

1 Methodological and Conceptual Issues in Digital Media Research

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Decades of research on adolescence has demonstrated that contexts such as families, peer groups, schools, and neighborhoods play an important role in adolescent development (Petersen, 1993; Steinberg & Morris, 2001). To these well-accepted contextual influences, we should add media – both mass media (e.g., television, films, and music) as well as new digital media, which include the Internet (e.g., websites, online forums and communities, and video- and image- sharing platforms), communication applications/platforms (e.g., social media and messaging apps), and electronic games. Survey data suggest that digital media have become ubiquitous in young people’s lives (Anderson & Jiang, 2018; Rideout & Robb, 2019); of particular note is that a majority of US adolescents now have access to a computer or smartphone, with 95% reporting access to a smartphone and 45% reporting that they are online almost all the time (Anderson & Jiang, 2018).

Research to date suggests that adolescents primarily use digital media for information, communication, and entertainment, with peer interaction and communication becoming especially popular (Anderson & Jiang, 2018; Subrahmanyam & Greenfield, 2008; Valkenburg & Peter, 2011). In prior work, we have suggested that new digital worlds should be considered an important developmental context during adolescence (Subrahmanyam & Šmahel, 2011; Subrahmanyam et al., 2006). Not only are digital media an important social context, but they have also become instrumental in adolescents’ interactions with other key contexts such as friends and families. Relationships with friends and families are predictive of health and well-being during adolescence (Moore et al., 2018) and it is important to understand the impact of youths’ digital media use on their psychological well-being and mental health.¹ This handbook brings together the multidisciplinary scholarship on adolescent social media use and mental health, and critically evaluates the extant research to provide a blueprint for future research. In this introductory chapter, we first provide an overview of the definitions and terminology related to digital media and social media, an overview of adolescents’ digital media use at the time of this writing, and a brief historical account of the study of adolescents’ social media use. In the second part of the chapter, we describe some of the key methodological and conceptual issues pertaining to adolescent digital media use research.

Overview of Definitions and Terminology

When reviewing the literature on new digital media, one sees a confusing array of terminology and labels with little consistency in how the terms are used. Thus, it is important to begin by defining the terminology that will be used in this chapter and more *generally in this handbook*. At the most general level, the term mass media is used to refer to legacy media forms such as television, films, and music, where the communication is “one-to-many”; in other words, a media producer creates the content, which is then consumed by many people, often using specific hardware (e.g., television set, boombox, record player). In contrast to mass media are new media, also called interactive media, screen media, or digital media, the term used in the title of this book. Although there are many definitions of interactive media, we adopt the one proposed by England and Finney (2002) that states: “interactive media is the integration of digital media including combinations of electronic text, graphics, moving images, and sound, into a structured digital computerised environment that allows people to interact with the data for appropriate purposes” (p. 2). There are two key elements to note in this definition of interactive media – first is that the user interacts with the electronic data to construct and co-construct the content; second, the digital environment includes a variety of hardware components (e.g., computers, mobile devices, smartphones) and software platforms (operating systems, internet browsers, and specialized applications/apps).

The term digital media is a broad umbrella term for a variety of media forms including electronic/video games, online messaging, social media, and other digital communication applications/digital tools. Social media are the primary focus of this book and we adopt the definition put forth by Carr and Hayes (2015): “Social media are Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others” (p. 51). As clarified by Nesi, Prinstein, and Telzer (see the Introduction to this volume), “We define this to include social networking sites (e.g., Instagram, Snapchat, WeChat, and Facebook), messaging tools (e.g., text messaging and messaging apps), online forums and communities, video- and image-sharing platforms (e.g., YouTube and TikTok), and video games with a social component.” In this chapter, we use the terms social media and digital media interchangeably.

Overview of Adolescents’ Digital Media Use

Adolescent respondents to the 2019 Common Sense Census reported an average of 7 hours and 22 minutes of daily screen use that was not for school or homework; furthermore, they reported spending 39% of their screen

time watching TV/videos, 22% of their time on gaming, 16% on social media, and 8% browsing websites (Rideout & Robb, 2019). Among the adolescent respondents in the 2018 Pew report, YouTube (85%), Instagram (72%), and Snapchat (69%) were the most popular online platforms, and only 51% reported that they used Facebook (Anderson & Jiang, 2018). According to a 2021 Pew report, TikTok is gaining popularity among younger social media users – 55% of its users are between the ages of 18 and 24 (Auxier & Anderson, 2021). Overall, the survey data suggest that adolescents spend a considerable portion of their day with screen media.

History of the Study of Adolescents' Social Media Use

In this section, we present a brief historical account of the study of adolescents' use of digital media, including social media. The Internet as we know it has only been used widely by youth for about a decade and a half, and so it might seem strange to use a “historical lens” to describe research on it. Nonetheless, the lessons learned from examining the historical context and arc of the extant body of work can help researchers adapt to the changes in social media that are inevitable in the years to come. Research on youth digital media use has been conducted by scholars coming from a range of disciplinary traditions including psychology, communication studies, media studies, education, computer science, and human–computer interaction.

The disciplines of psychology and developmental psychology / developmental science were slow to recognize the growing importance of digital media in the lives of children and adolescents. Researchers who first worked in this area (Subrahmanyam & Manago, 2012) found it challenging to publish in mainstream journals in the field unless the papers were part of a special issue or a special collection (Greenfield et al., 2012; Greenfield & Yan, 2006; Michikyan & Suárez-Orozco, 2016; Subrahmanyam & Greenfield, 2008; Yan & Hardell, 2018). In fact, it was not until 2016 that the Society for Research in Child Development hosted its first special topics conference on the role of technology in child development. The constantly changing and fluid nature of the digital landscape presents unique methodological challenges to digital media researchers, and we address them in a later section. For ease of communication, we divide research on adolescents' social media use into three phases. The first phase of research focuses on the use of the Internet and on early online communication contexts such as text-based chat rooms, bulletin boards, and blogs. The second phase investigates the first generation of digital media platforms, which were referred to as “social networking sites” in the literature. The third phase encompasses research on the social media platforms/applications that are in vogue at the time of writing this chapter.

