Positive and Negative Associations Between Adolescent Mental Health and Technology

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Research on the psychological implications of using and being exposed to social technologies is an emerging area of inquiry, given that digital communication is increasingly and intricately tied to adolescent daily behavior. Ninety-two percent of adolescents aged 13–17 go online daily [1]. Facebook, which is by far the most popular and well-researched social networking site [2], surpassed Google.com in March 2010 as the most visited site in the USA [3]. As of 2015, Facebook remains the most used social media site in adolescents aged 13–17 (71%), followed by Instagram (52%), Snapchat (41%), and Twitter (33%) [1]. Since the early years of mobile communication, adolescents have helped drive the mass adoption of mobile technologies in society [4] and remain the most active users today, relying on texting and voice mails to develop and maintain friendships and romantic relationships [5]. Eighty-eight percent of adolescents now own or have access to a mobile phone [6]. The current Generation M were born in the twenty-first century and do not remember a time without access to mobile devices or to the Internet [7]. A nationally representative study of video game play demonstrates that 97% of adolescents aged 12–17 play computer, web-based, or portable video games [6]. Gentile [8] found that youth aged 8–18 play video games on an average of 13.2 h per week.

To date, both problematic and beneficial implications of social technologies have been identified; however, the literature is heavily dominated by negative outcomes related to adolescents using social technologies too soon, too often, or inappropriately. For instance, adolescence researchers in social and developmental psychology have primarily examined the negative consequences (over 20 studies) of adolescent video game use such as addiction [9], aggression [10], and decreased empathy [11], while research on positive outcomes in adolescence alone is limited with just a few empirical studies [12, 13].

The early adolescent years between age 10 and 15 are marked by pubertal development, cognitive maturation, school transitions, social identity redefinitions, and the emergence of sexuality. This developmental period is one of increased vulnerability because many problems experienced in young adulthood begin in the early adolescent years [14]. At no other stage in development are people more susceptible to the influence of peers than in early adolescence [15]. Early adolescence is a particularly vulnerable age period due to the heightened awareness of peer status, approval, and rejection, and it is associated with a drop in self-esteem, weaker academic performance, and increased anxiety and competition with others [16]. During early adolescence,

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researchers have noted that there is a temporary increase in family conflict, particularly over issues of autonomy and control [17, 18]. Social media sites and mobile phones offer an opportunity for family members who are concerned or vigilant to become "friends" on the adolescent's profile page, where they can overtly (or covertly) monitor their adolescent's online behavior during the tumultuous early adolescent struggles with independence and peer approval.

A majority of adolescents use the Internet as a healthy venue for social interaction, online journaling, blogging, photography, and other pursuits [19]. Social technologies such as Facebook or mobile phones can facilitate an ability to define their peer community or "friendship network." Electronic interactions have been positively associated with emancipation from parental surveillance [20], adolescents' friendship quality, and feeling of closeness with friends [21–24]. Use of Facebook has been positively associated with building and maintaining social capital, particularly for at-risk young people, women of color [25], and those experiencing low self-esteem and life satisfaction [26].

On the other hand, due to young adolescents' limited capacity to self-regulate and susceptibility to peer pressure [27], potentially perilous online and social networking behaviors (e.g., lying about their age to gain access to certain sites) may increase as adolescents seek autonomy and separation from their familial networks [28–32]. Being susceptible to peer influences, adolescents are particularly vulnerable to the influence of what they see on social technologies [19, 26, 33, 34]. Risks include higher exposures to inappropriate sexual references or substance use [35–37], bullying [38], and psychosocial consequences such as anxiety, depression, and loneliness [39, 40], which may lead to higher likelihoods of substance abuse or unsafe sex [27]. In a national study of over 1500 students aged 10–15, 33% experienced online harassment in the past year, of which 9% were directly linked to a social media site [41]. Although not as frequent as in-person bullying, cyberbullying impacts on psychosocial health can be devastating. The negative impact of online victimization has been demon-strated to increase the number of detentions, suspensions, and truancy incidents as well as increases the likelihood of a student carrying a weapon to school in the past 30 days [41]. This is why it is critical to understand the online peer environments that adolescents experience as an avenue for parental consideration and clinical intervention.

