., Olsson, T., Huhtamäki, J., Paasovaara, S., & Kärkkäinen, H. (2020, February 14). From chance to serendipity: Knowledge workers' experiences of serendipitous social encounters. *Advances in Human-Computer Interaction*, Hindawi. https://doi.org/10.1155/2020/1827107

Olsson, T., Huhtamäki, J., & Kärkkäinen, H. (2020). Directions for professional social matching systems. *Communications of the ACM, 63*(2), 60–69. https://doi.org/10.1145/3363825

Ooi, K.-B., Lee, V.-H., Hew, J.-J., & Lin, B. (2019). Mobile social cyberbullying: Why are keyboard warriors raging? *Journal of Computer Information Systems,* 1–12.

Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences, 106*(37), 15583–15587.

Oppenheim, C. (1997). Managers' use and handling of information. *International Journal of Information Management, 17*(4), 239–248. https://doi.org/10.1016/S0268-4012(97)00002-9

Orben, A. C., & Dunbar, R. I. M. (2017). Social media and relationship development: The effect of valence and intimacy of posts. *Computers in Human Behavior, 73*, 489–498. https://doi.org/10.1016/j.chb.2017.04.006

Ott, H. K., Vafeiadis, M., Kumble, S., & Waddell, T. F. (2016). Effect of message interactivity on product attitudes and purchase intentions. *Journal of Promotion Management, 22*(1), 89–106. https://doi.org/10.1080/10496491.2015.1107011

Özbek, V., Alnıaçık, Ü., Koc, F., Akkılıç, M. E., & Kaş, E. (2014). The impact of personality on technology acceptance: A study on smart phone users. *Procedia: Social and Behavioral Sciences, 150*.

Özgüven, N., & Mucan, B. (2013). The relationship between personality traits and social media use. *Social Behavior and Personality: An International Journal, 41*(3), 517–528. https://doi.org/10.2224/sbp.2013.41.3.517

Pacauskas, D., Rajala, R., Westerlund, M., & Mäntymäki, M. (2018). Harnessing user innovation for social media marketing: Case study of a crowdsourced hamburger. *International Journal of Information Management, 43*, 319–327. https://doi.org/10.1016/j.ijinfomgt.2018.08.012

Pai, P., & Arnott, D. C. (2013). User adoption of social networking sites: Eliciting uses and gratifications through a means–end approach. *Computers in Human Behavior, 29*(3), 1039–1053.

Pancer, E., Chandler, V., Poole, M., & Noseworthy, T. J. (2019). How readability shapes social media engagement. *Journal of Consumer Psychology, 29*(2), 262–270. https://doi.org/10.1002/jcpy.1073

Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. Harmondsworth: Penguin.

Park, J., Baek, Y. M., & Cha, M. (2014). Cross-cultural comparison of nonverbal cues in emoticons on Twitter: Evidence from Big Data analysis. *Journal of Communication, 64*(2), 333–354. https://doi.org/10.1111/jcom.12086

Park, N., Kee, K. F., & Valenzuela, S. (2009). Being immersed in social networking environment: Facebook groups, uses and gratifications, and social outcomes. *CyberPsychology & Behavior, 12*(6), 729–733. https://doi.org/10.1089/cpb.2009.0003

Partala, T. (2011). Psychological needs and virtual worlds: Case Second Life. *International Journal of Human-Computer Studies, 69*(12), 787–800.

Pearce, W. B., & Sharp, S. M. (1973). Self-disclosing communication. *Journal of Communication, 23*(4), 409–425.

Pei, P. (2019). 剑侠情缘专题分析报告 仗剑为侠情难已 江湖夜雨十年灯 《剑侠情缘》的前世今生. Sinolink Securities Co.,Ltd. (国金证券). http://pdf.dfcfw.com/pdf/H3_AP201905311333132976_1.pdf

Peifer, C., Schulz, A., Schächinger, H., Baumann, N., & Antoni, C. H. (2014). The relation of flow-experience and physiological arousal under stress: Can u shape it? *Journal of Experimental Social Psychology, 53*, 62–69.

Pelet, J.-É., Ettis, S., & Cowart, K. (2017). Optimal experience of flow enhanced by telepresence: Evidence from social media use. *Information & Management, 54*(1), 115–128.

Pelling, E. L., & White, K. M. (2009). The theory of planned behavior applied to young people's use of social networking web sites. *CyberPsychology & Behavior, 12*(6), 755–759.

Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology, 30*(3), 227–238.

Pennycook, G., Cannon, T. D., & Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. *Journal of Experimental Psychology. General, 147*(12), 1865–1880. https://doi.org/10.1037/xge0000465

Pentina, I., & Tarafdar, M. (2014). From "information" to "knowing": Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior, 35*, 211–223.

