Gratification, Loneliness, Leisure Boredom, and Self-Esteem as Predictors of SNS-Game Addiction and Usage Pattern Among Chinese College Students

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ABSTRACT

This study investigated the relationships between perceived social network sites (SNS)-game addiction and gratifications, loneliness, leisure boredom, self-esteem, and usage of SNS-games. Data were gathered from a sample of 342 college students aged 18 to 22 in mainland China. Factor analysis yielded a three-factor gratifications structure (achievement, inclusion, and entertainment) based on the 11 motives for playing an SNS game obtained in a focus group. As hypothesized, loneliness and leisure boredom were found to be significant predictors of the level of SNS-game use and likelihood of addiction. SNS-game addicts tended to be male, lonely, often leisurely bored, and motivated by winning virtual money and gaining a sense of achievement. However, self-esteem was not a significant predictor. Implications for university administrators and suggestions for future research were discussed.

Keywords: *Chinese College Students, Gratifications, Leisure Boredom, Loneliness, Self-Esteem, Social Network Sites-Game (SNS-Game)*

INTRODUCTION

Social Networking Sites (SNS) have developed rapidly in recent years. According to the "Survey Report on SNS Usage Pattern among Chinese Netizen" published by CNNIC (2009), Chinese SNS users have reached 124 million. Among these, 50.3% were students. While the number of visitors to social networking sites is increasing, so too are the numbers of new services launched (such as SNS games).

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In mainland China, many large-scale SNS companies have found a market in SNS games. SNS games differ from traditional online games in several respects. Firstly, they are free of charge and have few entry barriers for new players. Some SNS games are as simple as parking cars or tending gardens online. Users do not need to read any game strategy or install any local client software to find out how to enhance the game level. Secondly, as previous research has defined the SNS as a bounded system, within which users can construct a public or semi-public profile and share a connection (Boyd & Ellison, 2007), the games in an SNS platform are usually played among real-life friends, or at least the gamers can become familiar with the other players' profiles through SNS. Thus, SNS games are more personal than traditional online games.

SNS-game applications are enormously popular in mainland China. Data from CNNIC (2009) shows that among people who log onto SNS more than once a day, 51.7% play an SNS game. More than 27% of SNS users considered the game application to be their motivation for using SNS. Because of the highly appealing game applications, many SNS websites began to use them to attract more dedicated users. Happy Farm is currently the most popular game in the SNS game market.

Happy Farm was launched by a Chinese company, Five Minutes Limited, in November 2008. Today, many SNS platforms such as Renren.com, Kaixin001.com and Q-zone have run the game. In this game, players act as the owner of a virtual farm where they plant different vegetables and fruits and raise animals as on a real farm. From seeding to maturity, the vegetables and fruits may suffer drought, plant diseases, and pests in each phase. After harvest, players can sell their products to earn virtual money. Meanwhile, players can "steal" products from other farms and sell these products to earn virtual money. Shanghai-based consulting firm BloggerInsight estimated that SNS farm games attract 28 million to 30 million daily active users, including a conservative estimate of 7 million daily active users for Kaixin001 and 15 million to 17 million daily active users for QQ's new entry.[1]

The proliferation of SNS games has also triggered many problems. Nearly all the gamers report such actions as getting up at midnight to harvest or "steal" vegetables. Helping others to "steal" vegetables even becomes a popular job among college students. In light of the potential significant effect the games may have on users' normal life and mental health, the government is considering limiting the use of Happy Farm.

Previous research about Internet addiction found that college students comprise the segment of society most vulnerable to developing a dependence on the Internet (Kandell, 1998; Leung, 2004). A study conducted by Chou and Hsiao (2000) also indicated that students who are addicted to the Internet report that the Internet affects their studies and daily routines significantly more than the non-addicted group. However, little research explored the relationship between psychological traits and addictive usage. And almost no research explored the special phenomenon of SNS games in mainland China.

