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Habit and addiction in the use of social networking sites: Their nature, antecedents, and consequences

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ABSTRACT

Habit and addiction are two distinct drivers of information technology (IT) use that nonetheless bear increasing resemblance in how they are conceptualized and modeled in the information systems (IS) literature. The purpose of this study is to aid the further growth of these heretofore-independent streams of research by developing a comparative framework that allows us to distinguish between them. Drawing on the theories of automaticity and incentive-sensitization, we developed a theoretical model that describes the nature, antecedents, and consequences of habit and addiction of IT use in the context of social networking services. The proposed model was tested based on the data collected from 420 actual users of Twitter. We found that habit was indeed influenced by its proposed unique antecedents of routine seeking and cognitive rigidity, whereas addiction was not. Similarly, addiction was influenced by its proposed unique antecedents of focused immersion and concern for social acceptance, whereas habit was not. Looking at their outcomes, we found that although both drivers positively affected goal-congruent outcomes, only habit enhanced goal-congruent usage and addiction had a negative impact. Overall, this study contributes to the IS literature by offering a robust conceptual framework that allows us to observe the profound differences between these superficially similar drivers of routine IT use.

1. Introduction

In recent years, online services have become integral elements of our lifestyle that we constantly reach for throughout the day. An exemplary case is seen in the ubiquitous use of social networking sites (SNS): Almost a third of Facebook users and a fifth of Twitter users returning to their SNS several times a day (Hampton, Goulet, Rainie, & Purcell, 2011; Thadani & Cheung, 2011). In terms of time spent on SNS, 17.3% of users spend more than 10 h a week on their preferred service, and 3.3% spend up to 25 h a week (Salaway, Caruso, & Nelson, 2008). Information systems (IS) researchers have recognized that frequent use of information technology (IT) is often habitual and involves markedly different psychological states and behavioral consequences than those that over time occur with merely continued use (Guinea & Markus, 2009; Kim, 2009; Kim & Malhotra, 2005; Limayem, Hirt, & Cheung, 2007; Polites & Karahanna, 2012). But for some users, online services such as SNS might be more an addiction than a habit.

The IS discipline has already shown keen interest in both forms of the use of IT applications. In particular, Kim and Malhotra (2005) found that prior use of certain online services is a strong predictor of future use, and thus indicative of habitual tendencies. Limayem et al. (2007) similarly showed that past use strengthens habit, which eventually drives continued use at the postadoption stage. In addition, Polites and Karahanna (2012) demonstrated that habitual behavior tends to prevent IT users from adopting other applications. Several pioneering works related to IT addiction have also recently been published (Turel, Serenko, & Bontis, 2011a; Turel & Serenko, 2012). These studies paint an unequivocal picture of the harmful effects of obsessive IT use driven by addiction. Looking at mobile e-mail use among workers, Turel et al. (2011a) found that addiction increases technology-family conflict and work overload. In a similar vein, Turel, Serenko, and Giles (2011b) showed that addiction to online auctions distorts individuals' beliefs in the perceived usefulness and perceived enjoyment of IT.

Although IT-specific research on habit and addiction has contributed immensely to our understanding of each of the two phenomena and IT use as a whole, recent developments in these two streams have not focused on contrasting these two mechanisms (Polites & Karahanna, 2012; Turel & Serenko, 2012; Turel, Serenko, & Giles, 2011). As a result, our conceptualization of each phenomenon has grown larger in scope and has begun to encroach on each other. For example, both habit

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and addiction are believed to develop primarily from frequent past use and enjoyment of IT applications. Not being able to distinguish how antecedents differentially give rise to habit or addiction makes it harder for researchers and practitioners to distinguish which course frequent users are likely to take. Similarly, prior research suggests that both habit and addiction result in much higher levels of IT use. Being unable to demarcate when extended use is due to habit versus addiction can lead to uninformed conclusions about the ramifications of such behavior. Finally, the measurement scales for habit and addiction have grown to include highly similar items, such as impulsivity. By operationally growing into each other, habit and addiction risk losing discriminant validity across studies, which further narrows our opportunity to contrast them. Overall, our inability to disentangle the habit and addiction could lead to spurious conclusions and missing out on significant mechanism-specific findings. In this study, we embrace the growing need to discern the differences between habit and addiction in terms of their nature, antecedents, and consequences.

Research that explicitly contrasts habit and addiction is in short supply. Until the theories that underlie these two phenomena are juxtaposed and compared, key questions about them will remain unanswered. To this end, we developed a unified theoretical framework that contrasts habit and addiction in the context of SNS use. We believe that these two phenomena can be teased apart, in terms of their antecendents and outcomes, if we examine how they mediate goal-driven user behavior. In accomplishing their SNS usage goals, IT users must regulate their behavior to determinedly ensure both that routine objectives are met while avoiding temptations to fall into uncontrolled over-indulgence. We draw from self-determination theory to create a decision-making framework from antecedents to goal-oriented behavior. We position habit and addiction as mediators in this framework, to examine how they differentially come from different factors, and how they differentially effect the outcomes.

We model the nomology of habit and addiction based on their respective core theories. Specifically, drawing on the theory of automaticity, we propose that habit is the automatic activation of goal-directed behavior (Aarts & Dijksterhuis, 2000; Bargh, Lee-Chai, Barndollar, Gollwitzer, & Trotschel, 2001; Kim, Malhotra, & Narasimhan, 2005). Meanwhile, using the incentive-sensitization theory, we theorize that addiction is obsessive and compulsive behavior that deviates from personal tendencies (Kelley & Berridge, 2002; Robinson & Berridge, 1993, 2003). The model proposed in this study suggests that although past use is a common antecedent of habit and addiction, other antecedents of habit and addiction can be differentiated. We argue that the unique cognitive antecedents of habit, such as routine seeking and cognitive rigidity, have little impact on addiction. In a similar vein, the antecedents of addiction, such as focused immersion and concern for social acceptance, exert little influence on habit. In addition, our model holds that habit and addiction on IT use differ in their behavioral consequences. Specifically, we argue that the consequences of habit, but not necessarily those of addiction, largely align with personal interests. We sought to verify our propositions through an empirical study in the context of SNS use because it is a powerful context in which behavior is likely driven by both habit and addiction. We tested the research model using data collected from actual users of Twitter, which is one of the most popular SNS in the world (Lunden, 2012).

Twitter is an example of an IT-mediated context in which users can pursue meaningful goals and socially express themselves. Like many other SNS, Twitter allows users develop an online social network (“follow” others and accrue one's own followers), to post public messages (“tweets”), publicly reply to tweets, as well as redistribute other users' tweets to one's own followers (“retweeting”). However, the content of Twitter conversations are fundamentally different from many other SNS, such as Facebook. According to the American Press Institute (Rosenstiel, Sonderman, Loker, Ivancin, & Kjarval, 2015), Twitter is largely used to keep up with news, pass the time, and share thoughts with like-minded people regarding ongoing events and personal interests. Unlike at other SNS, only 24% of Twitter users use the service to keep in touch with relatives and friends. Thus, we believe that Twitter users can exercise agency in their decisions to interact with strangers, rather than interacting out of a sense of personal obligation that might arise at other networks. These characteristics are advantageous to our study because extensive Twitter use is more likely to be related to habit or addiction than unavoidable interpersonal circumstances.

The findings of this study are expected to contribute significantly to IS research in several ways. First, this study represents an initial attempt to develop a theoretical model of SNS use that simultaneously examines habit and addiction and clarifies the unique properties of each one. SNS addiction, as a behavioral addiction, is different from substance addictions such as to alcohol or other drugs. But unlike other behavioral addictions (e.g., gambling), addiction to SNS is fueled by the pressure of peers in their online social network. These pressures could influence users to express and conform in word and deed or to participate regularly. In this study, we seek to demonstrate that the extent to which users either internalize or limit the pressure of these external influences by their own determination can lead to very different usage patterns and outcomes. Second, we looked beyond past use, which is a well-known and common determinant of habit and addiction, to systematically compare several distinct antecedent mechanisms that past use alone cannot account for. Finally, this study is an early step in the examination of the different outcomes and consequences of habit and addiction. Overall, our theory-driven analysis of habit and addiction offers a new and useful conceptual framework for understanding habit and addiction in the context of SNS use. As the investigation into these related but subtly different constructs deepens, IS researchers and IT managers will be better able to steer the design and management of online services in a direction that maximizes repeat patronage without encouraging it in harmful directions.

2. Theoretical background

2.1. Habit versus addiction

Habit of IT use is the routinization of behavior, which is a driving force of the automatic mechanism as long as a goal of using the IT has been met (Ray and Seo, 2013). Users of SNS read and post messages to socialize with others. The conscious, repeated use of IT services like SNS often becomes an automatic and habitual action (Jasperson, Carter, & Zmud, 2005; Kim et al., 2005; Limayem et al., 2007). This perspective of habitual *automaticity* is rooted in cognitive psychology (Aarts & Dijksterhuis, 2000; Verplanken, Aarts, van Knippenberg, & Moonen, 1998) and has been adopted in the IS literature (e.g., Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). Researchers believe that users initially evaluate IT based on conscious deliberation about its pros and cons and that they then purposefully coordinate their use of it toward desired goals. However, the links that bind a goal and its corresponding actions become mentally hardwired with repetition. As a result, the routine use of IT can eventually become habitual in that it is automatically triggered, without deliberation, whenever an intended goal needs to be achieved (Bargh et al., 2001; Jasperson et al., 2005; Kim et al., 2005). Habitually using SNS can be helpful to users because they expend little cognitive effort to activate participatory behaviors that help them meet their personal and social goals and also because this habit can be discarded when no longer useful.