Perrin, A., Anderson, M., & Inquiries, D. M. (2019). Share of U.S. adults using social media, including Facebook, is mostly unchanged since 2018. Pew Research Center. https://www.pewresearch.org/fact-tank/2019/04/10/share-of-u-s-adults-using-social-media-including-facebook-is-mostly-unchanged-since-2018/

Petersen, J. M., Prichard, I., & Kemps, E. (2019). A comparison of physical activity mobile apps with and without existing web-based social networking platforms: Systematic review. *Journal of*

Medical Internet Research, 21(8), e12687. https://doi.org/10.2196/12687

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In *Communication and persuasion* (pp. 1–24). Berlin: Springer.

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research, 10*(2), 135–146.

Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. *Academy of Management Review, 26*(2), 298–310.

Pierce, J. L., Kostova, T., & Dirks, K. T. (2003). The state of psychological ownership: Integrating and extending a century of research. *Review of General Psychology, 7*(1), 84–107.

Piller, F., Vossen, A., & Ihl, C. (2012). From social media to social product development: The impact of social media on co-creation of innovation. *Die Unternehmung, 66*(1), 7–27. https://doi.org/10.5771/0042-059X-2012-1-7

Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior*, *62*, 155–167. https://doi.org/10.1016/j.chb.2016.03.084

Pope, Z., Lee, J. E., Zeng, N., Lee, H. Y., & Gao, Z. (2019). Feasibility of smartphone application and social media intervention on breast cancer survivors' health outcomes. *Translational Behavioral Medicine, 9*(1), 11–22. https://doi.org/10.1093/tbm/iby002

Pope, Z., Zeng, N., Zhang, R., Lee, H. Y., & Gao, Z. (2018). Effectiveness of combined smartwatch and social media intervention on breast cancer survivor health outcomes: A 10-week pilot randomized trial. *Journal of Clinical Medicine, 7*(6), 140. https://doi.org/10.3390/jcm7060140

Postmes, T., Spears, R., & Lea, M. (1998). Breaching or building social boundaries? SIDE-effects of computer-mediated communication. *Communication Research, 25*(6), 689–715.

Preece, J. (2001). Sociability and usability in online communities: Determining and measuring success. *Behaviour & Information Technology, 20*(5), 347–356.

Preece, J., Nonnecke, B., & Andrews, D. (2004). The top five reasons for lurking: Improving community experiences for everyone. *Computers in Human Behavior, 20*(2), 201–223.

Przepiorka, A., Błachnio, A., & Díaz-Morales, J. F. (2016). Problematic Facebook use and procrastination. *Computers in Human Behavior, 65*, 59–64. https://doi.org/10.1016/j.chb.2016.08.022

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior, 29*(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.

Qin, L., Kim, Y., Hsu, J., & Tan, X. (2011). The effects of social influence on user acceptance of online social networks. *International Journal of Human-Computer Interaction, 27*(9), 885–899.

Quan-Haase, A., & Young, A. L. (2010). Uses and gratifications of social media: A comparison of Facebook and instant messaging. *Bulletin of Science, Technology & Society, 30*(5), 350–361.

Quest Mobile. (2020). QuestMobile2020 移动互联网全景生态报告-行业研究报告-*QuestMobile*. https://www.questmobile.com.cn/research/report-new/111

Ra, C. K., Cho, J., Stone, M. D., Cerda, J. D. L., Goldenson, N. I., Moroney, E., Tung, I., Lee, S. S., & Leventhal, A. M. (2018). Association of digital media use with subsequent symptoms of Attention-Deficit/Hyperactivity Disorder among adolescents. *JAMA, 320*(3), 255–263. https://doi.org/10.1001/jama.2018.8931

Raacke, J., & Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *Cyberpsychology & Behavior, 11*(2), 169–174.

Radovic, A., Gmelin, T., Stein, B. D., & Miller, E. (2017). Depressed adolescents' positive and negative use of social media. *Journal of Adolescence, 55*, 5–15. https://doi.org/10.1016/j.adolescence.2016.12.002

Rafaeli, S. (1988). From new media to communication. *Sage Annual Review of Communication Research: Advancing Communication Science, 16*, 110–134.

Ramirez, Jr, A., & Burgoon, J. K. (2004). The effect of interactivity on initial interactions: The influence of information valence and modality and information richness on computer-mediated interaction. *Communication Monographs, 71*(4), 422–447. https://doi.org/10.1080/0363452042000307461

Rau, P.-L. P., Gao, Q., & Ding, Y. (2008). Relationship between the level of intimacy and lurking in online social network services. *Computers in Human Behavior, 24*(6), 2757–2770. https://doi.org/10.1016/j.chb.2008.04.001

Rauniar, R., Rawski, G., Yang, J., & Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: An empirical study on Facebook. *Journal of Enterprise Information Management*, *19*.

Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mößle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *Cyberpsychology, Behavior, and Social Networking, 13*(3), 269–277.

Reinecke, L., Vorderer, P., & Knop, K. (2014). Entertainment 2.0? The role of intrinsic and extrinsic need satisfaction for the enjoyment of Facebook use. *Journal of Communication, 64*(3), 417–438.

Rettie, R. (2003). Connectedness, awareness and social presence. In *Proceedings of 6th Annual International Workshop on Presence*.

Rice, R. E. (1987). Computer-mediated communication and organizational innovation. *Journal of Communication, 37*(4), 65–94.

Riedl, C., Köbler, F., Goswami, S., & Krcmar, H. (2013). Tweeting to feel connected: A model for social connectedness in online social networks. *International Journal of Human-Computer Interaction, 29*(10), 670–687.

Rimé, B. (2009). Emotion elicits the social sharing of emotion: Theory and empirical review. *Emotion Review, 1*(1), 60–85.

Rodríguez-Ardura, I., & Meseguer-Artola, A. (2019). Imagine, feel "there", and flow! Immersive experiences on m-Facebook, and their affective and behavioural effects. *Information Technology & People, 32*(4), 921–947. https://doi.org/10.1108/ITP-10-2017-0358

Rolls, K., Hansen, M., Jackson, D., & Elliott, D. (2016). How health care professionals use social media to create virtual communities: An integrative review. *Journal of Medical Internet Research, 18*(6), e166.

Ross, B., Pilz, L., Cabrera, B., Brachten, F., Neubaum, G., & Stieglitz, S. (2019). Are social bots a real threat? An agent-based model of the spiral of silence to analyse the impact of manipulative actors in social networks. *European Journal of Information Systems, 28*(4), 394–412. https://doi.org/10.1080/0960085X.2018.1560920

Ross, C., Orr, E. S., Sisic, M., Arseneault, J. M., Simmering, M. G., & Orr, R. R. (2009). Personality and motivations associated with Facebook use. *Computers in Human Behavior, 25*(2), 578–586.

Rubin, Z. (1975). Disclosing oneself to a stranger: Reciprocity and its limits. *Journal of Experimental Social Psychology, 11*(3), 233–260.

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology, 39*(3), 472.

Russell, J. A. (1979). Affective space is bipolar. *Journal of Personality and Social Psychology, 37*(3), 345.

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68.

Ryan, T., Allen, K. A., Gray, D. L., & McInerney, D. M. (2017). How social are social media? A review of online social behaviour and connectedness. *Journal of Relationships Research, 8*.

Ryan, T., Chester, A., Reece, J., & Xenos, S. (2014). The uses and abuses of Facebook: A review of Facebook addiction. *Journal of Behavioral Addictions, 3*(3), 133–148.

Ryan, T., & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior, 27*(5), 1658–1664.

Sabate, F., Berbegal-Mirabent, J., Cañabate, A., & Lebherz, P. R. (2014). Factors influencing popularity of branded content in Facebook fan pages. *European Management Journal, 32*(6), 1001–1011. https://doi.org/10.1016/j.emj.2014.05.001

Sánchez-Prieto, J. C., Olmos-Migueláñez, S., & García-Peñalvo, F. J. (2016). Informal tools in formal contexts: Development of a model to assess the acceptance of mobile technologies among teachers. *Computers in Human Behavior, 55*, 519–528.

Scanfeld, D., Scanfeld, V., & Larson, E. L. (2010). Dissemination of health information through social networks: Twitter and antibiotics. *American Journal of Infection Control, 38*(3), 182–188.

Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information, 44*(4), 695–729.

Schlenker, B. R., & Wowra, S. A. (2003). Carryover effects of feeling socially transparent or impenetrable on strategic self-presentation. *Journal of Personality and Social Psychology, 85*(5), 871–880. https://doi.org/10.1037/0022-3514.85.5.871

Schlosser, A. E. (2020). Self-disclosure versus self-presentation on social media. *Current Opinion in Psychology, 31*, 1–6. https://doi.org/10.1016/j.copsyc.2019.06.025

Schmidt, L. A., & Trainor, L. J. (2001). Frontal brain electrical activity (EEG) distinguishes valence and intensity of musical emotions. *Cognition & Emotion, 15*(4), 487–500.

Schmierbach, M., & Oeldorf-Hirsch, A. (2012). A little bird told me, so I didn't believe it: Twitter, credibility, and issue perceptions. *Communication Quarterly, 60*(3), 317–337.

Schreiner, M., Fischer, T., & Riedl, R. (2019). Impact of content characteristics and emotion on behavioral engagement in social media: Literature review and research agenda. *Electronic Commerce Research,* 1–17.