In this chapter, we will provide an overview of both positive and negative psychological associations with adolescent use of social technologies, focusing mainly on interactive digital communication between peers, such as through social media and mobile use.

Hierarchy

Social Connectivity and Sense of Belonging

It is well established that a sense of social connection forms the basis for creating meaningful, enduring interpersonal bonds [42]. Humans have an innate psychological drive to belong to groups and participate in social interactions—the sense of belongingness is almost as compelling a need as food [43], particularly in the normative developmental trajectory between adolescence and adulthood. Research conducted over the past decade demonstrates that more frequent online communication is associated with higher quality friendships. For instance, Valkenburg and Peter [23] found significant associations among time spent online, time spent with friends in person, frequency of online chats with friends, friendship quality, and well-being. Reasons given for this link between online communication and social connectedness stems from the promotion of self-disclosure and feelings of belonging [24, 44]. Davis [44] conducted a qualitative study of 32 adolescents, which found that casual exchanges through texting, posting on social network sites, and instant messaging fostered a sense of belonging and a feeling of validation regardless of physical location or time of day. In terms of gender differences, Quinn and Oldmeadow [45] surveyed 443 early adolescents demonstrating that

sense of belonging was associated with social networking for boys but not for girls. The researchers argued that boys might find online spaces as safe rehearsal venues for caring relationships and to feel more connected. However, in another study, girls were found to be less lonely than boys following use of social media [46], suggesting that girls may benefit from being connected to others through social media differently than for boys.

Colwell and Kato [12] conducted a study with 12- and 13-year-old Japanese students demonstrating that the preference of playing video games over spending time with friends was unrelated to friendship quality. They concluded that preferring video games might be an emotional substitute for in-person friendships when they are alone, as opposed to a preference for social isolation. More cross-cultural comparative studies can examine whether the "emotional substitution" hypothesis of interactive video gaming carries over into different cultural contexts. Contrary to popular sentiment, Durkin and Barber [13] demonstrated that 16-year-old adolescent video game players had higher levels of family closeness, activity involvement, attachment to school, and positive mental health, regardless of gender, when compared to non-video game players. This demonstrates that video gaming is not as antisocial as many people assume, because a lot of gaming is interactive with live players that form new communities to belong to and new ways of achieving a flow and personal contentment [47].

Personal Contentment and Self-Esteem

In our Media and Identity Study, which collected online survey data from 747 adolescents in 47 US states aged 12–18, we examined relationships between personal contentment and social technologies. Four items were used to create the personal contentment mean for each participant using their self-report answers about how well they get along with their parents, how many friends they have, and how often they feel bored and sad. Our results showed Facebook habits

were significantly related to personal contentment. For example, as the number of Facebook friends increased, particularly friends they knew well on Facebook, so did personal contentment. Higher personal contentment was associated with more likelihood of texting and calling about having a bad day with peers, but we did not find any significant relationships between personal contentment and instant messaging, emailing, tweeting, or posting on Facebook. These findings demonstrate that even though social media is one forum to provide support in times of need, it does not preclude the use of other more traditional ways of connecting with people during difficult times.

Davis [48] collected survey data on over 2000 students aged 11 to 19, demonstrating that students who communicated online with their friends had higher friendship quality which was in turn associated with greater self-concept clarity, that is, a clear, well-defined sense of self across social situations. In one of the few experimental studies that induced social exclusion while using technology, adolescents and young adults were assigned to either a solitary game play versus playing games while instant messaging others. The ones who could instant message others during the task had higher self-esteem, perceptions of being valued, accepted, and respected [49] compared to those who could not communicate their thoughts with others.

