

# Social Contributors and Consequences of Habitual and Compulsive Game Play

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## ABSTRACT

*This study examines the relationship between social motivations, pro-social relationship outcomes, and two types of game play—habitual and compulsive—in the context of simulation games on Facebook. Social motivations were significantly associated with compulsive game play, but not habitual game play. Compulsive play was a positive predictor of pro-social outcomes whereas habitual use was not. By differentiating two different types of media use that are both associated with problematic use, the authors see that social factors contribute to people's inability to control their gaming behavior, but that the so-called "addictive" behavior can also yield positive relationship outcomes.*

*Keywords: Addiction, Compulsive Use, Habit, Online Gaming, Relationship, Social Motivations, Social Network Games*

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## INTRODUCTION

Online game usage has been characterized as one of the most addictive activities since the early ages of the Internet (Grusser, Thalemann, & Griffiths, 2007; Young, 1998). Social network games (SNGs), in particular, have been a target of criticism by popular press as a source of addiction. SNGs are digital game applications that use network data from social network sites such as Facebook (Wohn, Lampe, Wash, Ellison, & Vitak, 2011). Prior research has found that the time people spend playing SNGs can be largely

attributed to habit, and this habitual behavior can be predicted by specific features of the game which require repetitive actions (Wohn, 2012).

SNGs are defined by their platform rather than their gameplay genre (Wohn & Lee, 2013). The connection to social network sites enables SNG players to interact both within the game and outside of the game on the social network sites, making them different from single-player games or even multiplayer games that exist on isolated platforms. From a communication perspective, the social connections that SNG players make are interesting because unlike

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most massively multiplayer online (MMO) games, players are exposed to the identity of their fellow game players outside of the game.

Playing games with people whom one has connections to offline can have its ups and downs. SNGs often rely on use of network connections to advance in the game (Wohn, Lee, Sung, & Bjornrud, 2010) by requiring that players request their connections for favors. Prior studies have shown that these obligations can sometimes be overwhelming and coaxes people to play the game even when they don't want to (Wohn et al., 2011). However, there has been evidence that playing these games can have positive outcomes—for example, they can serve as mechanisms of bonding (Price & Wearn, 2012; Wohn et al., 2011), especially for families that are not co-located (Boudreau & Consalvo, 2014).

As of 2013, the United States SNG market value is estimated to be around \$152 million US dollars, with nearly 200 million players worldwide (Superdata, 2014). SNGs attract a wide range of players, perhaps because they are often free to play and can be played in short sessions. It is important to understand why SNGs are so popular among so many players, not only from a design perspective, but also from the players' motivation and expectation perspectives.

In this paper, we are interested in the connections between social factors and problematic behavior, or so-called “addiction,” in SNGs. From a practical perspective, it is important to understand addiction of SNGs because there are many self-reported addicts, as reflected in anecdotal evidence in media reports and the number of game addict support groups online (Tran, 2010). However, more importantly, we address the challenges that the scholarly community has been facing in terms of trying to define and measure what exactly “addiction” is. To do that, we suggest that we shouldn't be using the colloquial term of addiction at all, but looking at constructs that are more theoretically driven—such as compulsive behavior and habitual behavior. We explored the relationship between social motivation (why people play),

how people play, and their relationship outcomes. In particular, we examine two types of play that have been associated in the past with addiction: compulsive play and habitual play. By differentiating these two types of play, we will be able to see how these different play types are associated with different motivations and different relationship outcomes.

## EXPLAINING ADDICTION: COMPULSIVE OR HABITUAL?

For the past decade, researchers studying problematic game play have had very little consensus on the conceptualization of addiction as a phenomena. Several different terminologies have been used, including compulsive, addiction, excessive, pathological and problematic—all referring to the similar undesired effects of online game playing (Kuss & Griffiths, 2012). These undesired effects, generally speaking, are such that the “gamers” play without self-restraint, to the exclusion of other interests, and their persistent and recurrent online activity results in clinically significant impairment or distress (American Psychiatric Association (APA), 2013).

The underlying characteristics of behavioral disorders related to game play are in most studies identified with symptoms of substance addictions (Grusser, Thalemann, & Griffiths, 2007; Hussain & Griffiths, 2009; Kim, Namkoong, Ku & Kim, 2008; Smahel, Blinka, & Ledabyl, 2008). However, neither online game addiction nor Internet addiction is an established *behavioral* disorder classified by the American Psychiatric Association. Only recently has Internet Gaming Disorder been listed in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, in Section III as a condition warranting more clinical research and experience before it might be considered for inclusion in the main book as a formal disorder (APA, 2013).