The First Phase: Research on Internet Use and Early Online Communication Contexts

The Internet became available to the public in 1991, and we see survey reports and journal articles on youths' internet use starting around the late 1990s and early 2000s (Finkelhor et al., 2000; Kraut et al., 1998; Roberts et al., 1999; Sanders et al., 2000; Stahl & Fritz, 2002; Subrahmanyam et al., 2001; Turow, 1999). Given the novelty of the Internet and that youth were among the early adopters of it, studies generally focused on two questions – what youth did online (Roberts et al., 1999; Turow, 1999) and how their internet use related to their safety and psychological well-being (Kraut et al., 1998; Sanders et al., 2000; Stahl & Fritz, 2002; Subrahmanyam et al., 2001). The majority of studies used self-report survey designs and showed that from the very beginning, youth who had access to the Internet used it for communication, with popular applications including email and chat rooms (Turow, 1999).

Each new media technology such as radio, film, and television has been greeted by concerns about its negative effects on youth (Wartella & Jennings, 2000; Wartella & Robb, 2009), and the Internet was no different. Early concerns centered on risky behaviors related to visiting problematic content (e.g., pornography), having contact with strangers, inappropriate/unsafe interactions (e.g., sexual solicitation, threatening or harassing contact) (e.g., Finkelhor et al., 2000; Stahl & Fritz, 2002), and psychological well-being (Kraut et al., 1998; Sanders et al., 2000). The latter concern stemmed from two related elements of youths' internet use at that time – first, computer-mediated interactions were text-based, and users were disembodied, so they did not have access to face-to-face cues such as gaze, gestures, emotional tone, and body language. Thus, online interactions were perceived to be lower in quality. Additionally, internet use was not very diffuse and so youths' online interactions mostly occurred with strangers and others from outside their offline social networks. Given these elements of youths' online interactions, the concern was that lower quality online interactions with strangers were displacing/replacing higher quality face-to-face interactions with friends and acquaintances; thus, early scholarship examined the implications of adolescents' internet use for social isolation, loneliness, and depression. A detailed description of this research is beyond the scope of this chapter, and the interested reader is referred to the papers above and a monograph on digital youth coauthored by the first author (Subrahmanyam & Šmahel, 2011).

This body of work suggested that the relation between internet use and psychological well-being was complex with contradictory results. For instance, the HomeNet study, a longitudinal field study conducted in Pittsburgh between 1995 and 1998 (Kraut et al., 1996, 1998) found that during the first two years of the study, increased time spent online was associated with declines in well-being (social involvement, loneliness, and depression). However, in the third year of the study, internet use was associated with smaller declines and even

reversals (i.e., improvements) in well-being (Subrahmanyam et al., 2001). The HomeNet study was unique in that a diverse sample of 93 families (208 adults and 110 children and adolescents) were given computers and internet access in 1995. They were then surveyed on several measures and their online activities were automatically recorded whenever they went online. The seminal study was conducted at a time when people had little exposure to technology, and thus the researchers were able to get a detailed picture of youths' online activities and well-being from their first exposure to this technology and for a short period of time thereafter. Despite the study's contradictory findings, the appeal of online settings for youth was clear – a 16-year-old HomeNet participant declared, "I really want to move to Antarctica – I'd want my cat and Internet access and I'd be happy." The HomeNet study was conducted in 1995 – not much seems to have changed in that regard since that time!

Other studies in the first phase of research were more qualitative and focused on obtaining a rich picture of what adolescents and emerging adults (college students) were doing online (Greenfield & Subrahmanyam, 2003; Turkle, 1995a). Recall that youth were among the early adopters of the most common communication venues of that era, including internet relay chat rooms, multiuser dungeons (MUDs), and the commercially available chat rooms hosted by AOL, Yahoo, and instant messaging (also hosted by AOL). These spaces were significantly different from the social media apps were available when this chapter was written. They were text-based, accessed via computers and low-speed internet, and users were disembodied and largely anonymous (Subrahmanyam & Šmahel, 2011).

Adult researchers were not using these venues, and thus were unfamiliar with the text-based language and code that digital media users were constructing and coconstructing within them; using qualitative methods from a variety of disciplines including ethnography, participant observation, and discourse analysis, these researchers provided a rich picture of the structure, content, modes of online communication, and youth subculture that was emerging within new online venues such as MUDs, chat rooms, blogs, bulletin boards, and webpages (Greenfield & Subrahmanyam, 2003; Huffaker & Calvert, 2005; Šmahel & Subrahmanyam, 2007; Subrahmanyam et al., 2004; Suzuki & Calzo, 2004). These studies provided a window into adolescents' emerging online lives and showed that youth used these spaces in the service of core developmental issues, including identity exploration, intimacy, health, and sexuality. Whereas youths' online lives were psychologically connected to their offline counterparts, they were not mirror images of each other. Given the features of new online environments such as anonymity, disembodiedness, and lack of face-to-face cues, youths' communication within them was often exaggerated and were observed with new intensities (Šmahel & Subrahmanyam, 2007; Subrahmanyam, 2007). For instance, within online chat rooms, there was one sexual comment per minute, and one obscene comment every two minutes (Subrahmanyam et al., 2006).