However, some users find that their relationship with an IT application has spiraled into addiction (Robinson & Berridge, 2003; Turel, Serenko, & Giles, 2011). Neuroscience uses the theory of incentive-sensitization to address the process by which initially benign behavior turns compulsive (Robinson & Berridge, 1993). According to this theory, repeated exposure to highly pleasurable stimuli can hypersensitize neural systems and amplify the pleasure associated with rewarding behavior. Hypersensitization subsequently leads to *incentive*

salience, wherein addicts feel compelled to pursue behaviors that are registered in memory as previously having triggered pleasure (Kelley & Berridge, 2002). Incentive salience is essential to addiction because it activates the change from "liking" to "wanting" (Robinson & Berridge, 1993). Susceptible individuals may keep repeating a behavior that was once rewarding even after its gratification diminishes (Ainslie, 2001). In SNS use, repeated visits can make the neural systems of certain users increasingly sensitive to the pleasure of social participation. But as these users immerse themselves in such interactions, they may become increasingly concerned about the possibility of being denied or derided by others (Caplan, 2002). In the end, addicted users may reach a point where they are obsessed with using their SNS despite the failure of this excessive usage to continue meeting their needs (Grodner & Reid, 2010). Two factors most often associated with addiction are 'loss of control' and 'negative consequences' (Andreassen, Torsheim, Brunborg, and Pallesen, 2012; Griffiths, 2005). In this paper, we focus on 'loss of control' as a primary indicator of incentive sensitization, which then leads to negative consequences such as excessive use of SNS.

From the fundamental theories underlying habit and addiction, we can intuit that these behaviors involve deeply different processes, beginning with different antecedent mental states and resulting in considerably different outcomes in people's lives. But distinguishing between these two types of behavior based on the empirical studies in the literature proves difficult. As described earlier, both mediators are thought to immediately stem from similar factors and to produce similar short-term results.

However, we expect that the fundamental difference between automaticity and incentive salience should produce noticeable differences when examining people's long-term goals. Maintaining a stable long-term use of a delightful information system in harmony with one's life and routines requires a certain level of determination and mental fortitude. Users must first avoid daily temptations to overuse an information service beyond what they might typically need. They must also regulate their behavior when external pressures, such as from other people, urge them to indulge. We expect that one's ability to determine one's own goals and then constantly regulate one's behaviors will largely determine whether users become habitual and addicted with long-term use. And consequently, these two sets of users will find themselves in contrasting situations in terms with the implicit goals they once set out for themselves.

Therefore, this self-determination provides an idea for us to identify distinguishable antecedents and outcomes of habit and addiction. Before we introduce antecedent and outcome variables, we present Self-Determination Theory (SDT) as an umbrella framework below.

2.2. Self-determination and regulation

We mentioned earlier that Twitter users largely use the SNS service to engage with topics of interests: it helps them keep up with relevant news and events, follow the opinions with others who share their interests, and contribute their own opinions to the discussion on this SNS. These goals require using Twitter at a regular and steady level. Using it too infrequently may risk one becoming out-of-touch with developments and people they are following. On the other hand, using it too often may lead one's usage an obsession that interferes with other personal and professional activities. Thus, users of an SNS must both internalize the need to regularly use the service to remain relevant, while resisting external pressures of peers to engage more deeply to the point of becoming self-absorbed.

The question of how people maintain personal goals despite external pressures has gotten considerable attention from psychologists who seek to understand the goal-directed behavioral process by which plans are formed, enacted, and how they eventually turn out. There are two complementary streams of literature that have examined each end of this process. At outcome side, the goal striving literature has observed that people must exert effort to enact a plan to realize one's goals. However, enacting a plan does not always coincide with realizing the specific benefits of a goal, so plan enactment and goal realization must be examined as two different outcomes of goal striving. Our conceptual model in Fig. 1 has goal-congruent usage as an outcome that measures how well the plan to use Twitter was enacted, while goal-congruent outcome reflects whether the benefits of using Twitter were realized.

On the other end, the goal pursuit literature has examined why people pursue goals and how different traits and characteristics influence the process. This investigation of goal pursuit has theorized that self-determination is critical to seeing one's goals through and thereby obtaining the fruit of one's dedicated efforts. Self-determination theory (SDT) has been applied to study recreational versus pathological behavior of gamblers (e.g., Back, Lee, & Stinchfield, 2011; Chantal, Vallerand, & Vallieres, 1995). SDT is a theory of motivation and personal tendency that reflects the human need to feel competent and in control when interacting with one's environment (Deci & Ryan, 1985, 1991). For example, many people are attracted to gambling even though they are aware of its high potential for addiction and of the low probability of winning bets (Gilovich, 1983; Walker, 1992). Although people start to gamble with the similar goals such as enjoying gambling itself and winning it if they are lucky, some people can remain recreational gamblers, while others become addictive gamblers. Applying SDT, researchers found high and low self-determined types of motivation were related to recreational and addictive gamblers respectively (Chantal et al., 1995). People who have a high self-determined type of motivation tend to be recreational gamblers, while people who have a low self-determined type of motivation are likely to become addictive gamblers (Chantal et al., 1995). Similar differences between high versus low determination are found in research areas such as employment and gaming (e.g., Bargh et al., 2001; Wang, Khoo, Liu, & Divaharan, 2008).

In the context of SNS, the key component of high self-determination we are interested in is identified regulation (Chantal et al., 1995), wherein people identify with and internalize the reasons they participate in an activity. For SNS users, these reasons could include keeping in touch with friends, following the opinions with others who share their interests, contributing their own opinion to the discussion, etc. What is of particular interest to us is that people under identified regulation maintain a sense of ownership over their behavior and value maintaining behavioral routines around the relevant interest, both of which reflect high self-determination (Silva et al., 2010; van Beek, Taris, & Schaufeli, 2011). Thus, internalized characteristics of *routine seeking* and *cognitive rigidity* as identified regulations, are relevant to high self-determination. *Routine seeking* is a personal tendency to incorporate routines into her/his life (Polites & Karahanna, 2012). *Cognitive rigidity* is a personal reluctance to change her/his mind (Rokeach, 1960). These tendencies as identified regulations are related to build high self-determination.

The key component of low self-determination related to SNS is introjected regulation, wherein people adopt external standards and social approval without internalizing them (van Beek et al., 2011). For SNS users, this might mean interacting and participating so as to not be seen as an outsider, or in order to portray oneself to others in admirable ways. Here, we are particularly interested in the characteristics of people under introjected regulation that involve valuing *seeking social acceptance* and escaping from reality, both of which reflect low self-determination. *Focused immersion* is a sensory experience that enable a person is deeply engrossed what (s)he doing while temporarily forgetting her/his daily worries and concerns (Jennett et al., 2008), which is directly related to escaping from reality. *Concern for social acceptance* is one's worry about supportive and positive social contacts (Morahan-Martin & Schumacher, 2000). These tendencies of focused immersion and concern for social acceptance are not rational reasons for people to internalize in order to use SNS. Therefore, these tendencies as introjected regulations are related to build low self-determination.

We propose that in the context of SNS use, people who have a high

self-determined type of motivation can harmonize SNS use into their lives, while people who have a low self-determined type of motivation tend to become obsessive users of SNS. Although repeated use of IT services becomes an automatic and habitual action (Jasperson et al., 2005; Kim et al., 2005; Limayem et al., 2007), we propose that people with a high self-determination are likely to remain as habitual users without developing further into addictive users. We also note that there are other elements of motivation and regulation that we do not include as primary constructs of interest in our study. For example, organizational researchers are often interested in external regulation, wherein people act solely for external rewards such as pay. However, we only consider SNS that are for personal and volitional use so that we do not consider external regulation. Furthermore, some researchers distinguish another form of external regulation known as integrated regulation, but often do not empirically analyze it because of the difficulty of psychometrically distinguishing it from intrinsic motivation (van Beek et al., 2011). Instead, we directly control for intrinsic motivation in our study.

Just as different regulatory factors (identified versus introjected) belonging to high or low self-determination affect the development of harmonious or obsessive gambling and gaming behavior, we seek to utilize them to distinguish the habit versus addiction of SNS users. Thus, this study will develop the research model based on regulatory elements of SDT and draw antecedents of habit and addiction from identified versus introjected regulations.

3. Research hypotheses

Fig. 1 shows an overall conceptual model of the relationships we proposed in this study. We contrast users whose regular use of SNS is controlled by identified regulations versus those who act under introjected regulations.

We posit that the desire to keep stable patterns of usage and outcome lead those under identified regulations (*routine seeking* and *cognitive rigidity*) to operate under a habit-driven mode, and to seek goals that are congruent with their plans. In contrast, those acting under introjected regulations (*concern for social acceptance* and *focused immersion* related to escaping from reality) are more likely to fall into addictive patterns of use, and be unable to align their goals and outcomes. Thus, the identified and introjected regulations are respectively related to two different mechanisms of habit and addiction. Based on these relationships, we found that outcomes of people's goals can be different due to the different mechanisms (habit versus addiction) influenced by personal tendencies to pursue their goals in the context of SNS use. Their potentially common antecedents are listed as control variables. Appendix A summarizes the relevant literature on habit and addiction in terms of several criteria, including study contexts, methodologies, research variables, and findings. As shown in Tables A1 and A2, the relevant literature of habit and addiction has been studied independently. Therefore, identified variables from the literature are common for the both research streams instead of distinguishable antecedents of habit versus addiction. For this reason, we draw distinguishable variables based on the SDT as mentioned before and develop hypotheses as below.

3.1. Antecedents of habit

The first mechanism of interest to us is how highly self-determined users' seeking routine and predictable patterns of use can settle into habit of SNS use. Habit is an automatic process that begins with an initially deliberate behavior that is repeatedly performed to accomplish a goal. Eventually, subjects automatically repeat this behavior when the outcome of the goal is again desired (Verplanken & Orbell, 2003). Among IS users, this habit process usually yields a relatively stable long-term pattern of frequent use (Kim & Malhotra, 2005).

The part of the habit process we are particularly interested in occurs when habit has formed and behavior is automatically activated without deliberation or planning. Because habit is essentially goal-oriented behavior, habitual users can retrospectively check whether its outcome fulfills the initial goal (Kim et al., 2005; Limayem et al., 2007). Inconsistencies between the outcome of habitual actions and one's initial goals can trigger the need for a conscious reevaluation (Polites & Karahanna, 2012). In such a case, habit dissolves and cognitive power again takes charge to seek a new solution to the changing environment (Louis & Sutton, 1991). Thus, vigilant users can break their habit by deliberately adopting a new sequence of actions (Verplanken & Wood, 2006). Some people are more likely to be vigilant than others with regard to the value of their habitual service vis-à-vis alternative services. These watchful individuals are likely to perform retrospective appraisals more frequently, actions that would create more opportunities for them to reevaluate the consequences of habit of SNS use. If done to excess, such retrospection can even hinder the formation of habit. However, the lack of constant retrospection — attributed to such personal characteristics as routine seeking and cognitive rigidity — is extremely conducive to the formation of habit (Polites & Karahanna, 2012).