In light of the social significance of the SNS-game phenomenon in mainland China and the lack of previous study in this area, this exploratory research attempts to identify predictors of SNS games with a focus on gratification, loneliness, leisure boredom, and self-esteem.

LITERATURE REVIEW

Uses and Gratifications (U&G) Theory

Wimmer and Dominick (1994) proposed that U&G theory began in the 1940s when researchers became interested in why audiences engaged in various forms of media behavior, such as listening to radio or reading the newspaper. From the 1970s on, U&G theory researchers put more emphasis on examining the audiences' social and psychological motivations. Katz, Gurevitch, and Haas (1973) constructed a

comprehensive list of social and psychological needs said to be satisfied by exposure to mass media, including relaxation, social interaction, self-identity, escape and information-seeking. Furthermore, Katz (1973) continued to point out that the needs and motives of choosing different media are associated with personal characteristics. In other words, audiences are goal-oriented and can state their own motives for using specific types of media. For example, Bryant and Zillmann (1984) discovered that individuals who live stressful lives prefer more tranquil programs.

As new technologies present people with more and more media choices, motivation and satisfaction become even more crucial components of audience analysis. Past research have explained the involvement of computer-mediated communication from the perspective of U&G. Kuehn (1994) outlined a list of U&G statements as rating scales to evaluate computer-aided instructional programs. Four motivations were identified including relationship development, convenience, intellectual appeal and diversion. Similarly, Papacharissi and Rubin (2000) identified companionship, action, substitution for friendship, passing time and isolation as reasons for predicting the use of the Internet.

In recent years, U&G theory has also been adopted to examine a wide range of online activities. For example, Raacke and Bonds (2008) explored the use of friend-networking sites; Leung (2000, 2001a) examined cellular phone and ICQ usage and Chang, Lee, and Kim (2006) studied the adoption and continuance of online games. Corresponding motives and satisfaction such as "making new friends," "entertainment," and "passing time" were found based on different online activities.

SNS gaming is an emerging online technology that has received much attention because of the large number of users. One goal of this study is to explore a wide range of motivations in SNS-game use that users can identify as unique. As a result, the following research question is proposed:

RQ_1: What gratifications do users seek from SNS-game playing?

Internet and SNS-game Addiction

The traditional concept of "addiction" was based on a medical model and is properly reserved for bodily and physiological dependence on a physical substance and not a behavioral pattern. Recently, Internet addiction as a new form of addiction has received more and more attention from researchers in sociology, psychology and psychiatry, among other sciences. Researchers such as Young (1996) replaced the word "substance" with "Internet" in their analysis of Internet addiction, concluding that similar symptoms such as tolerance, withdrawal, craving and negative life consequences are present in Internet addiction as well as other types of addiction. Griffiths (1998) considered Internet addiction to be a kind of technological addiction, included in a subset of behavioral addictions. These problematic behaviors were labeled by Walker (1989) as obsessive and compulsive based on the similarities to gambling addiction and compulsive shopping, as these disorders also lack a chemical dependence.

Today, over-involvement with the Internet has been frequently observed, especially among college students, possibly due to their strong drive to develop a sense of identity and to forge meaningful and intimate relationships (Griffith, 1998; Leung, 2011; Leung & Lee, 2011). On most campuses, Internet connection is convenient and free of charge. Some students remain online virtually all of their waking hours. Many of them even reported that they could not do anything else and felt seriously depressed and irritated when the network connection was inaccessible (Chou & Hsiao, 2000).

Among all Internet activities, Young (1996) found that "real time" service such as Internet relay chat (IRC, live chat in which users socialize and discuss common topics) and multi-user domains (MUDS, text-based virtual worlds in which social interaction is required) proved to be most addictive. SNS games are characterized by this highly social interaction. Users of these game applications are not only players but also members of social networking sites. Most of the game players are friends in reality, and playing the SNS game provides them an opportunity to further develop social identities and get more interaction with each other. Besides, the satisfaction of achieving a higher level and more virtual money in the game can elevate the self-esteem that they may lack in real-world socialization, bring more excitement, and ease their sense of emptiness.