The Second and Third Phase: Research on Digital Communication Tools from Social Networking Sites to Social Media Apps

The next wave of online communication tools included the now defunct MySpace and Friendster, as well as Facebook. They were the first generation of social networking sites and were introduced in the early to mid-2000s. Social network sites were defined by boyd and Ellison (2007) as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system” (p. 211). For a detailed history of social networking sites, we refer the reader to boyd and Ellison’s 2007 article published in the special volume of the *Journal of Computer-Mediated Communication*, which was the first collection of research on social networking sites. Since then, there have been dramatic advances in hardware (e.g., smartphones and tablets), software, and internet access (e.g., high speed Wi-Fi), and the term “social media” has come to replace the term “social networking sites.” It is difficult to pinpoint who coined the term social media and when it began to be used in popular culture (Bercovici, 2010). As noted earlier, this handbook uses the term social media to refer to digital tools that can be used for social interaction and selective self-presentation.

Compared to the early text-based online communication tools, social networking sites and social media apps are multimodal and allow users to interact and communicate via text, images, audio, and video. They make it possible to have both private and public interactions, and they vary in the extent to which users are disembodied and anonymous (Subrahmanyam & Greenfield, 2008). As access to the Internet and mobile devices became widespread, users were also more likely to interact with people they knew from their offline lives. In contrast to the earlier generation of online venues, where youth primarily interacted with people they met online, research revealed that youth used social networking sites and then social media platforms/applications to interact and make plans with friends from their offline lives and to keep in touch with peers they were not able to meet in person (Pempek et al., 2009; Subrahmanyam et al., 2008). Social media platforms also allowed users to easily engage in self-expression and self-presentation via text and audiovisual content such as status updates, emojis, pictures and videos (Manago et al., 2008; Michikyan & Subrahmanyam, 2012).

As found in the first studies of online communication venues, youths’ offline and online social media lives were psychologically connected; online behaviors were again exaggerated, with youth reporting wider online networks (Manago et al., 2012). Given many adolescents’ 24/7 access to social media and, by extension, their immersion in elevated levels of peer interaction, self-disclosure, and self-presentation, research has examined the implications of social media use for the intrapersonal need for identity and the interpersonal

need for intimacy as well as for psychological well-being. The chapters of this handbook will give the reader a detailed picture of the theoretical and empirical scholarship related to adolescents' use of social media and their mental health. In the remaining part of this chapter, we draw on lessons learned from the extant research on youths' use of social media to identify methodological challenges and conceptual issues pertaining to adolescent digital media use research.

Methodological Challenges in Adolescent Digital Media Research

New online contexts presented many unique challenges to researchers when they burst on the scene and adolescents flocked to them. Researchers have now become adept with technology and are social media users themselves; in fact, within their ranks are those who are referred to as digital natives – or individuals who have grown up with technology their entire lives (Prensky, 2001). Here we examine some of the key methodological challenges confronting researchers who seek to investigate the implications of youths' digital media use. As before, we use a historical lens, as it helps to illustrate both the challenges that researchers faced and will continue to face.

Fluid Digital Media Landscape

The fluid nature of technology and rapid pace of change has always been an intrinsic element of the digital media landscape. During the first phase of digital media research, researchers not only had to contend with changes in hardware, but also in internet speed, software, and communication applications, and widening of users to include both strangers as well as friends and acquaintances. Additionally, there were constant shifts in the communication applications that were popular among adolescents at any given time, and changes in the features and elements within applications. MySpace, which was at one time a favored social networking site, was eventually supplanted by Facebook. There were also constant changes in elements of social media apps such as the top 8 list in MySpace or the Like button on Facebook. Rapid change in technology and rates of adoption also meant that there were changes in who was online. As noted earlier, initially youth mostly interacted online with strangers, including adults and peers who they did not know from their offline lives. Subsequently, as technology became more diffuse and widespread, more of their peers were online. Simultaneously there was an explosion in the popularity of more private and closed systems via social networking sites, within which people created profiles and chose who they interacted with and who could see the information they shared on their profiles. They were thus more likely to interact online with peers from their offline lives.

Perhaps the most challenging issue was how frequently changes occurred – there was often a lag between when a digital media platform emerged and gained popularity and when researchers began to investigate its use in earnest. In some cases, researchers found themselves investigating a platform that was no longer in vogue, as youth had moved on to the next new context that had appeared on the digital scene. This fluidity of digital platforms is particularly challenging for longitudinal studies as it complicates comparisons between different waves of data. Logistically, this meant that researchers had to focus broadly on a category of applications (e.g., chat rooms or social networking sites) and not target specific applications (e.g., AOL chat rooms, MySpace, or Facebook). This is also the approach adopted in this handbook. Given the fundamentally transient nature of digital platforms, even focusing on application categories does not ensure continued relevance after a platform's eventual demise; so, we used a developmental lens for our early studies and focused on developmental tasks including identity, sexuality, and intimacy. Such a developmental approach ensures that study results are relevant long after the shelf life of a particular digital media platform or category of platforms/applications. An additional approach to ensure the continued relevance of research on an application is to focus on elements or features of digital platforms and the activities that they support. This issue also relates to conceptual considerations and is discussed in further detail in the latter part of this chapter.

A related methodological challenge that arose in early digital media studies was that each new platform had different communication features or capabilities. From the earliest studies of online communication, communication scholars interested in computer-mediated communication investigated how communicative cues in online settings shape interaction within them (Culnan & Markus, 1987; Walther, 1992). Subsequently, drawing from this body of work and Gibson's notion of affordances in the context of object perception (Gibson, 1979), the term media affordances (Hutchby, 2001) has been used to refer to the qualities of different digital platforms, including mobile phones and social media (boyd, 2011; Ellison & Vitak, 2015; Reid & Reid, 2007; Subrahmanyam & Šmahel, 2011; Treem & Leonardi, 2013). Because different platforms have different affordances, it is important for researchers to be flexible and use different approaches when studying youths' use of these technologies.

