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Explicating problematic social network sites use: A review of concepts, theoretical frameworks, and future directions for communication theorizing

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Abstract
The prevalence of social network sites (SNSs) has sparked a growing interest in understanding the development of problematic SNSs use among adolescents. Yet, this nascent area of research is marked by some deficiencies in existing theoretical paradigms. This article seeks to review the state of research in problematic SNSs use—broadly with a specific focus on adolescents—and identify key areas of research for future scholarly work. First, we summarize the historical and recent developments of media *addiction* and problematic SNSs use research. Second, we discuss the theoretical perspectives that contribute to our understanding of the problematic SNSs use phenomenon and identify the weaknesses of these frameworks. Third, we propose that communication scholars should strive for theoretical integration and examine the impact of microsystem (e.g. parents and peers) and macrosystem (e.g. surveillance culture) on the development of problematic SNSs among adolescents. Directions for future theoretical and methodological approaches are suggested.

Keywords
Adolescents, macrosystem, media addiction, microsystem, peers, problematic use, social network, social network sites (SNSs), surveillance culture

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The phenomenal growth of social network sites (SNSs) has captured a considerable amount of attention from the academic community in recent years. Particularly, the potential of SNSs to elicit addictive tendencies, or *problematic SNSs use*, has attracted much scholarly interest. Research has shown that the estimates of problematic SNSs use ranged from a low of 1.6% to a high of 34% in various study populations (Griffiths and Kuss, 2015), and this figure is likely to increase based on the upward trend in SNSs adoption—the number of Internet users who use SNSs increased fivefold from 2006 to 2015 (Perrin, 2015). As the problem is more pronounced among adolescents (Meena et al., 2012), it illustrates the importance of this topic for teenagers. Adolescents are at a higher risk of developing problematic SNSs use as they are the most frequent users of SNSs, and the proliferation of smartphone ownership among the young make it very convenient for them to access SNSs (Griffiths et al., 2014; Lauricella et al., 2014). Moreover, it is at the stage of adolescence where teenagers display the highest level of difficulty in behavioral and emotional regulation (e.g. Prencipe et al., 2011). With the ease of accessibility to SNSs, it is reasonable to postulate that the incidence of problematic SNSs use may increase gradually, even though like most behavioral addiction, it is ultimately a problem that only affects the minority (Sussman et al., 2011).

As such, it is important to unpack *problematic SNSs use* theoretically for future research. While our subsequent discussion aims to examine the topic broadly, we will keep a specific focus on adolescents, as they are the most susceptible to problematic SNSs use. The purpose of this article is fourfold. First, we highlight some of the challenges faced by researchers involved in problematic SNSs use research, followed by a brief explication of problematic SNSs use. Next, we review the general theoretical paradigms that could guide research in problematic SNSs use. Third, we propose that future research directions should strive for theoretical integration and examine the impact of microsystem (e.g. parents and peers) and macrosystem (e.g. surveillance culture) on adolescents' development of problematic SNSs use. Last but not least, we also suggest that future works should incorporate a network perspective to understand the phenomenon and to extend existing communication theories by accounting for the synergistic influence of both external- and individual-level constructs on adolescents' problematic SNSs use.

Challenges to research in problematic SNSs use

While problematic SNSs use is a relatively nascent research area, there is a surge in the number of publications and debate about this phenomenon in recent years (e.g. Andreassen et al., 2012; Kittinger et al., 2012; Meena et al., 2012). Even with the burgeoning scholarship, there are challenges to research in problematic SNSs use due to unaddressed theoretical and methodological shortfalls. Unfortunately, instead of providing clarity, the quantitative increase in research has produced some unwanted consequences. One of such is exacerbating the existing fragmentation in the field instead of achieving the intended conceptual convergence. Specifically, there are three distinct issues facing researchers involved in problematic SNSs use research.

First, one of the unresolved issues is the confusion over conceptualization—what do scholars actually mean by *problematic SNSs use*? For instance, *problematic media use* is

used synonymously with terms such as *dependency*, *addiction*, and *pathological* usage (Andreassen et al., 2012; LaRose et al., 2003). Scholars need to understand the qualitative differences among the terms and use them discriminately.