Symptoms of SNS-game addiction are similar to those of Internet addiction. In online games, Leung (2004) found that addicted gamers become preoccupied with gaming, lie about their gaming use, lose interest in other activities just to game, withdrawal from family and friends to game, and use gaming as a means of psychological escape. These are similar to several important signs of Internet addicts as illustrated in Griffith (1998): (1) Use of Internet becomes the most important daily activity; (2) the addict feels aroused and excited when online and enjoys a feeling of escape from the real world; (3) the addict experiences increased tolerance to the effects of being online; (4) the addict experiences unpleasant feelings when offline; (5) the addict experiences increased conflicts with friends and families and a decrease in other activities; and (6) the addict is incapable of reducing Internet use.

Moreover, significant correlations between Internet usage and some psychological traits were found in previous studies. For example, Moody (2001) and Leung (2004) suggested that high Internet use (such as ICQ, e-mail, and computer games) is associated with high emotional loneliness, depression, and sensation-seeking. Young (1996) also found that the Internet can serve as a substitute for real-life social interaction for individuals with low self-esteem.

Loneliness

A sense of loneliness reflects the discrepancy between the individual's expectations of interpersonal relationships and his or her actual social situation (Asher, Parkhurst, Hymel, & Williams, 1990). Peplau and Perlman (1982) and Rubenstein and Shaver (1982) describe loneliness as an unpleasant emotional experience that stems from inadequate social relationships in some important ways. By this definition, loneliness may occur when people lack friendship (Margalit, 1994), suffer from the absence of social support (House, Landis, & Umberson, 1988), or become frustrated and dissatisfied with an existing relationship (William & Asher, 1990).

John and Ernst (1999) suggested that loneliness is associated with two factors: situational factors and personal factors. The situational factor refers to the fact that the change of situation can significantly affect the sense of loneliness. For example, a study conducted by Shaver, Furman and Buhrmester (1985) discovered that during the first year of college life, most students' satisfaction with their friendship network decreased and their sense of loneliness increased. The personal factor emphasized the role of social skills in determining the state of loneliness. Individuals high in self-rated social skills were less lonely. Those with inadequate social skills including passivity, lower self-esteem, greater shyness and self-consciousness were more likely to experience loneliness (Jones, 1981).

Loneliness is a common problem among college students (Cutrona, 1982; Shaver, Furman, & Buhrmester, 1985). Lonely students report significantly lower intimacy in social relationships. They tend to speak less and have difficulties in maintaining stable relationships. With the advancement of technology, recent studies found that students who scored signifi-

cantly higher on the UCLA Loneliness Scale were frequent Internet users (Leung, 2001b, 2002). Compared with building relationships in the offline world, they were more likely to go online to relax, talk to others with similar interests or find support (Morahan-Martin & Schumacher, 2000). The increased feelings of loneliness among Internet users have aroused much attention. The Happy Farm game has even earned the user-posed slogan "We are not stealing vegetables, but the loneliness." Accordingly, the following hypotheses are posed:

H_{1a}: The lonelier the SNS-game players are, the more they will play the SNS-game.

H_{1b}: The lonelier the SNS-game players are, the higher the likelihood they will be addicted to the SNS-game.

Leisure Boredom

Leisure boredom has been conceptualized as a subjective perception that available leisure experiences are not sufficiently frequent, involving, exciting, varied or novel (Iso-Ahola & Weissinger, 1990). Psychologists have concluded that boredom is a state of under-stimulation, under-arousal, lack of momentum or lack of psychological involvement associated with dissatisfaction in the task situation (Brissett & Snow, 1993; Larson & Richards, 1991; Mikulas & Vodanovich, 1993). In fact, leisure and boredom have a complex relationship. Susan and Keis (2000) claimed that different leisure activities can result in diverse levels of boredom. They found, for example, that young people who were involved in unstructured leisure activities such as peer-directed socializing, television or videos, non-competitive sports, games and idle activities were potentially more prone to boredom.