In our own work at the Children's Digital Media Center @ Los Angeles, techniques from discourse analysis and participant observation were adapted to investigate how adolescent digital media users utilize the communication cues available in online chat rooms to construct and co-construct conversational coherence (Greenfield & Subrahmanyam, 2003; Subrahmanyam & Manago, 2012) in the service of key developmental tasks such as identity and sexuality (Subrahmanyam et al., 2004). These studies were qualitative in design and used a single chat transcript to analyze the online culture that

adolescent digital media users were co-constructing. Subsequent studies utilized a combination of qualitative and quantitative analysis to examine a larger number of utterances in chat rooms as well posts on online blogs (Subrahmanyam et al., 2006, 2009). When social networking sites and text messaging became popular and youths' digital communication occurred in private spaces, we shifted to self-report measures and adapted techniques from social network analysis (Reich et al., 2012; Subrahmanyam et al., 2008), mixed-method (Michikyan, 2019; Michikyan et al., 2015), and daily diary (Subrahmanyam et al., 2020) designs to better investigate the developmental implications of youths' digital media use for their well-being. Thus, it is important for researchers investigating youths' social media to be flexible and adapt their methodological and analytical approaches based on an analysis of the digital media platform's affordances, how youth use it, and its potential mental health implications.

Measuring Digital Media Use

Researchers investigating youths' digital media use must make decisions about how they measure usage and the research designs they adopt. These decisions have methodological as well as conceptual implications, and in this section, we address them from a methodological perspective. Using the "historical lens" that we have adopted heretofore in this chapter, we see that from the earliest studies of youths' internet use and continuing into extant social media apps, amount of time spent online has been researchers' favored measure of operationalizing social media usage. This was influenced by prior research on mass media such as television, and research on the first generation of electronic media, including computers and games, when computers were often in common spaces and shared among members of the family. Thus, it was reasonable that digital media users would be able to estimate the time they spent on average during a given period (day or week). With youths' widespread access to mobile technologies and high-speed internet, the issue of time use has become considerably complicated. As with all retrospective self-report measures, internet time use measures are susceptible to inaccurate/distorted/biased estimates (Parry et al., 2021; Scharrow, 2016). An alternative way of obtaining an estimate is to use software to automatically record internet use, as in the HomeNet study; however, given that multitasking with multiple windows on a screen or with multiple devices is ubiquitous, it is important to distinguish between open/active windows and applications to which a user may or may not actually be paying attention.

Another approach to studying digital media use is by analyzing the actual content of digital communication. In fact, this was the method by which researchers analyzed conversation in the first generation of digital media platforms such as online teen chat rooms, blogs, and bulletin boards

(Subrahmanyam et al., 2006, 2009; Suzuki & Calzo, 2004). These applications were publicly available and so accessing the content was relatively easy for researchers. As the digital landscape moved toward closed networks with private (e.g., private messaging on Facebook, direct messaging on Twitter, private messaging on smartphones) and public communication (e.g., Facebook wall, publicly available tweets), researchers deployed automatic means to capture the content of youths' digital communication (Negriff, 2019; Underwood et al., 2012). Underwood et al. (2012) pioneered this technique by providing adolescent participants in a longitudinal study with BlackBerry devices and automatically recording text messages and other contents of their private communication. While this approach provides an unfiltered window into adolescents' digital worlds, it is logistically challenging, as it provides a vast amount of data that then has to be analyzed by researchers, machine learning models, or a combination of the two (Dinakar et al., 2014). The biggest concern of this approach, of course, is that the analytical technique – whether human or machine – may impute intentions, emotions, biases, and motives that were not intended by the social media user.

While there is no easy remedy for the measurement challenges outlined above, some possible solutions are briefly described next. This is not intended to be an exhaustive list, but to provide a selective sampling to illustrate how to approach measurement of youths' social media use. First, researchers should consider a mixed-methods design to capture users' intentions; in one study on online self-presentation, we asked participants to describe a picture they posted, and their identity-related meaning making was coded and then quantitatively analyzed. Note that codes were based on participants' own descriptions of the picture and their reasons for posting instead of the researchers trying to deconstruct the image and post (Michikyan et al., 2015). Second, we encourage researchers to consider daily diary designs and ecological momentary assessment techniques to get more accurate estimates of users' social media use and activities over several days at a time. Daily diary studies have been used extensively in social psychology to study frequent everyday interactions (Bolger et al., 2003); at the end of each day, participants are asked to report on their interactions that day and about other variables such as well-being, conflict, etc. In the experience sampling method, participants are asked to self-report what they are doing, feeling, and thinking at random points during times they are awake (Larson & Csikszentmihalyi, 2014). In both methods, participants report about their social media use when it is fresh in their mind, helping to limit memory distortions that are more likely when asked to estimate or recall use and activities on average. Both designs have the added advantage of yielding multiple data points over time, which are essential to address key questions regarding the longer-term implications of social media use and for the examination of within-person effects (Gonzales, 2014; Jelenchick et al., 2013; Kross et al., 2013; Pouwels et al., 2021; Subrahmanyam et al., 2020).

