



Transformation of Adolescent Peer Relations in the Social Media Context: Part 1—A Theoretical Framework and Application to Dyadic Peer Relationships

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Abstract

Investigators have long recognized that adolescents' peer experiences provide a crucial context for the acquisition of developmental competencies, as well as potential risks for a range of adjustment difficulties. However, recent years have seen an exponential increase in adolescents' adoption of social media tools, fundamentally reshaping the landscape of adolescent peer interactions. Although research has begun to examine social media use among adolescents, researchers have lacked a unifying framework for understanding the impact of social media on adolescents' peer experiences. This paper represents Part 1 of a two-part theoretical review, in which we offer a *transformation framework* to integrate interdisciplinary social media scholarship and guide future work on social media use and peer relations from a theory-driven perspective. We draw on prior conceptualizations of social media as a distinct interpersonal context and apply this understanding to adolescents' peer experiences, outlining features of social media with particular relevance to adolescent peer relations. We argue that social media transforms adolescent peer relationships in five key ways: by changing the frequency or immediacy of experiences, amplifying experiences and demands, altering the qualitative nature of interactions, facilitating new opportunities for compensatory behaviors, and creating entirely novel behaviors. We offer an illustration of the *transformation framework* applied to adolescents' dyadic friendship processes (i.e., experiences typically occurring between two individuals), reviewing existing evidence and offering theoretical implications. Overall, the *transformation framework* represents a departure from the prevailing approaches of prior peer relations work and a new model for understanding peer relations in the social media context.

Keywords Adolescents · Social media · Peer relations · Friendship · Relationship quality · Review

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Introduction

Over many decades, substantial research has documented the profound impacts of peer interactions, friendships, and status for adolescent development and well-being (Choukas-Bradley and Prinstein 2014; Rubin et al. 2015; Steinberg and Morris 2001). As compared to children, adolescents spend significantly more time with peers, experience more frequent peer-based stressors, and exhibit heightened emotional reactivity to peer stress (Brown and Larson 2009; Rudolph 2014). Prior research suggests that adolescents' peer experiences are prospectively associated with educational outcomes, mental health symptoms, addictive behaviors, and even physical health morbidity and mortality decades later (Allen et al. 2014; Almqvist 2009; Almqvist and Östberg 2013; Menting et al. 2016; Modin et al. 2011; Moffitt 1993). However, youth are now increasingly turning to social media

as a primary means of interaction with peers, requiring investigators to reconsider prior conceptualizations of the peer context (Lenhart 2015a; Rideout 2015). Indeed, recent statistics suggest that 92% of adolescents go online daily, 89% belong to at least one social networking site, and 88% have access to a cell phone (Lenhart 2015a). With young people spending an average of nine hours per day connected to media and sending or receiving an average of between 20 and 80 text messages per day, social media has now become a critical part of the social fabric that makes up adolescents' lives (Lenhart 2015a; Rideout 2015). It is clear that in order to fully understand the developmental implications of modern adolescents' peer experiences, we must consider the central role of social media.

The growing presence of social media has prompted a proliferation of research across disciplines investigating its uses and effects among youth (Uhls et al. 2017; Yan 2018). However, research on adolescent peer relationships has lacked a unifying framework for understanding the mechanisms by which social media may impact traditional peer relations constructs. As such, we offer this two-part theoretical review to provide an organizing framework for future peer relations research. The current paper (Part 1) introduces an integrative *transformation framework* for understanding the role of social media in adolescent peer experiences. We integrate conceptualizations of social media from multiple disciplines, in order to highlight seven unique features of the social media environment with particular relevance for adolescent peer experiences. Given that scholarship on social media and youth is only recently emerging as a distinct field of study, we focus on these four broad disciplines—computer-mediated communication (CMC), media effects, organizational psychology, and developmental psychology—which have each contributed novel conceptualizations of communication technologies, adolescent media use, or both.

Drawing on prior frameworks (McFarland and Ployhart 2015; Subrahmanyam and Šmahel 2011), we argue that these unique features of social media create a distinct social context. Furthermore, we propose that adolescents' peer experiences are transformed within this context. We outline five conceptual categories for understanding the ways that social media may transform adolescent peer relationships: by changing the frequency or immediacy of experiences, amplifying experiences and demands, altering the qualitative nature of interactions, offering new opportunities for compensatory behaviors, and/or creating entirely novel behaviors. Finally, we apply the *transformation framework* to adolescents' experiences of friendship, drawing on prior theoretical and empirical research across disciplines. In particular, we discuss the role of social media in transforming adolescents' dyadic peer interactions—or those experiences traditionally occurring between two individuals—including communication processes, relationship quality, friendship

support, and problematic interpersonal behaviors. The second paper in this series (Part 2) will provide a detailed application of the *transformation framework* to the domains of peer status, peer influence, and peer victimization, and will discuss future directions for research on the role of social media in adolescents' peer relationships.

Introduction to the Transformation Framework

Whether implicitly or explicitly, much of the previous work on adolescents' peer experiences in the age of social media has adhered to a “mirroring” framework, or the idea that adolescents' experiences on social media simply mirror, or reflect, their offline experiences. This line of thinking suggests that adolescents' online behaviors and peer interactions are the same as those enacted offline—simply in a new environment. It follows, then, that in understanding adolescent social media use, we may rely on existing peer relations theories and constructs, as well as expect similar predictors and outcomes of peer experiences that occur online and offline. Indeed, we certainly would expect to see continuity between online and offline contexts (Mikami and Szwedo 2011). As adolescents create and construct their online worlds, they are likely to play out similar “offline” developmental issues and challenges (Subrahmanyam and Šmahel 2011; Subrahmanyam et al. 2006). For example, adolescents who are popular offline are likely to be popular online (Zywica and Danowski 2008), and adolescents who are victimized by their peers offline are likely to be victimized online, too (Olweus 2012).

However, with a mirroring framework as the prevailing view of adolescents' peer experiences via social media, too little attention is given to the many important *differences* between the offline and online environments, perhaps stymying further work in this area. A primary shortcoming of the mirroring framework is that it fails to account for the importance of *context* in shaping behavior, beliefs, and emotions—and the potentially transformative role of social media as an interpersonal context for adolescent peer relationships. Thus, the *transformation framework* represents a critical departure from prior peer relations work by positing that the social media context *transforms* adolescents' peer experiences. We rely on a broad definition of *transform*, as provided by Merriam-Webster: “to change in composition or structure, to change the outward form or appearance of, [or] to change in character or condition; convert” (Transform 2018), and suggest that the “transformation” of peer experiences through social media may take a number of different forms. Notably, this framework does not make specific claims regarding the positive, negative, or neutral outcomes of these transformations on adolescents' development and well-being. Rather, it simply suggests that adolescents' peer experiences are

fundamentally *different* in the context of social media, providing a crucial first step in understanding the complex role that social media plays in adolescents' lives.

The idea that the unique features of online environments shape individuals' experiences and behaviors is certainly not new. Scholars within the computer-mediated communications literature have long identified the ways in which mediated, versus traditional, communication impacts individuals' interpersonal experiences (for a review, see Walther 2011). In addition, media and developmental psychology scholars have considered the ways in which the features or affordances of the Internet and social networking sites impact adolescents' social experiences (boyd 2010¹), self-presentation and self-disclosure (Valkenburg and Peter 2011), and navigation of developmental tasks (Subrahmanyam and Šmahel 2011; Peter and Valkenburg 2013). Recent reviews have also characterized the risks presented by social media (Livingstone and Smith 2014), as well as its overall impact on adolescents' well-being (Best et al. 2014), psychosocial development (Peter and Valkenburg 2013; Spies Shapiro and Margolin 2013), and friendships (Amichai-Hamburger et al. 2013). Within the organizational psychology field, McFarland and Ployhart (2015) have recently proposed a "contextual framework" of social media. This framework identifies social media as a large, "omnibus" (i.e., higher level) context and describes unique features of social media, or "ambient stimuli," that comprise the discrete (i.e., lower level) context of social media. They identify eight stimuli most relevant to organizational contexts and argue that these stimuli may influence theory and practice related to organization behavior.

Despite these important contributions, however, no comprehensive framework has yet been offered for understanding the ways in which traditional adolescent peer relations constructs are transformed in the context of social media. We build and expand on McFarland and Ployhart's (2015) framework by integrating prior models specific to adolescent development and relationships (e.g., boyd 2010; Peter and Valkenburg 2013; Subrahmanyam and Šmahel 2011) in order to offer new insights. In particular, we identify features of social media with particular relevance to adolescent peer relationships and suggest that these features exist on a continuum within any given social media tool. Furthermore, we propose the idea of *transformation* as a means of conceptualizing adolescents' peer experiences within this new context. In particular, we propose five conceptual categories of transformation, including changing the frequency or immediacy of experiences, amplifying experiences and demands, altering the qualitative nature of interactions, offering new

opportunities for compensatory, and creating entirely novel behaviors. In doing so, we offer the *transformation framework* as a new model for understanding adolescents' peer experiences through social media, aiming to organize and synthesize previous cross-disciplinary work in this area and guide future peer relations research from a theory-driven perspective.

This paper is organized into three parts. First, we broadly define social media and discuss its relevance to the adolescent developmental period. Second, we outline the *transformation framework* for understanding adolescent peer relations and social media use. We review prior work examining features of social media that differentiate it from traditional, in-person contexts and outline seven features that create a unique social context with particular relevance for adolescent peer experiences. Finally, as an illustration, we consider adolescents' experiences of dyadic friendships within this *transformation framework*, addressing how social media may transform adolescents' experiences in this domain. Notably, we do not aim to provide a comprehensive review of the literature on social media and peer relationships in these papers. Rather, we selectively review studies to illustrate the *transformation framework*, highlighting existing empirical support when available, and proposing theory-based future directions within this rapidly growing field.

Characterizing Social Media and Adolescent Development

What is social media? The answer to this question is one that scholars have wrestled with for over a decade (Kaplan and Haenlein 2010; Obar and Wildman 2015). A variety of approaches have been taken to defining social media (see Ellison and Boyd 2013), with recent definitions emerging to offer some guidance. One popular characterization of social media describes it as a collection of Web 2.0 applications involving user-generated content, user profiles, and the connection of profiles into an online "social network" (Obar and Wildman 2015). Social networking sites, or "social network sites,"² may be considered a subset of "social media" and have been defined as networked communication platforms that involve user-generated profiles, public connections to other users, and interactive content created by users (Ellison and Boyd 2013). A distinction also has been made between "traditional" communication media (e.g., e-mail, text messaging, Skype) and social media (e.g., Facebook), with the former lying in the

¹ Boyd has chosen not to capitalize her name; more information can be found at www.danah.org

² Ellison and Boyd (2013) argue that the use of "social network sites" rather than "social networking sites" is more accurate to modern SNS, as the term "networking" suggests an active search for new people and connections, rather than those that already exist offline.

middle of a continuum that places non-digital (physical) communication and social media at either extreme (McFarland and Ployhart 2015).