The phenomenon of leisure boredom has caused much alarm and attention because many previous studies have found that leisure boredom is related to other forms of addiction and has been implicated in detrimental behaviors such as delinquency, extreme sensation activity and alcohol and drug abuse (Caldwell & Smith, 1995; Iso-Ahola & Crowley, 1991). For instance, frequency and quantity of alcohol use among female college students has been found to be positively correlated with boredom susceptibility (Orcutt, 1984). Moreover, Blaszczynski, McConaghy, and Frankova (1990) report that pathological gamblers are more bored and use gambling as a way of avoiding or reducing noxious physiological states or dysphoric moods. Kuley and Jacobs (1988) also found that gambling addicts have elevated boredom-proneness scores.

Addressing the leisure choice of college students serves an important function because they are a special group that is experiencing the transition from adolescence to young adulthood. Their lifestyle characterized by having recently moved away from home, living in residence halls or with friends off-campus and enjoying their newfound freedom. These contextual changes may have a fundamental influence on their leisure pursuits. Today, the advancement of electronic media, including Internet/Web surfing and computer/video gaming, has occupied most leisure time of young people and has greatly displaced other forms of social activities. Although a large amount of research has examined psychological and sociological problems related to college students, leisure researchers have not paid adequate attention to this group, thus the leisure activities of college students have not been fully understood. As many college students are SNS-game players, this research will examine the relationship between leisure boredom and SNS-game use among this cohort. Accordingly, the following hypotheses are posed:

H_{2a}: The higher the level of leisure boredom the SNS-game players experience, the more they will play the SNS-game.

H_{2b}: Level of leisure boredom the SNS-game players experience will be significantly and positively related to SNS-game addiction.

Self-Esteem

Over the years, researchers have devoted considerable attention to the term "self-esteem," defined as "the evaluation which the individual makes and customarily maintains with regard to the self" (Coopersmith, 1967, pp. 4-5). When individuals evaluate themselves negatively, they may have an unfavorable self-concept. As a result, they are less motivated to communicate because they expect to fail. A study conducted by Joiner, Alfano, and Metalsky (1991) even discovered that male college students with low self-esteem are significantly associated with being depressed fear of rejection.

Increases and decreases in self-esteem are often coincident with major successes and failures in life. Subjective experience creates the impression that self-esteem rises when one wins a contest, garners an award, solves a problem or gains acceptance to a social group, and that it falls with corresponding failures (Campbell, Krueger, Vohs, & Baumeister, 2003). Research also found that self-esteem is a good predictor of Internet use. Low self-esteem may drive people to use the Internet as an escape, especially for college students who may find it difficult to adapt to life away from home and fit in with others (Craig, 1995). Considering that Happy Farm offers the satisfaction of increasing game levels, harvesting vegetables and stealing friends' virtual products, it is possible that many individuals with lower self-esteem in reality may enjoy the experience of having high self-esteem gained by playing the SNS-game. In addition, past research has found that perception of boredom in leisure activities correspond with low levels of self-esteem, social competence and leisure satisfaction (Iso-Ahoha & Weissinger, 1990). As a result, we expect that:

H_{3a}: Subjects who score low on self-esteem will play SNS-game more often.

H_{3b}: Subjects who score low on self-esteem will demonstrate a higher tendency of being addicted to the SNS-game.

Based on the similar study and the increasing phenomenon of SNS-game addiction in mainland China, this exploratory study seeks predictors from addiction literature and other psychological theories such as loneliness, leisure boredom and self-esteem in order to differentiate the addicts and the non-addicts and to explain usage patterns of SNS-games. Therefore, the following questions are posed:

RQ_2: To what extent are college students in mainland China addicted to SNS games, and in what way do they differ from non-addicts in terms of demographics, loneliness, leisure boredom, self-esteem, and usage pattern?

