Adolescent Development in the Digital Media Context

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Digital media has increasingly become a central feature in the lives of adolescents, yet its impact on youths' development and mental health remains poorly understood. Granic et al. (this issue) contribute to a growing body of work that aims to move away from prior emphases on overall "screen time," and instead to consider *how* and *why* digital media use may alternatively promote or undermine adolescent mental well-being. They present a theoretical framework, drawing on principles of narrative identity development, as a lens through which to understand the impact of digital media on adolescents. Here, we offer an examination and extension of the theoretical principles outlined by Granic and colleagues, as well as a discussion of future directions in this rapidly evolving field of research. We focus our discussion on two key areas: 1) the need to distinguish between online and offline contexts, and the potential for one to transform the other; and 2) the concept of "screen time," and the need for greater complexity and nuance in models of digital media effects.

Online and Offline Contexts

One critical theme that Granic et al. (this issue) highlight is the concept of the "hybrid reality," which they describe as the "offline world that is woven dynamically and interactively with online contexts in a single holistic ecosystem" (p. 5). While it is certainly true that the boundary between online and offline spaces is increasingly blurred, we believe that two alternative conceptualizations are worthy of further research: 1) that digital and offline spaces represent *distinct* contexts that shape adolescents' behavior, and 2) that the digital context actually *transforms* the offline context in ways that fundamentally change adolescents' experiences.

Digital and Offline Spaces as Distinct Contexts

Granic et al. (this issue) argue that the "hybrid reality" of online and offline contexts requires applying existing knowledge of developmental tasks to our understanding of adolescents' digital experiences. In line with co-construction approaches to understanding youths' Internet use (Subrahmanyam et al., 2006; Subrahmanyam & Greenfield, 2008), it is clear that adolescents create and co-create their online environments to address basic developmental needs, including identity formation, peer connection, and autonomy. Yet

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while it is important to understand how adolescents' online experiences are reflective of longstanding developmental tasks, it is equally important to *differentiate* between new, digital contexts and the traditional, offline contexts that have historically informed adolescent development.

The idea that youth development occurs within a series of interconnected contexts – including family, school, peer, and cultural settings – is not new (Bronfenbrenner, 1979). Indeed, decades of work have considered how the features of any given context, from family relationship dynamics to classroom climate, impact adolescent development and mental health. Of course, the fundamental developmental tasks of adolescence remain relatively consistent across contexts: adolescents may strive for autonomy and explore their identities in the classroom, at home, and among peers. However, the features that *differentiate* these contexts are crucial, as they shape adolescents' behaviors, experiences, and, in many cases, subsequent developmental outcomes. For example, in the context of an adolescent's home – with features that might include parental rules and interaction with siblings – an adolescent's behavior and experiences will be very different than in the context of a party, where features may include fewer rules and frequent interaction with peers. The impact of these contexts on adolescents' well-being are likely to differ as well, both in positive and negative ways. Furthermore, a crucial task of adolescence is the development of a cohesive self-concept (Harter, 2012). Adolescents must learn to differentiate their behavior across contexts according to prescribed social norms, while also reconciling inconsistencies in their self-presentations (e.g., acting quiet and shy in some contexts, but outgoing in others).

Prior work, including our own (boyd, 2010; Moreno & Uhls, 2019; Nesi et al., 2018; Subrahmanyam & Smahel, 2011; Valkenburg & Peter, 2011), has thus taken a "contextual approach" to consider the features of the *digital* context that may shape adolescents' experiences. This work has often emphasized the ways in which this digital context differs from traditional, in-person contexts; Granic et al. (this issue) similarly discuss the ways in which digital contexts support or suppress identity development processes. A variety of important features of the digital context have been identified, including the publicness of interactions, the relative lack of interpersonal cues (such as tone of voice and facial expressions), the permanence of shared content, and the "quantifiability" of interactions in the form of likes, views, and comments (Boyd, 2010; Moreno & Uhls, 2019; Nesi et al., 2018; Subrahmanyam & Smahel, 2011; Valkenburg & Peter, 2011). While it is certainly the case that the online and offline world are increasingly interwoven and interconnected, considering unique features of these contexts and their influence on adolescent behavior is essential.