Routine seeking refers to "an individual's tendency to incorporate routines into their life, and a preference for familiar situations with limited stimulation and novelty" (Polites & Karahanna, 2012, p. 30). People who tend to seek routines are less likely to retrospectively check whether the outcome of a routine aligns with their goal. Such people will seek to avoid new situations that might result in changes (Harrison, 1968; Harrison & Zajonc, 1970). As a result, routine seeking leads one to follow familiar rituals, which is conducive to the further development of habitual tendencies. Thus, we posit that routine seeking will have a positive relationship with habit of SNS use.

H1. *Routine seeking will have a positive relationship with habit of SNS use.*

Cognitive rigidity refers to one's personal reluctance to change one's mind (Rokeach, 1960). People inclined toward cognitive rigidity are characterized as dogmatic, closed-minded, and less willing and able to adjust to new situations (Oreg, 2003). Cognitive rigidity is negatively related to the capability to learn new approaches; that is, once those with a high degree of cognitive rigidity adopt a certain course of action, they stay with it without considering alternatives (Corder & Corder, 1974). These users are less likely to rely on careful deliberation to examine whether the outcome of SNS use coincides with an initial goal. Therefore, cognitive rigidity should reinforce habit of SNS use.

H2. *Cognitive rigidity will have a positive relationship with habit of SNS use.*

Although we assert that one's propensity to resist changes affects habit of SNS use, we do not believe that it relates to addiction of SNS use. Unlike the goal-oriented nature of habit, addiction is generally contrary to a person's own interests because they cannot regulate their actions for reasons other than routine-seeking and cognitive rigidity. Although SNS users have the opportunity to assess post-use experiences, our research suggests that those who are addiction-prone tend to justify their irrational choices by distorting their perceptions (Davis, 2001; Sutton, 1987; Turel, Serenko, & Giles, 2011).

3.2. Antecedents of addiction

The literature on addiction suggests that it also is a process — one that grows through two distinct and opposing forces that push people into obsessively performing a behavior instead of letting them passively settle into a habit. These two forces are a deepening involvement in seeking rewards and a reactive concern about the possibility of losing them (Gray, 1970; Gray & McNaughton, 2000; Jennett et al., 2008; Kelley & Berridge, 2002). In contrast to habit, the addiction process initially stems from a distorted value system that overestimates the positive consequences of rewarding behaviors and eventually underestimates its negative consequences (Ainslie, 2001). The addiction

process is also unlike habit in that it is eventually reinforced by constant anxiety that one's source of pleasure may end. In this study, the aspect of the addiction process that interests us most is the actual experience of *addiction*, in which users return to an SNS service out of a persistent obsession. Two most important indicators of addiction are 'loss of control' and 'negative consequences' (Andreassen et al., 2012; Griffiths, 2005). As 'loss of control' leads to negative consequences, this study focuses on obsession as 'loss of control' on using SNS. We posit that those who overly immerse themselves in their SNS experience become deeply involved and more prone to addiction than others. Likewise, we expect that those most anxious about losing the pleasurable benefits of SNS interactions are more vulnerable to addiction than others (Gray, 1970; Gray & McNaughton, 2000). Together, focused immersion and concern for social acceptance deserve scrutiny because both are antecedent states of mind that bring about addiction to the point of negative consequences.

Early in their progress into addiction, people go through a hypersensitization process in which they become more excited each time they return to a source of pleasure (Kelley & Berridge, 2002). A heightened cognitive state experienced during the use of IT is referred to as focused immersion (Agarwal & Karahanna, 2000). Focused immersion, which involves a heightened sensory experience that suppresses awareness of one's surroundings and concerns, has proven to be a significant predictor of addiction in the context of IT use (Jennett et al., 2008; Seah & Cairns, 2008, pp. 55–63). Focused immersion provides users with sensory experiences that enable them to temporarily forget their daily worries and concerns (Jennett et al., 2008). As people become more deeply engaged with an IT mediated task, they become less aware of their surroundings and the passage of time (Seah & Cairns, 2008, pp. 55–63). This highly pleasurable sense of immersion is consistent with the pre-addiction phase within the incentive-sensitization framework. In particular, hypersensitization to SNS is likely to center on the perceived positive results of SNS use that creates a time free of stress and everyday worries and concerns. The hypersensitization process ensures every immersion experience will deliver SNS users an even higher level of pleasure than the last. Over time, the incentive to use SNS will become so strong that users eventually will be obsessed with using SNS. Thus, incentive-sensitization theory suggests that users who experience the heightened state of focused immersion are susceptible to hypersensitization, which increases the addiction of SNS use.

H3. *Focused immersion will have a positive relationship with addiction of SNS use.*

SNS are considered online forums that help participants avoid the embarrassment possible in face-to-face relationships while also addressing individuals' craving for social acceptance, which lies at the heart of SNS addiction. SNS provides these individuals with a safe and secure medium of social interaction. As a result, individuals who need positive affirmation from others in their online social network are more likely to become dependent on online relationships and become addicted (Caplan, 2002; Davis, Flett, & Besser, 2002; Morahan-Martin & Schumacher, 2000). Such online users — who are in need of, anxious for, and concerned about social acceptance in the context of SNS — are likely to use the platform beyond their original expectations because it, at one point, became a critical outlet that filled a social void and created rewarding social experiences. We define *concern for social acceptance* as one's worry about the lack of positive social contacts within the context of SNS use (Morahan-Martin & Schumacher, 2000). We derived this factor from the general notion of need-to-belong in social psychology (Leary, Kelly, Cottrell, & Schreindorfer, 2013; Mellor, Stokes, Firth, Hayashi, & Cummins, 2008), adapting it to be specific to social issues related to addiction of SNS use. People eager for social acceptance tend to seek online relationships. But, more important, they want such relationships to be warm, supportive, and pleasant. In particular, concern for social acceptance indicates anxiety over critical responses from other users of SNS out of fear of being left alone (Caplan, 2002; Davis et al., 2002; Morahan-Martin & Schumacher, 2000). And, this mental condition is known to be strongly associated with uncontrollable dependency on online relationships. In summary, the discussion mentioned previously leads us to expect that SNS users concerned about social acceptance are likely to develop patterns of addiction.

H4. *Concern for social acceptance will have a positive relationship with addiction of SNS use.*

We stated earlier that the retrospective appraisals made possible by seeking routine and cognitive rigidity should not be a significant route to addiction because people stick to habitual behavior without regard to whether it aligns with their interests. Similarly, we find no reason to expect that the antecedents of addiction, i.e., focused immersion and concern for social acceptance, will affect habit. Habit forms when mental links are strengthened with repeated use, and its formation is not clearly linked to emotional states such as immersion or to deliberation about social acceptance.

The above hypotheses establish theoretical links between certain personal tendencies and either habit or addiction. We have also suggested that significant cross-effects from the antecedents of habit to addiction, or those from the antecedents of addiction to habit, are theoretically unlikely. Nonetheless, we will statistically control for potential cross-effects of antecedents in our empirical study, as a full alternative model, to ascertain whether they exist.

3.3. Goal-congruent usage

We have noted throughout that habit is a goal-directed behavior, wherein maintaining that a habit facilitates the accomplishment of an external goal. For example, a Twitter user who wishes to stay up-to-date on a current news topic might follow other Twitter users who discuss this topic. Here, habit enables users to achieve their goal to stay abreast of a topic by routinely putting them in front of such news. However, one may note that an addicted Twitter user might also stay abreast of a particular news topic by impulsively turning to Twitter throughout the day.

To better discern habit from addiction, we can examine how the outcomes of these two behaviors are aligned with, or deviate from personal goals. To this end, the literature on goal-setting and striving suggests that plan enactment and goal realization are the final phases of goal-directed behavior (Bagozzi, Dholakia, & Basuroy, 2003). Plan enactment is defined as "the degree of successful enactment of the chosen plan," whereas goal realization refers to "the attainment of the goal chosen by the decision maker" (Bagozzi et al., 2003, p. 280). Plan enactment is a concept with a focus on whether the action plan is implemented as intended; in contrast, goal realization represents whether the outcome of the action meets the intended goal. Thus, we argue that habit and addiction should have discernibly different impacts on plan enactment and goal realization specific to the online use of SNS.

In this paper, we propose an IT-specific construct called *goal-congruent usage* that is comparable to plan enactment. As one of the behavioral outcomes, goal-congruent usage measures the extent to which an amount of SNS usage coincides with an individual's original plan. We consider the level of SNS use to be highly goal congruent if it is contained within the limits of prior expectation; we deem it to have low goal congruence if it exceeds prior expectations. In looking at the personal use of SNS, addiction may do more harm than good to individual users, organizations, and society as a whole (Holden, 2001; Hur, 2006; Wang, Baker, Wagner, & Wakefield, 2007; Young, 2004). Thus, when studying potentially addiction of SNS use, it is critical to understand to what extent the amount of SNS use is aligned with one's rational interests.

We expect that habit and addiction result in strikingly different goal-congruent usage. Habit of SNS use stems from personal goals, although the user may no longer be consciously aware of the association between goal and actions (Kim et al., 2005). Habit of SNS use simply

indicates that individuals' visits to SNS are performed automatically so that precious mental energy can be allocated to different tasks. However, because of the goal-oriented nature of habit (Louis & Sutton, 1991), a user who feels he or she is spending too much time on SNS can revert to conscious evaluation and deliberately break the chain of habit and reduce SNS usage to match earlier expectations. Thus, we hypothesize that habit of SNS use is positively related with goal-congruent usage of SNS.