Our objective in this paper is not to offer a comprehensive technical definition for the term “social media.” Instead, our objective is to propose a useful method for characterizing the impact of social media on adolescents’ peer experiences. Thus, drawing on these prior definitions, we rely on a maximally inclusive conceptualization of social media as media used for social interaction, or any digital applications or tools that allow users to share content and communicate with others (Moreno and Kota 2013). We rely on this highly inclusive definition because, in the context of adolescents’ social media use, it has become increasingly difficult to distinguish among “traditional” digital communication, social networking sites, and social media. For adolescents, who are frequently the earliest adopters of new technologies, as well as the earliest adopters of new features within those technologies (Jordan and Romer 2014), the vast majority of platforms can be used for a myriad of functionalities, some of which resemble “traditional” digital communication and others of which do not. For example, adolescent text messaging often involves messaging apps, photograph sharing, group messaging, a “profile picture,” and other features traditionally associated with social media or social networking sites. Additionally, platforms that may be considered characteristic of “social media” apps or Web sites (e.g., Facebook, Snapchat, Instagram, Twitter) may often be used for video chatting or private messaging. Thus, for adolescents, it may be less relevant and—as more functionalities are built into each platform—increasingly more difficult to draw this distinction. Furthermore, adolescents’ preferred digital media platforms change rapidly, such that any effort to categorize specific platforms is unlikely to capture the range of young people’s experiences within this constantly evolving landscape. Thus, we believe that in order to best capture the broad implications of social media tools for adolescent peer relationships, it is useful to take this inclusive approach. As such, we consider “social media” to include social network sites, such as Facebook, Twitter, and Instagram. We also consider social media to include other socially interactive technologies, such as text messaging, photograph sharing, online dating, and instant messaging, along with the platforms that allow for such activities (e.g., WhatsApp, Tinder, chat rooms). In addition, it should be noted that, in this paper, we use the term “online” to refer to experiences that take place via social media, as well as the term “offline” in reference to traditional, in-person experiences.

Adolescent Development and the Draw of Social Media

From the inception of some of the first social networking sites in the late 1990s and early 2000s (see Boyd and Ellison

2008), social media has represented a radical departure from the communication channels that have traditionally been the focus of adolescent developmental research—mass media (e.g., television, magazines, the “nonsocial” Internet) and traditional, in-person interaction. Even in the early days of social media, social psychology scholars identified the importance of studying how the Internet’s features were changing social interactions (McKenna and Bargh 2000). Examining social media use among adolescents may be especially important, given the unique social and biological characteristics of this critical developmental period. During adolescence, young people seek to resolve numerous stage-salient tasks in the presence of peers, such as establishing and maintaining more complex, intimate peer relationships; navigating emerging sexualities and romantic relationships; developing cohesive self-identities; and striving for autonomy from parents and other adults (Cicchetti and Rogosch 2002). Socially, the adolescent transition involves increasingly frequent and intimate interactions with peers, as well as the growing reliance on peer relationships for determining self-worth (Parker 2006). Adolescents also exhibit an increased focus on peer status and approval, with higher levels of engagement in social comparison, reflected appraisal, and feedback-seeking to glean self-relevant information from peers (Borelli and Prinstein 2006; Butzer and Kuiper 2006; Prinstein et al. 2005).

Biological changes associated with adolescence also are consistent with this increased emphasis on social motivation and reward. The “dual systems” approach to adolescent brain development suggests that the “socioaffective circuitry” of the brain (i.e., amygdala, striatum, and medial prefrontal cortex), which is responsible for social cognition, emotion, and reward processing, may develop more quickly than the ventromedial and lateral prefrontal cortices that are responsible for cognitive and emotion regulation (Dahl 2004; Somerville 2013; Steinberg 2008). During adolescence, pubertal hormones may also disproportionately affect neurotransmitter systems within this “socioaffective circuitry,” increasing functional sensitivity within these brain regions and potentially heightening detection of and responses to social information (Somerville 2013). As such, adolescents may be more motivated to engage in socially rewarding behaviors and less inclined to temper this desire with a rational evaluation of the potential consequences. In experimental work, adolescents have shown increased activity in reward-related brain regions, and subsequently greater risk-taking, when in the presence of peers (Chein et al. 2011). Adolescents may be particularly susceptible to peer influence, as the motivation to engage in peer-valued behaviors outweighs logical reasoning that may inhibit these behaviors (Prinstein and Giletta 2016).

Social media use has become nearly ubiquitous among adolescents (Lenhart 2015a). These digital tools may be

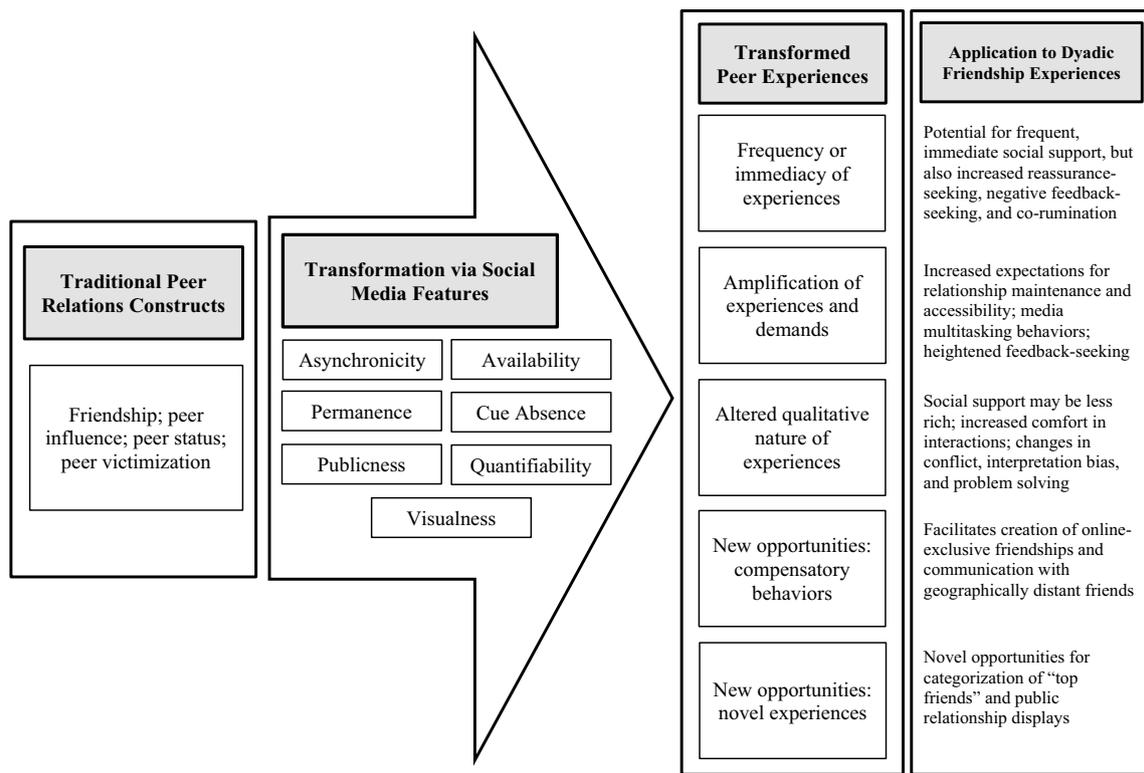


Fig. 1 The transformation framework: a model for understanding the transformation of peer experiences in the context of social media, with examples of transformation in the domain of dyadic friendship experiences

particularly appealing to adolescents because the social media environment provides a compelling context for youth to navigate critical socio-developmental tasks (Peter and Valkenburg 2013; Subrahmanyam and Greenfield 2008; Subrahmanyam and Šmahel 2011). As adolescents are striving for more frequent connections with peers, social media provides near constant opportunities for interaction, particularly via mobile technologies (Spies Shapiro and Margolin 2013). Social media also may activate the biological systems that are responsible for adolescents’ heightened sensitivity to social feedback and rewards (Sherman et al. 2016) and allow adolescents to experiment with broadcasting various aspects of their personalities, interests, and identities related to sexuality, gender, and race or ethnicity (Lee 2012; Manago et al. 2008; Michikyan et al. 2015; Valkenburg and Peter 2008). Furthermore, social media allows adolescents to engage in selective self-presentation, posting certain photographs and text that reflect their burgeoning identities, gaining feedback from their peers on such presentations, and engaging in social comparison with the self-presentations of their peers (Subrahmanyam and Šmahel 2011; Valkenburg and Peter 2011). Thus, adolescents are bringing many of these peer-driven traditional developmental tasks into the online environment (Subrahmanyam et al. 2006). Given the profound impact of peer relationships on adolescent development and

mental health (Prinstein and Giletta 2016; Steinberg and Morris 2001), it is critical to examine how the social media context may be transforming these traditional peer experiences (Boyd 2007; Subrahmanyam and Šmahel 2011).

A Transformation Framework of Adolescent Peer Relations and Social Media

The *transformation framework* offers a model for understanding the transformative role of social media in adolescent peer relations (see Fig. 1). Drawing on previous interdisciplinary scholarship, we present seven features of social media that distinguish it from traditional interpersonal environments, with particular attention to features that may impact adolescents’ peer experiences. As in prior work (McFarland and Ployhart 2015; Subrahmanyam et al. 2006), we suggest that these features come together to create a new, distinct interpersonal context. Adolescents’ social lives are increasingly embedded in this context, and the *transformation framework* aims to integrate prior work and guide future investigations to better understand this phenomenon. It proposes that the unique context of social media fundamentally transforms adolescents’ peer experiences across multiple domains, including peer victimization,

peer status, peer influence, and friendship. We suggest that these experiences are transformed in five key ways: changes in the frequency or immediacy of experiences, amplification of processes through increased intensity and scale, alterations in the qualitative nature of experiences, opportunities for compensatory behaviors, and the creation of entirely novel behaviors.

In the current section, we first outline the broad importance of various ecological contexts for shaping adolescents' behavior. We then argue for a conceptualization of social media as a new interpersonal context for youth. We review and integrate prior work to outline seven unique features of social media that differentiate it from in-person contexts and may uniquely impact adolescents' peer experiences. Finally, we elaborate on the *transformation framework* before applying it to an understanding of adolescents' dyadic friendship experiences.

The Role of Ecological Contexts in Shaping Adolescent Behavior: Social Media as a New Interpersonal Context

The *transformation framework* is based on the premise, outlined in prior work (e.g., McFarland and Ployhart 2015; Subrahmanyam and Šmahel 2011), that social media represents a new psychosocial context made up of a range of unique features or affordances. This conceptualization is critical to understanding social media's role in adolescents' lives, given that scholars across numerous disciplines have long recognized that contextual factors are key determinants of adolescent behavior (Smetana et al. 2006). Contemporary models of development emphasize an interactionist perspective, whereby individual functioning is shaped by ongoing, reciprocal interactions between individual-level and environmental-level factors (Magnusson and Stattin 1998). Developmental scholars highlight the role of multiple internal and external systems and contexts in affecting adjustment and behavior, as well as the transactions between those contexts (Cicchetti 1993; Lerner 1984; Magnusson 1988; Magnusson and Cairns 1996; Sameroff 2009). Key to developmental researchers' understanding of the social context is Bronfenbrenner's (1979) classic model of social ecologies. From the advent of this framework, developmental psychologists have emphasized that child development does not occur in a vacuum—that is, aspects of each of these external contexts, from families (Darling and Steinberg 1993) to neighborhoods (Leventhal and Brooks-Gunn 2000) to larger cultural contexts (Greenfield and Cocking 2014), have a critical impact on young people's development and behavior.