Understanding digital and offline contexts as distinct entities raises an important question: to what degree do skills learned in the very specific setting of a digital environment translate to the offline world? Granic et al. (this issue) describe the potential benefits of digital games that allow youth to persevere through obstacles, build mastery, and even confront psychological challenges. Yet the context of an online game provides very specific features – a tightly controlled environment with limited interpersonal cues, a degree of anonymity, and the ability to "turn off" at any moment. On the one hand, this may allow youth to practice building resilience in a safer context, and then apply these skills to "offline" challenges,

such as overcoming failures in school or navigating in-person relationships. On the other hand, it may be that the skills developed within online spaces are purely digital, lacking applicability in youths' offline lives. Taken a step farther, however, some may argue that the applicability of such skills in the "offline world" is irrelevant – perhaps certain in-person skills will become increasingly obsolete as our lives are lived primarily online. The degree to which skills built in digital environments carryover into the offline world – and how much this matters for adolescents' long-term healthy development – will be a critical area of future research.

In addition, differentiating between digital and offline contexts allows us to explore how these settings reciprocally influence one another, just as we might consider the ways in which experiences in one *offline* context (e.g., failing a test at school) spillover into another offline context (e.g., getting in trouble at home with parents). In regard to the digital context impacting the offline, George and colleagues (2020) have investigated online-to-offline "spillover," or experiences on social media that caused problems, arguments, or difficulties within face-to-face contexts. Although George and colleagues (2020) highlight the frequency (29%) with which young adolescents perceive online-to-offline spillover of online *problems*, the same conceptualization could apply to online successes. For example, prior research has found that youths' ability to maintain existing friendships and form new friendships via social media may "spillover" to create offline social benefits (Lee, 2009; Valkenburg & Peter, 2011). While the concepts of online-to-offline spillover describe ways in which distinctly online experiences may infiltrate offline life, the reverse direction of effects has been explored as well. For example, the concept of "context collapse" (Marwick & Boyd, 2011) reflects the idea of offline contexts spilling over into online life. This phenomenon refers to a common situation on social media in which individuals from a variety of offline contexts (i.e., family, friends, acquaintances) come together in a singular online audience, creating unique challenges for the user as they navigate their self-presentation

Do Digital Contexts Transform Offline Developmental Tasks?

We have discussed the utility of understanding offline and digital spaces as distinct contexts that influence one another, with features that shape adolescents' behavior within each setting. However, it is also worth considering the extent to which the digital context actually *transforms* adolescents' offline experiences and larger developmental processes. With the digital context now an inescapable presence in youths' lives, the question becomes: have traditionally "offline" developmental tasks evolved in fundamental ways? In regard to identity development specifically, Granic et al. (this issue) note that agency and communion are key factors affecting identity development. They cite longstanding research highlighting the need for adolescents to achieve balance or coherence between these factors as they mature (Erikson, 1959, 1968), and it is assumed that the nature of this coherence has remained constant in the digital age.

Yet it is possible that the features of social media have altered or even transformed the balance between agency and communion. For example, the fact that social media emphasizes public, sometimes self-promotional displays, as well as the sense of anonymity

to share one's opinion, may create an environment in which agency is celebrated and reinforced. In fact, self-disclosure, which represents a key process in asserting one's personal agency, may be facilitated through digital platforms. The Internet Enhanced Self-Disclosure Hypothesis (Valkenburg & Peter, 2009) draws on earlier hyperpersonal computer-mediated communication theories (Walther, 1996) to suggest that the relative anonymity afforded by online environments may stimulate self-disclosure. In turn, this can lead to higher quality relationships and well-being—which translates to offline functioning —depending on characteristics of both the individual and the online platform used. Indeed, more recent experimental and neuroimaging research suggests that adolescents' self-disclosure can be inherently rewarding (Tamir & Mitchell, 2012; Vijayakumar et al., 2020; Vijayakumar & Pfeifer, 2020). With adolescents' greater use of digital media, and associated increases in highly rewarding self-disclosure processes online, it may be that agency and independence are increasingly valued among youth growing up in the digital age. On the other hand, digital media's allowance for immediate and frequent contact with peers may increase the need for belonging, making communion a more strongly valued piece of the coherence balance. It is possible that "master narratives" are shifting with increased reliance on digital media, with new cultural values and norms being created in the digital space.

Beyond identity development, other developmental processes also may be transformed in the context of digital media. Our prior work (Nesi et al., 2018) has highlighted the potential for the meaning and experience of social relationships to be altered due to the influence of the digital context. For example, social status has always been central to adolescence, due to youths' increased biological sensitivity to peer evaluation and acceptance during this time period. Yet with social media environments creating opportunities for and encouragement of curated self-presentations, and providing quantifiable feedback metrics (likes, followers, comments), it may be that social status has taken on new meaning and importance in the digital age (Nesi & Prinstein, 2019). Another example may be found in the domain of physical appearance, which represents a key facet of adolescents' self-concept (Harter, 2012). Social media is a unique context in which photos of one's self can be, and are, shared at all hours of the day, and are immediately subject to others' feedback. This emphasis on appearance may transform adolescents' offline experiences with appearance-related behaviors and experiences. Choukas-Bradley et al. (2020) investigated Appearance-Related Social Media Consciousness (ASMC), or the idea that thoughts and behaviors reflecting concern about one's appearance on social media may intrude on everyday, offline experiences. Indeed, many adolescents report that, even when they are alone, they imagine how they look in social media photos and that, during "offline" social events, they are distracted by thoughts about how they may look in photos posted to social media.