There are two main issues with the existing literature on gaming addiction. The first is measurement. Addiction, in general, is measured

through a checklist of items of symptoms, but the cut-off points used in diagnosis of substance-related addictions is difficult to apply to the context of media usage and very few people are actually clinically diagnosed as having gaming addiction. Therefore, many media scholars have used other types of measurement and in many cases, developing their own scales, making it difficult to conduct meta-analyses—summaries of effects across multiple studies (Ozkaya, LaRose, & Wohn, 2011). Secondly, the severities of the life consequences are questionable. While extreme cases (e.g., Tran, 2010) have been reported, it is uncertain whether the types of negative life outcomes that so-called gaming addiction produces are comparable to those associated with substance (e.g., drugs, alcohol) addiction. Due to these two major challenges, some researchers avoid using the term addiction, and prefer “problematic” or “excessive” to indicate undesired overuse of media (e.g., Caplan, Williams, & Yee, 2009; LaRose, 2010) although the use of the term addiction is still quite prevalent.

One of the most recent developments is a call for distinction between habitual media use and compulsive media use (LaRose, 2010). The two constructs have a degree of overlap but are conceptually different (LaRose, 2010). Habitual use is a non-conscious, automatic behavior that refers to when a person reverts to a routine when exposed by certain environmental stimuli (Verplanken & Aarts, 1999; Verplanken & Orbell, 2003). When the individual is engaging in habitual behavior, he or she is not actively thinking of why or how. This may result in spending a lot of time doing the behavior; in the context of SNGs, Wohn (2012) found that habitual game play was the strongest predictor of time spent playing the game.

On the other hand, compulsive use is a behavior that the user is *aware* of but unable to control (Caplan, 2010; LaRose, Lin, & Eastin, 2003). Habitual and compulsive behavior may be similar in that they both represent lack of control, but habitual behavior is accompanied by a lack of awareness, whereas compulsive behavior is accompanied by awareness. In the

following sections, we will go into more detail about habitual and compulsive behavior.

## Compulsive Use

Compulsive use of media is characterized by core criteria such as (a) repeated reversion to earlier patterns of use after periods of abstinence or regulation and (b) failure to resist temptation to use (Caplan, 2010; King, Delfabbro, & Zajack, 2011). In other words, compulsive use is a behavior that the user is *aware of* but unable to control (Caplan, 2010; LaRose, Lin, & Eastin, 2003). Research from various disciplines, including communication and psychology, has shown increased ill effects of compulsive gaming (e.g., Kim, Namkoong, Su, & Kim, 2008; Rooij, Schoenmakers, Eijnden, & Mheen, 2010).

Impulse control disorder has been classified under the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as characterizing problems in emotional and behavioral self-control (APA, 2013). Self-control is an important determinant in understanding impulsivity-- failure to resist temptation, urge or impulse that may harm oneself or others. Earlier conceptualizations of game addiction studies encompass problematic behavior that is categorized under DSM-5 as “Impulse control Disorders Not Otherwise Specified,” which includes compulsive shopping, Internet addiction, or intermittent explosive disorder.

The underlying biological basis of low self-control is believed to be located in attention networks in the brain. The heightened risk-taking and impulsivity observed in adolescence has been partly attributed to the slow development of brain regions necessary for cognitive control, subsuming response selection, top-down control and inhibitory processes (DeLisi, 2014).

In the context of video game use, compulsive use has been used as a sub category of the more general problematic video game use (see Kuss & Griffiths, 2012). Prior research mainly stressed that the relapse or loss of control dimension of the behavior is one of the strongest indicators of the problematic video game use

(King, Delfabbro, & Zajack, 2011; Turner et al., 2012). Popular press supported this with reporting anecdotal evidences from heavy gamers of serious negative life outcomes (Tran, 2010; Anderson, 2012).

## Habitual Use

Contemporary theoretical explications regard habits as cognitive knowledge structures, or so to say, “scripts” (Abelson, 1981) that exist independently from past behavior (Aarts & Dijksterhuis, 2000; Armitage, 2007). A habit is a self-directed process that, once started, runs by itself (Graybiel, 2008). It is this nature of habits that helps economize on the cognitive effort and helps them be maintained, especially due to the comfort and ease they provide.

Media habits are defined as a form of automaticity in media consumption that develops as people repeat media behavior in stable circumstances (LaRose, 2010). The relationship between frequency of behavior and habit has been a subject of controversy, due to the fact that measuring habits simply by frequency of behavior includes non-habitual but frequently repeated behaviors (LaRose, 2010). For habit formation, repetition of behavior may be of importance but not all frequently repeated behaviors are habits or turn into habits. In understanding the role of habits in repeated behaviors it is therefore more accurate to look at the dimension of automaticity rather than raw frequency.