The human need for affiliation and self-disclosure is highlighted in other forms of computer-mediated communication, such as blogging [50]. According to the 2015 Pew Research Center Teens, Social Media, and Technology overview [1], only 5% of boys use microblogging sites like Tumblr; however, 23% of girls aged 13–17 use Tumblr to curate and share their thoughts with a specified audience [1]. There is evidence suggesting that the motivation behind blogging for women is not just about self-expression but also about gaining influence in the blogosphere and forming connections with other people [50]. In a study examining MySpace bloggers and non-bloggers after 2 months' time, researchers demonstrated that compared to the control group, bloggers experienced higher levels

of social integration (e.g., sense of belonging to like-minded communities) and counting on others for assistance (e.g., reliable alliance) [51]. In a more recent experimental study of the psychological effects of blogging, researchers found that bloggers who had an open, active audience who could submit feedback had the most positive effect on participants' self-esteem, mental health, and social behaviors, particularly when writing about their social-emotional difficulties [52].

Emotional Expression/Control

Those with existing vulnerabilities (such as shy introverts) may use online communication, such as instant messaging to build their social skills, increase interpersonal contacts, improve fluency of conversations, and decrease loneliness [53]. Texting provides adolescents with a greater sense of control with their interactions in emotional situations [54]. Bonetti, Campbell, and Gilmore [55] collected data on 626 Australian adolescents aged 10–16 and found that lonely students were significantly more likely than non-lonely students to use online chat spaces to discuss private topics such as emotions, problems, or secrets they may be experiencing. Lonely students were also more likely to admit meeting new people online since face-to-face encounters are too uncomfortable. Online communication reduces anxiety-inducing stimuli such as making eye contact or having to respond instantaneously [56] and thus allows vulnerable adolescents, such as those with social anxieties or learning disabilities [57] to experience less loneliness and improve their well-being [58].

Identity Development

Social identity gratification [59, 60] proposes that individuals tend to seek out information and experiences that affirm their preexisting social identities. Adolescents use social media for this purpose—to establish and maintain positive self-images, to express their sexuality, individuality, and "self-branding" [61]. Social media can be a forum for developing, maintaining, and highlight-ing social identities, particularly for unique or stigmatized groups. Online spaces may offer safer spaces for young people to explore sensitive topics and their identity and sexuality [62]. For instance, Ceglarek and Ward [63] demonstrated that sexual minority youth who engage in lesbian, gay, bisexual, transgender, and/or queer (LGBTQ) online communities experience reduced levels of paranoia associated with their "coming out" and identity development. Gajaria and colleagues [61] revealed that Facebook support groups for adolescents with attention deficit hyperactivity disorder (ADHD) tended to portray those with ADHD in a flattering light; thus group membership was used as a form of self-branding to ward off social stigma. Dolev-Cohen and Barak [64] argue that repressing emotions through nondisclosure can have a negative impact upon well-being; thus online disclosure opportunities can benefit stigmatized groups and encourage them to connect with mental health resources [65]. For instance, individuals with severe mental illness can find a support network through YouTube, thereby reducing isolation, improving hope, sharing strategies for coping with day-to-day challenges, and learning from shared experiences of medication use [66, 67].

Negative Associations

Negative Self-Concept

Although a prior study of 134 participants found that MySpace bloggers and non-bloggers did not differ in terms of anxiety or depression levels [51], our correlational study of 747 adolescents found lower levels of personal contentment for those creating characters online and writing blogs—both of which require personal investment in generating an audience for self-disclosures. In a sense, adolescents can be considered brave to be able to reveal such hidden truths about themselves to a public audience; however, there are a number of studies that correlate blogging with low self-esteem [68, 69]. Perhaps low self-esteem coincides with the compulsive need to self-disclose. Further research is needed to unpack whether the platform of blogging is primarily a

forum for venting one's personal feeling and frustrations or if the act of blogging may negatively impact one's contentment or if the desire to blog in the first place is related to one's self-concept.

Alienation and Social Anxiety

Cyberostracism has been coined to describe the alienation that can occur in online social environments due to exclusion, rejection, or being ignored [70], a construct that is believed to be as hurtful as the equivalent in offline situations often threatening one's sense of belonging [71]. In a study comparing cyberostracism among 8–14-year-olds and adults playing an online interactive game of Cyberball where social inclusion or exclusion was manipulated, Abrams et al. [71] demonstrated that adolescents aged 13–14 were the most strongly affected by cyberostracism, suggesting that adolescents place more priority on inclusion by their peers compared to children and adults. Whereas online communication may help build networks and self-confidence for some, other individuals find that it exacerbates existing mental health concerns. When using technology for entertainment rather than communicative purposes, adolescents with poor friendship quality offline experienced heightened feelings of loneliness, isolation, and social anxiety [72]. Turkle [73] has warned of the dangers of adolescents who need to script a "flawless narrative" about their lives, echoing the sentiments of Bortree [74] who suggested that adolescents struggle to reconcile wanting to present their lives truthfully while wanting to impress others. Thus, there is a tension between being anxious about fitting in and belonging to an in-group versus being unnoticed and ignored altogether.