The second challenge is identifying and applying theoretical frameworks appropriately to examine problematic SNSs use. There are many theoretical frameworks in psychology, communication, and neurobiological or psychophysiological studies that scholars could adopt to examine problematic SNSs use. For instance, some have examined it through the theoretical lenses of personality types (Caci et al., 2014; Ross et al., 2009; Skues et al., 2012), while others have argued that problematic SNSs use should be interpreted through the social cognitive lens (e.g. LaRose et al., 2010). Scholars have also proposed applying theories such as the theory of planned behavior or Caplan's problematic Internet use to the context of SNSs use (Baker and White, 2010; LaRose et al., 2010; Pelling and White, 2009).

While each of these theoretical frameworks bring their unique contributions, few have presented a systematic defense of the chosen theoretical framework and demonstrate how their works contribute to the overall development of communication theorizing. Without addressing the *why* questions, the quantitative increase in the research will merely add to the creation of isolated academic frog ponds (Rosengren, 1993), while taking very little stride in the development of communication theory.

The third issue is that the existing theoretical frameworks seem to over-emphasize individual-level constructs while ignoring how external environmental factors could contribute to the development of unhealthy SNSs usage. While psychological theories focusing on individual-level factors do partially explain why some exhibit uncontrollability in their SNSs use, a large body of research has also identified external factors such as parents or peers' influence—the ecological systems one is embedded in—as important contributors to the development of addictive tendencies (Santrock, 2007, 2008).

Addiction, dependency, or problematic use?

There are a variety of terms used for addictive tendencies to media (LaRose et al., 2003). For instance, scholars have used terms such as *addiction* (Alabi, 2013; Koc and Gulyagci, 2013; Young, 2004), *dependency* (Lu, 2008; Peng and Liu, 2010), and *problematic use* (Caplan, 2002, 2010; Caplan and High, 2012) to describe individuals' uncontrollable urge to use media.

Addiction is a compulsive and unhealthy dependence on a habit or substance that has negative physical or psychological repercussions (Byun et al., 2009). Despite having a longstanding academic tradition, the term *addiction* remains highly contentious, resulting in much division in the scholarly community. The usage of the word initially fell out of favor with professional academic societies such as the American Psychiatric Association (APA), which replaced it with the preferred term *dependence* in the *Diagnostic and Statistical Manual of Mental Disorder, Fourth Edition* (DSM-IV) (LaRose et al., 2003). Media addiction was not recognized as an official disorder as issues such as etiology, comorbidity (e.g. Ho et al., 2014), and treatment were not clearly accounted for, and it raises false alarm to seek treatment when there is none (LaRose et al., 2003).

The preference for *dependence* as a descriptive label was short-lived. Even though *dependence* was less loaded than *addiction*, it did not gain widespread acceptance. In the latest DSM-5, scholars recognized that the word *dependence* had caused much confusion instead of achieving conceptual clarity. As such, *dependency* was eventually replaced by *substance use disorder* in the description of addictive tendencies related to substance use while *addictive disorder* was used to describe behavioral addictions (American Psychiatric Association [APA], 2013).

Problematic use as the preferred term

In recent years, the use of the term *problematic use* has become popular with Internet researchers (Yellowlees and Marks, 2007). Many scholars prefer this concept because compared to terms like *addiction* or *dependency*, it does not assume that all cases of problematic SNSs use are pathological; at the same time, it is broad enough to encapsulate varying degrees of compulsivity and negative outcomes experienced by individuals (Caplan, 2002; Yellowlees and Marks, 2007).

Based on Davis' (2001) work in pathological Internet use, Caplan (2002) was one of the researchers who popularized the term *problematic internet use* as a preferred term over *Internet addiction*. In his treatment of the topic, Davis emphasized using a cognitive-behavioral approach and highlighted the importance of examining maladaptive cognitions and behaviors associated with Internet use as antecedents to negative consequences (Caplan, 2002; Neo and Skoric, 2009).