Automaticity is an attention process, or rather lack thereof, which satisfies three criteria: a) initiation and termination are involuntary, b) few or no attentional resources are required for processing, and c) processing is inaccessible to conscious awareness (Schneider, Dumais, & Shiffrin, 1984). Habitual processes are automatic, which means they lack effortful attention, intentionality, awareness and/or controllability (Bargh & Chartrand, 1999). The lack of the awareness dimension is what makes habitual behavior different from compulsive behavior because when an individual is being compulsive, they are very aware of what is going on.

There is growing evidence of the importance of habits as determinants of media behavior (LaRose, 2010; LaRose, Lin and Eastin, 2003; Verplanken & Orbell, 2003; Wohn, 2012; Wood, Quinn, & Kashy, 2002). Habitual use has also been correlated with problematic outcomes in the context of online video games (Hartmann, Jung, & Vorderer, 2012; Lemola, Brand, Vogler, Perkinson-Gloor, Allemand, & Grob, 2011). Scholars emphasized the possibility that behavioral addictions such as online game addiction can be described as habits that have gotten out of control (Marlatt, Baer, Donovan & Kivlahan, 1988; LaRose, 2010) and that they begin as relatively nonthreatening patterns of behavior that can be described simply as media favorites.

## EXPLAINING COMPULSIVE AND HABITUAL USE

### Motivations

Despite the dramatic experiential differences between gaming solo and gaming with others, or despite the fact that social interactivity is what explains how much time people spend playing in most games, less attention has been given to role of social motivations in problematic gaming behavior. Playing online with friends as a means of social gathering (Cole & Griffiths, 2007; Klimmt, Schmid, & Orthmann, 2009), forming new relationships over games (Caplan, Williams, & Yee, 2009), competing with others, and creating a sense of affiliation with the community are among the attractive social reasons for gamers (Hsu, Wen, & Wu, 2009). Moreover, some SNGs offer persistent game societies that exist even when players log off (Yee, 2006; Lee, Lee & Choi, 2012).

In effort to enlighten preventive and treatment programs, a number of studies investigated the individual traits that could predispose individuals to become addicted to online games. Studies in this line are largely divided into two components: personality and motivation. Scholars have found some evidence to linking

problematic gaming to personality traits such as lack of self-control and narcissism (Kim, Namkoong, Ku, & Kim, 2008), low self-esteem (Ko, Yen, Chen, Chen, & Yen, 2005), aggression and hostility (Mehroof & Griffiths, 2010), and lower social control skills (Peng & Liu, 2010) or schizoid interpersonal tendencies (Allison, von Wahlde, Shockley, & Gabbard, 2006) among others.

Motivations, or reasons for playing games, may put a user at risk for online gaming addiction. Research on players of massively multiplayer online (MMO) games found a wide range of motivations that could lead to addiction-like behaviors, including more active motivation for entertainment (Wan & Chiou, 2006), playfulness (Lu & Wang, 2008), curiosity (Hsu, Wen, & Wu, 2009), and immersion (Billieux et al., 2011) and motivations to divert one's attention from something else such as dysfunctional coping (Ng & Wiemer-Hastings, 2005), diversion from everyday life (Chen, Chen & Ross, 2010) and escapism (Li, Liao, & Khoo, 2011; Kuss, Louws, & Wiers, 2012).

Here, we focus on the motivational factors that contribute to compulsive or habitual use. Earlier, we argued that habitual and compulsive behavior, while not mutually exclusive, should relate to other variables differently. This separation stems from the argument that both compulsive and habitual behaviors can be associated with difficulty of controlling behavior, however, only habitual behaviors lack self-awareness (Wood, Quinn, & Kashy, 2002; LaRose, 2010). It is therefore expected that certain motivations—for example “to feel relaxed”—would be correlated with habitual use but not compulsive, because a person who is aware of and trying to cut down from use unsuccessfully would not find playing as relaxing as a habitual user.

There are mixed results on the relationship between social motivations and problematic gaming. In a study with 332 Chinese college students, Zhou (2010) found that the social inclusion motivations and game achievement as two of the strongest predictors of SNG addiction. Social inclusion was reflected by statements

such as “to have more care and attention from friends” and to communicate with classmates and friends.” Hussain and Griffiths (2009) also found that people who seek interpersonal uses of video games to satisfy their social needs are more likely to report problematic outcomes.

However, other studies did not find significant relationship between social motivations and problematic game use (Billieux, et al., 2011; Kuss, Louws, & Wiers, 2012). Moreover, studies that looked at different dimensions of social motivations found that, sense of belonging was shown to be a significant predictor of online game addiction while bonding or competing reasons were insignificant (Hsu, Wen, & Wu, 2009; Zhou, 2010).