Social media, however, seems to challenge the very boundaries of our traditional ideas of systems and contexts. Certainly, social media may be considered an environmental context, one that is external to the individual; however,

the specific system within which it is situated may be less clear. First, it incorporates aspects of a dyadic social system, in which individuals interact directly with others known in their immediate social network. Social media likely also rests, however, within larger meso-, macro-, and exosystems. Similar to certain mass media channels (e.g., television, magazines), social media may bring into adolescents' awareness a variety of environments that are outside of their immediate social realm, extending outward to incorporate larger sociocultural influences, values, and trends. Furthermore, social media must be placed within an historical context. The current generation of adolescents lives in an environment that is saturated with social media of different types at increasing frequencies, providing an historical period that may be vastly different than what existed a mere five or 10 years prior. When adolescents post on social media, they may directly encounter this blending of contexts, or “context collapse,” as they attempt to navigate the multiple audiences—across individuals, settings, and time—who may view their posted content (Marwick and Boyd 2011).

In outlining a *transformation framework* for understanding adolescent peer relations and social media, we draw on recently emerging conceptualizations of social media as a unique social context or environment that shapes individuals' thoughts, behaviors, and relationships (boyd 2010; McFarland and Ployhart 2015; Peter and Valkenburg 2013; Subrahmanyam and Šmahel 2011). We draw on McFarland and Ployhart's (2015) contextual framework to argue that the features of social media, which differentiate it from traditional interpersonal environments, come together to create a distinct social context. We further this notion by proposing that this context transforms adolescents' peer experiences. This understanding of social media represents a critical shift in thinking from prior peer relations work. Furthermore, this framework lays the groundwork for understanding how experiences that take place via social media—as an increasing proportion of adolescents' peer interactions do—will have unique implications for youths' development and well-being. In addition, it suggests that the traditional measures and constructs of the peer relations field may no longer be sufficient to understanding modern adolescents' peer experiences.

Features of the Social Media Context

The unique interpersonal context of social media is characterized by a number of features that differentiate it from adolescents' traditional interpersonal environments. “Traditional” interpersonal environments are defined here as social contexts that rely on face-to-face interaction. In elaborating on this definition, we rely on classic conceptualizations of face-to-face interactions as those in which participants share a common spatial–temporal system, engage in a two-way

flow of information, and employ multiple verbal and non-verbal cues for communication (see Thompson 1995). Since the advent of early forms of computer-mediated communication, scholars have suggested that digital communication differs in important ways from face-to-face communication (Newhagen and Rafaeli 1996; Thompson 1995; Walther and Parks 2002). The field of computer-mediated communication (CMC) has offered various theories for understanding the impact of CMC on interpersonal relationships (for an overview, see Walther 2011). For example, “cues-filtered-out” theories (Culnan and Markus 1987) suggest that computer-mediated communication channels provide fewer interpersonal, nonverbal “cues” and synchronicity, thus impacting social interactions that typically rely on those communicative features. More recently, scholars have applied principles from the CMC literature in order to understand the ways in which social networking sites shape social interactions among adolescents in particular (boyd 2010). A related strain of “media effects” research, evolving from the tradition of mass communication (Valkenburg et al. 2016), has sought to examine the characteristics of adolescents’ Internet communication that may affect processes of self-presentation and self-disclosure (Peter and Valkenburg 2013; Valkenburg and Peter 2011). Similarly, within the developmental psychology field, researchers have examined the characteristics of youths’ digital communication environments that differentiate them from traditional developmental contexts (Subrahmanyam and Šmahel 2011). Finally, as previously noted, a separate line of work within organizational psychology has highlighted numerous “ambient stimuli” of social media, or features relevant to organizational settings, that shape individuals’ behaviors, affect, and cognitions (McFarland and Ployhart 2015).

In delineating our *transformation framework*, we integrate and apply this work to adolescent peer relations processes in order to present a comprehensive, up-to-date model for understanding the role of social media in adolescents’ interpersonal relationships. In the current section, we outline seven features of social media that are critical to understanding adolescents’ social media-based peer experiences. Later in this paper, we identify the ways in which these features fundamentally transform adolescent dyadic friendships. The seven features that we discuss are: *asynchronicity*, *permanence*, *publicness*, *availability*, *cue absence*, *quantifiability*, and *visualness*. We identified these features after a careful review and synthesis of the literature, with an eye toward elements of social media that may have particular consequences for adolescents’ experiences of peer relations online. In some cases, our features represent summations of conceptually related features presented across other frameworks. In other cases, we offer “new” features, based on a close reading of the prior literature examining facets of social media with unique relevance to adolescents. Considered within

the framework of classic communications theories (Berlo 1960; Lasswell 1948; McLuhan 1964), our goal is to present features of social media that characterize the “channel” or “medium” of social media itself, rather than the sources, messages, or receivers of communications via social media. Although some features will have a clear impact on the receivers of messages (e.g., increased frequency of communication), or on the messages received (e.g., greater breadth and depth of content), we consider these outcomes to be separate from the features of the media itself.

We suggest that, overall, social media tends to show higher levels of each of these features compared to traditional face-to-face contexts. Note, however, that we do not offer these features for definitional purposes—that is, we do not expect that features will be used to define what is and is not “social media.” Rather, we offer these features as a useful framework for considering social media’s impact on adolescent peer relations. The degree to which a given social media tool exhibits each feature varies considerably across tools, including different platforms (e.g., Facebook, Snapchat) and their various potential functionalities (e.g., posting a public photograph, sending a private message). We thus propose that each feature can be considered on a continuum for a given social media tool, with each specific social media tool potentially having high levels of some of these features and low levels of others (see Fig. 2). As research progresses within the field of adolescent social media use, researchers may identify the levels of each feature that make up a given social media platform or functionality. We may then consider how each feature, or combination of features, may impact adolescents’ experiences using that tool. Each of these features is outlined below. For each feature, we offer a brief discussion of prior work that has informed the construct, drawing on CMC, media effects, and psychology traditions (see Table 1).

Asynchronicity

The *asynchronicity*, or time lapse between aspects of a conversation, has long been considered an important aspect of cues-filtered-out approaches to media-based communication (Culnan and Markus 1987) and has been frequently highlighted within the psychology and media effects literature (McFarland and Ployhart 2015; Valkenburg and Peter 2011). In outlining the ways in which Internet communication differs from face-to-face interaction, Berger (2013) also highlights the *asynchronicity* inherent in written (rather than oral) communication, which is more common on social media. Social media tools vary in the extent to which time passes between aspects of a conversation, with video communication tools providing near perfect synchronicity (i.e., to the same extent as in-person interactions, barring technical glitches), whereas e-mail provides high

		LOW	HIGH
Face-to-Face Communication	Asynchronicity	X	
	Permanence	X	
	Publicness	X	
	Availability	X	
	Cue Absence	X	
	Quantifiability	X	
	Visualness	X	
Private Text Messaging <ul style="list-style-type: none"> • Text messaging • Use of messaging apps (e.g., WhatsApp) • “Chat” features on social networking sites • Instant messaging 	Asynchronicity		X
	Permanence		X
	Publicness	X	
	Availability		X
	Cue Absence		X
	Quantifiability	X	
	Visualness	X	
Private Photo Messaging <ul style="list-style-type: none"> • Sending photos via text message or messaging apps • Sending photos dyadically (i.e., “privately”) via photo-based apps (e.g., Snapchat messaging, Instagram “direct messaging”) 	Asynchronicity	X	
	Permanence		X
	Publicness	X	
	Availability		X
	Cue Absence		X
	Quantifiability	X	
	Visualness		X
Public Photo Sharing <ul style="list-style-type: none"> • Posting photos on Facebook, Instagram, Snapchat “stories,” and other social networking sites 	Asynchronicity		X
	Permanence		X
	Publicness		X
	Availability		X
	Cue Absence		X
	Quantifiability		X
	Visualness		X
Private Videochatting <ul style="list-style-type: none"> • Live videochatting through Facetime, Skype, etc. 	Asynchronicity	X	
	Permanence	X	
	Publicness	X	
	Availability		X
	Cue Absence	X	
	Quantifiability	X	
	Visualness	X	

Fig. 2 Illustration of features present to varying degrees across a selection of social media tools. All features are present to the lowest degree in face-to-face communication. Note that *visualness* refers specifically to an emphasis on photograph or video sharing

Table 1 Social media features highlighted within the *transformation framework*, with summary of the prior literature

Features of social media	Definition	Related approaches described in prior literature
Asynchronicity	Time lapse between aspects of communication	Asynchronicity (Peter and Valkenburg 2013); “Cues-filtered-out” approaches (Culnan and Markus 1987); written communication (Berger 2013); transmission velocity, parallelism, rehearsability (Dennis et al. 2008); synchronicity (McFarland and Ployhart 2015)
Permanence	Permanent accessibility of content shared via social media	Persistence, searchability, replicability (boyd 2010); retrievability (Peter and Valkenburg 2013); verifiability, permanence (McFarland and Ployhart 2015); reprocessability (Dennis et al. 2008)
Publicness	Accessibility of information by large audiences	Invisible audiences (Boyd 2007); undirected communication, larger audiences (Berger 2013); interdependence (McFarland and Ployhart 2015)
Availability	Ease with which content can be accessed and shared, regardless of physical location	Accessibility (Peter and Valkenburg 2013); physicality, latency, accessibility (McFarland and Ployhart 2015); scalability (boyd 2010)
Cue Absence	Degree to which physical cues absent can range from including most in-person cues to being entirely anonymous (no cues)	“Audiovisual” and “source” anonymity (Valkenburg and Peter 2011), Cue management (Peter and Valkenburg 2013); “Cues-filtered-out” approaches (Culnan and Markus 1987); reduced social presence, anonymity (Berger 2013); anonymity, disembodied users (Subrahmanyam and Šmahel 2011); anonymity (McFarland and Ployhart 2015); symbol sets (Dennis et al. 2008)
Quantifiability	Allowance for countable social metrics	Not previously proposed in prior frameworks
Visualness	Extent to which photographs and videos are emphasized	Not previously proposed in prior frameworks

levels of *asynchronicity*, typically allowing for more time to read messages and construct responses. While prior work has sometimes considered chat and instant messaging to be “synchronous” communication tools, Münzer and Borg (2008) accurately point out that these tools still involve a certain level of *asynchronicity*, given that interpersonal feedback typically cannot be provided immediately (i.e., while a message is being constructed). The *asynchronicity* of a given tool allows for various media capabilities, as outlined by media synchronicity theory (Dennis et al. 2008)—including the speed messages are delivered (“transmission velocity”), the extent to which interactions can take place simultaneously (“parallelism”), and the extent to which a message can be carefully crafted (“rehearsability”). Due to *asynchronicity*, adolescents may participate in multiple conversations with peers simultaneously and engage in careful, selective self-presentation within messages and photographs.