Finding Equivalent Comparison Groups

A final methodological challenge stems from the widespread use of social media among adolescents. Typically, when studying the influence or impact of a variable, psychologists compare groups of people with varying levels of the variable in question. This is true whether the comparison group is naturally occurring in a correlational or descriptive study (e.g., coffee drinkers and nondrinkers, alcohol drinkers and nondrinkers, and video-game players and nonvideo-game players) or created by the experimenter's manipulation in an experimental design. Because digital media have become ubiquitous in adolescents' lives, it is virtually impossible to find a group of youth who do not use social media and are truly equivalent to a group of youth who use them, at least in the Global North. The lack of a naturally occurring control or comparison group is an intractable design challenge facing social media researchers, and correlational designs have dominated the literature to date. A few researchers have conducted clever experiments to test the effects of digital communication (Gross, 2009; Sherman et al., 2013, 2016; Vogel et al., 2015; Weinstein, 2017); given the dearth of such studies, there is an urgent need for more experimental designs to help unearth the mechanisms by which social media use shapes well-being.

Conceptual Considerations for Adolescent Digital Media Research

As the foregoing section demonstrates, the novelty, variability, and fluidity of the digital landscape presents methodological challenges for researchers investigating adolescents' digital media use. This section discusses some of the conceptual issues that should guide research on the implications of adolescents' social media use for their well-being.² Specifically, researchers examining youths' digital media use must make decisions about how they conceptualize and operationalize digital media usage. The following three conceptual considerations can help to guide researchers as they make these decisions:

- (1) Conceptualizing the role of digital media in adolescent development and well-being: digital media as a developmental context.
- (2) Conceptualizing youths' digital media usage: reimagining and operationalizing digital media use.
- (3) Conceptualizing pathways between digital media usage and well-being: considering mediators and moderators.

Figure 1.1 presents a schematic of the conceptual considerations that researchers should keep in mind when studying adolescent digital media use and psychological well-being.

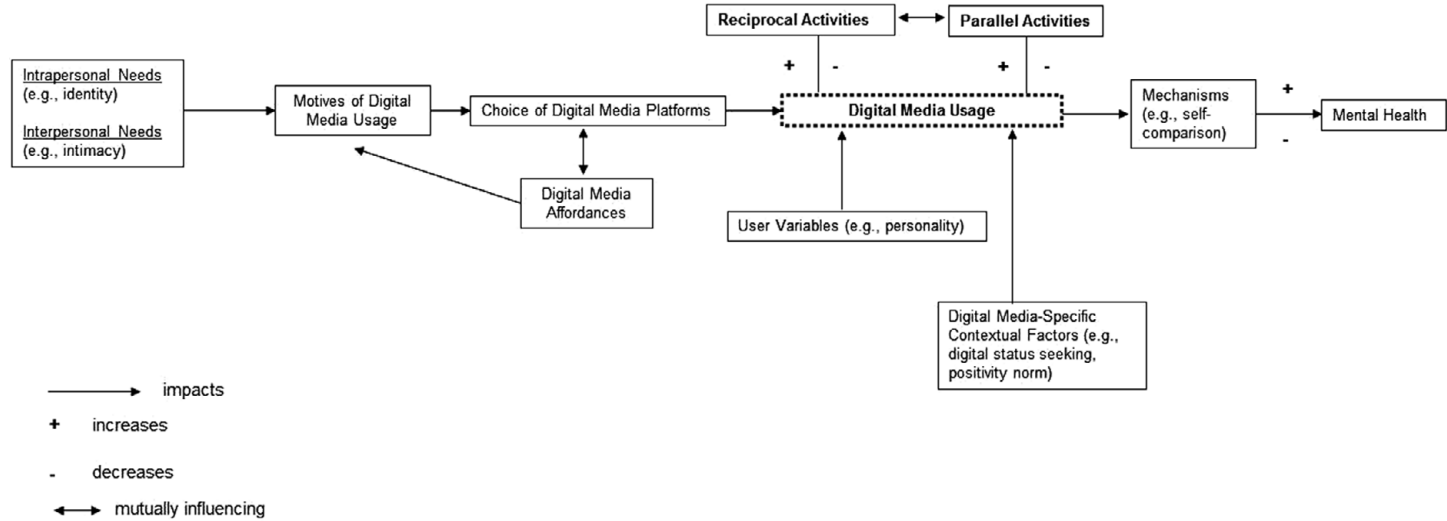


Figure 1.1 A schematic representation of conceptual considerations for digital media usage and mental health

Note: As indicated in the figure, intrapersonal needs and interpersonal needs drive adolescents' motives of digital media usage and impact their choice of digital media platforms. The selection of specific digital media platform and its affordances shape adolescents' use and motives as well as the levels and types of activities; these in turn influence the different mechanisms through which adolescents make meaning of their digital media use, impacting their psychological well-being and mental health. Individual factors as well as contextual factors both within and outside of the digital media context can influence digital media usage; only digital media-specific contextual factors (e.g., digital status seeking and positivity norm) are shown in the schematic.

Consider Digital Media as a Developmental Context

There is wide agreement in the literature that human behavior across developmental time can only be fully understood in context (Bronfenbrenner & Morris, 2006; Vygotsky, 1978). With regard to adolescent development, the role of contexts such as families, peer groups, schools, and neighborhoods has been well documented (Petersen, 1993; Steinberg & Morris, 2001), and as noted at the start of this chapter, digital media should be viewed as an important context in the lives of adolescents. Digital media broadly, and social media more specifically, are incredibly diverse, and a variety of applications are available, each with its own unique communication contexts and affordances. An important question is the extent to which researchers should focus on particular social media platforms in any study. As an example, consider the case of Twitter and Snapchat, which share similar features such as photo sharing, but also differ in their affordances and how they are used (Alhabash & Ma, 2017). From an affordances perspective (Treem & Leonardi, 2013), both social media platforms – Twitter and Snapchat – allow for *visibility* (i.e., the ability to make information about oneself, once fully or partly invisible, visible to others), *editability* (i.e., the ability to construct, reconstruct, and coconstruct the information intended to convey to others), and *association* (i.e., the ability to establish a relationship with others and with a specific content), but they differ in terms of *persistence* (i.e., the ability to access and review the information in its original form after the user has completed the communication or interaction). Empirical evidence also suggests that the specific digital media platform matters to the user in terms of *how* and *why* it is used (Alhabash & Ma, 2017; Madden et al., 2013; Utz et al., 2015); if it matters to the user, then it seems that it should matter to researchers' conceptualizations of digital media both when investigating and disseminating their results.