RQ_3: How can demographics, gratification, loneliness, leisure boredom, and self-esteem predict SNS-game use?

RQ_4: How can demographics, gratification, loneliness, leisure boredom and self-esteem predict SNS-game addiction?

METHOD

Sample and Data Collection

Data were collected from a convenience sample of 500 college students, aged between 18 and 22, in two medium-sized colleges in Shandong province in mainland China, who have played and were regular players of SNS-games. A total of 342 valid paper-based questionnaires were returned, and the response rate was 68.4%. All the participants were voluntary. The survey instrument was written in English, translated to Chinese, and pilot tested before distribution.

Among the respondents, 67.8% were female and 32.2% were male students. This gender distribution closely resembles the population in most liberal studies universities in China. More than 53% claimed that they logged in to play an SNS-game two or more times a day. In terms of education, 61.4% were first-year students, 36.5% were second-year students, and 2% were third-year students. More than 95% lived in a school dormitory.

Measurement Scales

Uses and gratification: As motivations for playing SNS games may differ from playing traditional online games, a focus group was conducted among 20 college students aged between 18 and 22 to understand the gratification they seek from playing SNS games. Ambiguous and repetitive answers were eliminated. Thus, based on the previously published U&G scales (e.g., Chang, Lee, & Kim, 2006; Leung, 2001a, 2002; Raacke & Bonds, 2008), as well as items from the focus group created for this study, 11 foremost gratification statements were used including: (1) to enjoy the game's interface, (2) to have fun, (3) to relax from gaming, (4) to participate in the traditional country life, (5) to communicate with classmates and friends, (6) to have more care and attention from friends, (7) to have a sense of belonging, (8) to pursue more virtual money, (9) to gain satisfaction from personal growth, (10) to enjoy the feeling of leveling up, and (11) to reduce stress.

The consolidated gratification statements were used as a multi-dimensional scale to examine the unique gratification gained from the SNS game. A five-point Likert scale was used in rating these items, namely "1" = strongly disagree and "5" = strongly agree.

SNS-game addiction: SNS-game addiction was measured using Young's (1996) classic Internet Addiction Test (IAT) with some necessary modifications. Eight items were adopted according to Young's screening instrument for addictive Internet use to test possible SNS-game addiction. A five-point Likert scale was applied in rating the 8-item scale, with "1" = not at all, "2" = rarely, "3" = occasionally, "4" = often and "5" = always. The eight questions included: (1) How often do you find that you have been playing SNS games longer than you intended? (2) How often do you block out disturbing thoughts about your life and replace them with soothing thoughts of SNS games? (3) How often do you find yourself saying "just a few more minutes" when playing SNS games? (4) How often do you feel preoccupied with SNS games when logged off, or fantasized about being logged on? (5) How often do you try and fail to cut down on the amount of time you spend on Happy Farm? (6) How often do you snap, yell or act annoyed if someone bothers you while you are playing SNS games? (7) How often do you feel depressed, moody or nervous when you are offline from SNS games, and these feelings go away when you are back online? And (8) how often do you try to hide how long you have been playing SNS games? Responses were recoded with "1 to 3" to "no" and the responses of "4 and 5" to "yes." According to Young (1996), respondents who gave five "yeses" or more of the eight items were considered as "addicts." The mean of the eight items was 17.2 (s.d. = 5.74) with Cronbach's alpha equals .77.

Loneliness: To measure loneliness, the Revised UCLA Loneliness Scale was used (Russell, 1996). In this scale, respondents were asked to self-report their emotional experiences concerning their interpersonal relationship expressed in the 20-item measure using a four-point scale with "1" = never, "2" = rarely, "3" = sometimes, and "4" = often. The mean of the scale was 52 (s.d. = 6.9), and its reliability was high, with alpha = 74.