Permanence

Permanence refers to the extent to which content or messages remain accessible following an original interaction or post (McFarland and Ployhart 2015). This feature is closely tied to “persistence,” or the automatic recording and archiving of things said online (boyd 2010). Within some forms of social media, adolescents may be aware of the degree of *permanence* before posting content (e.g.,

while posting a photograph on Facebook that can be discovered years later with a simple search). In other cases, adolescents may not directly perceive the *permanence* of a medium. For example, an adolescent can send photographs via Snapchat, where content ostensibly “disappears” soon after sending. Although these communications may not seem to be “permanent,” such content can easily be captured and copied by peers through screenshots or photographs. This may have particular relevance for adolescents, who may be more likely to post or share content impulsively or without consideration of the long-term consequences of permanently available content. Within the current framework, we consider *permanence* to be a driving factor for other media affordances. For example, the permanent accessibility of content allows for the abilities to search for (“searchability”; boyd 2010), retrieve (“retrievability”; Peter and Valkenburg 2013), and replicate (“replicability”; boyd 2010) that content. Similarly, *permanence* results in opportunities to reexamine previously shared content (“reprocessability”; Dennis et al. 2008), as well as to check or verify information (“verifiability”; McFarland and Ployhart 2015). Thus, we consider *permanence* to be a broad, encompassing feature of social media that is a necessary condition for these important processes described in prior discussions of social media (e.g., boyd 2010; Dennis et al. 2008; McFarland and Ployhart 2015; Peter and Valkenburg 2013).

Publicness

Prior frameworks have used various terms to describe the ways in which social media may allow communication to be shared with large groups of people simultaneously. For example, McFarland and Ployhart (2015) describe this phenomenon as *interdependence*, whereas others highlight the potential for audiences that are larger (Berger 2013) or invisible (Boyd 2007), with communication that is not directed to a specific recipient (Berger 2013). Within the current framework, we refer to this social media feature as *publicness*. We use this term in order to highlight the ways in which adolescents can use social media to communicate with a public audience of peers, adults, and even strangers to an extent that would not be possible offline. It should be noted that while the *publicness* of certain social media activities is obvious (e.g., posting a photograph for 500 followers on Instagram or Snapchat), *publicness* can also occur in such forums as group text messaging threads, where one can simultaneously communicate with groups of 10–20 friends or more. For adolescents, among whom egocentrism creates the perception that an “imaginary audience” is constantly observing one’s actions (Elkind 1967), *publicness* may create an actual audience that fulfills this expectation (Boyd 2014; Underwood and Ehrenreich 2017).

Availability

We use the term “availability” to describe the ease with which content can be accessed and shared, regardless of physical location. Again, with an eye toward the effects that social media features may have on adolescents’ peer experiences, we integrate prior frameworks within the broad construct of *availability*. We consider *availability* to first encompass the ease with which contact can be initiated and networks joined, mapping on to the idea of *accessibility* (McFarland and Ployhart 2015; Valkenburg and Peter 2011). The act of picking up one’s phone and sending a text message, for example, requires far less effort than driving to a friend’s house to talk, as does messaging a stranger online versus going to a party to meet someone new. This may be especially appealing as youth reach adolescence, when peer interactions become increasingly desired, frequent, and central to one’s sense of self (Hartup 1996). Within our conceptualization, *availability* also includes the irrelevance of physical distance when communicating via social media, or “physicality” (McFarland and Ployhart 2015), given that the ease of social media communication is greatly facilitated by the lack of physical travel required. A defining characteristic of *availability* is the removal of barriers, physical or otherwise, in regard to communication. Prior frameworks highlight the speed at which content can be shared (“latency”; McFarland and Ployhart 2015). Given our focus

on the impact of social media on adolescents’ peer experiences, in comparison with in-person interactions, we place greater emphasis on adolescents’ physical ability to quickly access and communicate with peers than on “latency” as a technical affordance of social media. We thus consider the speed with which adolescents can access and share content to be a consequence of *availability*, rather than a feature in itself. Combined with *publicness*, the *availability* of a given social media tool allows for “scalability,” or the potential for content to become highly visible, for example, through forwarding of messages or videos that quickly “go viral” (boyd 2010). We thus consider this previously proposed “structural affordance” of social network sites (boyd 2010) to fall under the broad conceptualization of *availability*.

Cue Absence

Cue absence represents a feature of social media that originates with cues-filtered-out theories of CMC (Culnan and Markus 1987) and the notions of “anonymity” and “social presence” previously described by scholars across fields (e.g., Berger 2013; Culnan and Markus 1987; McFarland and Ployhart 2015; Subrahmanyam and Šmahel 2011; Valkenburg and Peter 2011). The lack of physical presence required of communication via social media often precludes interpersonal cues such as vocal tone, physical touch, gestures, and facial expression, and reduces the number of ways that information can be expressed, or “symbol sets” (Dennis et al. 2008). Relatedly, scholars have described the potential for “cue management” online, or adolescents’ ability to choose which cues (visual, textual, auditory, video) are presented (Peter and Valkenburg 2013). The concept of “disembodied users,” or adolescents’ sense that certain communication cues are missing, has also been proposed (Subrahmanyam and Šmahel 2011). Although previous scholars often emphasized the *anonymity* of social media sites, many have begun to take a more nuanced approach, with Valkenburg and Peter (2011), for example, differentiating between “source anonymity,” in which the communicator is entirely unknown, and “audiovisual anonymity,” in which visual or auditory cues may be lacking or reduced. Similarly, Keipi and Oksanen (2014) suggest a continuum of anonymity, ranging from full anonymity to face-to-face interaction, with pseudonymity (e.g., interaction through avatars) and visual anonymity (interactions without physical characteristics or cues) falling in between. In contrast to the early days of computer-mediated communication, when much online communication was conducted with strangers (e.g., in chat rooms and online forums), current social media tools often encourage connections with known others, with the degree of connection with offline friends varying between sites (Boyd and Ellison 2008; Ellison and Boyd 2013). Thus, in order to acknowledge the range of possibilities for types of

anonymity within the current social media landscape, we characterize social media functions in terms of their *cue absence*. Drawing on continuum models, we suggest that the *cue absence* of a given social media tool may range from the multitude of interpersonal cues available via video chatting services (e.g., Skype, FaceTime), to—at an extreme end—a total lack of identifying information (complete anonymity). Within this broad range are a variety of different tools with varying levels of *cue absence*. For example, text-based communication offers fewer interpersonal cues (i.e., no facial expression, tone of voice, or gestures), while sending a photograph of one’s self to a friend may offer some cues (facial expression), but not others (voice).

Quantifiability

Scholars have begun to suggest that the “quantifiable” nature of social media interactions may have a significant impact on adolescents’ peer experiences online (Sherman et al. 2016). Although not highlighted in prior theoretical frameworks, we argue here that *quantifiability* is a critical feature of the social media context for adolescents. We define *quantifiability* as the extent to which social media allows for numerical social metrics, in a way that was not previously possible offline. Quantifiable indicators are commonplace within social media tools—for example, many social networking sites display numbers of “likes,” “retweets,” “views,” or “shares.” Numbers of friends and followers are displayed across many sites as well. The *quantifiability* of social media can even be seen in displays of times at which certain content was posted, thus allowing users to determine the length of time that passed for an individual to accrue a given number of likes or comments. In addition, *quantifiability* allows for the ability to count numbers of text messages shared and times at which those text messages were sent. Preliminary studies suggest that adolescents are highly aware of and influenced by these quantifiable metrics (Chua and Chang 2016; Sherman et al. 2016). For example, studies suggest that certain adolescents may post content at times of day when they believe they will receive more likes and comments (i.e., when friends are online; Nesi and Prinstein, in press) and take down or untag photographs that do not receive a desired number of likes or comments (Dhir et al. 2016; Nesi and Prinstein, in press).

Snapchat, one of the current most popular social media sites among adolescents (Lenhart 2015a), provides many clear examples of *quantifiability*. Although this particular platform may not remain popular over time, a description of its capabilities helps to illustrate the powerful ways in which social media’s *quantifiability* can play out within adolescents’ social lives. For example, Snapchat tracks the number of messages sent between each user and designates the individual with whom a user shares the most messages

as his/her “number one best friend.” The app displays various “emojis” next to individuals’ usernames to indicate, for example, whether two individuals have the same “number one best friend,” or whether one sends more messages than are reciprocated. Each user receives a Snapchat “score” reflecting the number of posts they have sent and received. And, when users have sent messages to each other for consecutive days, a “streak” score appears next to the user’s name to indicate the consecutive number of days.

Visualness

A second social media feature that has not been highlighted in prior theoretical frameworks is *visualness*. We define this feature as the extent to which a medium emphasizes photograph or video sharing. Although in-person interactions are obviously visual, we consider *visualness* to include the capability of social media to allow for a greater emphasis on visually pleasing, shocking, or humorous photograph compositions, as well as the application of appearance-enhancing filters (Perloff 2014). Certain social media applications, such as Instagram and Snapchat, have such “filter” mechanisms built in to allow for easy or automatic application to one’s photographs. The *visualness* of many social media platforms is considerable—so much so, in fact, that for sites like Instagram and Pinterest, very few functionalities are provided apart from photograph and video displays. On certain sites, like Snapchat, adolescents may exchange so many photographs each day that scholars have suggested a newly found legitimacy for “photographic communication,” or the use of self-photographs to convey expression, tone, or emotions within conversation (Waddell 2016). In addition, when combined with *cue absence*, the *visualness* of many photograph-based platforms engender limited, two-dimensional portraits of identity that lack the complexity and multifaceted self-presentations of traditional interactions. These two-dimensional, visually oriented portraits may be particularly salient during adolescence, given key features of this developmental period. For example, adolescents are acutely attuned to their own and their peers’ physical appearance and tend to engage in high levels of appearance-based social comparison (de Vries et al. 2016).

Toward a Transformation Framework

It is clear that these seven features of social media—*asynchronicity*, *publicness*, *permanence*, *availability*, *cue absence*, *quantifiability*, and *visualness*—create a unique context that is fundamentally different from adolescents’ offline social worlds. We propose that this distinct context transforms adolescents’ peer experiences in important ways. Through this *transformation framework*, we offer a model for understanding the ways in which the

features of social media reshape traditional peer relations constructs, such as peer status, peer influence, friendship, and peer victimization. We propose the *transformation framework* in order to integrate prior cross-disciplinary work regarding the impact of social media features on individuals' behaviors and experiences (boyd 2010; McFarland and Ployhart 2015; Peter and Valkenburg 2013; Subrahmanyam and Šmahel 2011; Valkenburg and Peter 2011; Walther 2011), and to offer a framework for future research on the role of social media in adolescent peer relations from a theory-based perspective.

Within the *transformation framework*, we propose that the context of social media transforms peer experiences in at least five ways (see Fig. 1). First, social media may simply increase the *frequency or immediacy* with which traditional offline peer experiences take place, for example, by allowing for peer interactions and communications to occur rapidly and often. Second, social media may *amplify* certain experiences and demands, increasing the intensity of traditional peer processes. For example, peer influence processes may be amplified in the context of social media as they can occur at a higher speed, with a greater volume of content, and on a larger, public scale. Within the broad domain of friendship, communication demands may be amplified, as the features of social media heighten expectations of availability and relational maintenance. Third, social media may *alter the qualitative nature* of peer experiences by changing the ways in which certain interactions are perceived or experienced. For example, communication and social support processes may be perceived as less “rich,” and victimization experienced as more harsh, within the online environments due to *cue absence* and *asynchronicity*.