Here, we try to build on this prior research by differentiating habitual and compulsive gaming behaviors. If motivations affect these two constructs differently, it would further support our conceptual distinction and give us better understanding of how motivations are related to how people play. We thus have a general research examining the relationship between different motivations and two types of play, compulsive and habitual.

**RQ1a:** What SNG motivations are associated with compulsive use?

**RQ1b:** What SNG motivations are associated with habitual use?

## Time and Frequency

Excessive use (time), is a strong positive indicator of addiction in MMOs (e.g., Grusser, Thalemann, & Griffiths, 2007) but may not be the case with SNGs as casual genres of games currently make up the majority of SNGs, especially those on Facebook. Casual games require less minimum time commitment. This does not mean that one cannot spend hours and hours on a casual game, only that the game has the option for short-term game play. Thus, it is uncertain whether or not time spent playing SNGs will be associated with SNG addiction in the same way that time affects MMO addiction.

In addition to time, frequency of play has also been found to be an indicator of addiction (Yee, 2006). However, depending on how problematic gaming is measured, time and frequency may lead to a tautological argument, as the term addiction inherently implies recursive behavior. Addicts may be frequent users, but whether all frequent users are addicts is questionable. Moreover, some addicts may not be frequent users, but still perceive themselves as having a problem.

**RQ2a:** Does time/frequency spent playing SNGs predict compulsive use?

**RQ2b:** Does time/frequency spent playing SNGs predict habitual use?

### Network Effects

The impact of network on the habitual or compulsive uses is unclear in literature. Many studies that looked at the predictors of the compulsive or addictive online game use neglected the number of friends in the network or number of in-game friends. However, sense of belonging has consistently been shown as predictors of problematic game use (Hsu, Wen, & Wu, 2009; Zhou, 2010). As players grew closer to their in-game contacts and have increased sense of belonging and social status among fellow gamers, they may develop unintentional or uncontrollable playing patterns. Williams (2006) noted a similar pattern of cocooning (i.e., retreating into the seclusion of one's home during leisure time) among online players, as, over time, they began to place their value on their in-game social contacts at the expense of pre-existing relationships.

To understand main effects of social network size and number of in-game friends we formulated the following research questions.

**RQ3a:** Is network size associated with compulsive use?

**RQ3b:** Is network size associated with habitual use?

### SNGS AND PRO-SOCIAL RELATIONSHIP OUTCOMES

Several correlational studies documented the negative consequences associated with problematic video game use including but not limited to anti-social behavior, or social conflicts related to the game (see for review Kuss & Griffiths, 2011), lower psychological well-being (Lemmens, Valkenburg, & Peter, 2010), lower academic achievement (Jeong & Kim, 2011) and maladaptive cognitions (Peng & Liu, 2010). There is dearth of evidence however, in whether frequent and sometimes excessive use created positive, or pro-social outcomes. Essentially, pro-social outcomes have "the potential for fostering social interactions that are non-violent and positive in tone" that happen as a result of social media use (Mares & Woodard, 2001, p.185). Sharing, helping, and cooperative forms of behavior are hallmarks of social competence. The burgeoning variety of communication methods has rapidly expanded the means of player interaction and game participation (Kim, 2011). Previous studies revealed SNG users thought that their relationships benefited from playing together, they grew closer to others and their sense of attachment increased (Wohn, et al., 2011).

Examining more general literature on the social outcomes of online gaming, there is some support for positive outcomes. On one hand, there is evidence that playing with other people can, over time, contribute to positive individual, interpersonal, and group outcomes (e.g., Cole & Griffiths, 2007). In particular, several studies found that online game use generates social capital among game players through mechanisms such as reciprocity (Williams, 2006; Wohn, 2011; Wohn, et al., 2011). At the same time, literature suggests that the positive outcomes only happen among the online game players, and that online game play negatively affects relationships with non-game players. In the case of MMOs, scholars found that more time spent playing games decreases quality of

interpersonal relationships offline (Lo, Wang, & Fang, 2005) because players would rather spend time in the game with in-game acquaintances than people they know offline (Ng & Wiemer-Hastings, 2005).

The literature on MMOs suggests that the positive outcomes only happen *among* players and that offline relationships deteriorate. However, the distinction of online friends (in the game) and offline friends becomes questionable with the genre of social network games (SNGs). Social network games blur the distinction between within-game friends and friends outside of the game because they are embedded within social network sites. Players have access to profiles of the people they are playing with, and interaction between players takes place both within the game and through other features of the social network site. Thus people playing SNGs are mostly playing with people they already know, and even if they meet new people through the game, they can access information about the other player on their profile pages (Boudreau & Consalvo, 2014). This may make it harder to selectively self-present, at least in comparison to MMOs, which do not require personal profiles that are connected to the player's offline identity. Also, since one's gaming behavior is visible to other people who are not playing the game (e.g., people can publish game achievements on their Facebook wall, request game items from non-players, or see other Friends who are playing the same game) this seamless interaction between in-game and out-of-game creates certain social dynamics that may or may not contribute to negative outcomes.