With digital contexts potentially transforming adolescents' offline experiences, the question arises as to whether digital media environments can, and should, be responsible for promoting developmental processes. For example, in regard to narrative identity development, Granic et al. (this issue) describe the potential for digital spaces to support, as one example, the creation of a temporally coherent self-story through Facebook's "On this Day" feature. Certainly, the incorporation of small design features (e.g., removing "likes," adding a button for easy reporting of problematic content) may be critically important for

decreasing social comparison or ensuring safety among youth online. But should social media and gaming tools be specifically designed to support larger developmental processes, such as building agency or helping piece together youth's temporal narrative? One could argue that, given the sheer amount of time with which youth are engaged in digital spaces, the promotion of these processes is critical – just as it might be in contexts like school or extracurricular activities. Alternatively, it could be argued that youth have always navigated these tasks on their own, piecing together experiences from various contexts (school, family, peers, and now, online) to shape a cohesive narrative identity outside the bounds of a singular setting. Furthermore, if digital spaces *are* designed to facilitate processes of identity development, will they be capable of doing so? A critical feature of digital spaces is that they are *constructed* – users' behavior is guided, often unconsciously, by algorithms, prompts, storylines, and design features. Perhaps the power of building one's narrative identity rests in the ability to do it independently – deciding for oneself which events should be remembered and integrated, and how best to overcome challenging situations – rather than within the confines of a technology company's algorithm.

From Screen Time to Moderators and Mechanisms

Even the title of Granic et al.'s (this issue) article reflects a growing movement in the field to abandon the concept of "screen time" altogether, moving instead toward an emphasis on how, why, and when digital media impacts youth. We ourselves have argued elsewhere (see Prinstein et al., 2020) that the concept of "screen time" is oversimplified and does not reflect the intricacies of adolescents' use of digital media, and that the examination of mere main effects of overall screen time on adolescent developmental outcomes has proven ineffective (Odgers & Jensen, 2020). Yet we also believe that the treatment of the construct of "screen time" requires greater nuance, rather than complete dismissal.

Understanding Screen Time

Both broader, theoretical frameworks and more narrow, methodological improvements in the analysis of "screen time" are needed to reciprocally inform one another and advance the field. At the methodological level, when studies report on measures of digital media use time or frequency, it is essential that screen time is clearly defined. Researchers must carefully consider the type(s) of media included in screen time measures (e.g., social media, digital games, general smartphone use), the unit of measurement (e.g., hours spent, number of phone pickups), and the accuracy of the measurement (i.e., self-report versus more objective measures; see Prinstein et al., 2020).

Yet beyond questions of measurement, the issue of whether screen time is, in fact, irrelevant in the current digital landscape is an empirical one that would benefit from further research. Two competing hypotheses can be considered. On the one hand, it may be that screen time represents an important moderator of the association between specific online experiences and psychosocial outcomes. Within this dose-response hypothesis, an adolescent who is the victim of cyberbullying *and* who spends greater time using digital media, thus garnering greater exposure to that bullying, will experience more negative mental health outcomes. Prior work has often implicitly put forth a dose-response framework. For example, Granic

et al. (this issue) argue that digital contexts which support or amplify identity-relevant processes will promote mental health, which could suggest that greater frequency of exposure to these contexts will necessarily engender positive outcomes. On the other hand, it may be that time truly *is* irrelevant, and that the quality and valence of youths' digital interactions are far more important than the time spent in those interactions. Perhaps the severity of a given cyberbullying encounter far outweighs the frequency with which an adolescent is exposed to victimization. Similarly, there may not be a linear association between time spent in "identity-promoting" digital contexts and healthy development. It may be that limited or gradual exposure to identity-promoting digital contexts, or even a singular online identity-promoting experience, is more beneficial for youth. Thus, while prior main effects approaches to analyzing associations between screen time and mental health outcomes have yielded limited progress (Odgers & Jensen 2020), the consideration of screen time within a more nuanced framework is critical.