Body Dissatisfaction and Eating Disorders

It is estimated that approximately half of adolescent girls are unhappy with their bodies [75], and these feelings can begin as young as 6 years of age among individuals of various body shapes and cultural backgrounds [76, 77]. Despite the higher prevalence of women and girls to experience body dissatisfaction and disordered eating compared to male counterparts in the USA and Australia [78], in studies that examine the relation between social media sites and body image or disordered eating, there are no significant gender differences [79]. For instance, Facebook use was a predictor of body consciousness and greater body shame across gender [80], and both males and females are less satisfied with their bodies after being exposed to attractive Facebook profiles [81]. In a large study involving 1087 girls aged 13–15 years, Tiggemann and Slater [82] showed significant positive relationships among using social media sites, the number of friends in the online network, and body image concerns. Body dissatisfaction can lead to maladaptive consequences such as depression, anxiety, low self-esteem, and eating disorders [83–85].

Triggering of Emotions

The accumulation of digital data from adolescents' online communication in the form of posts, photos, and videos, termed as "digital dossier" by Palfrey and Gasser [7], may influence adolescents' evolving sense of self. This is particularly salient if review of these online archives could cause discomfort or reliving of charged experiences, whereas prior generations of adolescents had the benefit of fading memories that were not recorded online [84].

The term *Facebook depression* was coined by authors citing websites that argued for a relationship between depression and social media use [85–88, 105, 106]. Researchers have found statistically significant correlations between time spent on social media sites and scores on the Beck Depression Inventory; however, these findings do not support causation or directionality [89]. Other studies have found no association between social network use and depression, one of which used a rigorous design of real-time assessment of Internet use and a validated clinical screening instrument for depression [90].

Instant messaging was found to be associated with increased depression in one study [91]. Underwood's et al. [92] observational study of adolescent text messages revealed that adolescents who send texts with more negative content are more likely to suffer from self-reported internalizing and depressive symptoms. Similarly, texts with antisocial messages are strongly associated with self-reported, parent-reported, and teacher-reported antisocial behavior over time [93].

Although studies have shown that frequency of Facebook use bears no relation to depression, the *quality* of interactions on Facebook is key [94]. For instance, negative social interactions on Facebook are associated with greater levels of depressive symptoms, and positive interactions are associated with fewer depressive symptoms. In addition, if a young person is well-adjusted, he or she is more likely to experience enhanced feelings of connectedness on social media sites, whereas someone who is prone to depression will likely feel more disconnected [94]. More research is needed to determine the nature of the relationship between social technologies and triggering of intense emotions like depression [95].

Discussion and Implications

In this chapter, we provided an overview of positive and negative aspects of adolescents using social technologies that can bolster or hinder mental health depending on the intended use (solo entertainment vs. communication with others) as well as preexisting social and emotional conditions, such as quality of social networks offline and sense of self-worth. An important element of peers' online influence can be understood in the context of *social comparison processes*, the impetus to gain accurate self-evaluations [96, 97] which are major sources of influence on adolescent health attitudes, intentions, and behaviors [98]. Social technologies allow such social comparisons to take place. For instance, adolescents who are connected to each other online may learn through observation or vicarious experiences as they read about others' experiences, which can reduce (or intensify) feelings of isolation or provide role modeling to

increase socially supportive interactions. Prior research has shown that youth who engage in more social comparison tend to use Facebook more frequently, have poorer self-perceptions, lower self-esteem, and more negative affect [99]. Rumination has been proposed as a key component to the negative effects of social comparison, resulting in more depressive symptoms [100]. In addition, passive or "surveillance" uses of social networking sites (i.e., viewing of others' posts without commenting or not making it known that they are observing others' online activities) predicts social anxiety, brooding, and envy [101, 102].