Understanding SNG problematic use is important because the games are strongly reliant on asynchronous interaction among players as the basic mechanism of the game—for example, to advance in the game, players often have to exchange virtual items because they have access to different resources. For this, the games have been criticized for “forcing” interactions among players, raising the question of whether or not these interactions truly social, but scholars have

found that even without a social expectation, the behavior of exchange within the game could still create positive interpersonal outcomes over time (Wohn et al., 2011). Our following research questions therefore focus on the relationship between compulsive/habitual use and pro-social outcomes of SNGs after taking into consideration motivations and different types of playing patterns.

**RQ4a:** Is compulsive associated with pro-social relationship outcomes?

**RQ4b:** Is habitual use associated with pro-social relationship outcomes?

## METHODS

This data was collected as part of a larger study on how people play SNGs. Variables completely unrelated to the constructs examined in this paper have been used in another study (Lee & Wohn, 2012).

## Participants

Participants were recruited from undergraduate courses in telecommunication and asked if they had played, or currently play simulation games on Facebook, such as Farmville. Of 304 survey respondents, about half ( $N=129$ ) reported playing simulation games. Only the people who actually played games on Facebook were retained for analysis. Participants were 22.3 years old ( $SD=2.4$ ) and 56.5% were male. In terms of ethnicity, 61.3% were White, 16.9% were Asian, 13.7% were Black, and 4% were multiracial.

Participants reported having, on average, 546 Facebook Friends ( $SD=377.09$ ) and 12 game neighbors ( $SD=13.93$ ). Three outliers who had more than 1,500 Facebook Friends were eliminated from analysis. 77.2% of participants reported playing less than 30 minutes a day; 16.3% reported between 30 min. and an hour, and 6.5% reported between one and two hours. In terms of frequency of play, 66.1% reported

playing once a week or less, 121% played 2-3 times a week, 8.9% played 4-6 times a week, and 4% reported playing every day of the week.

## Measures

Compulsive use was a three-item measure (Cronbach's  $\alpha = .84$ ) from Caplan (2005) that was reworded to replace "Internet" with "Facebook game": "I have made unsuccessful attempts to control playing Facebook games." "I have a hard time resisting the urge to play Facebook games," "I am unable to reduce the amount of time I spend playing Facebook games." Habitual use ( $\alpha = .71$ ) was adapted from LaRose and Eastin (2004) by replacing "going online" and "the Internet" with "Facebook games (e.g., "Playing Facebook games is part of my daily routine"). Pro-social outcomes ( $\alpha = .94$ ) was three items based on pilot interviews with SNG players. Asking them to think about the people they play SNGs with, participants rated the following items: "My relationships with people whom I play games with have improved," "I feel closer to them after playing the games," and "I feel more attached to them since we've started playing together" on a 5-point Likert-type scale with responses ranging from "strongly disagree" to "strongly agree."

Motivations were measured using general social network game motivation items from Wohn, Lee, Sung, and Bjornrud (2010) that were originally adapted from Internet use scales and MMO scales (LaRose & Eastin, 2004; Yee, 2006). This set of questions asks individuals to mark their level of agreement to a set of statements that begin with "I play simulation games on Facebook to..." on a 5-point Likert-type scale from "strongly disagree" to "strongly agree." Since this study was only about one genre of social network games, we ran the items through a principal components analysis with a Varimax rotation, deriving four factors that explained 77.6% of variance. Varimax assumes that the factors are orthogonal. The four motivations were social (Cronbach's  $\alpha = .92$ ), status ( $\alpha = .79$ ), and passing time ( $\alpha = .83$ ). The exact

wording of the items and factor loadings can be found in Table 1.

## RESULTS

The means for our dependent variables were relatively low. Only 7.9% of participants reported a level of compulsive play above the mean of the 5-point scale ( $M = 1.75$ ,  $SD = .79$ ). This was consistent with previous studies that report the rate of problematic users as being 5 to 15% of the studied population (Grüsser et al., 2007; Hussain & Griffiths, 2009). Both quantitative and qualitative data suggest that a small, but significant, group of users suffer from dependence and withdrawal symptoms (Yee, 2006). The mean for habitual use was 2.11 ( $SD = .95$ ) and 2.30 ( $SD = 1.03$ ) for pro-social outcomes.