H5. *Habit of SNS use will have a positive relationship with goal-congruent usage of SNS.*

Unlike habit, which is goal-driven, addiction reflects a persistent dependency on SNS use. Incentive salience, which is the key process underlying addiction, changes brain systems to regularly produce insatiable urges for more of the pleasure they once found from SNS use. At this stage an individual's behavior is no longer moderated by any rational reflection about objectives. Instead, an addict has become the subject of his or her distorted mental state. As a result, we expect that addiction yields excessive reading and posting of messages on SNS by users beyond what they earlier considered appropriate. Thus, without strong mechanisms to balance their addiction, we predict that addicted users will find their actual usage has quickly exceeded their expectations.

H6. *Addiction of SNS use will have a negative relationship with goal-congruent usage.*

3.4. Goal-congruent outcome

People use SNSs for a variety of reasons, from getting up-to-date information to feeling connected with others (Hampton et al., 2011). It is reasonable to expect that some users will find they need to spend extra time on their SNS to achieve their desired outcome. In such cases, goal-congruent usage may not be sufficient to gauge whether SNS use is excessive. Thus, we further assert that users' evaluations of their usage should also examine the congruence between initial motivations and perceived outcomes. In this study, *goal-congruent outcome* refers to the extent to which the consequence of using SNS coincides with one's original plan. This factor is an IT-specific version of goal realization (Bagozzi et al., 2003), and it is quite comparable to such well-known concepts as perceived usefulness and relative advantage in the IS literature (Davis, Bagozzi, & Warshaw, 1989; Moore & Benbasat, 1991). But a goal-congruent outcome differs from those constructs in that it is specifically directed toward personal use of an IT application instead of work-related use within an organizational setting. A goal-congruent outcome could be low even when goal-congruent usage is high if the SNS use does not help achieve a personal goal. For some reasons (e.g., luck, misunderstanding), a goal-congruent outcome could be high despite low goal-congruent usage. Thus, as with plan enactment and goal realization, goal-congruent usage and outcome are clearly distinguishable.

We expect habit and addiction to yield different evaluations of goal-congruent outcomes. We propose that habit has a positive relationship with a goal-congruent outcome. Individuals' motivations will initially activate conscious use of SNS, but with repeated use, the mere presence of a cue can trigger automatic use. Although users may visit their SNS without any deliberate plans beforehand, such behavior is still expected to serve their original goals. From time to time, habitual users may find it undesirable to continue to use their SNS. Habitual users are assumed to have full control over their behavior when its outcome differs from their goals (Gollwitzer, 1996); consequently they can change their actions relatively easily to better align their SNS use with their original motivations. Thus, we hypothesize that the more habitual one's SNS use is, the more likely one is to perceive that his or her intended outcomes are being met.

H7. *Habit of SNS use will have a positive relationship with goal-congruent outcomes.*

As discussed earlier, the incentive-salience process causes significant changes in the mental processes of addicted users. Consequently, addicted users obsessively spend more time than necessary on SNS (Shotton, 1991; Yang & Tung, 2007). Furthermore, addiction will steer users toward an ever-increasing desire for SNS use. But at some point, inflated cravings will become difficult to satisfy (Davis, 2001). Given the increasing time addicts find themselves spending on SNS and their diminishing returns from this investment of time, we expect that the outcomes of their SNS use will be more negative than those of others. Taken together, if people become more obsessive about SNS use, we predict that their evaluations of the outcome of SNS use will compare unfavorably with their initial desired outcomes.

H8. *Addiction of SNS use will have a negative relationship with goal-congruent outcomes.*

3.5. Controlled paths

This study incorporates several control variables that may be pertinent in the context of online information services in general and SNS in particular. First, the continued use of an information system should bring expected utility to users, which we captured as prior satisfaction with the system in question (Bhattacherjee & Premkumar, 2004; Wixom & Todd, 2005). However, potentially addictive systems like SNS also amplify perceived intrinsic and extrinsic motivations (Davis, Bagozzi, & Warshaw, 1992; Heijden, 2004; Turel, Serenko, & Giles, 2011), and so we controlled for these two motivational factors. Beyond these generic motivations, the use of a SNS like Twitter will be specifically motivated by the need to achieve social goals, and so we specifically included social motivation as a potential factor. Finally, the continued use of an information system might simply be an extension of prior usage patterns (Limayem et al., 2007) that we captured in our model as experience and past use (Venkatesh, Brown, Maruping, & Bala, 2008). Apart from these major factors of continued systems use, we included demographic controls of gender and age that are known to often influence IT use (Venkatesh et al., 2003).

We must also note that several studies have suggested that habit can lead to addiction in certain cases and for certain people (Berke & Hyman, 2000; Everitt & Robbins, 2005; Grover et al., 2011). Take, for example, a person who initially visits a website to enjoy free time during a lunch break. He or she may soon regularly follow the same routine and, over time, these visits could become habitual. This is habitual and benign behavior that serves the intended purpose of relaxation before returning to work. But such a user may become addicted in certain cases, for example, if they undergo events and need to seek sources of distraction and immersion. What was once a casual routine could be transformed into an addiction (Turel & Serenko, 2012). However, from our understanding of habit and addiction outlined above, we do not posit that habit is a primary or even consistent antecedent to addiction. We will, nonetheless, control for a path between habit and addiction.

4. Method

4.1. Data collection

We chose Twitter as our target application. Twitter — one of the most popular social networking websites in the world — allows its users to transmit text-based messages that are up to 140 characters in length (Lunden, 2012). People use Twitter for a variety of purposes that include, but are not limited to, keeping up-to-date with current affairs, socializing with others, and posting their own ideas and experiences. In this study, we used a nationwide online panel from a market research firm. At the outset, we conducted a pilot test of the readability and

accuracy of our initial survey questionnaire by contacting 57 Twitter users from the online panel and asking them to check its design and wording. Based on their comments, we revised the measurement items and refined the format of the questionnaire. We conducted two surveys a month apart. In the first (Survey 1), we measured all constructs and controls except for goal-congruent usage and goal-congruent outcome. In the follow-up (Survey 2), we measured the two goal-congruence constructs.

First, we conducted Survey 1 by drawing a sample frame of adult members of Internet users between the ages of 18 and 65. In this survey, we included questions related to habit, addiction, and their antecedents and other controls. We randomly selected 8000 U.S.-based members from the panel pool and sent them invitations with a link to our Web-based questionnaire. Initially, 3627 members responded to the invitations, a response rate of 45%. However, of these 3627 initial respondents, only 569 were allowed to continue the survey because the others were not Twitter users. According to a survey by the Pew Research Center, approximately 15% of online adults use Twitter (Smith & Brenner, 2012). Thus, the proportion of Twitter users in our study, i.e., 16% (569 out of 3627), closely parallels that of general Internet users, i.e., 15%. However, because 17 responses were incomplete, we were left with a total of 552 complete responses in Survey 1. The average age of the respondents was about 36, and the number of men and women on the panel was equal.

One month later, we conducted Survey 2, which targeted the 552 respondents who had completed Survey 1. As with Survey 1, we sent each respondent an e-mail that included a link to a Web-based survey. This questionnaire included measures for goal-congruent usage and goal-congruent outcomes. In Survey 2, we collected 420 responses, yielding a relatively high response rate of 76%. The median age of these respondents was about 36, and 52% were men. No significant differences were found in age and gender distributions between non-respondents (i.e., those who responded only to Survey 1) and Survey 2 respondents (i.e., those who responded to both surveys). Thus, for subsequent analysis, we used the data collected from the 420 respondents who completed both surveys.

4.2. Measures

Most of our measurement items were adapted from existing scales in the literature. However, we developed some new items where necessary. Appendix B contains the specific items included in this study.

We measured the main constructs of this study, i.e., habit and addiction in Survey 1. We carefully designed our scales for these two constructs to measure distinct phenomena, to not overlap in any key dimensions, and to avoid measuring behavioral outcomes that are another major part of our study. We measured habit using three items from global measure of habit (Ray and Seo, 2013), which is based on the conceptualization of Kim et al. (2005). These items are similar to other global scales of habit (Limayem & Hirt, 2003; Mittal, 1988) in that they reflect automaticity of behavior. However, we took care to avoid items from previous habit scales that were reminiscent of measures of impulsiveness (e.g., Polites & Karahanna, 2012) that seem more closely related to addiction (Xu, Turel, & Yuan, 2011).

Likewise, we measured addiction by adopting concepts from Charlton (2002)'s global scale of addiction. Charlton (2002) mentioned criteria (salience, euphoria, tolerance, withdrawal, conflict, and relapse and reinstatement) based on Brown's works (1991, 1993). Griffiths (2005) refined these criteria into salience, mood modification, tolerance, withdrawal, conflict, and relapse. Andreassen et al. (2012) applied these criteria to Facebook addiction. We adapted and reflected our measurements from key components of addiction by Andreassen et al. (2012): salience, tolerance, and withdrawal. As we mentioned, in measuring addiction, we focus on the ‘out of control’ perspective of addiction. For this reason, our three items reflect an unregulated impulse to use SNS and are similar in spirit to the measures of compulsiveness and obsessiveness found in other addiction scales. We avoided items that correspond with conflict or negative outcomes, which we later captured as goal-related outcomes in Survey 2.

We note that, unlike some prior studies in information systems, we have not included any items that measure the negative behavioral outcomes of addiction (e.g., Polites & Karahanna, 2012). Our operationalization of addiction focuses exclusively on the unregulated impulsivity that defines the incentive-salience view of addiction. This uncontrollable urge to use SNS produces the myriad of undesirable outcomes associated with addiction, from wasted time to social conflicts. We do, however, measure the negative impact of addiction in our outcome factors, i.e., goal-congruent outcome and usage. By explicitly positioning outcomes as their own proper constructs, we can study the differential impact on them from habit, addiction, and the array of controls we have included.