Schultze, U. (2010). Embodiment and presence in virtual worlds: A review. *Journal of Information Technology, 25*(4), 434–449.

Schumann, S., Klein, O., Douglas, K., & Hewstone, M. (2017). When is computer-mediated intergroup contact most promising? Examining the effect of out-group members' anonymity on prejudice. *Computers in Human Behavior, 77*, 198–210.

Schwarz, J., & Morris, M. (2011). Augmenting web pages and search results to support credibility assessment. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1245–1254).

Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences, 54*(3), 402–407.

Seidman, G. (2014). Expressing the "true self" on Facebook. *Computers in Human Behavior, 31*, 367–372.

Shao, G. (2009). Understanding the appeal of user-generated media: A uses and gratification perspective. *Internet Research, 19*(1), 7–25.

Shearer, E. (2018, December 10). Social media outpaces print newspapers in the U.S. as a news source. *Pew Research Center*. https://www.pewresearch.org/fact-tank/2018/12/10/social-media-outpaces-print-newspapers-in-the-u-s-as-a-news-source/

Sheldon, K. M., Abad, N., & Hinsch, C. (2011). A two-process view of Facebook use and relatedness need-satisfaction: Disconnection drives use, and connection rewards it. *Journal of Personality and Social Psychology, 100*(4), 766.

Sheldon, P. (2009). "I'll poke you. You'll poke me!" Self-disclosure, social attraction, predictability and trust as important predictors of Facebook relationships. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 3*(2).

Shen, G., Jia, J., Nie, L., Feng, F., Zhang, C., Hu, T., Chua, T.-S., & Zhu, W. (2017). Depression detection via harvesting social media: A multimodal dictionary learning solution. In *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence* (pp. 3838–3844). https://doi.org/10.24963/ijcai.2017/536

Shiau, W.-L., & Chau, P. Y. (2012). Understanding blog continuance: A model comparison approach. *Industrial Management & Data Systems.*

Shin, D.-H. (2013). Defining sociability and social presence in Social TV. *Computers in Human Behavior, 29*(3), 939–947.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Chichester: John Wiley & Sons.

Shu, K., Sliva, A., Wang, S., Tang, J., & Liu, H. (2017). Fake news detection on social media: A data mining perspective. *ACM SIGKDD Explorations Newsletter, 19*(1), 22–36.

Silic, M., & Back, A. (2017). Impact of gamification on user's knowledge-sharing practices: relationships between work motivation, performance expectancy and work engagement (SSRN Scholarly Paper ID 2932987). Social Science Research Network. https://papers.ssrn.com/abstract=2932987

Simula, H., Töllinen, A., & Karjaluoto, H. (2013). Crowdsourcing in the social media era: A case study of industrial marketers. *Journal of Marketing Development and Competitiveness, 7*(2). https://jyx.jyu.fi/handle/123456789/42415

Sinclair, T. J., & Grieve, R. (2017). Facebook as a source of social connectedness in older adults. *Computers in Human Behavior, 66*, 363–369.

Sledgianowski, D., & Kulviwat, S. (2009). Using social network sites: The effects of playfulness, critical mass and trust in a hedonic context. *Journal of Computer Information Systems, 49*(4), 74–83.

So, H.-J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, *51*(1), 318–336.

Song, S. Y., Cho, E., & Kim, Y.-K. (2017). Personality factors and flow affecting opinion leadership in social media. *Personality and Individual Differences, 114*, 16–23. https://doi.org/10.1016/j.paid.2017.03.058

Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. *Science, 333*(6043), 776–778.

Spottswood, E. L., Walther, J. B., Holmstrom, A. J., & Ellison, N. B. (2013). Person-centered emotional support and gender attributions in computer-mediated communication. *Human Communication Research, 39*(3), 295–316.

Stavrova, O., & Luhmann, M. (2016). Social connectedness as a source and consequence of meaning in life. *The Journal of Positive Psychology, 11*(5), 470–479.

Stepanikova, I., Nie, N. H., & He, X. (2010). Time on the Internet at home, loneliness, and life satisfaction: Evidence from panel time-diary data. *Computers in Human Behavior, 26*(3), 329–338.

Stieglitz, S., & Dang-Xuan, L. (2013). Emotions and information diffusion in social media—Sentiment of microblogs and sharing behavior. *Journal of Management Information Systems, 29*(4), 217–248.

Suh, A., & Wagner, C. (2017). How gamification of an enterprise collaboration system increases knowledge contribution: An affordance approach. *Journal of Knowledge Management, 21*(2), 416–431. https://doi.org/10.1108/JKM-10-2016-0429

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior, 7*(3), 321–326.