We first ran a Pearson's Product Moment correlation between compulsive use, habitual use, and other variables (see Table 2). Compulsive use and habitual use were strongly correlated ( $r = .67$ ,  $p < .001$ ). However, these two types of use related in slightly different ways with other variables, implying that they are not a uniform concept. For example, compulsive use had a higher correlation with the social and status motivations in comparison to the correlation between habitual use and social and status motivations. However, habitual use had a stronger correlation with the relax motivation than that of compulsive use.

To investigate RQs 1-3, we ran separate OLS regression models with compulsive play and habitual play as the dependent variables. The independent variables were the four motivations, time spent playing games, frequency of playing games, number of game neighbors, and squared number of Facebook Friends. The number of Facebook Friends was centered and squared because the relationship between number of Facebook Friends and dependent variables was non-linear. Curve estimations indicated that the relationship between number of Facebook Friends and compulsive use, habitual



Table 1. Factor loadings of motivation items

“I Play Simulation Games on Facebook to...”	Factors			
	Social	Status	Relax	Pass Time
Maintain a relationship I value:	.84	.38	.00	-.02
Find something to talk about:	.83	.29	.09	.02
Improve a relationship:	.79	.45	.03	-.06
Forget my problems	.74	.23	.20	.14
Feel less lonely:	.69	.42	.27	.04
Help other players	.63	.34	.23	.13
Get support from other players	.61	.46	.28	.03
To impress other people in the game	.27	.83	-.04	.19
Be well-known for the game	.32	.81	-.04	.19
Tell others about myself	.41	.79	.15	.00
Find people like me	.36	.78	.34	-.07
Find others who respect my views	.40	.78	.30	-.09
To feel important	.49	.72	.30	-.08
Feel entertained	-.10	.11	.78	.28
Cheer myself up	.37	.30	.75	-.05
Feel relaxed	.37	.15	.75	.21
Relieve boredom	.11	.00	.10	.95
Find a way to pass the time	.01	.01	.21	.92

Table 2. Pearson's product moment coefficients between variables

	1	2	3	4	5	6	7	8
1 Neighbors	-							
2 Friends <sup>2</sup>	.32***	-						
3 Social	.26**	.15	-					
4 Status	.22*	.15	.76***	-				
5 Relax	.23*	-.01	.52***	.50***	-			
6 Pass Time	-.14	-.02	.12	.06	.30**	-		
7 Compulsive	.17	.31***	.65***	.62***	.40***	.10	-	
8 Habit	.20*	.21*	.55***	.55***	.45**	.17	.67**	-
9 Pro-social Outcomes	.13	.09	.70***	.58***	.51***	.12	.59***	.53***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

use, and pro-social outcomes was quadratic (a U-shape). The curve indicated that an increase in Facebook Friends decreased compulsive use, but compulsive use increased after number of Friends was above 700, as indicated through the curve estimation. The quadratic model explained more variance and was a better fit than the linear model for all three dependent variables.

The quadratic relationship between number of Facebook Friends and game play was also consistent with more general findings showing that there is a curvilinear relation between the size of one’s network and its ability to satisfy one’s needs (Polister, 1980). Other studies found a curvilinear relationship between number of Facebook Friends and social/physical attractiveness (Tong, Van Der Heide, Langwell, & Walther, 2008), social capital (Ellison, Steinfield, & Lampe, 2011), loneliness (Wohn & LaRose, 2014), and subjective well-being (Kim & Lee, 2011).

The regression model ( $F(10,104)=19.16, p<.001$ ) for compulsive use explained 65% of variance (Table 3). Status ( $\beta=.37, p<.01$ ) and

social ( $\beta=.22, p<.05$ ) motivations were statistically significantly associated with compulsive use. Frequency of playing simulation games on Facebook was also a significant factor, but time was not. Women were also more likely to report higher compulsive use, but only after adding motivations to the model. In the final model, we see that the squared number of Facebook Friends significantly contributes to explaining compulsive use.

Habitual use ( $F(10,104)=10.62, p<.001$ ) was largely explained by the relax motivation and frequency of play, but not social motivation (Table 3). The number of game neighbors also increased likelihood of being a habitual player, but became insignificant after adding motivations to the model. There was no relationship between number of Facebook Friends and habitual use.