Davis (2001) postulated that there are two dimensions of problematic Internet use—*specific* and *generalized* Internet usage. The former—*specific* problematic Internet use—refers to the uncontrollable dependency on specific content or function on the Internet (e.g. gambling and pornography). Researchers who examine specific problematic Internet use typically assume that users are goal-driven in their Internet use. As such, the Internet merely fuels pre-existing addictive tendencies. *Generalized* problematic Internet use, on the other hand, focuses on how cognitions and behaviors relate to general Internet usage and negative consequences (Caplan, 2010). There are two major assumptions of generalized problematic Internet use. First, it assumes that the unique communication context provided by the Internet such as anonymity, opportunities for self-presentation, and social interaction, together with pre-existing psychosocial problems, facilitate the growth of problematic use (Caplan, 2002). Thus, the Internet as a medium plays a significant role in fostering problematic use because of its affordances. Second, generalized problematic Internet use framework accounts for understanding online cognitions and behaviors of users who are not goal directed at all—not all online activities are goal directed and individuals may go online simply to pass time (Davis, 2001).

As such, problematic use may be a preferred[1] term to describe addictive tendencies to SNSs because it avoids premature diagnosis of a pathological problem, and yet it is broad enough to encompass differing levels of compulsivity and negative consequences related to SNSs use. The two assumptions of generalized problematic Internet use integrates well with the nature of SNSs. Pertaining to the first assumption, the unique affordances of SNSs (e.g. self-presentation, anonymity, and facilitating online communication) (Nadkarni and Hofmann, 2012), together with pre-existing psychosocial

problems, do exacerbate problematic use (LaRose et al., 2010). With regard to the second assumption, research has also shown that SNSs use may also not always be goal-directed, people sometimes use SNSs because they are bored or simply to pass time (Giannakos et al., 2012).

Existing theoretical frameworks for problematic SNSs use

To understand problematic SNSs use, scholars have adopted a variety of theoretical perspectives. In general, these theoretical perspectives could be categorized as (a) disease model of addiction, (b) neurobiological and psychophysiological perspective, (c) addictive personality model, (d) operant conditioning model of addiction, (e) social cognitive model of addiction, and (f) Caplan's problematic Internet use (Grant et al., 2010; Griffiths, 2013; LaRose et al., 2003).

Disease model of addiction

Among all the theoretical frameworks, the most prominent is the disease model of addiction. Under this framework, problematic use is equivalent to having a mental disease or psychiatric disorder with compulsive qualities (LaRose et al., 2003). Those who were found with problematic use would be labeled as "addicts," and those without the symptoms would be labeled as "non-addicts." Young's (1998) Internet addiction test is a good representation of this theoretical framework. Her eight-item criteria were adapted from what DSM-IV presented for pathological gambling, in which she equated Internet addiction to a clinical disorder similar to pathological gambling (Young, 2004). Apart from focusing on diagnosing and identifying the etiology of addiction, scholars who adopt this framework are also concerned about the treatment process, including knowing how to reduce the dependency on media through different programs such as therapy or group and individual counseling sessions (Young et al., 2007).

Neurobiological and psychophysiological perspective

Second, scholars have adopted the neurobiological and psychophysiological perspective in understanding problematic media use. The focus of the neurobiological perspective is comparing and contrasting neural activity between individuals with high and low dependence with respect to disrupted neurotransmission in terms of dopaminergic, serotonergic, or opioid systems (Grant et al., 2006). To date, there are no known studies that have examined problematic SNSs use from a neurobiological perspective even though this is worth consideration for future research (Andreassen and Pallesen, 2014); past studies have found similar neural activities between those who scored high on Internet gaming addiction and nicotine dependency (e.g. Ko et al., 2013). As such, it is plausible that similar neural activities would be found in frequent users of SNSs. As high SNSs users are prone to depression and anxiety, it is likely that they rely more on SNSs for mood modification as the brain's reward system will release endorphins and dopamine, contributing to an emotional high (Andreassen and Pallesen, 2014). Just like the neurobiological perspective, the application of a psychophysiological perspective to SNSs is

relatively new. Thus far, only one study has examined it from a psychophysiological perspective, measuring skin conductance and pupil dilation (Mauri et al., 2011).