Sum, S., Mathews, R. M., Pourghasem, M., & Hughes, I. (2009). Internet use as a predictor of sense of community in older people. *CyberPsychology & Behavior, 12*(2), 235–239.

Šumak, B., Pušnik, M., Heričko, M., & Šorgo, A. (2017). Differences between prospective, existing, and former users of interactive whiteboards on external factors affecting their adoption, usage and abandonment. *Computers in Human Behavior, 72*, 733–756.

Sun, N., Rau, P. P.-L., & Ma, L. (2014). Understanding lurkers in online communities: A literature review. *Computers in Human Behavior, 38*, 110–117.

Sundar, S. S. (2012). Social psychology of interactivity in human-website interaction. In *Oxford handbook of internet psychology*. Oxford: Oxford University Press.

Sundar, S. S., Jia, H., Waddell, T. F., & Huang, Y. (2015). Toward a theory of interactive media effects (TIME): Four models for explaining how interface features affect user psychology. In *The handbook of the psychology of communication technology* (pp. 47–86). New York: John Wiley & Sons.

Sundar, S. S., & Marathe, S. S. (2010). Personalization versus customization: The importance of agency, privacy, and power usage. *Human Communication Research, 36*(3), 298–322.

Sundar, S. S., & Nass, C. (2001). Conceptualizing sources in online news. *Journal of Communication, 51*(1), 52–72.

Sunstein, C. R. (2006). *Infotopia: How many minds produce knowledge?* Oxford: Oxford University Press.

Svendsen, G. B., Johnsen, J.-A. K., Almas-Sørensen, L., & Vittersø, J. (2013). Personality and technology acceptance: The influence of personality factors on the core constructs of the Technology Acceptance Model. *Behaviour & Information Technology, 32*(4), 323–334.

Swacha, J. (2015). Gamification in knowledge management: Motivating for knowledge sharing. *Polish Journal of Management Studies, 12*(2). http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-20c0b308-53d5-4fd9-a6d1-27664a6cdc7e

Swani, K., Milne, G. R., Brown, B. P., Assaf, A. G., & Donthu, N. (2017). What messages to post? Evaluating the popularity of social media communications in business versus consumer markets. *Industrial Marketing Management, 62*, 77–87.

Tacchini, E., Ballarin, G., Della Vedova, M. L., Moret, S., & de Alfaro, L. (2017). Some like it hoax: Automated fake news detection in social networks. *ArXiv Preprint ArXiv:1704.07506*.

Tamborini, R., Bowman, N. D., Eden, A., Grizzard, M., & Organ, A. (2010). Defining media enjoyment as the satisfaction of intrinsic needs. *Journal of Communication, 60*(4), 758–777.

Tamir, D. I., Templeton, E. M., Ward, A. F., & Zaki, J. (2018). Media usage diminishes memory for experiences. *Journal of Experimental Social Psychology, 76*, 161–168. https://doi.org/10.1016/j.jesp.2018.01.006

Tan, E. S.-H. (2008). Entertainment is emotion: The functional architecture of the entertainment experience. *Media Psychology, 11*(1), 28–51. https://doi.org/10.1080/15213260701853161

Tan, S. J. (2002). Can consumers' scepticism be mitigated by claim objectivity and claim extremity? *Journal of Marketing Communications, 8*(1), 45–64. https://doi.org/10.1080/13527260210122097

Tandoc Jr, E. C., Ferrucci, P., & Duffy, M. (2015). Facebook use, envy, and depression among college students: Is Facebooking depressing? *Computers in Human Behavior, 43*, 139–146.

Tang, J.-H., Chen, M.-C., Yang, C.-Y., Chung, T.-Y., & Lee, Y.-A. (2016). Personality traits, interpersonal relationships, online social support, and Facebook addiction. *Telematics and Informatics, 33*(1), 102–108. https://doi.org/10.1016/j.tele.2015.06.003

Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007). The impact of technostress on role stress and productivity. *Journal of Management Information Systems, 24*(1), 301–328.

Taylor, R. E. (1999). A six-segment message strategy wheel. *Journal of Advertising Research, 39*(6), 7–7.

Tengstedt, M. Å., Fagerstrøm, A., & Mobekk, H. (2018). Health interventions and validity on social media: A literature review. *Procedia Computer Science, 138*, 169–176. https://doi.org/10.1016/j.procs.2018.10.024

Tian, Y., Bian, Y., Han, P., Wang, P., Gao, F., & Chen, Y. (2017). Physiological signal analysis for evaluating flow during playing of computer games of varying difficulty. *Frontiers in Psychology, 8*. https://doi.org/10.3389/fpsyg.2017.01121

TikTok. (2020). 2019 TikTok data report. 抖音数据报告). TikTok. https://index.toutiao.com/report/download/0b215aec3a1fd170e367c6ea3ce2954e.pdf

Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior, 26*(3), 277–287.