To investigate RQ4a, we ran an OLS regression to see if compulsive use is associated with pro-social outcomes while controlling for motivation, play-related factors, and basic demographic factors (Table 4). The model was significant ( $F(11, 98)= 8.52, p<.001$ , adjusted

Table 3. OLS regression models explaining compulsive and habitual use

	Compulsive Use (N=114)			Habitual Use (N=114)		
<b>Age</b>	.20*	.16	.09	.13	-.01	.09
<b>Sex<sup>1</sup></b>	.06	.09	.15*	.02	.07	.03
<b>Play Factors</b>						
No. of neighbors		.14	.01		.21**	.09
(No. of FB friends) <sup>2</sup>		.14	.14*		.08	.05
Time spent playing		.13	.02		.05	.01
Frequency of play		.29*	.20*		.44***	.30**
<b>Motivations</b>						
Social			.22*			.08
Status			.37**			.19
Relax			.08			.19*
Pass time			-.04			.00
<b>Adjusted R<sup>2</sup></b>	.05	.29***	.50***	.02	.34***	.46***

\*p<.05, \*\*p<.01, \*\*\*p<.001. All coefficients are standardized, <sup>1</sup>Sex was coded 0 for men, 1 for women

$R^2 = .46$ ). Social motivation and compulsive use were both significantly associated with positive relationship outcomes.

To investigate RQ4b, we ran the same OLS regression, but with habitual use instead of compulsive use as an independent variable. The model (Table 4, Model 2) was significant,  $F(11, 98) = 9.02$ ,  $p < .001$ , adjusted  $R^2 = .47$ . Again, social motivation was significantly associated with positive relationship outcomes. Habitual use, however, was not statistically significant ( $\beta = .15$ ,  $p = .15$ ).

## DISCUSSION

In this paper we focused on the social elements of play: how social factors, such as expectations of social interaction and friendship network size are associated with two different playing types of SNGs—compulsive and habitual.

While most of the extant literature identifies time as being an indicator of problematic gameplay, we found that frequency of playing, not time spent playing SNGs, was a significant factor explaining compulsive use. Because most of previous studies showing a relationship between problematic gameplay and time were in the context of console or massively multiplayer online games (Grusser, Thalemann, & Griffiths, 2007), it may have been that game genre was the underlying factor explaining time. If time was indeed an important factor of problematic use, we would have seen a relationship between time and compulsive use but we did not. This suggests that the relationship between time and addiction in previous studies may have been specific to genres of games that required a lot of time, unlike SNGs which don't require much time to play (Wohn & Lee, 2013). These findings also show that behavior can still be

Table 4. Regression model explaining pro-social outcomes

	Standardized Coefficients	
	Model 1	Model 2
Age	.06	-.02
Sex	-.02	.02
<b>Play Factors</b>		
No. of neighbors	.03	-.15
(No. of FB friends) <sup>2</sup>	.02	.02
Time spent playing	.14	.06
Frequency of play	.23	-.06
<b>Motivations</b>		
Social	.78***	.76***
Status	-.16	-.18
Relax	.16	.14
Pass time	-.03	-.04
<b>Compulsive Use</b>	.25**	
<b>Habitual Use</b>		.15
<b>Adjusted R<sup>2</sup></b>	.47	.47
<b>F</b>	9.77	9.02

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

problematic even if not much time is spent playing the game and that rather than time, we should be using measures such as compulsive use to determine whether or not a player is able to regulate their gaming behavior. Of course, in certain game contexts, time can be a good indicator of problematic gaming—there is no question that someone who ignores work, sleep, and starves their child to death (Tran, 2010) has a gaming problem. However, the argument that we want to make here is that even people who do not play for long hours may still have a problem.

Consistent with the corpus of research finding a connection between problematic Internet use and social motivations, we found a similar connection between social motivation and compulsive use in the medium of SNGs. However, there was no association between social motivation and habitual use. Our findings indicate that habitual users have more individualistic motivations than social. Social motivations did not predict habitual use, suggesting that those who play for social reasons may be more prone to psychological problems related to addiction than those who are playing out of routine to relax in the game. By the same token, relaxation was not correlated to compulsive use indicating that people lack of control over behavior detaches user from the relaxing aspect of playing the game.

Network factors were associated with compulsive use but not habitual use. For example participants' habitual use had a positive association with number of in-game neighbors, but compulsive use did not present such relationship. Also, number of Facebook Friends and compulsive use showed a curvilinear relationship; more friends decreased compulsion, but after more than 700, having more friends increased compulsion. There was no such association, however, with habitual use. The number of in-game neighbors is critical for keeping relatively stable game habit and may have more entertaining or relaxing probabilities with the increased number of in-game neighbors. But number of neighbors becomes less relevant if playing has compulsive nature.

Future studies may inquire into the nature of these neighbor relationships and contrast them with friends in the network. For example, neighbors that are strangers in the beginning of a play may become actual friends in time through socialization features of the SNGs. This aspect is particularly important for understanding pro-social outcomes of SNGs. These observations exemplifies that habitual use and compulsive use, though similar, are very distinct in terms of how they relate with other variables.