Leisure boredom: Leisure boredom was measured using the Leisure Boredom Scale (LBS: Iso-Ahola & Weissinger, 1990). The LBS is a self-report questionnaire used to measure "individual differences in perceptions of boredom in leisure" (Iso-Ahola & Crowley, 1991, p.264). The LBS consists of eight items from the original 16-item scale to which subjects responded on a five-point scale ranging from strongly disagree (1) to strongly agree (5), with high scores indicating greater leisure boredom. Sample items

included "For me, leisure time just drags on and on" and "leisure time activities do not excite me." Reliability alpha was acceptable at .78.

Self-esteem: The Rosenberg Self-Esteem Scale contained 10 items with a four-point Likert scale ("1" = not at all like me and "4" = very much like me) and provided an overall evaluation of one's worth or value. To cut down the length of the questionnaire, only six from the 10-item scale were randomly chosen (e.g., "I feel that I have a number of good qualities," "I feel that I am a person of worth, at least on an equal basis with others" and "I am able to do things as well as most other people"). Reliability alpha of these six items was also acceptable at .77.

SNS-game usage pattern: Using a 4-point scale, respondents were asked the following questions regarding the SNS-game usage pattern: (1) How many hours do you play Happy Farm per day (less than one hour, one to two hours, three to four hours, or more than four hours)? (2) How many times per day do you log in to check the status of "products" on Happy Farm (less than twice, two to three times, four to five times, or more than five times)? (3) How often do you steal virtual "products" from other players per day (less than once, one to two times, three to five times, or more than five times)? (4) Where do you play Happy Farm (dormitory, Netbar or home)? (5) How long in years have you played SNS games such as Happy Farm (1=less than one year, 2=one to two years, or 3=more than three years)? In this study, the level of SNS-game use was a composite measure of questions one, two and three. Reliability alpha of these three items was .74.

Demographics: Demographics were assessed in this study as control variables, including: gender (female=0), age, year in school and family income.

FINDINGS

Gratifications of SNS-game Uses

In order to optimally reduce the data into conceptually coherent and statistically non-overlapping factors, principal components factor analysis was conducted with a Varimax rotation method. As shown in Table 1, three major gratifications based on the 11 motives for playing SNS games obtained in the focus group were confirmed including: (1) "Achievement" (Cronbach's alpha = .81), which reveals that playing SNS games was to pursue more virtual money, gain satisfaction from personal growth and to enjoy the feeling of leveling up; (2) "Inclusion" (Cronbach's alpha = .76) reflects that college students played SNS games to experience the traditional country life, to communicate with classmates and friends, to have more care and attention from friends and to have a sense of belonging and (3) "Entertainment" (Cronbach's alpha = .61) indicates that college students played SNS games to enjoy the game's interface, have fun and relax. These dimensions suggest that playing SNS games was for fun, reducing stress, maintaining and reinforcing established interpersonal relationships and achieving higher statuses in their games. The factor structure explained 63.15% of the variance.

Hypotheses Testing

H_{1a} and H_{1b} hypothesized that the lonelier a SNS-game player is, the more he or she plays the SNS game and higher the likelihood he or she will be addicted to the SNS game, respectively. As shown in Table 2, loneliness was significantly and positively, albeit small, related to the use of SNS games ($r = .27$, $p < .001$), as well as SNS-game addiction ($r = .23$, $p < .01$). Thus, H_{1a} and H_{1b} were both supported. H_{2a} and H_{2b} hypothesized that the higher the level of leisure boredom users experience, the higher the level of SNS-game use and degree of addiction. Level of SNS-game addiction was measured by the eight items that were combined into a single index of addiction indicating that the higher