Tong, S. T., Van Der Heide, B., Langwell, L., & Walther, J. B. (2008). Too much of a good thing? The relationship between number of friends and interpersonal impressions on Facebook. *Journal of Computer-Mediated Communication, 13*(3), 531–549.

Tosun, L. P. (2012). Motives for Facebook use and expressing "true self" on the Internet. *Computers in Human Behavior, 28*(4), 1510–1517. https://doi.org/10.1016/j.chb.2012.03.018

Treem, J. W., & Leonardi, P. M. (2013). Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Annals of the International Communication Association, 36*(1), 143–189.

Trefzger, T. F., Baccarella, C. V., & Voigt, K. I. (2016). Antecedents of brand post popularity in Facebook: The influence of images, videos, and text. *Proceedings of the 15th International Marketing Trends Conference*, 1–8.

Trepte, S., Reinecke, L., & Juechems, K. (2012). The social side of gaming: How playing online computer games creates online and offline social support. *Computers in Human Behavior, 28*(3), 832–839. https://doi.org/10.1016/j.chb.2011.12.003

Tsai, Y.-Y., Chao, C.-M., Lin, H.-M., & Cheng, B.-W. (2018). Nursing staff intentions to continuously use a blended e-learning system from an integrative perspective. *Quality & Quantity, 52*(6), 2495–2513.

Tu, C.-H. (2002). The measurement of social presence in an online learning environment. *International Journal on E-Learning, 1*(2), 34–45.

Turel, O., & Serenko, A. (2012). The benefits and dangers of enjoyment with social networking websites. *European Journal of Information Systems, 21*(5), 512–528.

Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication, 14*(4), 875–901.

van Bel, D. T., Smolders, K., IJsselsteijn, W. A., & de Kort, Y. (2009). Social connectedness: Concept and measurement. *Intelligent Environments, 2*, 67–74.

van den Berg, P. E. W., Arentze, T. A., & Timmermans, H. J. P. (2012). New ICTs and social interaction: Modelling communication frequency and communication mode choice. *New Media & Society, 14*(6), 987–1003. https://doi.org/10.1177/1461444812437518

van den Eijnden, R. J. J. M., Lemmens, J. S., & Valkenburg, P. M. (2016). The Social Media Disorder Scale. *Computers in Human Behavior, 61*, 478–487. https://doi.org/10.1016/j.chb.2016.03.038

van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., & Valkenburg, P. M. (2015). The consequences of media multitasking for youth: A review. *Computers in Human Behavior, 53*, 204–215.

Van Deursen, A. J., Bolle, C. L., Hegner, S. M., & Kommers, P. A. (2015). Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in Human Behavior, 45*, 411–420.

van Mierlo, T. (2014). The 1% rule in four digital health social networks: An observational study. *Journal of Medical Internet Research, 16*(2), e33.

Vella, K., Johnson, D., Cheng, V. W. S., Davenport, T., Mitchell, J., Klarkowski, M., & Phillips, C. (2019). A sense of belonging: Pokemon GO and social connectedness. *Games and Culture, 14*(6), 583–603.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences, 27*(3), 451–481.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly,* 425–478.

Vlachos, A., & Riedel, S. (2014). Fact checking: Task definition and dataset construction. In *Proceedings of the ACL 2014 Workshop on Language Technologies and Computational Social Science* (pp. 18–22).

Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences, 86*, 249–256. https://doi.org/10.1016/j.paid.2015.06.026

Von Sikorski, C., & Hänelt, M. (2016). Scandal 2.0: How valenced reader comments affect recipients' perception of scandalized individuals and the journalistic quality of online news. *Journalism & Mass Communication Quarterly, 93*(3), 551–571.

Waheed, H., Anjum, M., Rehman, M., & Khawaja, A. (2017). Investigation of user behavior on social networking sites. *PloS ONE, 12*(2).

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research, 19*(1), 52–90.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*(1), 3–43.

Walther, J. B. (2010). Computer-mediated communication. In C. R. Berger, M. E. Roloff, & D. R. Ewoldsen (Eds.), *Handbook of communication science* (2nd ed., pp. 489–505). Thousand Oaks, CA: SAGE Publications.

Walther, J. B., Carr, C. T., Choi, S. S. W., DeAndrea, D. C., Kim, J., Tong, S. T., & Van Der Heide, B. (2010). Interaction of interpersonal, peer, and media influence sources online. In Z. Papacharissi (Ed.), *A networked self: Identity, community, and culture on social network sites* (vol. 17, pp. 17–38). New York: Routledge.

Walther, J. B., & Jang, J. (2012). Communication processes in participatory websites. *Journal of Computer-Mediated Communication, 18*(1), 2–15.