The fourth and fifth mechanisms of transformation both highlight *new opportunities for behaviors* that are present within the context of social media. The social media environment allows for numerous experiences that would have been unlikely, difficult, or entirely impossible without these technologies. This may create two related, yet distinct, types of transformation. First, social media may transform peer experiences by allowing new opportunities for *compensatory behaviors*. This refers to behaviors or experiences that may have been possible offline, but that certain adolescents are much more likely to engage in *online* due to increased comfort or opportunity. For example, the domains of friendship and peer status may be transformed as marginalized youth find opportunities to connect with similar peers online. Finally, social media may create new opportunities for *entirely novel behaviors*, or those that simply would not have been possible offline. For example, the domain of peer victimization may be transformed through opportunities to digitally alter and spread privately shared content, and peer status may be transformed through novel opportunities to accumulate “likes” and “followers.”

There is likely to be considerable overlap within these broad categories of transformation. For example, in many cases, the amplification of experiences may be caused by increasing frequency of behaviors or opportunities for new behaviors; similarly, opportunities for new behaviors may result in changes in the qualitative nature of experiences. In addition, it is likely the case that further refinement of these categories, and perhaps the addition of new categories, will be needed in the future as new research accumulates, and as the nature and capabilities of social media sites evolve. However, these five mechanisms offer an important conceptual starting point for understanding the myriad ways in which peer experiences can be transformed through social media.

As previously stated, the *transformation framework* does not specify social media's impact on peer experiences—it offers no explicit commentary on the *outcomes* of these transformations on adolescents' adjustment, nor does it inherently offer any overall characterization of social media's impact as “good” or “bad.” Prior theoretical, empirical, and popular conceptions of social media have often attempted to do so. However, as social media becomes inexorably woven into adolescents' daily experiences, and as nearly limitless possibilities exist for the ways in which adolescents can use social media tools, it becomes increasingly difficult to characterize social media's overall influence as either “harmful” or “helpful.” In contrast to these approaches, the *transformation framework* simply aims to identify the ways in which peer experiences via social media are *different*. These transformed peer experiences, then, may be alternatively beneficial, detrimental, both, or neither to adolescents.

Application of the Transformation Framework: Adolescent Friendship Processes

In this section, we apply the *transformation framework* to previous work on adolescent social media use and friendship processes (see Table 2). In particular, we consider adolescents' social media use in relation to dyadic processes, that is, processes typically occurring between two individuals. For example, we consider friendship support, relational maintenance behaviors, and more problematic friendship experiences (e.g., co-rumination, reassurance-seeking). Although these processes may occur within larger peer groups, the constructs examined here have traditionally been studied within dyadic friendships. In addition, as will be discussed, the features of social media may create opportunities for traditionally “dyadic” behaviors to occur within larger group settings. We review existing evidence for the proposition that social media transforms these experiences, and we also make theory-based predictions to guide further work in this area. It should be noted

Table 2 Examples of social media features transforming adolescents’ traditional dyadic friendship processes

	Social media features			
	Asynchronicity	Permanence	Publicness	Availability
Definition	Time lapse between aspects of communication	Permanent accessibility of content shared via social media	Accessibility of information to large audiences	Ease with which content can be shared, regardless of physical location
Application to Dyadic Friendship Processes	<ul style="list-style-type: none"> • More comfortable interactions with time to consider responses, especially during emotional conversations • May create greater relationship uncertainty, increase reassurance and feedback-seeking 	<ul style="list-style-type: none"> • Impulsive requests for support remain visible to others for extended time • Allow for comparisons and co-rumination that extend over longer periods of time 	<ul style="list-style-type: none"> • Can receive support from wide network • Need to “prove” friendship connections through public relationship displays • Unskilled interpersonal behaviors (e.g., reassurance-seeking) visible to large network 	<ul style="list-style-type: none"> • Immediate, frequent access to social support • Create expectations of constant accessibility • Causes media multitasking • Can stay in touch with geographically distant friends • Opportunity for “online exclusive” friendships
	Cue absence	Quantifiability	Visualness	
Definition	Degree to which physical cues absent	Allowance for countable social metrics	Extent to which photographs and videos are emphasized	
Application to dyadic friendship processes	<ul style="list-style-type: none"> • Social support may be less rich • Lack of practice of social skills • Increased comfort and self-disclosure, particularly for socially anxious youth • Easy to misinterpret comments • Disinhibition could lead to increased problematic behaviors, self-disclosure 	<ul style="list-style-type: none"> • Create new expectations for friendship with likes, comments, “scores” • Quantifiability of support may increase disclosure of more dramatic information • Quantifiable reinforcement of problematic behaviors 	<ul style="list-style-type: none"> • Opportunities for more visual communication with friends through photographs • Focus on how friendships appear to others • Expectation that friends comment on appearance 	

Many examples of transformed friendship experiences are likely to be the result of multiple social media features. For ease of presentation, friendship experiences are listed in relation to the social media feature believed to be most relevant in transforming that experience. Note that although some of these processes can occur in larger peer groups, they have traditionally been studied within dyadic friendships. In addition, as noted here, social media features may create opportunities for traditionally dyadic behaviors to occur within larger group settings

that this section is not meant to serve as a comprehensive review of the literature on social media and friendship processes. Rather, studies are selectively highlighted to illustrate the *transformation framework*, drawing on work by scholars across the fields of CMC, media effects, organizational psychology, and peer relations.

When available, we highlight studies that offer a direct comparison of online experiences and their offline corollaries. Such studies, for example, may show discriminant associations between each of these experiences and putative predictors and outcomes, or between corresponding online and offline behaviors. As such, they offer evidence that online experiences, though related, are distinct from similar offline experiences and thus directly support the *transformation framework*. In many cases, however, such strong empirical evidence has not yet accumulated, given the emerging nature of this field and rapidly changing social media landscape. As a result, we often review descriptive and experimental data highlighting the potential for new, more frequent, or qualitatively different friendship behaviors. Thus, some of the predictions offered

below remain necessarily speculative, and in many cases, we draw on studies of adults or college students.

It should be noted that many of the ways in which social media may transform peer experiences are likely to vary based on adolescents’ age. A long history of research on offline peer relationships has documented that friendships increase in stability, intimacy, importance, and attachment as youth age (Collins 2003; De Goede et al. 2009; Hunter and Youniss 1982; Poulin and Chan 2010). Important neurodevelopmental differences in the imbalance of socioemotional and cognitive control networks are also relevant for understanding the roles of peers in adolescents’ versus young adults’ lives (e.g., Chein et al. 2011). It is likely that a clear pattern of developmental differences in social media’s effect on friendships will emerge once more research has accumulated. The effects of quantifiable status indicators (e.g., “likes”) on the experience of friendship, for example, may differ greatly from early to late adolescence or early adulthood. However, the lack of research comparing age-specific effects makes such conclusions impossible at this time. We thus review studies across age groups offering

preliminary evidence of processes that may occur in adolescence, broadly defined, and we note that future research will be needed to clarify these effects.

Overview of Friendships in the Social Media Context

Friendships provide an important developmental context for adolescents' social and emotional growth (Newcomb and Bagwell 1995). Not only may friendships provide a context for the development of important social competencies, but they also serve a protective function in providing social support to prevent maladaptive outcomes (Sullivan 1953). Friendships differ from acquaintance relationships in their more intense affective and affiliative features, including greater social activity and intimacy (Newcomb and Bagwell 1995, 1996). In addition, as conflicts arise within these intimate relationships (Hartup 1996), friendships provide a context in which adolescents can practice effective conflict resolution (Newcomb and Bagwell 1995). As young people enter adolescence, changes across cognitive, biological, and social domains allow for increased intimacy, reciprocity, and support within friendships, with important implications for adjustment through the lifespan (Berndt 1982).

The intimacy and relationship quality of friendships provided by different communication channels have been a long-standing debate within the CMC research literature, with multiple theories proposed for how the online environment may impact the qualitative nature of interactions. The hyperpersonal model (Walther 1996), for example, posits that under certain conditions, the reduced cues and asynchronicity of the online environment can facilitate social interactions that exceed their face-to-face counterparts in terms of desirability and intimacy. On the other hand, "cues-filtered-out" theories (Culnan and Markus 1987) have suggested that computer-mediated communication channels do not provide the same interpersonal cues available in face-to-face environments (i.e., *cue absence*), thus negatively impacting relational tasks such as problem solving, decision making, conflict management, and intimacy. For example, social presence theory (Short et al. 1976) argues that communication channels with fewer nonverbal cues result in less warmth and closeness among those who are interacting. Media richness theory (Daft and Lengel 1986) highlights the different affordances of various communication channels and argues that "richer" media (e.g., face-to-face interaction) should be used for more "equivocal" decision-making tasks, or those in which there are multiple interpretations of information being shared. Building on media richness theory, media synchronicity theory (Dennis et al. 2008) has suggested that the capabilities of a given media platform (e.g., transmission velocity, rehearsability) should be matched to the needs of a social situation in order to optimize communication performance.

Within the media effects literature, which has focused more directly on the role of social media in contributing to individuals' relationship quality, the *displacement hypothesis* (Kraut et al. 1998) was first proposed in the early days of the Internet. This hypothesis suggested that the quality of individuals' offline relationships would suffer as a result of Internet use because high-quality offline relationships would be replaced with time spent in low-quality online interactions. Indeed, research suggests that online-only friendships may be of lower quality than offline or "mixed mode" friendships (i.e., meeting online and then spending time offline; Antheunis et al. 2012), perhaps due to *cue absence*. On the other hand, however, as modern social media tools encourage adolescents to engage online with friends already known in the offline context, a *stimulation hypothesis* has been proposed, with evidence accumulating to suggest that adolescents' friendship quality will be enhanced as the *availability* of social media allows for more time spent communicating with existing friends (Valkenburg and Peter 2007b, 2011). Using these hypotheses as a guide, prior reviews have highlighted the positive and negative consequences of social media for intimacy, friendship, loneliness, and relationship quality, typically within broader reviews of adolescent social media use and well-being (Amichai-Hamburger et al. 2013; Nowland et al. 2017; Peter and Valkenburg 2013; Spies Shapiro and Margolin 2013; Valkenburg and Peter 2011; Weinstein and Davis 2015). The current section draws on the literature from across the CMC, media effects, and developmental psychology fields to discuss the ways in which specific features of social media may impact dyadic friendship processes. The literature suggests that these processes may be transformed in a number of ways including: changing the qualitative nature of friendship experiences to be less rich or, alternatively, more comfortable; increasing the frequency and immediacy of support provision; creating new opportunities for compensatory friendship behaviors and online exclusive friendships, as well as for novel "relationship displays"; and amplifying communication demands. Furthermore, social media may transform problematic friendship processes, such as excessive reassurance-seeking and rumination, by amplifying their intensity and increasing the frequency and immediacy by which they can occur.