The four antecedents of habit and addiction — i.e., routine seeking, cognitive rigidity, focused immersion, and concern for social acceptance — were also measured in Survey 1. Routine seeking was measured with two items borrowed from Polites and Karahanna (2012). Similarly, three items borrowed from Polites and Karahanna (2012) and Oreg (2003) were used to measure cognitive rigidity. We noted that these routine seeking and cognitive rigidity are considered global personal tendencies in root literature as well as in the studies they are adapted to. Thus, we did not make them specific to the Twitter context. We used three items adapted from Agarwal and Karahanna (2000) to measure focused immersion, and they were contextualized appropriately. To measure concern for social acceptance, we used a three-item scale adapted from the highly related literature on social anxiety and social acceptance, which both stem from a more fundamental need to belong (Leary et al., 2013). We particularly chose items that relate to the feeling of concern by adapting two existing items that include “worry” and “concern” about what other might think. We also added a new item to measure how “afraid” respondents were of others finding fault with their opinions, because the fear of criticism that has been previously shown to be among the strongest correlates with perceptions of social inclusion (Leary et al., 2013). Furthermore, we adapted our three items to isolate only concern regarding one's tweets, rather than non-Twitter social interactions.

We also included in Survey 1 items to measure control variables such as extrinsic motivation, intrinsic motivation, social motivation, user satisfaction, past use, age, experience, and gender. We measured extrinsic motivation using three items modified from the scale of perceived information quality in Nicolaou and McKnight (2006). Intrinsic motivation was measured with three items modified from the scale of hedonic value in Kim et al. (2005). We created two new items to measure social motivation in the context of Twitter use. We measured user satisfaction by using three items adapted from Kim and Son (2009). To measure past use, we used two items that asked respondents the frequency of their Twitter use over the past month. Experience was measured by a single item that asked respondents for the number of years that they had used Twitter. We also determined age and gender at the end of Survey 1.

In Survey 2, we measured the consequences of habit and addiction of SNS use, i.e., goal-congruent usage and goal-congruent outcome. Goal-congruent usage is related to a plan and enactment of the plan. However, most SNS users are only likely to have a rough sense of how much usage is adequate, rather than an objective sense of how many hours they have put into their activities. Subsequently, we only expect users to be able to have a relative sense of their usage, ex post. Our measures of goal-congruent usage and outcome are deliberately operationalized in order to capture this retrospective process wherein users evaluate the appropriateness of their levels of usage. To measure goal-congruent usage, we developed three items derived from the scale of plan enactment (Bagozzi et al., 2003). In developing this scale, we were careful to follow its conceptual definition, i.e., one's perceptions of whether the amount of actual usage was within prior expectations.

Table 1
Properties of measurement scales.

					Correlation Matrix														
	ME	SD	CR	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. AGE	36.03	11.30	na	na	1.00***															
2. GEN	1.48	0.50	na	na	−0.07	1.00***														
3. EXP	2.53	1.49	na	na	−0.03	−0.06	1.00***													
4. PU	4.63	1.28	0.70	0.53	−0.16**	−0.06	0.04	1.00***												
5. EM	5.33	1.28	0.91	0.78	−0.06	0.01	0.12*	0.29***	1.00***											
6. IM	5.62	1.16	0.92	0.79	−0.15**	0.09	0.05	0.32***	0.47***	1.00***										
7. SM	4.61	1.63	0.87	0.78	−0.14**	−0.09	0.24***	0.20***	0.44***	0.43***	1.00***									
8. SAT	5.74	1.02	0.94	0.83	−0.07	0.09	0.07	0.36***	0.54***	0.66***	0.38***	1.00***								
9. RS	3.47	1.61	0.82	0.69	−0.12*	−0.10*	0.10*	−0.11*	0.09	−0.05	0.29***	−0.10*	1.00***							
10. CR	4.55	1.28	0.84	0.63	−0.04	−0.08	0.06	−0.04	0.17***	0.09	0.18***	0.10*	0.45***	1.00***						
11. FI	4.64	1.42	0.90	0.76	0.02	−0.05	0.14**	0.21***	0.44***	0.43***	0.61***	0.42***	0.18***	0.25***	1.00***					
12. CSA	3.72	1.75	0.95	0.87	−0.12*	−0.12*	0.14**	0.07	0.25***	0.10*	0.55***	0.07	0.50***	0.26***	0.42***	1.00***				
13. HAB	4.68	1.45	0.87	0.70	−0.20***	−0.08	0.13*	0.32***	0.37***	0.38***	0.49***	0.36***	0.30***	0.34***	0.42***	0.36***	1.00***			
14. ADD	4.21	1.58	0.89	0.72	−0.08	−0.10*	0.14**	0.33***	0.41***	0.35***	0.74***	0.30***	0.35***	0.29***	0.60***	0.61***	0.56***	1.00***		
15. GU	5.26	1.23	0.84	0.65	0.09	0.07	0.02	0.05	0.23***	0.30***	−0.01	0.36***	−0.07	0.15**	0.14**	−0.17***	0.20***	−0.05	1.00***	
16. GO	4.54	1.48	0.90	0.76	−0.18***	−0.05	0.21***	0.28***	0.55***	0.28***	0.49***	0.41***	0.22***	0.23***	0.48***	0.33***	0.53***	0.52***	0.28***	1.00***

Notes.
•n = 420.
•ME = mean; SD = standard deviation; CR = composite reliability; AVE = average variance extracted.
•AGE = age, GEN = gender, EXP = target system experience, PU = past usage, EM = extrinsic motivation; IM = intrinsic motivation; SM = social motivation; SAT = satisfaction, RS = routine seeking; CR = cognitive rigidity; FI = focused immersion, CSA = concern for social acceptance; HAB = habit; ADD = addiction; GU = goal-congruent usage; GO = goal-congruent outcome.

Likewise, to measure goal-congruent outcome, we used three items adapted from goal realization (Bagozzi et al., 2003). This scale was specifically designed to measure the perceived relevance of using Twitter.

5. Data analysis and results

5.1. Measurement model

Before testing our hypotheses, we used LISREL 8.80 to test the measurement model with a confirmatory factor analysis (CFA) of all measurement items and proposed constructs (Jöreskog & Sörbom, 1996). The measurement model consisted of 13 reflective multi-item factors and 3 single-item factors for sex, age, and experience. Overall, the estimated measurement model demonstrated satisfactory model fit: $\chi^2(585) = 1040.43$ ($p < 0.001$), CFI = 0.98, NNFI = 0.96, RMSEA = 0.045, SRMR = 0.043, GFI = 0.88, AGFI = 0.85. Table 1 shows means, standard deviations, composite reliabilities, and the average variance extracted for all 16 factors.

We also examined the validity and reliability of our measures from the CFA of our measurement model. Our multi-item factors displayed adequate convergent validity by having item loadings higher than 0.60 (Bagozzi & Yi, 1988). We verified discriminant validity in part by first making sure that interfactor correlations were smaller than the square root of their average variance extracted (Fornell & Larcker, 1981). For added surety, we further examined the discriminant validity of construct pairs that had large correlations. We modeled each pair of factors using two alternative confirmatory measurement models: One allowed the pair to freely correlate; the other restricted the correlation to unity (Segars, 1997; Zait & Bertea, 2011). In each case, we found a significant chi-square difference between the alternatives, providing further evidence of discriminant validity. Apart from convergent and discriminant validity, we also checked the reliability of our factors by ensuring that they each had a composite reliability higher than 0.70 and an average variance extracted above 0.50 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). The adequate level of model fit and satisfactory criteria for validity and reliability suggested that our measurements were suitable for further use in a structural model to test our hypotheses.

In order to evaluate the possibility of common method bias, we first conducted Harman's one-factor test. In this test, if a considerable amount of common method variance exists, only a single factor will emerge from exploratory factor analysis or one general factor in the variables will account for the majority of the variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Our result showed that 10 factors appeared with eigenvalues larger than 1.0 that explained 76.25% of the total variance. And the largest principal component accounted for 30.87% of the variance. Further, we used a proxy marker-variable approach, wherein we checked factor correlations and, as a conservative estimate for common method variance, employed the second smallest correlation (Lindell & Whitney, 2001; Malhotra, Kim, & Patil, 2006). The second-smallest correlation is 0.04, which is not statistically significant given the sample size (n = 420). We also examined the third-smallest correlation (i.e., 0.05) to be more conservative, but it was not significant either. It seems, as a result, safe to argue that common method variance is not a concern in our study.

5.2. Proposed and alternative models

We extended our measurement with structural paths to create three alternative structural models. The first, our base model, considered only the effects of the control factors of prior motivation, usage, and experience on the outcomes of interest. The second, our proposed model, extended the base model by adding antecedent factors and hypothesized paths (Fig. 1). The third was a full model that extended the proposed model by allowing for all combinations of structural paths between antecedents and the mediating factors of habit and addiction. Table 2 shows model fit indices and estimated structural parameters for the three alternative models.

The base model contained the factors frequently associated with the use of information systems; these factors constitute the major control variables of our study as discussed earlier: satisfaction, intrinsic motivation, extrinsic motivation, social motivation, past use, gender, and age. The base model allowed all of these controls to relate to habit, addiction, and goal-oriented usage and outcomes. We found that the control variables had notable effects on certain factors. Past use and social motivation had strong effects on both habit and addiction. Age had small but nevertheless significant effects on habit and behavioral consequences. In contrast, extrinsic motivation, intrinsic motivation, social motivation, and satisfaction strongly influenced behavioral consequences. As seen in Table 2, the base model displayed fair goodness-of-fit with a RMSEA value below 0.08, but it could not meet the 0.05 threshold for close fit (Browne, Cudeck, & Bollen, 1993).

We compared the parameter estimates of the proposed model with those of the base model to see if our hypothesized antecedents and structural paths improved the predictive validity of our endogenous factors or otherwise produced a noticeably better model. The proposed model included an additional four antecedent factors, namely, routine seeking, cognitive rigidity, focused immersion, and concern for social acceptance as well as the eight hypothesized structural paths. Most controlled effects remained fairly stable compared with their estimates in the base model. However, social motivation, which in the base model had a strong effect on goal-oriented usage and outcomes, no longer had these effects once habit and addiction were inserted into the proposed model. The goodness-of-fit for the proposed model, shown in Table 2, indicates close fit across all indices — a marked improvement over the base model. The respective variance-explained for habit and addiction were 42% and 68%; the variance-explained for goal-congruent use and goal-congruent outcome were 25% and 51%. Compared with the base model, the relative increase in variance explained in the proposed model was 7.9%–31.6% for the four endogenous constructs.