Addictive personality model

The third type of theoretical framework used in problematic media use research is the addictive personality model. This paradigm presumes that individuals of certain personality types are more likely to exhibit addictive tendencies to SNSs (e.g. Hughes et al., 2012; Skues et al., 2012). After decades of psychological research, scholars have identified five dimensions of personality—neuroticism, extraversion, conscientiousness, openness to experience, and agreeableness—which collectively are known as the five-factor model of personality (Hughes et al., 2012). This perspective has received some degree of empirical evidence as studies have shown that traits such as conscientiousness, openness to experience, (Amichai-hamburger and Vinitzky, 2010; Özguven and Mucan, 2013), and extraversion (Caci et al., 2014) were associated with high SNSs use even though the relationship was disputed by some (e.g. Ross et al., 2009).

Operant conditioning model

Fourth, the operant conditioning model is a framework adopted by scholars in addiction studies (e.g. Davis, 2001). The assumption of this paradigm is that consumption behavior goes through four stages—from *initiation*, *transition* to *on-going use*, to *addiction* (Marlatt et al., 1988). At the initiation stage, an individual engages in a certain behavior (e.g. either substance related or non-substance related) due to the positive expected outcomes, such as obtaining gratification from the behavior. The obtained gratification propels the individual to persist in the behavior for continual gratification, and at this stage, the behavior is not problematic even though there is a level of automaticity involved. However, if the behavior becomes an exclusive mechanism to achieve the desired outcomes (e.g. gratification), there is a transition to *addiction.* In the addiction phase, individuals may require higher consumption level to achieve the same level of gratification; they may also face withdrawal symptoms in the absence of the consumption behavior (LaRose et al., 2003).

Social cognitive model

The fifth type of theoretical framework is the social cognitive model, which LaRose et al. (2003) modified for the context of problematic media use. This model stemmed from Bandura's (1986) work in the social cognitive theory, which postulates that human behaviors are a function of a triadic causation of human, behavioral, and environmental determinants (Bandura, 2001). Central to the social cognitive model is the *self-regulation* mechanism, which assumes that humans have self-regulatory power over their behavior.

LaRose et al. (2003) argued that in many cases, where individuals display addictive tendencies to media platforms, it could be due to the interplay of deficiency in self-regulatory functions—known as *deficient self-regulation*—and the habitual strength of

media usage— a context-specific behavior that occurs automatically without the need of self-instruction (LaRose, 2010). As individuals seek to maximize positive and minimize negative outcome expectations by consuming media, they may develop deficiencies in self-regulation and an increase in media habit strength as they become less conscious of their actions. The symbiotic relationship of deficient self-regulation and habit strength will contribute to high media consumption behavior.

Caplan's problematic Internet use model

Last but not least, the sixth theoretical framework used in problematic media studies is Caplan's problematic Internet use model (Caplan, 2003, 2005). Caplan (2002) drew from Davis' (2001) conceptualization of pathological Internet use that comes from the cognitive-behavioral model, which postulates that maladaptive symptoms of problematic Internet use consists of both cognitive and behavioral dimensions. Like Davis, Caplan advocates a shift from the traditional media addiction framework when examining individuals' excessive Internet use and hypothesized that psychosocial problems such as depression predispose individuals to develop maladaptive cognitions associated with Internet use (Caplan, 2002), leading to undesirable negative outcomes such as disruptions to relationships and work.

Insufficiencies of the theoretical frameworks

These six theoretical frameworks have in their own way contributed significantly to research on problematic media use and have provided important conceptual perspectives for researchers embarking on problematic SNSs use research. Yet, there remain gaps and insufficiencies that impede the development of a holistic communication theory.