Walther, J. B., & Parks, M. R. (2002). Cues filtered out, cues filtered in: Computer-mediated communication and relationships. In M. L. Knapp & J. A. Daly (Eds.), *Handbook of interpersonal communication* (3rd ed., pp. 529–563). Thousand Oaks, CA: SAGE Publications.

Walther, J. B., Van der Heide, B., Kim, S.-Y., Westerman, D., & Tong, S. T. (2008). The role of friends' appearance and behavior on evaluations of individuals on Facebook: Are we known by the company we keep? *Human Communication Research, 34*(1), 28–49.

Wang, C., Lee, M. K. O., & Hua, Z. (2015). A theory of social media dependence: Evidence from microblog users. *Decision Support Systems, 69*, 40–49. https://doi.org/10.1016/j.dss.2014.11.002

Wang, N., & Sun, Y. (2016). Social influence or personal preference? Examining the determinants of usage intention across social media with different sociability. *Information Development, 32*(5), 1442–1456.

Wang, X., Zhang, C., Ji, Y., Sun, L., Wu, L., & Bao, Z. (2013). A depression detection model based on sentiment analysis in micro-blog social network. In J. Li, L. Cao, C. Wang, K. C. Tan, B. Liu, J. Pei, & V. S. Tseng (Eds.), *Trends and applications in knowledge discovery and data mining* (pp. 201–213). Cham: Springer. https://doi.org/10.1007/978-3-642-40319-4_18

Wathen, C. N., & Burkell, J. (2002). Believe it or not: Factors influencing credibility on the Web. *Journal of the American Society for Information Science and Technology, 53*(2), 134–144.

Watts, D. J. (2004). *Six degrees: The science of a connected age*. New York: WW Norton & Company.

Wei, F.-Y. F., Wang, Y. K., & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: Does text messaging during class influence cognitive learning? *Communication Education, 61*(3), 185–204. https://doi.org/10.1080/03634523.2012.672755

Weibel, D., Wissmath, B., & Mast, F. W. (2010). Immersion in mediated environments: The role of personality traits. *Cyberpsychology, Behavior, and Social Networking, 13*(3), 251–256.

Weidlich, J., & Bastiaens, T. J. (2017). Explaining social presence and the quality of online learning with the SIPS model. *Computers in Human Behavior, 72*, 479–487. https://doi.org/10.1016/j.chb.2017.03.016

Weidlich, J., & Bastiaens, T. J. (2019). Designing sociable online learning environments and enhancing social presence: An affordance enrichment approach. *Computers & Education, 142*, 103622.

Welch, V., Petkovic, J., Simeon, R., Presseau, J., Gagnon, D., Hossain, A., Pardo, J. P., Pottie, K., Rader, T., & Sokolovski, A. (2018). Interactive social media interventions for health behaviour change, health outcomes, and health equity in the adult population. *The Cochrane Database of Systematic Reviews, 2018*(2).

Westerman, D., Spence, P. R., & Van Der Heide, B. (2012). A social network as information: The effect of system generated reports of connectedness on credibility on Twitter. *Computers in Human Behavior, 28*(1), 199–206.

Whiting, A., & Williams, D. (2013). Why people use social media: A uses and gratifications approach. *Qualitative Market Research: An International Journal, 16*(4), 362–369. https://doi.org/10.1108/QMR-06-2013-0041

Whittaker, S. (2003). Theories and methods in mediated communication. In A. C. Graesser, M. A. Gernsbacher, & S. R. Goldman (Eds.), *Handbook of discourse processes*. Mahwah, NJ: Erlbaum.

Wiener, M., & Mehrabian, A. (1968). *Language within language: Immediacy, a channel in verbal communication*. Ardent Media.

Willems, R. A., Bolman, C. A. W., Lechner, L., Mesters, I., Gunn, K. M., Skrabal Ross, X., & Olver, I. (2020). Online interventions aimed at reducing psychological distress in cancer patients: Evidence update and suggestions for future directions. *Current Opinion in Supportive and Palliative Care, 14*(1), 27–39. https://doi.org/10.1097/SPC.0000000000000483

Williams, K. L., & Galliher, R. V. (2006). Predicting depression and self–esteem from social connectedness, support, and competence. *Journal of Social and Clinical Psychology, 25*(8), 855–874.

Wilson, J. M., Straus, S. G., & McEvily, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. *Organizational Behavior and Human Decision Processes, 99*(1), 16–33. https://doi.org/10.1016/j.obhdp.2005.08.001

Wilson, K., Fornasier, S., & White, K. M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, and Social Networking, 13*(2), 173–177.

Witmer, B. G., & Singer, M. J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence, 7*(3), 225–240.