Mechanisms and Moderators of Digital Media Effects

In addition to more careful treatment of the concept of "screen time," it is essential that studies continue to investigate underlying mechanisms and moderators that influence the association between digital media use and adolescent development. Granic et al. (this issue) highlight a number of important points in this regard. Critically, they note that the same digital media mechanisms – from opportunities for personal expression, to exposure to a vast array of diverse content – can produce both positive and negative mental health effects depending on two moderating factors. These factors include: 1) the digital context, and 2) individual differences. They propose two types of studies to investigate these moderating factors. The first compares identity processes and mental health outcomes across different digital contexts, and the second compares identity processes and mental health outcomes from different individuals in the same digital context.

In regard to the former, we believe that comparisons on the basis of *affordances* or features of various digital contexts, rather than by platform, will be particularly fruitful (e.g., Moreno & Uhls, 2019; Nesi et al., 2018). Within any given digital media platform, there are likely possibilities for a number of different activities and tools, such as private messaging, live video chatting, and public posting of photos. Each of these tools differs in the degree to which it encompasses certain features. For example, some tools are more *public* (e.g., posting a photo) than others (e.g., sending a private message). Some tools are more *permanent* (e.g., posting on one's main feed) than others (e.g., posting a "story"), some are more *visual* (e.g., sharing a photo or video) than others (e.g., posting a comment), and some contain more *interpersonal cues* (e.g., video chatting) than others (e.g., sending a text message). Examining how these features influence associations between digital media use and developmental outcomes allows for continuity between various platforms, and provides a framework for future investigations of emerging platforms. Further, as Granic et al. (this issue) suggest, it allows for more specific comparisons of functionally different activities (i.e., sharing a "story" versus a more permanent post) within a singular platform.

In regard to the exploration of "individual differences" as a moderator, we believe that the Differential Susceptibility Model (Valkenburg & Peter, 2013) offers an important starting

point. Individual differences, based on dispositional, developmental, and social factors, should be considered at various stages of media effects models, including how youth *use* digital media (i.e., specific behaviors and experiences), as well as how youth interpret and *respond* (i.e., emotionally, cognitively, and behaviorally) to those experiences. For example, in our prior work, we have found significant gender differences in uses of and responses to digital media – with girls more likely to report both positive (e.g., receiving support or encouragement) and negative (e.g., feeling left out or excluded) social media experiences (Nesi et al., 2019). We have also found that social status plays an important role, with youth who are less popular among their peers exhibiting fewer 'status-seeking' online behaviors (Nesi & Prinstein, 2019), and also showing stronger associations between online social comparison behaviors and depressive symptoms (Nesi & Prinstein, 2015).

Finally, while Granic et al. (this issue) emphasize identity developmental as a core mechanism through which digital experiences influence adolescent mental health, a number of other mechanisms should be considered as well. Developmental psychopathology approaches emphasize the complex interplay of biological vulnerabilities and psychosocial risk factors in shaping normal versus atypical developmental trajectories (Cicchetti, 1993; Cicchetti & Rogosch, 2002). Various transdiagnostic risk and resilience factors for the onset and maintenance of mental health problems have been identified in the literature that may be particularly relevant in digital contexts. For example, within the NIH Research Domain Criteria Initiative, factors related to reward processing, attention, impulsivity, inhibition, and social communication have been implicated in a range of internalizing and externalizing mental health concerns (Insel et al., 2010). It may be that individual differences in neural endophenotypes – such as heightened reward sensitivity – may determine the extent to which digital media influences mental health outcomes during adolescence. Such biology by environment interactions can help explain why some youth develop psychopathology and others do not (Guyer, 2020). For instance, we have shown that adolescents exposed to more negative family and peer contexts report higher internalizing and externalizing symptoms, but only among adolescents with high neurobiological sensitivity. Those with low neurobiological sensitivity, on the other hand, are resilient to their social environment (Rudolph et al., 2020; Tezler et al., in press). Similarly, digital media may influence youth non-uniformly, such that only youth with susceptible endophenotypes will be vulnerable to psychopathology in the context of digital media. Future work should expand on Granic et al.'s (this issue) framework to consider these and other important processes that likely contribute to adaptive and maladaptive outcomes in the context of digital media use.

Conclusion

Adolescents' use of digital media has the potential to create new challenges, but also to promote healthy development. In order to tease apart these complex processes, both theoretical and methodological advances are needed in the field. It is critical that future work carefully consider distinctions between online and offline contexts and the treatment of "screen time," and that it aims to uncover the mechanisms by which social media alternative promotes or undermines well-being. Furthermore, moderators must be considered both at the level of the individual, and the level of the digital context. Granic et al. (this issue) have aimed to integrate principles from personality, social, clinical, and developmental

psychology to shed new light on the theoretical underpinnings of adolescent digital media use. Such interdisciplinary perspectives, further integrating theories from areas such as communications and media studies, will be essential for better understanding the impact of digital media on adolescent mental health.

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