Further comparison of the proposed model to the fuller model, within which it is nested, allowed us to gauge whether there was added value in theory-driven parsimony. Table 2 lists the parameter estimates and indices associated with the full model. The difference in model fit between the proposed and full models ($\Delta\chi^2 = 5.79$; $\Delta df = 4$; p = ns) suggests that despite its added complexity, the full model does not fit the data significantly better than the proposed model. Furthermore, the full model's variance explained for habit, addiction, goal-congruent usage, and goal-congruent outcome were nearly identical to that of the proposed model. Thus, the proposed model gives a more parsimonious explanation of variance than the full model while offering comparable model fit and predictive utility. Overall, we preferred the proposed model's theory-based choice of antecedents and structural constraints. In contrast to the proposed model, the simpler base model seemed overly simplistic with worse fit, but a fuller model seemed overly complex with no added value from this complexity.

5.3. Tests of research hypotheses

The estimated structural parameters of our proposed model allowed us to test the claims of our eight hypotheses. Fig. 2 illustrates the results of the eight hypotheses. As shown in Fig. 2, the estimated parameters strongly supported most of our hypotheses at the 5% significance level ($p < 0.05$), but mostly at even smaller significance levels ($p < 0.01$ and $p < 0.001$). Hypotheses H1 through H4 called for positive relationships between two sets of antecedents and the two mediating factors; these relationships were borne out in the results. Routine seeking was positively related to habit (0.15, $p < 0.05$) as stated in H1, and cognitive rigidity was positively related to habit as stated in H2 (0.21, $p < 0.001$). Similarly, we found that focused immersion was positively related to addiction (0.15, $p < 0.01$) as proposed in H3, and concern for social acceptance was positively related to addiction (0.25,

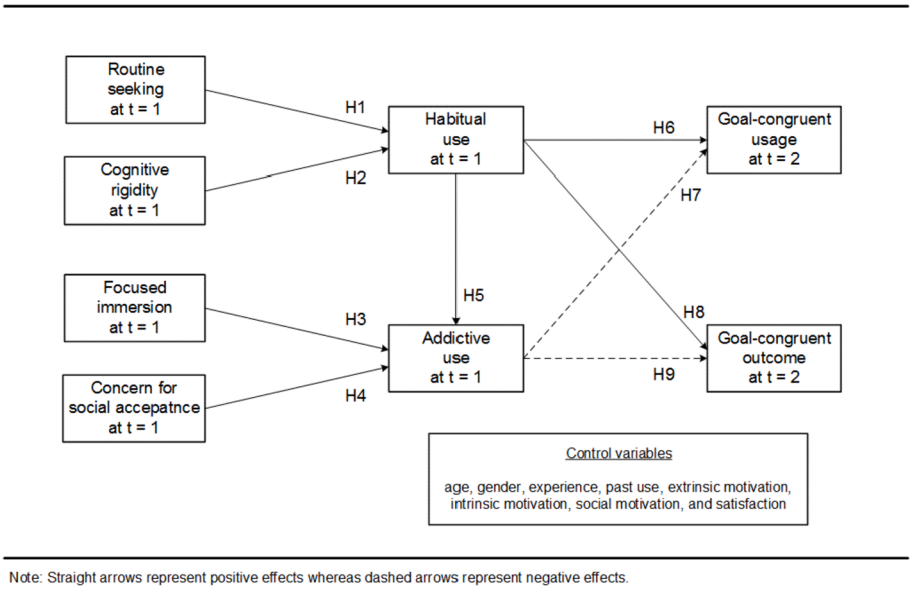

Fig. 1. Research model.

$p < 0.001$), supporting H4. We also found that the controlled, but not hypothesized, path between habit and addiction was significant (0.19, $p < 0.001$).

In examining the consequences of habit and addiction, the proposed model called for positive relationships between habit and the two goal-congruent consequences, but predicted negative relationships between addiction and the same set of consequences. We found that habit had a positive relationship with goal-congruent usage (0.27, $p < 0.001$), as stated in H5. In contrast, addiction had a negative relationship with goal-congruent usage ($-0.21, p < 0.05$), as predicted in H6. Habit had a positive relationship with goal-congruent outcome (0.26, $p < 0.001$), as stated in H7. The parameter estimate relating to our final hypothesis, H8, yielded an unexpected result: Addiction was predicted to have a negative relationship with goal-congruent outcome, but instead it had a positive relationship with it (0.18, $p < 0.05$). Altogether, our research hypotheses were largely upheld, and the results paint an intricate picture in which habit and addiction have distinctive cognitive roots and have varied consequences for how users interact with information technologies.

Table 2
Results of structural equation modeling.

Effects	Base Model				Proposed Model				Full Model			
Causes	HAB	ADD	GU	GO	HAB	ADD	GU	GO	HAB	ADD	GU	GO
AGE	–0.10*	0.04	0.11*	–0.11*	–0.08	0.06	0.14**	–0.09*	–0.09*	0.06	0.14**	–0.09**
GEN	–0.04	0.00	0.01	–0.01	–0.03	0.01	0.02	–0.01	–0.03	0.01	0.02	–0.01
EXP	0.01	–0.04	0.04	0.08	0.02	–0.04	0.03	0.09*	0.02	–0.04	0.03	0.09*
PU	0.19**	0.23***	–0.07	0.12*	0.20***	0.16***	–0.10	–0.01	0.20***	0.19***	–0.11	–0.01
EM	0.09	0.08	0.12	0.37***	0.05	0.03	0.11	0.34***	0.04	0.02	0.11	0.34***
IM	0.06	–0.02	0.17*	–0.19**	0.11	0.00	0.16*	–0.20***	0.10	0.01	0.16*	–0.20***
SM	0.38***	0.73***	–0.22***	0.33***	0.26***	0.42***	–0.18	0.07	0.20**	0.43***	–0.18*	0.07
SAT	0.06	–0.09	0.30***	0.16*	0.08	–0.07	0.27***	0.17**	0.08	–0.07	0.27***	0.18**
RS					0.15*				0.13*	0.05		
CR					0.21***				0.20***	0.06		
FI						0.15**			0.08	0.14**		
CSA						0.25***			0.04	0.22***		
HAB						0.19***	0.27***	0.26***		0.15**	0.27***	0.27***
ADD							–0.21*	0.18*			–0.20*	0.18*
Explained Variance												
SMC	0.37	0.63	0.19	0.46	0.42	0.68	0.25	0.51	0.42	0.69	0.25	0.51
Model Fit												
$\chi 2/df$	2.56				1.87				1.87			
RMSEA	0.061				0.045				0.046			
SRMR	0.057				0.047				0.046			
CFI	0.97				0.98				0.98			
NNFI	0.97				0.98				0.98			
GFI	0.89				0.88				0.88			
AGFI	0.84				0.84				0.84			

Notes.
•n = 420.
•AGE = age, GEN = gender, EXP = target system experience, PU = past usage, EM = extrinsic motivation; IM = intrinsic motivation; SM = social motivation; SAT = satisfaction, RS = routine seeking; CR = cognitive rigidity; FI = focused immersion, CSA = concern for social acceptance; HAB = habit; ADD = addiction; GU = goal-congruent usage; GO = goal-congruent outcome.
•$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$ (two-tailed).

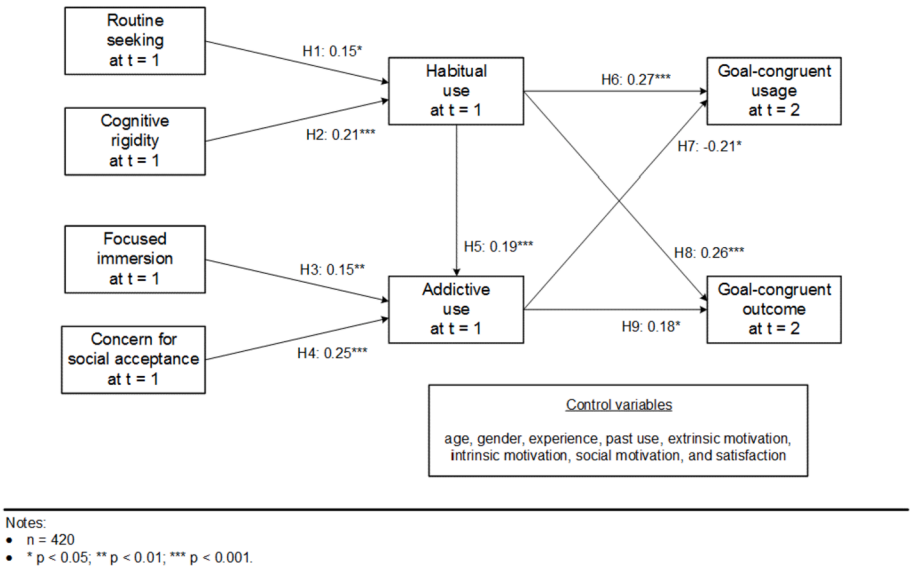

Fig. 2. Results of research hypotheses.

6. Discussion

The objective of this study was to clarify the similarities and differences between habit and addiction in the context of SNS use. Drawing on the theories of automaticity, incentive-salience, and linking Self-Determination Theory (SDT) as the umbrella framework, we developed a theoretical model that describes the nature, antecedents, and consequences of habit and addiction. The proposed model was tested based on data collected from 420 actual users of Twitter. The results of structural equation modeling provided strong support for our model and hypotheses. As expected, our findings indicate that the antecedents of habit, i.e., routine seeking and cognitive rigidity as identified regulations, influenced only habit. In a similar vein, we found that the antecedents of addiction, i.e., focused immersion and concern for social acceptance as introjected regulations, influenced only addiction. Moreover, this study shows that habit had a positive impact on goal-congruent usage, whereas addiction had a negative impact on goal-congruent usage. In contrast, habit and addiction were found to exert significant impacts on goal-congruent outcome in the same positive direction. Overall, the present study contributes significantly to the IS literature by offering a robust conceptual framework for understanding the two seemingly similar, yet profoundly distinct, drivers of SNS use.