Xiao, S., Wei, C.-P., & Dong, M. (2016). Crowd intelligence: Analyzing online product reviews for preference measurement. *Information & Management, 53*(2), 169–182. https://doi.org/10.1016/j.im.2015.09.010

Xue, Y., Dong, Y., Luo, M., Mo, D., Dong, W., Zhang, Z., & Liang, H. (2018). Investigating the impact of mobile SNS addiction on individual's self-rated health. *Internet Research, 28*(2), 278–292.

Yang, C., Hsu, Y.-C., & Tan, S. (2010). Predicting the determinants of users' intentions for using YouTube to share video: Moderating gender effects. *Cyberpsychology, Behavior, and Social Networking, 13*(2), 141–152.

Yang, D., Yao, Z., Seering, J., & Kraut, R. (2019). The channel matters: self-disclosure, reciprocity and social support in online cancer support groups. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1–15).

Yang, H.-L., & Lai, C.-Y. (2011). Understanding knowledge-sharing behaviour in Wikipedia. *Behaviour & Information Technology, 30*(1), 131–142. https://doi.org/10.1080/0144929X.2010.516019

Yee, N. (2006). Motivations for play in online games. *CyberPsychology & Behavior, 9*(6), 772–775.

Yee, N., Ducheneaut, N., Nelson, L., & Likarish, P. (2011). Introverted elves & conscientious gnomes: The expression of personality in world of warcraft. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 753–762).

Yoon, C., & Rolland, E. (2012). Knowledge-sharing in virtual communities: Familiarity, anonymity and self-determination theory. *Behaviour & Information Technology, 31*(11), 1133–1143.

Yoon, C., & Rolland, E. (2015). Understanding continuance use in social networking services. *Journal of Computer Information Systems, 55*(2), 1–8.

Yu, E., Jung, C., Kim, H., & Jung, J. (2018). Impact of viewer engagement on gift-giving in live video streaming. *Telematics and Informatics, 35*(5), 1450–1460. https://doi.org/10.1016/j.tele.2018.03.014

Yu, Y., Duan, W., & Cao, Q. (2013). The impact of social and conventional media on firm equity value: A sentiment analysis approach. *Decision Support Systems, 55*(4), 919–926. https://doi.org/10.1016/j.dss.2012.12.028

Zhang, H., Lu, Y., Wang, B., & Wu, S. (2015). The impacts of technological environments and co-creation experiences on customer participation. *Information & Management, 52*(4), 468–482. https://doi.org/10.1016/j.im.2015.01.008

Zhang, J., Brackbill, D., Yang, S., Becker, J., Herbert, N., & Centola, D. (2016). Support or competition? How online social networks increase physical activity: A randomized controlled trial. *Preventive Medicine Reports, 4*, 453–458. https://doi.org/10.1016/j.pmedr.2016.08.008

Zhang, X. M., & Zhu, F. (2011). Group size and incentives to contribute: A natural experiment at Chinese Wikipedia. *American Economic Review, 101*(4), 1601–15.

Zhao, M., & Xie, J. (2011). Effects of social and temporal distance on consumers' responses to peer recommendations. *Journal of Marketing Research, 48*(3), 486–496.

Zhao, Q., Chen, C.-D., & Wang, J.-L. (2016). The effects of psychological ownership and TAM on social media loyalty: An integrated model. *Telematics and Informatics, 33*(4), 959–972. https://doi.org/10.1016/j.tele.2016.02.007

Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. *Computers in Human Behavior, 24*(5), 1816–1836. https://doi.org/10.1016/j.chb.2008.02.012

Zheleva, E., & Getoor, L. (2009). To join or not to join: The illusion of privacy in social networks with mixed public and private user profiles. In *Proceedings of the 18th International Conference on World Wide Web - WWW '09*, 531. https://doi.org/10.1145/1526709.1526781

Zhong, Z.-J. (2011). The effects of collective MMORPG (Massively Multiplayer Online Role-Playing Games) play on gamers' online and offline social capital. *Computers in Human Behavior, 27*(6), 2352–2363.

Zhu, Y.-Q., & Chen, H.-G. (2015). Social media and human need satisfaction: Implications for social media marketing. *Business Horizons, 58*(3), 335–345. https://doi.org/10.1016/j.bushor.2015.01.006

Zolkepli, I. A., & Kamarulzaman, Y. (2015). Social media adoption: The role of media needs and innovation characteristics. *Computers in Human Behavior, 43*, 189–209. https://doi.org/10.1016/j.chb.2014.10.050

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Mahwah, NJ: Erlbaum.

Zuiderveen Borgesius, F. J., Trilling, D., Möller, J., Bodó, B., de Vreese, C. H., & Helberger, N. (2016). Should we worry about filter bubbles? *Internet Policy Review, 5*(1). https://doi.org/10.14763/2016.1.401