At the same time, social media platforms are adopting similar features – Snapchat Stories vs. Instagram Stories vs. Facebook Stories. What was once unique to Snapchat – the limited time feature – is no longer the case, as Instagram and Facebook now afford the ability to automatically vanish videos and images. The most recent trends – similarities across social media platforms and the emergence of newer platforms like TikTok – push us to consider whether and how we need to distinguish between the various social media platforms that youth use when investigating implications for development and well-being. Given how quickly digital media platforms evolve and the variety of affordances and activities possible on each platform, it is challenging for researchers to remain consistent in their conceptualization as the platforms themselves change. Perhaps one way to reconcile this conundrum – a lack of consistency in conceptualizing and operationalizing specific digital media platforms – is to be consistent in the recognition and articulation of digital media platforms as unique developmental contexts with specific

affordances through which users influence and are influenced by the context (Subrahmanyam & Greenfield, 2008; Subrahmanyam et al., 2006).

Researchers should also be mindful of both the contextual factors outside of the digital world (e.g., race, socioeconomic status, immigration generation status) as well as within the specific social media context (i.e., implicit and explicit norms and expectations shared among users within a specific digital media context) (De Choudhury et al., 2017; Elsaesser et al., 2021; Michikyan & Suárez-Orozco, 2017; Nesi & Prinstein, 2019; Valkenburg & Peter, 2007). For brevity, we only discuss contextual factors within social media, and provide two examples to illustrate the potential role of social media-specific contextual factors that could shape psychological well-being and mental health. One example is the *positivity norm* found within many social media platforms, where the unspoken expectation is for users to engage in a set of behaviors in an attempt to put their best “face” forward (Qui et al., 2012). Another example is *digital status seeking* – wherein users engage in specific behaviors to obtain peer status (Nesi & Prinstein, 2019). These examples illustrate that just as researchers take into account key features of particular developmental contexts such as peer groups and schools, they should take into account the contextual characteristics of the specific digital media platform studied – including its affordances and unique cultural elements (e.g., positivity norm), even when such contextual characteristics may not be analytical variables. Taken together, these examples suggest that consistency in the recognition and articulation of digital media can provide a more complete understanding of digital media usage in the service of development and mental health.

Reimagine Digital Media Usage

Another critical issue concerns the conceptualization and operationalization of digital media *usage*. Digital media usage has been conceptualized and operationalized in myriad ways (see Kross et al., 2020; Schönning et al., 2020, for a review). Extant research has mostly operationalized digital media usage in terms of the extent to which users engage in different activities via digital platforms, for example through self-presentation and self-disclosure using social media and the frequency and time spent on these activities (e.g., Gil-Or, 2015; Manago et al., 2008; Masur & Scharkow, 2016; Michikyan, 2019; Michikyan, Dennis, & Subrahmanyam, 2014a; Michikyan et al., 2015; Qui et al., 2012; Twomey & O’Reilly, 2017; Wright et al., 2018). In the next subsections, we discuss the different ways that digital media usage has been operationalized and make recommendations for how usage can be conceptualized to study adolescent digital media use more accurately and meaningfully.

Digital Screen Time: As noted earlier in the methodological challenges section, digital screen time is frequently used in investigations of youths’ digital media use, and as a retrospective self-report measure, it is susceptible

to both over- and underreporting (Parry et al., 2021; Scharkow, 2016). Here we examine whether total digital screen time, on its own, is a meaningful and accurate measure of digital media usage as related to psychological well-being (see Meier & Gray, 2014; Orben & Przybylski, 2019a, for a similar argument). Scholars (e.g., Orben, 2020) have asked whether self-reported measures of digital screen time should be “retired.” The arguments for retiring self-reported measures of total digital screen time seem valid given that the size of the negative effects of digital media use on mental health is either non-existent (Coyne et al., 2020) or too small to have a practical significance or to warrant a meaningful scientific debate (Orben & Przybylski, 2019b). In fact, some have argued that adolescent digital media users would need to spend a physically impossible amount of time using digital media – more than 63 hours per day – to experience noticeable decline in their well-being (see Orben & Przybylski, 2019a). While it might be premature to “retire” the concept of self-reported measures of digital screen time without more research, it is important to “reimagine” it. A more meaningful approach to conceptualizing and operationalizing digital screen time would be to combine – the amount of time + activity + specific time frame + motive of use – within a single item or question (e.g., “How much time did you spend today chatting with friends on Instagram to tell them about your problems and troubles?”). Doing so would increase the meaningfulness and accuracy of measuring digital screen time. Another possibility is to combine objective measures of screen time (e.g., via tracking apps) with objective measures of content or activity, and a subjective measure of motivation (see Subrahmanyam et al., 2020; Underwood et al., 2012). Future research should aim to tease apart the role of these different components – for instance, examining whether chatting with friends on Instagram about problems improves mental health when it happens for short durations of time, but undermines mental health when it happens for longer periods of time. Taken together, it appears that it might not be the amount of digital screen time in and of itself that matters for psychological well-being, but rather, how adolescents use their time engaging with digital media.