6.1. Theoretical contributions

Overuse of the Internet has been cited as one of the most serious problems in the information age (Yellowlees & Marks, 2007). In general, the causes of such overuse have often been attributed to habit (Huang et al., 2009) or addiction (Chak & Leung, 2004; Wang, 2001; Young, 1998). Although IS researchers have accumulated considerable knowledge about habit and addiction, most studies paid attention to only one of these two forces and ignored the other. As a result, an integrative view of the interplay of habit and addiction in the context of IT use was lacking. In this sense, this study contributes significantly to the IS literature by systematically combining habit and addiction into a unified theoretical model. Drawing on theories from cognitive, neurocognitive sciences, and linking Self-Determination Theory (SDT) as the umbrella framework, our model posits that habit is goal-driven behavior, whereas addiction is driven by inflated desire. We found from our investigation that the model represents SNS use in a substantially accurate way. Thus, further credence can be given to the validity of our theoretical model. We believe that the new model will serve as a solid basis for further research on SNS use as well as on other nonwork-related use of online services.

Prior research shows that routine seeking and cognitive rigidity help explain why people continue to use the same IT application over and over (Polites & Karahanna, 2012). However, no studies have related such personal tendency factors to the antecedents of habit in the IS field. Based on the theories of automaticity, the present study presents a theoretical account of how the formation of habit is influenced by one's tendency to assess the outcome of prior IT use (Aarts & Dijksterhuis, 2000; Kim et al., 2005; Verplanken et al., 1998). Some IS studies have identified the antecedents of habit, such as past use and satisfaction (Kim & Malhotra, 2005; Limayem & Cheung, 2011). Nevertheless, our study is the first to show that personal tendencies under high self-determination such as routine seeking and cognitive rigidity can influence the formation of habit. An even more interesting aspect of this study is that it shows routine seeking and cognitive rigidity have little impact on addiction. These findings offer additional evidence that the formation of habit differs considerably from that of addiction in the context of SNS use. Thus, another contribution of this paper to the IS literature lies in its demonstration that habit and addiction are formed through fundamentally different mechanisms. These mechanisms of automaticity and incentive-salience are influenced by different self-determined type of motivation. People who have a high self-determined type of motivation are more affected by internalized regulations on SNS use so that they tend to harmonize SNS use into their lives as a habit. Meanwhile, people who have a low self-determined type of motivation are more affected by introjected regulations on SNS use so that they tend to be addicted to SNS use.

In one of the pioneering studies on addition, Turel et al. (2011b) demonstrated that addiction affects such beliefs as perceived ease of use, perceived usefulness, and perceived enjoyment. Our study expands the boundary of knowledge on addiction by showing its antecedents. Rooted strongly in the addiction literature, this study identified two antecedents of addiction, i.e., focused immersion and concern for social acceptance, that are related to the active pursuit of pleasure from SNS use and the fear of losing such pleasure (Kelley & Berridge, 2002; Robinson & Berridge, 1993, 2003). This study is meaningful in that it provides valuable insights about the pre-addiction phase, which is characterized mainly by overestimation of the benefits (i.e., immersion) and costs (i.e., concern for social acceptance) of SNS use. Another

notable point of this study is that although they are significant antecedents of addiction, the psychological states represented by focused immersion and concern for social acceptance had little impact on habit. These findings further support the notion that habit is automatic behavior without the involvement of any conscious thought.

Another notable feature of this study is its introduction of the goal-oriented perspective of IT usage, and more important, its demonstration of how habit and addiction differ in affecting this outcome factor. In IS research, the mere amount of IT use has been treated as an important dependent variable. Although helpful for understanding initial use and continued use, the simple notion of IT usage yields no insight into whether such usage is within the limit of an individual's original plan in nonwork-related settings. This study contributes to the IS literature by conceptualizing and operationalizing a relatively new construct of goal-congruent usage. An important aspect of this new concept is that it clearly reveals the fundamental difference between habit and addiction. Consistent with our hypotheses, the findings of this study suggest that habit positively affects goal-oriented usage, but addiction negatively affects goal-oriented usage. These findings support our main claim that habit is goal-oriented, but addiction is not. To the best of our knowledge, this study is the first attempt to explicitly focus on how habit and addiction affect subsequent usage differently.

The results support all but one of our hypotheses. The lone exception relates to the impacts of addiction on goal-congruent outcome. Although the effect of habit on goal-congruent outcome was, as expected, positive, the effect of addiction on goal-congruent outcome was also found to be positive, which was the opposite of our prediction. We previously contended that addiction would make people visit a website to such a great extent that it would no longer benefit them. However, we found that addicted users still find their SNS use helpful in fulfilling their needs. Interestingly, in a cross-sectional context, Turel et al. (2011b) found that addiction is positively associated with perceived usefulness, which is similar to goal-congruent outcome. Turel et al. (2011b) explained this association by asserting that people distort their perceptions to positively color the outcome of their IT use. This explanation is not necessarily contradictory to our view that at an early stage of addiction people tend to inflate the benefits of IT use. However, our view also holds that with repeated use these people's "liking" changes to a sort of "wanting," and they eventually reach a point where they regret excessive use. Perhaps most respondents in our sample do not reflect severe cases of addiction. Consequently, they still view the outcome of addiction favorably. In any case, this study is considered a significant addition to the discussion on SNS use because it reveals the multifaceted consequences of habit and addiction. We hope that further research will clarify the different complex consequences that are shaped by habit and addiction of SNS use.

6.2. Practical implications

Although this research focuses on the context of Twitter, the findings can be applied to many other areas, especially ones with voluntarily social interactions such as online gaming environments and online message boards.

Our study shows that a strong level of habit is relatively harmless or could even boost an individual's efficiency in handling everyday tasks. Thus, the public and media do not need to be overly concerned about habit of SNS use. But our findings clearly indicate that addicted individuals use SNSs more than they want to. Unsurprisingly, such overuse is known to have negative ramifications on individual users, organizations, and society as a whole (Holden, 2001; Hur, 2006; Wang & Chu, 2007; Young, 2004). To provide healthy environments for SNS users, it is important that service providers quickly identify those individuals at risk of addiction. How to identify SNS addiction-prone and addicted users is a significant issue. If practitioners simply consider hours and frequencies of SNS use in identifying addiction-prone and addicted users, they may confuse habit with addiction. In such cases, practitioners may target the wrong users for preventive measures. This research shows that habit and addiction of SNS use are based on two different processes (automatic versus incentive-sensitization). By heeding this distinction, practitioners can more accurately identify addiction-prone and addicted users. People who have strong tendencies for focused immersion and concern for social acceptance are inclined to addiction. SNS providers should take steps to find how focused immersion and concern for social acceptance correlate to the unique interaction events of their service. For example, perhaps users who are prone to focused immersion might be identified by the intensity of interface interactions (scrolling, clicking). Similarly, those seeking social acceptance might be identified by semantic analysis of their postings or by their preference to follow certain other users. Once such correlates are identified, providers can routinely monitor usage patterns and preferences.

Having identified potentially vulnerable users, providers of SNS and mental health practitioners can design effective measures to prevent users from falling into addiction. For example, social motivation, which is one of the control variables in this study, is found to more strongly influence addiction than any other research and control variables (path estimate $= 0.43, p < 0.01$). These findings imply that SNS users whose primary motives are interpersonal interactions are more likely to become addicted than others who use SNS for information and enjoyment purposes. Thus, people with a high level of social motivation could be properly informed of the potential hazard related to excessive use, reminded of their usage levels, or simply encouraged to take a break during intense sessions of SNS use. In this way, practitioners will be better able to mitigate potential risks associated with SNS use.

This research also suggests that caution should be applied to how extreme SNS addiction is treated. Because focused immersion, concern for social acceptance, and social motivation are strongly related to SNS addiction, simply forcing users to decrease the hours and frequencies of SNS use is not an effective way to treat already addicted users. Once users are addicted to SNS use, it is not easy to break or replace their emotional and social dependency on SNS. Therefore, addicted users of SNS may need additional support such as a range of counseling services and support groups to overcome the concern for social acceptance and to discharge the wanting feeling that arises from focused immersion and social motivation.

6.3. Limitations and further research

Several limitations of this study should be noted. First, the model proposed in this study is not meant to be comprehensive; rather, it is mainly intended to contrast habit and addiction. Accordingly, our conceptual model may miss some variables relevant in the context of SNS use. Also, our data collection was performed using survey questionnaires, and thus, method biases such as common scale formats, common scale anchors, and social desirability could potentially confound our findings (Podsakoff et al., 2003). Although we expect a minimal effect of method biases in this study, care should nevertheless be taken in interpreting our findings.

Researchers should note that our choice of scales for habit and addiction are not orthodox to many studies focused on either phenomenon. Habit and addiction were operationalized as first-order factors in our study, but some other studies have treated them as second-order factors (Polites & Karahanna, 2012; Turel, Serenko, & Giles, 2011). Second-order factors were not used here because of the need to control the length of the survey. We carefully chose items that remove overlap between the two constructs and our specific items were also chosen from prior literature to increase compatibility with other studies. But researchers may want to review their own choice of items. For example, our habit construct uses items that include the word "habit" in them, which could color respondents' perceptions. Similarly, we have not explicitly tested the effects of social desiribility bias on our habit and addiction constructs. Thus, it is unclear whether the survey responses to

our two mediating mechanisms were biased by respondents' concern about how they present themselves. Overall, we recommend that our model should be further validated through other forms of operationalization.

Our study suggests fruitful avenues for further research. Researchers should note that in our efforts to discriminate habit from addiction, we selectively chose validated items from literature for each construct in such a way as to avoid conceptual overlap. Nonetheless, this is only a start in the process of operationally distinguishing these two constructs. We hope that future research will seek to develop new and more comprehensive measures to measure habit and addiction in ways that clarify their distinction.

Another interesting future research avenue can be incorporating psychological ownership on an IT product or service, which researchers are increasingly paying attention to lately (Egan, 2016). Psychological ownership refers to a person develops possessive feelings about a target (e.g., IT product or service) (Klesel, Ndicu, & Niehaves, 2016, pp. 1–16). The effects of psychological ownership can be positive (e.g., increase of loyalty) and negative (e.g., distress), but there is a lack of empirical research about the potential outcomes of psychological ownership (Sinclair & Tinson, 2017). We suspect that psychological ownership will be found to affect the development of habits and addictions.