First, some of the frameworks operate more on the descriptive level and do little to provide theoretical justification for the broader *why* questions. For instance, why do the factors in the theoretical frameworks account for possible addictive tendencies? This limitation extends to the neurobiological and psychophysiological perspectives as well as for the addictive personality model. For the neurobiological and psychophysiological framework, while there is a novelty associated with data-richness, one major weakness is the lack of explanatory power—even though it shows how the neural and psychophysiological activity correlates with addictive tendencies, there are no distinct *communication* paradigms that undergird such research. As for the addictive personality model, while extensive research has been done for the SNSs context (Amichai-hamburger and Vinitzky, 2010; Hughes et al., 2012; Ross et al., 2009), there were only few that highlighted how this perspective fit into the overall communication theorizing or point to implications for theoretical development in the communication.

Second, many of these theories (e.g. addictive personality and social cognitive model) were overly focused on personal-level constructs without taking into account how external factors could provide the impetus for individuals to engage in addictive behaviors. Addiction is a complex phenomenon, and theoretical frameworks based only on individual constructs fail to address how the interplay of both internal and external environmental determinants serve as push and pull factors that contribute to the development of

addictive behaviors. Even though LaRose et al. (2003) claimed to adopt Bandura's social cognitive model that sought to explain why individuals develop problematic media use through the interplay of environmental, personal, and behavioral determinants, the actual model tested in subsequent studies did not include any environmental determinants (LaRose and Eastin, 2004; LaRose et al., 2010; Lee and LaRose, 2007).

Future extensions—theoretical integration

One way communication scholars could overcome the insufficiencies of these frameworks is to adopt an integrative approach to understand problematic SNSs use, instead of relying on a singular theoretical framework without referencing others. By drawing out similar conceptual ideas and integrating them, scholars can achieve parsimony in model testing and overcome the issue of developing academic myopia. Some scholars have attempted to adopt the synergistic approach and the results were promising. For instance, research has identified conceptual similarities among the variable *deficient self-regulation* (from the social cognitive model) and *cognitive preoccupation* and *compulsive use* (from problematic Internet use model), and thus an integrated model drawing from the two perspectives was proposed (Caplan, 2010). In addition, research has theoretically synthesized the social cognitive model with the problematic Internet use model; this extended model gives a broad overview of how psychosocial problem and deficits in social skills relate to self-regulatory problems and negative outcomes (LaRose et al., 2010).

A second potential way of integration is testing existing models (e.g. social cognitive model or problematic Internet use model) across different personality types. Researchers have often concluded that individuals who possess certain personality traits are more likely to develop problematic media use—however, the results are largely mixed and at best inconclusive (Caci et al., 2014; Özguven and Mucan, 2013). Instead of attempting to identify the one personality trait that is most at risk of developing problematic media use—which may inevitably result in unnecessary stigmatization—scholars could test how relationships between variables in existing theoretical models differ across personality types by using multi-group analyses. There are two benefits of doing so. First, communication scholars can establish statistical invariance across the multiple groups of personality traits. If the relationships in the model pan out in the same way regardless of personality types, it suggests that there is a higher degree of universality between the independent and dependent variables, giving more credibility to hypothesized relationships. Second, if the relationships between variables in the models truly differ across personality traits, scholars can investigate meaningful differences in how personality types relate to the development of problematic media use.

Future extensions—microsystem and macrosystem

Apart from theoretical synthesis, a second way communication scholars could address the insufficiencies of these frameworks is to conscientiously account for the role of environmental and external factors in influencing adolescents' problematic SNSs use development. One way to do so is to integrate Bronfenbrenner's ecological system theory with

existing communication theories. The ecological system theory postulates that individuals are situated in an ecological system that is made up of different layers of systems, and each layer exerts a certain level of influence over their development process (Meece and Daniels, 2008). These systems[2] are identified as microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Santrock, 2007).

To an individual, the most proximal system is known as the *microsystem*, which consists of individual's immediate interpersonal relationships that has a direct influence over his life. For instance, interpersonal networks (e.g. parents, peers) are considered part of one's microsystem. *Macrosystem*, on the other hand, is the most distant environmental system to an individual. This refers to a more abstract form of influence on individuals, and they consist of social norms, cultural values, attitudes, as well as the political and economic systems (McHale et al., 2009). For this review, we focus on how the role of parents and peers (microsystem), as well as the normalization of the surveillance culture (macrosystem) due to the prevalence of SNSs, may partially contribute to the development of problematic SNSs use among adolescents.