Transformation of the Qualitative Nature of Friendship Processes

The *asynchronicity* and *cue absence* of the social media environment may transform friendship processes by altering the qualitative nature of specific communication processes (e.g., interpretation of information, conflict resolution, problem solving), as well as the quality of relationships and social support more generally.

Altered Quality of Communication Processes

The *cue absence* and *asynchronicity* of social media likely change the qualitative nature of communication processes in multiple ways. In general, these features may present challenges for the interpretation of information shared online. In qualitative work, for example, young people report that the inability to share facial expressions, body language, or tone of voice on some forms of social media can result in misinterpretations and misunderstanding within conversations (Madell and Muncer 2007). Experimental work with young adults confirms that the ability to accurately interpret tone (e.g., sarcastic, serious, angry) can be hindered by text message communication (Kruger et al. 2005). For certain adolescents, this ambiguous online social context can result in greater levels of “interpretation bias,” or the tendency to ascribe threatening interpretations to ambiguous social situations. In an experimental study of college students, Kingsbury and Coplan (2016) developed and validated a vignette-based measure of interpretation bias in the context of text messaging. Correlations between this measure and traditional measures of face-to-face interpretation bias were between .40 and .46, suggesting that these phenomena are related, yet distinct, constructs. Furthermore, the authors found that higher levels of social anxiety were more strongly associated with interpretation bias in face-to-face, versus computer-mediated, environments. Although preliminary, this finding provides initial evidence that, due to the *cue absence* of online environments, adolescents may be more likely to misinterpret social stimuli online, regardless of whether they experience social anxiety.

The features of social media are likely to influence conflict processes as well. Conflict, and the effective resolution of conflicts, is an important aspect of close relationships in adolescence (Newcomb and Bagwell 1995). On the one hand, the *asynchronicity* of social media may benefit adolescent communication with friends in that it allows for time to “cool down” during conflicts, engendering more productive conversations; on the other hand, however, the *cue absence* and *asynchronicity* of social media may create new challenges in regard to problem solving and negotiation. A number of experimental studies within the CMC field have explored conflict resolution tasks online, and although these studies have primarily been conducted with adults engaged in problem-solving tasks, they may be applicable to considering how conflict-related communication processes take place more generally, with potential implications for adolescent friendships. One study, for example, suggests the potential for more effective problem-solving communication online by comparing asynchronous (i.e., e-mail) with more synchronous (i.e., instant message) communication methods for an experimental negotiation task (Pesendorfer and Koeszegi 2006). Compared to those who communicated

via e-mail, those who used more synchronous communication tools expressed more emotion, showed poorer problem solving, and engaged in less friendly communication; those in the asynchronous condition reported greater satisfaction with the process and outcome. Extrapolating from these findings, one might suspect that communication via even more synchronous means (i.e., face to face) may produce even higher levels of affect and, perhaps, less effective negotiation. As such, we might expect that adolescents engaged in conflicts within their friendships would benefit from the use of asynchronous media, where communication might be less emotional and more effective.

Other experimental studies, however, indicate the opposite. In an experimental test of media richness theory among adults, for example, Dennis et al. (1999) found that teams take longer to make decisions when they use less rich forms of media (i.e., those with fewer interpersonal cues). More recently, drawing on media synchronicity theory, Tang et al. (2013) found that, during negotiation and problem-solving tasks, adults were less satisfied with the process and outcome of the task when they perceived less “social presence” from a communication medium (i.e., synchronicity, number of communication cues, speed of responses). Applying these results to adolescent friendships, we might expect media tools with greater *cue absence* to result in less effective conflict resolution. On the other hand, Münzer and Borg (2008) show that while asynchronous media may initially hinder the process of information integration (i.e., collaborative problem solving) in adults, communicators may engage in compensatory strategies to improve communication effectiveness when using asynchronous media. Among adolescents, many of whom have considerable experience using digital technologies, such compensatory strategies may come naturally—resulting in more effective communication with friends. Thus, while findings from the CMC literature overall provide evidence that the features of online communication transform the qualitative nature of conflict resolution, whether the altered quality of these interactions is positive or negative—or both—remains unclear. Furthermore, although these experimental findings likely have important implications for adolescents’ conflict management, directly examining these processes within adolescent friendships will be an important area for future work.

Altered Quality of Relationships and Social Support

Initial evidence also suggests that the *asynchronicity* and *cue absence* of social media may change the qualitative nature of social support and communication between friends more broadly. Some studies, for example, suggest that communication may be less “rich” when conducted via social media. Some of this work is rooted in the ideas of the *displacement hypothesis* (Kraut et al. 1998), which, as previously

discussed, was perhaps more relevant in the early days of Internet use, when communication with existing friends was less common, and communication with strangers more common, online. However, insofar as adolescents now engage in a considerable proportion of their communication with existing friends using social media, the potential for lower quality (i.e., less “rich”) interactions to take place online remains an important area of study. A recent theme of this work within the developmental psychology literature has been the impact of digitally mediated communication on adolescents’ development of social skills. Interestingly, a recent review suggests that online interactions may require different types of social competence compared to offline interactions, highlighting the potential transformation of these processes online (Reich 2017). In terms of offline social skills, one study of young adolescents directly examined the impact of screen time reduction on young adolescents’ social skills; compared to adolescents who used social media as usual, those who attended an outdoor camp for 5 days without access to screens showed improved ability to recognize nonverbal emotion cues (Uhls et al. 2014), suggesting that the use of less “rich” communication in the form of social media may impede adolescents’ development of these skills. In addition, one longitudinal study of adolescents in romantic relationships showed that those who engaged in higher proportions of their communication with dating partners via technology (versus in-person) reported lower levels of interpersonal competence one year later (Nesi et al. 2016). Although this study examined communication within romantic relationships specifically, one might expect similar processes to occur within adolescents’ non-romantic friendships, as well. In addition, these studies focused on early and middle adolescents. Given that the nature of and competencies involved in early adolescent relationships differ from those of later adolescent relationships (Collins 2003; Poulin and Chan 2010), it will be critical for future research to examine the impact of social media features on interpersonal competency across adolescent development.

Another theme of the literature examining the transformation of relationship quality and “richness” online is the role of *cue absence* and *asynchronicity* in social support, and in particular, emotional support, processes. Although social support may now be readily available from a wide network of peers due to social media’s *availability* and *publicity* (see below), the question remains as to whether support received via social media is qualitatively equivalent to that received offline. Studies conducted with adults suggest that while social media may provide informational support, offline contexts may be more valuable for providing emotional and instrumental support (Trepte et al. 2015). Both experimental (Jiang et al. 2013) and self-report (Anandaraman et al. 2010) studies have suggested that when young people perceive media tools as providing greater “richness”

(e.g., ability to communicate different cues, emotional tone, and varied language), perceptions of social rewards such as improved communication, companionship, and respect, increase as well. It may follow that less “rich” media tools might not provide these same social rewards. Indeed, another experimental study suggests that emotional bonding between friends decreased across four conditions (face to face, video chat, audio chat, and text messaging), as systematically fewer interpersonal cues were available (Sherman et al. 2013), perhaps indicating that emotional support received in these environments may be less impactful. These elements of social reward, including companionship, improved communication, and interpersonal bonding, though conceptually distinct from social support, may offer more meaningful or intimate interactions in the context of social support provision.

Although few studies have directly compared the quality of social support received online versus offline among adolescents, one study found a direct positive association between greater support-seeking on Facebook and increased depressive symptoms (Frison and Eggermont 2015). Providing evidence for the differential quality of offline versus online support, no such associations were found between depressive symptoms and support-seeking *offline*. This may indicate that online support-seeking represents a more maladaptive, less active coping strategy. Another study indicates that adolescents perceived interactions taking place through Snapchat as less supportive than face-to-face and voice call interactions, both of which represent lower levels of *cue absence* and *asynchronicity* (Bayer et al. 2016). Interestingly, the same study found that Snapchat interactions, which represent low levels of *permanence*, were also perceived as less supportive than those taking place on more permanent platforms (e.g., e-mail, text message). Among adults, studies find that although both face-to-face and digital methods of communicating social support decrease distress following a difficult or traumatic event, face-to-face methods may be more effective in doing so (Hawdon and Ryan 2012; Lewandowski et al. 2011). Taken together, these studies provide evidence that social support processes occur differently online compared to offline and that the *cue absence*, *permanence*, and *asynchronicity* of social media environments may transform the qualitative nature of these processes.

In addition to the potential for *cue absence* and *asynchronicity* to transform the perceived “richness” of relationships and social support online, these features also may impact adolescents’ sense of comfort in online communication. Communication via social media may be perceived as “safer” or easier than offline communication. Qualitative work suggests that young people may enjoy using text and instant messaging because these tools allow for more time to think about how to express themselves, particularly in

emotional situations (Madell and Muncer 2007; Quan-Haase 2008), and that the lack of cues of the online environment may contribute to this sense of comfort (Keipi and Oksanen 2014). A recent study suggests that the *permanence* of social media may also play a role in these processes, with adolescents reporting that ephemeral messaging (i.e., on Snapchat) was more enjoyable than interactions with greater *permanence* (i.e., through e-mail, Facebook, and texting; Bayer et al. 2016). In addition, adolescents may feel more comfortable engaging in self-disclosure with existing friends online, which may increase feelings of closeness in relationships (Valkenburg and Peter 2009).

This may be especially true for socially anxious adolescents, who report that online interactions allow for greater controllability around what, when, and how they communicate (Schouten et al. 2007; Valkenburg and Peter 2007c; Young and Lo 2012), resulting in greater perceived breadth and depth of communication topics discussed online (Peter and Valkenburg 2006; Schouten et al. 2007; Valkenburg and Peter 2007a, b, c). One longitudinal study suggests that this perception of greater breadth and depth during online communication increased levels of closeness with friends (Valkenburg and Peter 2007a, b, c), and cross-sectional work suggests that socially anxious adolescents experience greater feelings of closeness and decreased levels of social phobia during online, compared to offline, interactions (Yen et al. 2012; Young and Lo 2012). In reference to initiating *new* friendships, one study found that adolescents who engaged in higher levels of instant messaging showed greater ability to initiate *offline* friendships six months later, suggesting that the “safety” of the online environment may allow for practicing social skills that later translate offline (Koutamanis et al. 2013). It should be noted, however, that these longitudinal studies do not control for offline behavior, precluding conclusions regarding the *unique* role of social media communication in contributing to friendship quality and initiation. In addition, it will be important for future studies to account for the age of adolescents, as comfort in friendship initiation and communication may increase as adolescents develop (De Goede et al. 2009).