Digital Activities: Social media platforms afford users a range of possible digital activities, and there is empirical evidence that different activities may differentially impact psychological well-being (Kross et al., 2020). For instance, digital activities that involve interacting with existing friends via text messaging can enhance well-being (Valkenburg & Peter, 2007), because certain features of text-based content may serve as “digital affiliative cues” that can facilitate emotional bonding (Sherman et al., 2013). Similarly, digital activities that involve visual cues or image-based content (e.g., photos) can also enhance well-being by decreasing loneliness and by increasing happiness and life satisfaction (Pittman & Reich, 2016), likely because photos can foster increased social connectedness (Bakhshi et al., 2014; Goh et al., 2009); it is worth noting that image-based content can also negatively impact well-being

by increasing social comparisons, particularly those focused on appearance and body image (e.g., Lewallen & Behm-Morawitz, 2016).

Other aspects of digital media activities that are relevant in adolescent social media use research are the *type of activity* and *level of interactivity* – or exchanges between users and between users and specific digital media features (see Stromer-Galley, 2004, for a detailed argument). Research examining youths' digital media usage and psychological well-being has focused on the distinction between two types of social activities: “active” use vs. “passive” use (Kross et al., 2020; Schønning et al., 2020); “active” use (e.g., commenting on or responding to someone else's content) has been found to enhance well-being (Escobar-Viera et al., 2018; Liu et al., 2019), whereas “passive” use (e.g., reading comments or newsfeeds of hundreds of friends and followers without any participation or lurking) has been found to undermine psychological well-being (Escobar-Viera et al., 2018; Tandoc et al., 2015; Underwood & Ehrenreich, 2017).

Although the terms “active” and “passive” capture some aspects of social media use that are relevant to mental health and well-being, other aspects of use are not captured by these terms. Consider one example of self-presentation via posting photos, which is considered an “active” use of digital media (Wang et al., 2017). Missing from the current conceptualization of “active” digital media usage, however, is whether and how *interactive* “active” usage is. For instance, when a user posts a picture, does the self-presentation occur during an interaction with other users, or does the user engage in self-presentation outside of an interaction, as a result of an exchange between the user and specific digital media features, or some combination of both? The current conceptualization of “passive” digital media usage places significant emphasis on content consumption with minimum interactivity (e.g., lurking) (Underwood & Ehrenreich, 2017). Even with content consumption, “passive” activities such as viewing humorous or inspiring social media content might improve mood and well-being. An important question is how passive “passive” digital media usage is. Is reading someone else's comments *really* passive?

This begs the question of what “active” use and “passive” use in the current paradigm *really* capture (Valkenburg et al., 2021). It appears that the active-vs. passive-use paradigm emphasizes the *behavioral* component of digital media usage, while mostly ignoring its *cognitive* and *affective* components. A focus on the behavioral component of digital media usage assumes that “passive” use (e.g., lurking) is psychologically passive. Drawing from Bandura that “a theory that denies that thoughts can regulate actions does not lend itself readily to the explanation of complex human behavior” (Bandura, 1986, p. 15), we reject the premise that digital media usage is passive. Even “passive” digital media usage wherein the user chooses to observe other users' activities online without any participation (e.g., reading someone else's comments) involves some level of psychological activity (e.g., encoding, interpretation,

and processing) (see Sherman et al., 2018; see also Bandura, 1997). Instead, we propose that digital media usage be viewed on an interactivity continuum with exchanges between users and between users and specific digital media features (Stromer-Galley, 2004). In this conceptualization of digital media usage, digital activities are assumed to be inherently active, although the level of interactivity might vary. Drawing from the developmental literature on peer interactions (Rubin et al., 2006), the terms *reciprocal activities* and *parallel activities* may better capture the distinction between different kinds of social media activities that are relevant to mental health and well-being.

Reciprocal activities involve exchanges via digital media platforms wherein users can take turns to respond and react to one another (e.g., texting, chatting, commenting on another user's post, liking another user's photo, etc.). Parallel activities involve actions via digital media platforms that do not engage other users in a particular exchange, or actions that do not involve reciprocity or response from other users (posting a status, a comment, or a photo to express one's thoughts and feelings, watching a video/film, etc.). Reciprocal and parallel activities vary across the interactivity continuum, with reciprocal activities at the high end of the interactivity continuum and parallel activities at the low end. Given the complexity of digital media usage, reciprocal activities and parallel activities may also be dynamic – influencing one another and at varying levels of intensity. For instance, a user can engage in both high or low levels of reciprocal *and* parallel activities simultaneously (e.g., texting while reading someone else's comment, or posting more than one photo and chatting with one or more persons at the same time). This distinction is one possibility and not intended to comprehensively capture all aspects of digital/social media activities. Another distinction proposed in the research is between content creation, production, and consumption (see Schönning et al., 2020); content curation and/or content distribution are increasingly important aspects of social media use. The point here is that when considering social media usage, researchers must capture the nuances when conceptualizing digital activities. The continuum of parallel to reciprocal activities can help as it can capture both the level and the characteristic of digital media usage – whether and how actively the user is interacting with others online and/or whether and how actively the user is “interacting” with a digital media platform and with themselves.

Consider a Variety of Mechanisms and User Variables as Mediators and Moderators

As noted elsewhere in the literature (Beyens et al., 2020; Subrahmanyam et al., 2020) and in this handbook, extant research on the relation between adolescent digital media use and psychological well-being has revealed no clear or consistent patterns, suggesting that the relation is complex. Thus, it is important for researchers to also consider underlying mechanisms as well as

individual factors that may shape the pathways between digital media usage and mental health.