Microsystem—the role of parents

It is important to consider the role of parents and the development of addictive tendencies in adolescents as research have demonstrated the empirical link between parents' role (Baumrind, 1991; Montgomery et al., 2008; Siomos et al., 2012) and adolescents' psychosocial problems (Fitzpatrick et al., 1996). Increasingly, there are more research examining the role of parents and adolescent's SNSs use (Clark, 2011; Lee and Chae, 2007; Panek, 2014; Valcke et al., 2010).

Specifically, scholars can focus on two areas: parenting styles and family relationships (Doty and Dworkin, 2014; Floros and Siomos, 2013; Li et al., 2013; Martinez De Morentin et al., 2014). Current literature has identified four types of parenting methods—*authoritative*, *authoritarian*, *permissive*, and *rejecting-neglecting* styles (Baumrind, 1991). Authoritative parents are demanding and highly responsive to their children's needs; while they are assertive, they are not necessarily restrictive. Authoritarian parents on the other hand are demanding but not responsive to the needs of their children. They expect strict compliance to what they say without offering much explanation. Permissive parents are high in their responsiveness but not demanding, while rejecting–neglecting parents are neither responsive nor demanding.

There are no existing studies that have examined parenting behaviors on their children's SNSs use even though there are strong theoretical reasons to postulate such a relationship—parenting behaviors are associated with the development of self-regulation in children, which is a key component in LaRose's social cognitive model. Children who grew up with parents who adopt authoritative style are often happy, well developed, with higher levels of self-control, compared to children who grew up in neglectful or permissive homes (Santrock, 2007). Besides this, during the adolescence stage, conflict between parents and child escalates (Santrock, 2008), and SNSs serve as an avenue for mood modification (Caplan, 2005; LaRose et al., 2010).

Apart from parenting styles, parent–child relationships may also influence the development of addictive behaviors in adolescents (Cheong et al., 2011). The family serves as

a social and emotional support for adolescents (Yan et al., 2014). If the family provides high social support, the less likely the child or adolescent will develop problematic SNSs use—there is an inverse relationship between the level of support given by family and the development of addictive tendencies (Gunuc and Dogan, 2013). In addition to the quality of relationship, the perceived warmth of the family environment may also play a crucial role in explaining why some adolescents develop problematic SNSs use. Past research that has shown that individuals growing up in warm family environment will display less addictive tendencies (Cheong et al., 2011; Huang et al., 2009).

Microsystem—the role of peers

Apart from parents, scholars should consider how peers—another important element in the microsystem (Meece and Daniels, 2008)—could influence adolescents' problematic SNSs use. Peers constitute an important role in a young person's life (Allen and Antonishak, 2008) as the period of adolescence is marked by a significant time spent with peers and desire to belong to peer groups (Santrock, 2009). Peers are individuals who are similar to a person in terms of age or maturity (Santrock, 2008), and for adolescents, their peers are most likely to be others who attend the same class, school, community, or religious institutions. Research has shown that adolescents' behavior mirrors their peers, and peer relationships are significantly associated with adolescents' development of problematic behaviors such as alcohol and substance use (Schwinn and Schinke, 2014; Slater and Henry, 2013), as well as problematic Internet use (Zhu et al., 2015). There are three specific areas that may be related to adolescents' problematic SNSs use: (a) the attributes of peers, (b) the affordances of the mediated environment of SNSs, and (c) the quality of online peer relationships.