Despite the fact that 95% of adolescents are now online, 81% of them are using social media sites [1], and 80% of adolescents sleep with their mobile phones [103], little is known about the long-term effects of social technologies on psychosocial and behavioral health outcomes in adolescence, particularly early adolescence (aged 10–15). In a review of mobile use and reducing risk of harm [104], the following factors were identified as critical: personality factors (sensation-seeking, low self-esteem, moral disengagement, psychological difficulties), social factors (peer norms, lack of parental engagement), and digital factors (digital skills, online practices, affordances of online sites). These factors might be critical as a checklist for counselors, social workers, and practitioners to assess when to be concerned about online behaviors and how to identify the behavioral markers that can flag an emerging problematic situation. For instance, with the knowledge that higher levels of digital fluency, more frequent social media use, and greater exposure to more social network sites that feature anonymity is more likely to lead to online risk, practitioners can ask both parents and adolescents about digital skill levels, frequency of use, and the types of sites they use, to obtain a broad assessment of potential online risk. When clinicians see an adolescent showing signs of distress, they could inquire about possible online as well as offline contexts, particularly any indication that mental well-being is diminished due to use or misuse of social technologies by the patient/client or an online peer. Additionally, clinicians should also

be aware of the adolescent's fear of losing phone or computer privileges, which can detract them from reporting harmful occurrences. The same devices can also be a source of private information or social support for the adolescent [104]. The age of digital devices that pervade our social interactions is here to stay; thus it would be of practical and clinical importance for clinicians and health practitioners to become more literate in social technologies that their adolescent populations use and to provide resources for parents, family members, educators, and adolescents to become media literate consumers who know when to pull the plug when mental health is at stake.

Case Study

Sixteen-year-old Dave presented for treatment with symptoms of depression and anhedonia, reportedly following a difficult season on his high school hockey team. According to Dave's mother, he recently became aware of a private group within his team Slack, which included disparaging comments about him and about his younger sister, who is developmentally delayed. Dave reported that he did not realize his teammates were teasing him about his tall skinny frame, nor did he know they were making inappropriate sexual comments about his sister. As a result, Dave reports quitting his hockey team and now finds himself bored and angry. His grades have dropped. He spends all of his time in his room, with the door shut, and is irritable toward family members.

In an initial meeting with Dave, the clinician begins by checking in about his family and social relationships, in order to evaluate the degree to which he is connected to his parents and peers. It quickly becomes clear that, while Dave felt close to his parents last year, he has drawn less engaged with them as he has become more and more reliant on digital communications with his peers. He now spends most of his time separate from family members, on his phone, or computer, where he is vulnerable to criticism and taunting by his peers. While Dave has no history of significant psychological difficulties, he reports that he has long been anxious about his school performance and feels pressure to be independent and successful. He admits that, when friends post about their grades, it makes him feel worried that he can't keep up academically and that he will never be able to go to a good enough college.

In working with Dave, the clinician utilizes behavioral activation strategies as well as a cognitive behavioral approach. Her first goal is to help him increase social activities with peers and family members, as a way to counter some of the negative effects of his difficult digital interactions with peers, decrease his reliance on digital communications, and address his isolation from family members. They plan two family dinners weekly and also schedule a fun activity for the family each weekend (e.g., a meal out, a baseball game). She similarly helps him to plan to meet friends one evening each weekend and also to see friends after school. The clinician also works on cognitive restructuring with Dave around media and technology, helping him to recognize that material that is posted is highly edited, and that it is likely that, when a peer posts a good grade, it is the highlight of an otherwise less stellar report card. The clinician likewise works with Dave to rethink the definition of success and the meaning of a "good" college. Finally, the clinician talks with Dave about the reality that adolescents are more likely to post negative comments than say them. She helps Dave to rank the types of negative comments he sees or hears from peers, from those that he can respond to with humor, such as those about his skinny frame, to those that are simply unacceptable, such as taunting comments about his sister. They plan ways that Dave can respond lightly to some comments and make clear that he will no longer be a friend to those who make unacceptable comments.

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