Possible Mechanisms: Digital media usage has been linked with different mechanisms that can either enhance or undermine mental health and well-being (Escobar-Viera et al., 2018; Yoon et al., 2019). For instance, researchers have demonstrated that specific digital activities (e.g., reading someone else's comments without any participation), on the one hand, can undermine well-being through upward social comparison (i.e., comparing oneself with someone better off than oneself), negative self-evaluation (Wang et al., 2017), and rumination (Feinstein et al., 2013), as well as through feelings of envy (Appel et al., 2015) and fear of missing out (Oberst et al., 2017; Przybylski et al., 2013). On the other hand, digital activities wherein users peruse their own photos on social media might also improve psychological well-being through self-affirmation (see Toma & Hancock, 2013) and perhaps through downward comparison (i.e., comparing oneself with someone worse off than oneself).

Depending on the type of self-comparison, social media users may experience decreases or increases in their mental health and well-being. Not only do people compare themselves with others, but they also compare their "current self" with their "past self" and generally view themselves as improving over the years, despite how illusory this view may be (M. Ross & Wilson, 2003). Applying this to digital media usage, it is to be expected that users who engage in downward comparison (i.e., viewing the current self as better than the past self when comparing recent online photos with the earlier photos) may experience increases in their mental health. Although it remains to be seen, the effects of downward comparison may be of even greater significance for adolescent digital media users who are undergoing the task of developing a personal fable (Elkind, 1967; Erikson, 1959; Granic et al., 2020a, 2020b).

Possible User Variables: Examining user variables that may moderate the pathway between social media usage and well-being can also yield more nuanced insights about the ways that digital media use can enhance or undermine mental health. As an example, we focus on one variable, personality, to illustrate why researchers should consider individual factors as moderators and mediators when studying the relation between digital media usage and psychological well-being and mental health (Ehrenberg et al., 2008; Kircaburun et al., 2020; Michikyan et al., 2015; C. Ross et al., 2009). Other potential moderators identified in prior research include age and gender (Booker et al., 2018; Correa et al., 2010; Simoncic et al., 2014), offline support (Hatchel et al., 2019), and social anxiety (Hatchel et al., 2018; Subrahmanyam et al., 2020).

Personality can be defined as a collection of generally stable characteristics that define the self across time and context (Zuckerman, 1991) – including traits such as extroversion, introversion, neuroticism, and openness to new

experiences (Costa & McCrae, 2008). Social media users who are extroverted (e.g., outgoing, talkative) and who are open to new experiences (reflecting curiosity and novelty-seeking) appear to engage in self-enhancing digital activities (e.g., via posting selfies) (Sorokowska et al., 2016, Zywica & Danowski, 2008), which can further enhance their interpersonal skills and psychological well-being. However, even among extroverts, users who are also experiencing psychological well-being concerns (e.g., lower life satisfaction) may be prone to problematic social media use such as addiction (Nikbin et al., 2020).

Like their extroverted peers, introverted users who are shy or less outgoing and users who are moody (indicative of high neuroticism) also benefit from using social media (Simoncic et al., 2014); however, these groups of users appear to utilize social media to compensate for a lack of offline social networks and a lack of confidence in their interpersonal skills (Ehrenberg et al., 2008; C. Ross et al., 2009). Since neuroticism can be manifested as loneliness and anxiety (Cattell & Mead, 2008), it is also not uncommon for social media users with high trait neuroticism to engage in frequent parallel activities involving self-presentation (e.g., posting comments and photos) (C. Ross et al., 2009), which tend to be more elaborate (Bai et al., 2012), more negative (Kern et al., 2014), and more socially desirable and less truthful (Michikyan et al., 2014). It appears that the reluctance to engage other users via digital media might reflect social anxiety or the fear of being negatively evaluated by other users that is typically experienced by social media users with high trait neuroticism (Bowden-Green et al., 2021). A major complication in the search for user variables is that different individual factors may interact both with one another as well as with contextual factors, often in a nonlinear way. Thus, the various ways in which different individual factors and contextual factors as well as different mechanisms interact with one another should be considered when conceptualizing the multiple ways digital media usage impacts adolescents' psychological well-being and mental health.

Conclusions

As digital media are now entrenched in the lives of adolescents, they have become an important contextual influence along the lines of families, peer groups, and schools. Considerable research demonstrates the importance of friends and families in adolescent health and well-being, and it is similarly important to investigate the impact of digital media on adolescent well-being and mental health. This introductory chapter presented an overview of the terms and history of research on this topic and described some of the pressing methodological and conceptual issues confronting researchers investigating this topic. Our discussion highlighted two main themes: (1) Changes in technology are inevitable, and thus researchers will need to be flexible in the

methodological approaches they adopt to investigate the short- and long-term implications of youths' social media use; (2) Researchers must clearly articulate how they conceptualize and operationalize digital media, its role, usage, and pathways of influence. We present a few ways that researchers can adapt to the methodological challenges and clarify how they should innovate when conceptualizing and measuring adolescents' digital media use. These are but a few suggestions, and we encourage researchers to build and expand on them as they investigate the growing presence of social media in adolescents' lives.

Notes

- ¹ Researchers examining digital media use frequently use the term “psychological well-being” and “mental health” interchangeably to refer to different psychological outcomes such as depression, anxiety, distress, life satisfaction, self-esteem, loneliness, etc. (see Orben, 2020, for a review). In this chapter, we use these terms interchangeably as both psychological well-being outcomes (e.g., life satisfaction) and mental health outcomes (e.g., depression) are interrelated; however, we do recognize that substantive differences distinguish these constructs especially concerning digital media use (Verduyn et al., 2015).
- ² Throughout this section the terms well-being and mental health are used interchangeably; when describing research findings, we have adopted the particular terms used by the study authors themselves.

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