New Opportunities: Compensatory Friendship Behaviors

The *availability*, *publicness*, and *cue absence* of social media may create new friendship opportunities for adolescents, in ways that previously may have been difficult or impossible offline. For example, the features of social media create an environment in which some adolescents can create new friendships or receive social support from unknown others. The experience of having friends whom an individual has not met in-person is clearly a phenomenon specific to the social media context, facilitated by social media’s features. Although adolescents primarily use social media to

communicate with existing friends, evidence suggests that many adolescents do develop “online exclusive” relationships: recent statistics suggest that 57% of adolescents have met a friend online, and only 20% have later met this friend in-person (Lenhart 2015b). Furthermore, the *availability* of the online environment may create compensatory opportunities by allowing adolescents to seek out online friends with unique shared experiences—from cancer (Love et al. 2012) to physical disabilities (Stewart et al. 2011)—that might previously have been prohibitively difficult offline. Despite research suggesting that online exclusive friendships may be of lower quality than offline friendships (Antheunis et al. 2012), for adolescents who are lonely or socially isolated, such friendships may provide companionship. For example, longitudinal studies of adolescents and young adults suggest that for those who were shy or introverted, communication with online exclusive friends predicted increases in self-esteem and decreases in depressive symptoms (Van Zalk et al. 2011; Van Zalk et al. 2014). Multiple cross-sectional studies have suggested that adolescents with mental illnesses, and depressive symptoms in particular, may be more likely to use social media to make new friends or to interact with strangers—perhaps as a means of reducing loneliness or compensating for peer difficulties offline (Gowen et al. 2012; Hwang et al. 2009; Mitchell and Ybarra 2007; Ybarra et al. 2005). Furthermore, one longitudinal study showed that females with childhood ADHD diagnoses were more likely to interact with strangers online as young adults and that this association was mediated by offline peer impairment (Mikami et al. 2015). However, the benefits of online exclusive friendships for socially isolated adolescents are not clear, with at least one study showing that lonely adolescents who talked online with strangers showed decreased well-being over time (Valkenburg and Peter 2007a). Thus, the extent to which “online exclusive” relationships can provide the intimacy and protective qualities of offline relationships remains to be seen, with more research needed.

In addition to creating opportunities for communicating with strangers, evidence suggests that social media increases opportunities for communication with geographically distant friends. One obvious transformative feature of social media’s *availability* is the ease and speed with which friends can be contacted, regardless of their location. Studies suggest that, perhaps not surprisingly, adults communicate more using electronic means (versus face to face) with friends who live farther away—importantly, however, one study found that electronic communication does not *replace* face-to-face contact and physical travel, but rather, that those who communicate more via electronic means also communicate more face to face (Tillema et al. 2010). The ability to easily communicate with geographically distant friends may also serve as a protective factor for mental illness among some young people. One study showed that among college students with

low levels of offline friendship quality, online communication with geographically distant friends resulted in decreased depressive symptoms over the course of one month (Ranney and Troop-Gordon 2012).

Increased Frequency and Immediacy of Communication

The *availability*, *publicness*, and *permanence* of social media also may increase the frequency and immediacy of receiving social support, which may enhance friendship quality. In line with the *stimulation hypothesis* (Valkenburg and Peter 2007b), social media's *publicness* allows adolescents to access a wide network of peers, with social media's *availability* ensuring that peers may be available at almost any time of day, from any location. The *permanence* of communication means that requests for support can be viewed, and responded to, over an extended period of time. This may transform friendship processes in important ways. Whereas social support may have traditionally been sought out in dyadic relationships, this can now occur in larger group settings. Although previously discussed research identifies the potential for digitally mediated support to be less "rich," studies also suggest that the ability to receive immediate support from a large network of friends may improve well-being. Frison and Eggermont (2015), for example, found that adolescents who both sought and perceived that they received social support through Facebook showed lower levels of depressive symptoms. In general, studies with college students have found that those who perceive larger audiences for their posts on Facebook report higher perceived social support, with a primary function of public posts being "emotional disclosure" (Manago et al. 2012); in addition, college students who perceive greater levels of emotional support on Facebook report lower levels of perceived stress (Wright 2012). Thus, the features of social media may allow for increased perceptions of positive social support within a young person's existing friend network.

This frequent and immediate friendship support may enhance quality within existing relationships. One longitudinal study of adults from 2002 to 2012 suggests that, as individuals' access to technology has increased, their perceptions of others' accessibility have also increased, thus decreasing attachment anxiety within relationships (Chopik and Peterson 2014). Media multiplexity theory posits that strong tie relationships, or individuals who are closer, exhibit greater "multimodality," or communication via a larger number of media channels (Haythornthwaite 2005). Work within this CMC tradition suggests a reciprocal positive association between number of media communication channels and friendship closeness, with friends who exhibit greater multimodality showing increased interdependence (Ledbetter 2010) and relational closeness (Miczo et al. 2011). Similarly, young people who engage in greater "relational

maintenance" behaviors via mobile phone (calling and text messaging to say hello or pass the time, for example) showed higher levels of interdependence and relationship satisfaction (Hall and Baym 2012). Drawing on the *stimulation hypothesis*, studies within the developmental and media effects literatures have also suggested that more communication with friends online enhances existing friendship quality (Valkenburg and Peter 2007b, 2011); however, Burke and Kraut (2016) highlight the importance of communication type and tie strength in this association. Specifically, their findings suggest that only *direct* communication via social media among individuals with strong ties served to increase young adults' well-being, including perceptions of social support; receiving "one-click feedback," such as likes, and viewing friends' public posts, had no effect on well-being.

Amplified Expectations and Demands Within Friendships

While the *publicness*, *permanence*, and *availability* of social media may transform adolescents' friendship experiences by enhancing the quality of those relationships, these features also may amplify expectations and demands. In particular, the constant *availability* of social media may create new expectations regarding relational maintenance and friend communication. Although few studies have examined these processes among adolescents specifically, qualitative work with college students provides evidence that many young people feel intense pressure to be accessible to friends at all times, for communication, comments, or simply "liking" photographs as a show of support (Fox and Moreland 2015; Niland et al. 2015). Many young people describe feeling "tethered" to Facebook in order to keep up their relationships (Fox and Moreland 2015) and say that social media use requires new kinds of "response work," or intensive investment in their availability and communication with friends (Niland et al. 2015). Relatedly, a qualitative study of instant message use found that college students reported experiencing invasion of personal time through IM notifications (Quan-Haase and Collins 2008). Given the presence of mobile technologies, where social media notifications may reach adolescents with high degrees of frequency and at any time of day, this "invasion" of personal time may be greatly exacerbated. Indeed, Licoppe (2012) has described this phenomenon as "the crisis of the summons," whereby smart phone text messages, e-mails, and pop-up notifications create a tension between individuals' desire for accessibility and connectivity on the one hand, and concern to protect personal time on the other hand.

Preliminary research suggests that the sense of constant accessibility and pressure to remain connected to friends via social media may create challenges within adolescents' friendships. For example, Hall and Baym (2012) found that, although electronic maintenance behaviors (use of

cell phones to check in, say hello, or keep friends updated) were positively associated with friendship interdependence among college students, they were also positively associated with *overdependence*—such as feeling that the friendship was detracting from individual activities or goals. Additionally, this study found that some young people experienced “mobile entrapment,” or feelings of pressure or guilt to be available and respond to friends’ communications. These feelings of overdependence and mobile entrapment were associated with increased relationship dissatisfaction. Relatedly, within romantic relationships, some adolescents report exploiting the *availability* of social media, in demanding excessive contact with partners and expecting constant check-ins (e.g., Baker and Carreño 2016; Draucker and Martsolf 2010), as well as experiencing jealousy when partners interact with members of the opposite sex online (e.g., following them or commenting on their pictures; Baker and Carreño 2016; Utz et al. 2015). These experiences, which are likely exacerbated due to the *availability*, *publicness*, and *permanence* of social media, may occur within adolescents’ friendships as well. For example, one study of college students found a positive relationship between frequency of Facebook use and psychological distress that was mediated by “communication overload,” or the sense that one is receiving too many communication demands (Chen and Lee 2013). In fact, social media’s *availability* may create such strong expectations of accessibility that adolescents may become concerned if they do not receive immediate responses—one study of adolescents found that almost a quarter of participants worried that friends disliked them if they did not receive immediate responses to e-mails (Katsumata et al. 2008). This process is, again, likely to be exacerbated with the presence of mobile phones and multiple social media channels. In addition, these processes may be amplified among younger adolescents, for whom the social self-concept is less well developed (Byrne and Shavelson 1996), thus potentially creating more uncertainty within peer relationships.

Evidence for the amplification of communication demands within friendships also may come from studies that have identified “media multitasking” behaviors. Media multitasking can refer to either engaging with multiple forms of media simultaneously (e.g., text messaging while looking at Facebook), or to using media while engaged in a non-media activity (e.g., text messaging while having an in-person conversation; van der Schuur et al. 2015). Although limited studies are available to test causal relationships between media multitasking and friendship processes (van der Schuur et al. 2015), preliminary research suggests that multitasking while engaged in conversation with friends (either in-person or via other media channels) may have negative social consequences. As such, “media multitasking” may transform adolescents’ friendship processes by decreasing the quality

of in-person interactions. Experimental studies with adults have found that the mere presence of a mobile phone in the room during a conversation can result in lower feelings of relationship quality, particularly when the conversation is about a meaningful topic (Przybylski and Weinstein 2013), and that holding a mobile phone in one’s hand or placing it on the table during conversation results in lower feelings of connectedness and empathic concern among conversation partners (Misra et al. 2016). Presumably, this may be due to distraction or interruption by mobile devices, a phenomenon that has been termed “technoference” (McDaniel and Coyne 2016). The effects of media multitasking on social relationships may be particularly detrimental during face-to-face conversations. For example, Xu et al. (2016) found that media multitasking negatively impacted social success (i.e., number of close friends and feelings of connectedness) during synchronous communication (face-to-face conversations, phone conversations, and video chat), but not during asynchronous communication (e-mail and text messaging). This is problematic, given adolescents’ increasing tendency to engage with social media while engaged in other conversations; in fact, a study of college students found that 93.1% of young people had used text messaging while speaking to someone else in-person (Harrison and Gilmore 2012). Furthermore, in a cross-sectional study of preadolescent girls, those who engaged in higher levels of media multitasking showed lower levels of social success, including having fewer friends and feeling less accepted (Pea et al. 2012); frequency of face-to-face communication, on the other hand, was associated with higher levels of social success.

New Opportunities: Novel Experiences Increase Friendship Demands

While the *availability* of social media may transform adolescents’ friendship experiences through expectations of constant accessibility and opportunities for media multitasking, the *publicness* and *permanence* of social media may create additional expectations through the introduction of novel friendship behaviors. One new experience created by social media is the quantifiable, public categorization of relationships into “top friends” or “best friends” lists, which may create the potential for jealousy and “drama” (Marwick and Boyd 2014). For example, in a qualitative study describing adolescents’ use of the social media app Snapchat, young people noted that they may feel jealous if they are not at the top of their romantic partner’s “best friends list,” i.e., the top three friends with whom a user exchanges “snaps” (Vaterlaus et al. 2016). Although specific to romantic relationships, such clear examples of the importance of *quantifiability* are likely to occur within adolescent peer relationships more broadly. Indeed, an early qualitative study of MySpace use among adolescents highlights jealousy and conflict that may

arise when an adolescent does not appear in a friend's publicly posted "top friends" list (Boyd 2007).