Although this research focuses on the context of Twitter, the findings can be applied to many other areas, especially ones with voluntarily social interactions such as online gaming environments and online message boards, and so on. For example, our model might be applied to contexts such as online gaming, although the effects of addiction on behavioral outcomes might be relatively stronger than found in the present study. In contrast, in settings such as online weather services, habit seems more likely to be a dominant factor. An interesting question here is how to analyze contextual characteristics that cause such changes in the roles of habit and addiction. If a classification scheme is created that organizes the contextual characteristics that affect the salience of habit and addiction (for example, behavioral opportunities), researchers will be able to anticipate the prevalence of habitual and addicted users in novel online services. Such a theory-based approach to contextual differences also is a key to the systematic accumulation of diverse findings in this emerging research area.

Another interesting avenue for further research would be to investigate changes in habit and addiction over time. In the present study, we focused on clarifying the causes and effects of habit and addiction and have studied them over a month. But we have paid little attention to how habit and addiction undergo transformation as individuals accumulate experience with online services. We will have a better understanding of the mechanism behind one's inertia by scrutinizing how habit and addiction vary over different lengths of time. In such a study, the consequences of prior habit and addiction could serve as the inputs to subsequent habit and addiction, in addition to the antecedents already identified in this study. Moreover, through this type of panel study, the effects of the antecedents on the inertia factors would be evaluated more accurately. This improved accuracy would be because prior habit and addiction can be taken into account as additional antecedents of subsequent habit and addiction. We believe that a new panel study along this line will help clarify complex relationships that drive changes in habit and addiction over time.

Our constructs were largely measured using items derived and adapted from their respective literature. However, we recognize that as studies of habit and addiction in information systems mature, they will increasingly require measurements that are specific to IT contexts. For example, measures of usage could refer to actions like posting, replying, including attachments, and so on. For now, we hope our use of generic scales borrowed from literature such as consumer behavior helps maintain parity and compatibility with their conceptualization and nomology in other contexts.

6.4. Conclusions

Online social networking is one of the most popular Internet services, and its popularity is expected to continue. Although numerous users already spend a vast amount of time on SNS every day, we have had only limited knowledge of the hidden mechanisms underlying their continued use. Our study clearly demonstrates that both habit and addiction are the important drivers of continued use, but their nature, causes, and effects are fundamentally different. Moreover, this study presents a theoretical framework to better clarify the differences between habit and addiction in the context of SNS use. We expect that habit and addiction play important roles in a variety of online contexts — for example, online games and online communities. It is our hope that more effort will be devoted to these important subjects of habit and addiction and that our model will serve as a useful tool for such endeavors.

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Appendix A. Summary of the Literature on Habit and Addiction

Table A1
Summary of Habit Literature.

Study	Methodology	Context/Setting	Sample frame	Sample Size	Main Variables	Outcomes	Findings
Venkatesh, Morris, and Ackerman (2000)	Longitudinal; Survey	Information retrieval	Organizational workers	355	Attitude, subjective norm, and perceived behavioral control	IT usage	Past IT use was a good predictor of subsequent IT use.
Limayem and Hirt (2003)	Longitudinal; Survey	Online bulletin board	College students	60	Habit, social factors, facilitating conditions, perceived consequences	IT usage	Habit had positive effects on affect and system usage.
Kim and Malhotra (2005)	Longitudinal; Survey	Online portal	College students	189	Perceived usefulness and perceived ease-of-use	Intention to use IS	The influence of past use on future use was substantial, and it actually overshadows the effect of intention on future use.
Kim et al. (2005)	Longitudinal; Survey	Online news	Online consumers	990	Utilitarian value, hedonic value, social value, age gender, Internet experience, past use	IT usage	Past use had positive effects on intention and system usage. In addition, past behavior had a significant correlation with habit.

(continued on next page)

Table A1 (*continued*)

Study	Methodology	Context/Setting	Sample frame	Sample Size	Main Variables	Outcomes	Findings
Limayem et al. (2007)	Longitudinal; Survey	Web use	College students	227	Perceived usefulness, satisfaction, confirmation, comprehensiveness of usage, frequency of past use	IS continuance usage	Habit is primarily produced by satisfaction, and it moderates the relationship between intention and use.
Kim (2009)	Archival data	Secondary data from two past studies of organizational IT	Employees of organizations	355 and 342	Attitude, subjective norm, perceived behavioral control	IT usage	Past use significantly affected behavior.
Lankton, Wilson, and Mao (2010)	Longitudinal; Survey	Four Internet applications from a university	College students	371	Prior IT use; satisfaction; importance; task complexity; habit	Continued IT use	Prior IT use, satisfaction, and importance affected habit. Habit affected continued IT except one application.
Polites and Karahanna (2012)	Longitudinal; Survey	E-mail and Google Docs use	College students	334	Incumbent system habit; sunk costs; transition costs; perceived ease of use; relative advantage; subjective norm	Intention to use a new system	Habit, sunk costs, and inertia hindered the acceptance of a different system.

Table A2
Summary of Addiction Literature.

Study	Methodology	Context/ Setting	Sampleframe	Sample Size	Variables	Outcomes	Findings
Young (1998)	Cross-sectional; Survey	Internet use	Internet users	496	Eight items to distinguish between dependent and nondependent Internet users; length of time using Internet; hours per week; applications used	Extent of problems (academic, relationships, etc.)	There were significant differences between dependent and nondependent Internet users. Interactive applications were more related to pathological Internet use.
Wang (2001)	Cross-sectional; Survey	Internet use	Students in an Australian university	219	Social relationship; patterns of the Internet usage; Internet activities; Internet history; affective status; psychological measures	Internet addiction disorder (IAD)	In a comparison of three groups (none, light, and severe IAN), there were differences in terms of several variables examined.
Chak and Leung (2004)	Cross-sectional; Survey	Internet use	Internet users	722	Shyness; locus of control; Internet use and online experience; online activities (online communications, information search, online games)	Internet addiction	Shyness and locus of control affected Internet addiction. Heavy users tended to be Internet addicts.
Charlton and Danforth (2010)	Cross-sectional; Survey	Massively multiplayer online role-playing game	online game players	388	Extraversion; agreeableness; emotional stability; attractiveness; negative valence	Addiction; Engagement	All of the five variables affected addiction, but only negative valence affected engagement.
Kuss and Griffiths (2011)	Archival; empirical and conceptual insight	Social networking sites (SNS)	Articles	43	Usage; motivations; personality	Addiction	SNS usage could affect academic achievement and relationships that might be indicative of potential addiction.
Turel et al. (2011a)	Cross-sectional; Survey	Mobile e-mail	Mobile e-mail users in three organizations	241	Addiction to mobile e-mail; technology-family conflict; work overload	Work family conflict; Organizational commitment	Addiction to mobile e-mail affected technology-family conflict and work overload. Work overload also affected organizational commitment.
Turel et al. (2011b)	Two studies: Cross-sectional; Survey	eBay website	eBay users	132 and 223	Online auction addiction; beliefs (perceived ease of use, perceived usefulness, perceived enjoyment)	Behavioral usage intentions	Online auction addiction affected individuals' beliefs, which determined behavioral usage intention.
Turel and Serenko (2012)	Cross-sectional; Survey	Social networking websites (SNW)	Social networking websites users	194	Time spent; comprehensiveness of usage; perceived enjoyment; habit	Addiction; high engagement	Enjoyment leads to high engagement of SNW. At the same time, it affects habit, which influences addiction formation.

Appendix B. Measurement Items

Habit (HAB)

- Using Twitter is something I do as a matter of habit.
- I often use Twitter out of force of habit.
- Using Twitter is routine without a deliberate plan beforehand.

Addiction (ADD)

- I am troubled if I am away from Twitter.
- I find it difficult to overrule my impulse to use Twitter.
- I feel an urge to use Twitter.

Routine Seeking (RS)

- I generally consider changes to be a negative thing.
- I like to do the same old things rather than try new and different ones.

Cognitive Rigidity (CR)

- Once I've come to a conclusion, I'm not likely to change my mind.
- I don't change my mind easily.
- I am reluctant to change my views.

Focused Immersion (FI)

- My attention does not get diverted easily while using Twitter.
- I am absorbed in what I was doing while using Twitter.
- I am immersed in what I was doing while using Twitter.

Concern for Social Acceptance (CSA)

- I worry that others will think my tweets are not worthy.
- I am often afraid that people will find fault with my tweets.
- I am concerned about the opinions that people have of my tweets.

Goal-Congruent Usage (GU)

- The effort I put into using Twitter in the past month was well within my original plans.
- The frequency with which I posted and read messages on Twitter in the past month is in line with what I intended.
- The number of messages that I posted and read on Twitter in the past month is not significantly different from what I intended.

Goal-Congruent Outcome (GO)

- I became more efficient because of Twitter.
- Using Twitter was beneficial to me.
- Using Twitter helped me get things done.

Extrinsic Motivation (EM)

- I am using Twitter because I get useful information.
- I am using Twitter because it is informative.
- I am using Twitter because it makes me knowledgeable.

Intrinsic Motivation (IM)

- I am using Twitter because it is fun.
- I am using Twitter because it is enjoyable.
- I am using Twitter because it is entertaining.

Social Motivation (SM)

- I am using Twitter because I feel close to people.
- I am using Twitter because I feel like I belong to a group.

User Satisfaction (SAT)

- I am pleased with my experience with Twitter.
- I am satisfied with my experience with Twitter.
- I am content with my experience with Twitter.

Past Use (PU)

- On average, how frequently have you used Twitter over the past month? (1 = less than once a week; 2 = once a week; 3 = a few times a week; 4 = once a day; 5 = a few times a day; 6 = about seven times a day; 7 = more than 10 times a day)
- How often have you used Twitter over the past month? (1 = very infrequent; 2 = moderately infrequent; 3 = slightly infrequent; 4 = sometimes; 5 = slightly frequent; 6 = moderately frequent; 7 = very frequent)

Experience (EXP)

- For how many years have you been using Twitter? (Years)

Age (AGE)

- Age in years (Years old)

Gender (GEN)

- Gender (1 = male; 2 = female)

Note: Unless otherwise indicated, the anchors for all items were 1 = strongly disagree to 7 = strongly agree.
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