First, peer attributes may have a significant influence on the development of problematic SNSs use because of the intrinsic desire of adolescents to be part of peer groups or to form cliques (Meece and Daniels, 2008). Peers meet adolescents' need for *companionship*, *stimulation* (e.g. information), *physical support*, *ego support* (e.g. encouragement), *social comparison*, as well as *intimacy* (Santrock, 2007), and as such, they exert certain amount of influence over adolescents' behavior (e.g. Choukas-bradley et al., 2015; Schwinn and Schinke, 2014; Slater and Henry, 2013). Driven by the intrinsic desire to be part of a peer group, there is pressure for adolescents to conform to social norms. If majority of their friends use a particular SNS for communication, they are more likely to use it to be included into the group. Existing research has shown that SNSs are widely used for maintenance of social connection with friends (Balakrishnan and Shamim, 2013) and that peer norms are associated with intention to use SNSs (Pelling and White, 2009).

Second, scholars could examine how the affordances of SNSs environment, together with peer communication, facilitate the development of problematic SNSs use. One of the affordances of SNSs environment is to allow for asynchronous communication (Lee et al., 2012); this means that users of SNSs can communicate with one another without the constraints of time. This is a highly attractive feature for adolescents as it removes the pressures that come along with face-to-face interactions and gives adolescents greater control of how they present themselves to others (Caplan, 2005; Kim and

Lee, 2011). During the adolescence period, teenagers are concerned with their physical appearance and the need for peers' approval (Santrock, 2008). Thus, this may induce a preference for online communication via SNSs, which provide a safe haven for interaction as it gives adolescents the power of manipulating how they are presented to their online communities (Nadkarni and Hofmann, 2012). This, known as the *social compensation hypothesis* (the poor gets richer), has received substantial empirical support where individuals who suffer from psychosocial problems were more likely to use SNSs for social skills compensation (Barker, 2009; Kuss and Griffiths, 2011; Teppers et al., 2014).

Third, the instant accessibility to peers through SNSs platforms incentivizes adolescents' desire for online peer connection compared to offline social interaction; this in the long run may create an unhealthy dependence on SNSs (Davis, 2013). The instant accessibility to social networks facilitates *online peer communication*, which is the degree to which adolescents are motivated to go online to maintain their friendships (Davis, 2013). The unobstructed access to peers via SNSs may increase the chances of developing dependency on such platforms for interpersonal relationships. This is not surprising as scholars have found that the use of SNSs can create a sense of online social connectedness (Grieve et al., 2013), which serve as a psychological incentive for increased SNSs usage.

Macrosystem—normalization of the surveillance culture

Apart from immediate interpersonal influences, scholars should also examine the general environment where individuals are situated (macrosystem) in facilitate the growth of addictive tendencies toward SNSs. One of the macrosystems that could influence the addictive trajectory of individuals on SNSs is the normalization of the interpersonal surveillance culture resulting from the proliferation of SNSs use. Surveillance is an unobtrusive, habitual, and purposeful collection of information from people (Lyon, 2001). The idea of surveillance is not new—surveillance research predates the SNSs era as contemporary societies are by themselves surveillance driven (Murakami and Webster, 2009). Traditionally, surveillance research was concerned with the interplay of relationships among hierarchical classes, typically between the watcher (those endowed with hierarchical power) and the watched (Monahan, 2011). This was known as *vertical* surveillance.

When SNSs became popular, it greatly altered the surveillance landscape by democratizing surveillance. Now, surveillance is not a function exclusive to the elites anymore, and this phenomenon is integrated into everyday social interaction. As media products become domesticated (e.g. mobile phones and computers), there is a shift from vertical to *lateral* surveillance (Andrejevic, 2006; Trottier, 2012). A simple way to understand lateral surveillance is to think of it as social monitoring—where individuals seek to find out more information about people in their network.

So how is the culture of interpersonal surveillance a contributing factor to problematic SNSs use? The climate of interpersonal surveillance is more pronounced in adolescents as it facilitates the developmental task of identity formulation through online social comparison with peers and control of self-presentation. As SNSs provide adolescents with a

plethora of information about their friends, what they like and their interests (Mussweiler et al., 2006), information that were only obtainable via physical social interaction could now be retrieved on SNSs by only lateral surveillance.