In addition, the public nature of social media tools may create the need for adolescents to "prove" or "display" their friendships to others in the peer network—with this expectation amplified by the *quantifiability* of social media metrics. For example, adolescents may experience an obligation to publicly express support for their friends' online activities via likes and comments—a new behavior made possible by the social media environment. Although research directly examining this phenomenon is limited, one focus group study with college students suggests that "relationship displays" are a critical aspect of social media use, with such displays serving a variety of functions, including enhancement of self-image (i.e., by showcasing connections with others), as well as providing public "proof" of associations with friends (Manago et al. 2008). The *extended chilling effect* (Marder et al. 2016) refers to individuals' adjusting of their *offline* behavior to avoid potential negative self-presentations to the *online* audience. In line with this effect, adolescents may shape their offline behavior based on how it may appear online—that is, becoming increasingly aware of the ways in which their offline friendship experiences will be portrayed for peers in photographs, posts, and comments on social media. It is possible that this may transform some adolescents' perceptions of friendship itself, as they become more focused on how relationships appear to others online than how they actually experience them in-person.

Transformation of the "Dark Sides" of Friendships

A somewhat newer focus within the literature on friendships more generally has been on problematic interpersonal processes, often occurring within dyadic relationships, that may contribute to peer relationship difficulties. These processes may confer risk for the development or maintenance of mental disorders, and depression in particular (Choukas-Bradley and Prinstein 2014). Studies have identified such "depressogenic interpersonal behaviors" as excessive reassurance-seeking, or repeatedly asking others for reassurance of their personal worth (Prinstein et al. 2005), negative feedback-seeking, or the tendency to seek out criticism or negative feedback in close relationships (Borelli and Prinstein 2006), and co-rumination, or extensive discussion, rumination, and speculation among peers about problems or stressors (Rose 2002).

There are a number of ways in which these interpersonal behaviors may be transformed in the context of social media, including by amplifying the intensity of these experiences, as well as increasing their frequency and immediacy. Little research has examined these processes directly. However, scholars have posited that the *availability* of social media may increase opportunities for constant feedback,

rumination, and reassurance-seeking (Feinstein et al. 2013; Nesi and Prinstein 2015; Smith et al. 2013) and that the *asynchronicity* in the social media environment may result in higher levels of relationship uncertainty, and thus feedback- and reassurance-seeking behaviors (Billieux 2012). The *cue absence* of social media may further exacerbate adolescents' feelings of uncertainty and insecurity, as nonverbal cues signaling warmth, understanding, or connection may not be available. Unskilled behaviors may also be more public and permanently accessible, and thus more damaging, on social media (Koutamanis et al. 2015). However, these behaviors may also be highly reinforced, given the potential for *quantifiable*, immediate responses from peers. Finally, the *visuality* of social media may allow these behaviors to occur in novel, nonverbal ways—for example, posting frequent photographs with the expectation of friends' comments as a means of reassurance-seeking—and this visualness may heighten the focus on appearance-based reassurance-seeking and validation (Perloff 2014).

Evidence has begun to accumulate that reassurance- and feedback-seeking behaviors do occur on social media and that they may have negative consequences for youth. For example, Hummel and Smith (2015) found that college students who received negative comments after engaging in negative feedback-seeking (i.e., posting personally revealing "status updates," or public posts containing negative content about one's personal life) were more likely to report eating disorder symptoms 4 weeks later. Furthermore, some studies have controlled for engagement in "traditional" forms of reassurance-seeking, thus providing evidence that these online behaviors are differentially, and uniquely, associated with adjustment outcomes. For example, one study found that, controlling for college students' general tendencies to engage in excessive reassurance-seeking, engagement in reassurance-seeking via Facebook predicted lower self-esteem, higher thwarted belongingness, and higher perceived burdensome four weeks later (Clerkin et al. 2013). In college females, using Facebook for negative feedback-seeking and social comparison resulted in increased body dissatisfaction and subsequent bulimic symptoms four weeks later, again controlling for general excessive reassurance-seeking (Smith et al. 2013). Finally, a study with adolescents found that engagement in social comparison and feedback-seeking behaviors on social media was positively associated with depressive symptoms, over and above levels of excessive reassurance-seeking (Nesi and Prinstein 2015).

Co-rumination refers to an excessive discussion of problems and focus on negative feelings occurring within a dyadic relationship and, when examined in offline contexts, has shown associations with greater internalizing symptoms (Rose 2002). Very little work, however, has examined the ways in which co-rumination may occur via social media. One study suggests that co-rumination may be concurrently

positively associated with frequency of text messaging and social networking site use, perhaps indicating that social media may provide a convenient vehicle through which young people can engage in co-rumination (Davila et al. 2012). Furthermore, in one study of college students, Murdock et al. (2015) found that co-rumination taking place via cell phone (i.e., through calls, text messages, and other social media) moderated the association between perceived interpersonal stress and well-being, such that higher levels of stress were associated with decreased well-being only among those who engaged in rumination via cell phone. Interestingly, co-rumination conducted face to face did not moderate the association between stress and well-being. These concurrent findings, although preliminary, suggest that there may be important differences between online and offline co-rumination processes. Furthermore, the positive association between co-rumination via cell phone and co-rumination in face-to-face settings was moderate, indicating that these are related but distinct constructs. The ways in which co-rumination may be transformed will be an important area of future study, given that features of social media may allow this behavior to occur on a larger, more public, and more immediate scale. In addition, as previously discussed, the *cue absence* inherent to social media may make adolescents more comfortable disclosing feelings of distress, perhaps amplifying the process of co-rumination.

Conclusions

The current paper offers a novel, comprehensive framework for understanding how adolescents' peer experiences are transformed within the context of social media. Scholars have long recognized the critical role of peer relationships in shaping adolescent development (Choukas-Bradley and Prinstein 2014; Furman and Rose 2015; Rubin et al. 2015; Sullivan 1953; Steinberg and Morris 2001), with these relationships offering an essential context for the acquisition of developmental competencies. As youth enter adolescence, they engage in more frequent and intimate relationships with peers, and these experiences become increasingly salient for the development of identity and self-worth (Brown and Larson 2009; Hunter and Youniss 1982; Parker 2006). Research suggests that these relationships have long-term implications for mental health and illness (e.g., Modin et al. 2011). However, as adolescents increasingly turn to social media as a primary means of engaging with peers, the peer relations field has lacked a unifying framework through which to examine the implications of this phenomenon.

Through the *transformation framework*, we introduce an integrative model to unify interdisciplinary social media scholarship, with the ultimate goal of stimulating future work regarding adolescent social media use and

peer relationships from a theory-driven perspective. While much prior work on adolescents' online peer experiences has implicitly adopted a "mirroring" framework, suggesting that the dynamics of peer interactions on social media simply replicate those occurring offline, the *transformation framework* builds on emerging work recognizing social media as a distinct interpersonal context that directly impacts adolescent behaviors and experiences (boyd 2010; McFarland and Ployhart 2015; Peter and Valkenburg 2013; Subrahmanyam and Šmahel 2011). We propose that this unique interpersonal context fundamentally transforms adolescent peer relations processes. The *transformation framework* thus represents a critical departure from the prevailing approach of prior work on adolescent social media use and peer relations, highlighting the many important differences between offline and online environments that may shape adolescent behavior.

This framework integrates previous conceptualizations of digital environments from across the fields of computer-mediated communication, communications and mass media, and developmental and organizational psychology. It identifies seven unique features with particular relevance to adolescent peer relations processes, which differentiate social media from traditional, in-person contexts. These features—*asynchronicity*, *permanence*, *publicness*, *availability*, *cue absence*, *quantifiability*, and *visualness*—are critical to understanding how adolescents' peer experiences may be transformed through social media. As such, the *transformation framework* offers a much-needed alternative to prior approaches within the peer relations field, which have sought to examine specific social media platforms (e.g., Facebook, Instagram)—often resulting in confusion or frustration as adolescents inevitably turn to new platforms years, or months, later. By shifting focus to emphasize shared *features* that impact adolescents' peer experiences across social media tools, the current framework provides a foundation for future research that may build on a set of common principles.

The *transformation framework* suggests that social media transforms adolescents' peer experiences in at least five broad ways. These include increasing the frequency and immediacy of experiences, amplifying certain experiences and demands, altering the qualitative nature of interactions, creating new opportunities for compensatory behaviors, and creating new opportunities for entirely novel behaviors. In the current paper, we apply this *transformation framework* to adolescents' dyadic friendship processes and summarize the ways that these processes may be shaped by the social media context. We identify a growing body of evidence suggesting that the social media context fundamentally transforms experiences within this domain, and offer theory-driven predictions for future research. Specifically, we suggest that social media may transform the frequency and immediacy of contact and support within friendships, alter

the quality of communication processes, amplify communication demands, and create opportunities for online exclusive friendships. In addition, we find preliminary evidence that social media may amplify and increase the frequency of problematic interpersonal behaviors that typically occur within dyadic relationships, such as social comparison, co-rumination, reassurance- and feedback-seeking.

The current paper highlights the transformative role of social media in adolescents' peer relationships, and brings to light the critical need for more research in this area. It should be noted that although our discussion focuses broadly on adolescents' social media experiences, there is likely to be considerable variability in the transformative effects of social media depending on an adolescent's age. Prior work regarding "offline" peer relations suggests that peer processes vary with developmental stage. Resistance to peer influence, for example, has been shown to decrease across early adolescence and then increase slightly during the high school years (Steinberg and Silverberg 1986). Similarly, the value placed on peer status has been shown to peak in early adolescence and decrease as youth age (LaFontana and Cillessen 2010). It is possible that social media has a particularly transformative effect on the peer experiences of younger adolescents, given the value placed on peers at this stage and the more limited social experience of youth at this age. With regard to friendships, it is possible that social media use disrupts the development of social competencies during early and middle adolescence in particular, as has been suggested in preliminary work on adolescent romantic relationships (Nesi et al. 2016). On the other hand, given that friendships continue to increase in intimacy over the years of adolescence (e.g., De Goede et al. 2009; Hunter and Youniss 1982), it is possible that social media use has an especially powerful role in the friendships of older adolescents. However, each of these possibilities is necessarily speculative at this point. Very little research has directly examined developmental variations in social media uses and effects, and an insufficient number of studies have accumulated to compare age groups in the role of social media and friendships. Much future work will be needed to explore these questions.

Through the *transformation framework*, we offer an integrative model for understanding the ways in which social media transforms adolescents' experiences. In the current paper, we apply this framework to adolescents' experiences within dyadic friendships. However, this discussion offers only a preliminary starting point for understanding the ways that adolescents' peer experiences are transformed by social media. In particular, it is likely that the unique features of the social media environment, such as *publicness* and *quantifiability*, necessitate a fundamental shift in our understanding of group-based peer processes and behavior. Adolescents' peer relationships may take on a number of forms—from dyadic relationships, to cliques, to larger social

networks—and social media offers unique opportunities for each to occur, transforming them in different ways. Part 2 of this two-part theoretical review will apply the transformation framework for three group-level domains of peer relations: peer influence, status, and victimization.

It has become clear that any comprehensive understanding of adolescent development requires a consideration of the role of social media. The *transformation framework* highlights the need for peer relations researchers to acknowledge the critical role that social media plays within modern adolescents' peer experiences. It is no longer sufficient to rely on a "mirroring" framework in regard to adolescents' experiences on social media. Rather, it is necessary to recognize social media as a unique social context, and in doing so, to consider the ways in which this context fundamentally shapes adolescents' behaviors and experiences.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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