The curvilinear relationship we found between number of Facebook Friends and compulsive use suggests that friends can play a role in both curbing problematic behavior and instigating it. Of course, the number of Facebook Friends is most likely, at best, to be a proxy of other psychological issues, such as loneliness (Wohn & LaRose, 2014), and future investigation should be done to see what is so special about people who are two or more standard deviations away from the mean. It could be that those with excessive Facebook Friends are those who are more sensitive to social attention or those who have a lot of peripheral friendships but not any meaningful connections. Neither the time of play nor the frequency of play predicted pro-social outcomes indicating that in the absence of social motivations improvements on relationships or sense of attachment is not likely to occur regardless of habitual or compulsive uses. Also, the fact that the social motivation, but not status motivation, was significant in predicting pro-social outcomes suggests that those achieving pro-social outcomes were not those who were competing with their friends but those who were cooperating with their friends. Further investigation of the difference of cooperation and competition in relation to compulsive behavior and pro-social outcomes are needed.

## Limitations and Future Studies

With these avenues for research in mind, we are also mindful of the limitations of our study that we hope future studies may attempt to address. First, our results were based on a

sample of college undergraduates and may not generalize to other age groups. Given that the average player demographic of SNGs is females around the age of 40 (Data Genetics, 2013), further research needs to be conducted with a larger, more diverse sample to see if the relationship between motivations, usage, and outcomes are consistent in other age and gender populations. However, by limiting the sample to undergraduate student, the study controls other confounding factors that may be associated with age such as income or network size. Second, we measured habitual behavior with a self-report survey questionnaire method. It has been argued in the literature that since habits act on a semi-conscious level using self-report methodology bring accuracy limitations (Sniehotta & Pousseau, 2012). As an alternative measurement paradigm, recent experiments with priming goals and measuring judgment speed have been providing promising findings (Aarts & Dijksterhuis, 2000; Ozkaya, 2014). Future studies should employ a multi-method approach to measure habit construct.

In understanding conscious and unconscious processing of goal-directed behaviors, which habitual behaviors sit on the border or interaction of both, it is essential to understand the role of deficient self-regulation. Emerging studies in the field indicates a potential link between deficient self-regulation and habit activation (Ozkaya, 2014). It has been previously shown that depletion of self-control resources impairs the inhibition of habits, and conversely, the inhibition of habits depletes self-regulation (Vohs, Baumeister, & Ciarocco, 2005). Future studies should investigate into the role of deficient self-regulatory states as a functional energy saving trigger and hence indirect initiator of habitual behavior.

Third, we only used one measure of addiction: compulsive use. Our reason for using this measure was because it was used in at least three previous studies as a subscale of problematic Internet use, but using other measures of addiction may yield different results. As noted by previous scholars (Kuss & Griffiths, 2011; Ozkaya, LaRose, & Wohn, 2011) measure-

ment of online game addiction has not been uniform, making it difficult for researchers to conduct quantitative meta-analyses. Future studies should employ multiple measures of addiction to address measurement problems and create standards within the field for comparison across studies.

Some of the social motivations also could be related to game genres. For example playing puzzle games is a different experience from playing a poker game in terms of social interactions. Future studies should integrate the role of genres into investigating the habitual and compulsive gameplay dynamics.

## CONCLUSION

“Would we ever characterize any time spent in the real world with friends as ‘addicting’?” John Grohol pointed out in 1999, criticizing the hype of research on Internet addiction (Grohol, 1999). He claimed that there is nothing wrong with referring social interaction online than in in-person because it is one of personal preference. He emphasized that online friendships are a “different way of interacting, but not necessarily a less-quality interaction.” (p.399).

In our study, we found empirical evidence showing that indeed, social factors play a complex role in how people play, as well as the relationship outcomes that derive from in-game interactions. Our research shows that social motivations can lead to uncontrollable behavior (compulsive use), but that very behavior is also associated with positive interpersonal relationships. While most research has only focused on the negative outcomes of compulsive media usage, we found that the phenomena commonly labelled as “addiction” can also have pro-social outcomes.

Do we define addiction by the properties of the behavior or its negative consequences? Media scholars have had disagreement on what the criteria of addiction should be. Based on our findings, we question the definition of problematic media behavior as being based on outcomes of the behavior—if a behavior can

generate both positive and negative outcomes, perhaps criteria of problematic should be based on the characteristics of the behavior itself rather than the outcome.

While we found a strong relationship between social factors and compulsive game play, habitual gaming was not found to be associated with either social motivations or pro-social outcomes. Both habitual and compulsive use have been associated in the past with addiction because both have been linked to excessive time, but our results suggest that we should carefully consider the criteria we are using when defining and measuring so-called “addiction” because examining different dimensions indicate that these behaviors are very different. Rather than trying to use a vague concept of addiction, we suggest that more granular distinctions based on theory—such as compulsive play and habitual play—provide a clearer understanding of the type of behavior being examined, and reduce ambiguity in interpreting the relationship between variables.

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