Implications for future communication theorizing

By acknowledging that the elements within adolescents' micro- and macro-systems could partially explain why adolescents develop problematic SNSs use, we highlight the need to build communication theories that account for both external and individual level influences on problematic SNSs use. To do so, scholars should consider incorporating a *network perspective* in understanding the phenomenon of problematic SNSs use (Zhang and Leung, 2014). The fundamental assumption of having a network perspective is that individuals are not as independent as we think—we are all nested in different networks, and the actions of others could have a significant bearing over ours. Research has largely support this notion that individuals' behavior mirror the actions of people in their social networks—the type of social networks where individuals are situated in does explain why they do or do not develop problematic addictive behaviors such as smoking or tobacco usage (e.g. Mason et al., 2010; Mercken et al., 2010).

There are multiple ways of approaching problematic SNSs use from a network perspective. First, researchers may extend existing communication theories by accounting for how macro- and micro-systems, together with individual level psychological constructs, synergistically relate to adolescent's problematic SNSs use. This approach is commonly known as the actor–partner interdependence model (APIM) (Kenny et al., 2006; Ledermann et al., 2011), where variances in outcome variables are postulated as a function of both *actors* (the individuals themselves) and *partners* (parents and peers). For instance, apart from examining how psychosocial problems relate to problematic SNSs use through deficient self-regulation (a core premise of the social cognitive model), researchers could extend the social cognitive model by incorporating the quality of parent and peer relationships as explanatory factors. This is consistent with existing research that has suggested that relationships with parents and peers are associated with adolescents' self-regulation (Farley and Kim-Spoon, 2014).

Second, to account for how macrosystem—specifically the surveillance culture—influences adolescents' problematic SNSs use, researchers may consider using a network-based approach for data collection in addition to self-reports. This allows for a bird's eye view of adolescents' problematic SNSs use in relation to the environment they are situated in. We propose that three possible types of networks could be constructed—(a) surveillance network (the tendency to use SNSs for lateral surveillance), (b) the dependence on SNSs for identity construction (e.g. self-presentation), and (c) problematic SNSs use network. These three networks could be constructed by asking adolescents to rank their peers (e.g. An and Doan, 2015) in order of their perceived tendency to use SNSs for surveillance, the level of dependency on SNS for identity construction, and their problematic SNSs use. The construction of different networks would give a macro-view of the degree of problematic SNSs usage that self-reports would not be able to.

Conclusion

Like all emerging fields, problematic SNSs use as an area of research currently lacks clarity in terms of the explication of its terms despite a plethora of theoretical perspectives that could be imported from Internet addiction research. This study has provided a review of addiction research, explicated what problematic SNSs use is and identified some possible theoretical extensions that could be used in this area.

Despite our best efforts, this review is by no means exhaustive. For instance, in strictly keeping to our theoretical focus on why adolescents may develop problematic SNSs use, we did not explore how these theories suggest mitigating problematic SNSs use. Second, we largely examine problematic SNSs use in the context of adolescents; however, there is emerging evidence that it may be a problem among adults as well (e.g. Oldmeadow et al., 2012). Last but not least, while we suggest that future research should incorporate a network-based approach to understanding the phenomenon, we recognize that scholars need to have a significant amount of resources to overcome the administrative and logistical constraints if they want to collect data from adolescents' parents and peers.

The field of problematic SNSs use is at its infancy stage, and there is much more work to be done to achieve a holistic understanding of problematic SNSs use. We certainly hope that communication researchers find this review useful in providing a brief summary of the field and consider adopting some of our recommendations laid out in this article. As more scholars embark on research in this area, we are confident that the quality of communication theories in addressing the issue of addictive tendencies to SNSs or any other new media platforms will improve significantly; this will greatly enrich our understanding of the problematic media use phenomenon and advance theory building in communication research.

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Notes

1. While we argue that *problematic use* is a preferred term in this article, we do not advocate a puritanical and dogmatic use of the term as we recognize that all concepts are often subjected to evolutionary progress in accordance to societal and technological changes.
2. As this article is not meant to be a thorough discussion on Bronfenbrenner's ecological theory, only relevant aspects of micro- and macro-system's influence on problematic SNSs use are discussed.

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