Table 1. Factor analysis of perceived gratification of SNS-games

	Factors			Mean	SD
	1	2	3		
Achievement:					
1. To gain gratification from winning	.86	.17	.05	3.43	.95
2. To acquire more virtual money	.86	.08	.07	3.47	.98
3. To enjoy the feeling of leveling up	.72	.05	.38	2.80	1.00
4. To reduce stress from accomplishment	.58	.35	.02	2.41	.96
Inclusion:					
5. To gain more care and attention from friends	.04	.81	.23	3.02	.91
6. To communicate with classmates and friends	.01	.81	.23	2.83	.86
7. To have a sense of belonging	.39	.68	.05	2.58	.93
8. To participate the traditional country life	.27	.58	.19	2.56	.98
Entertainment:					
9. To relax from gaming	.11	.14	.79	3.00	.71
10. To enjoy the game interface	.43	.16	.61	2.80	1.00
11. To have fun	.32	.39	.57	3.07	.78
Eigenvalues	4.27	1.64	1.04		
Variance explained	38.79	14.89	9.47		
Cronbach's alpha	.81	.76	.61		

Scale: 1=strongly disagree and 5=strongly agree; N=342

the score, the higher the level of addiction. As shown in Table 2, a significant and positive link was found between leisure boredom and SNS-game usage ($r = .29$, $p < .001$) as well as SNS-game addiction ($r = .31$, $p < .001$). Thus, H_{2a} and H_{2b} were also supported. H_{3a} and H_{3b} respectively hypothesized that subjects who score low in self-esteem will play more SNS-game and exhibit a higher tendency of being addicted to the SNS game. However, no significant relationship was found. As a result, both H_{3a} and H_{3b} were rejected.

Profiles of SNS-Game-Addicted College Students

More than one-third (36.5%) of the total 342 respondents play SNS games in Netbars, while 32.7% play in the dormitories and 27.8% play at home. Most of the college students played SNS games less than an hour a day (49.1%), 33.3% played one to two hours and more than 17% played three or more hours a day. They logged in to SNS games to check their own game status two to three times a day (M = 1.84, SD

Table 2. Regression analysis of demographics, gratification, loneliness, leisure boredom, and self-esteem as predictors of SNS-game addiction and SNS-game use

Predictors	Level of SNS-game use		SNS-game addiction	
	r	β	r	β
Demographics:				
Gender (female=0)	.09	.07	.15**	.13**
Age	-.06	-.02	-.05	-.03
Year in school	-.06	-.05	.03	.08
Family income	.02	.01	-.08	-.04
Gratifications:				
Achievement	.34***	.17**	.55***	.49***
Inclusion	.14**	.02	.31***	.17***
Entertainment	.15**	.13*	.07	-.02
Loneliness	.27***	.17***	.23**	.09*
Leisure boredom	.29***	.13*	.31***	.17**
Self-esteem	.12*	.01	.08	-.02
Where played (dormitory=1)	.08	.18***	.10	-.01
History of play	.41***	.31***	.28***	.05
R^2		.34		.49
Adjusted R^2		.32		.47

Notes: Figures are Pearson coefficients, standardized beta coefficients and significance tests.
*p <= .05, **p <= .01, ***p <= .001, N = 342

= .85) as well as stealing products from others one to two times every day (M = 2.13, SD = .89). We also found that "stealing products from others" has been the most popular functions of SNS-game with 90.4% respondents reporting that they have been stolen from by others.

Level of SNS-game use was a combined measure in the frequency of playing SNS-game every day, the amount of time students play SNS games every day and the number of times they steal products from other players on a common four-point Likert scale.According to Young's (1996) classic definition of Internet addiction, respondents giving five or more "yes" answers to eight yes-or-no questions were classified as addicts. In this sample, 24% (N=82) of the total 342 college students can be classified as SNS-game addicts. A canonical discriminant analysis was conducted to examine the difference between SNS-game addicts and non-addicts with demographics, loneliness, leisure boredom, self-esteem and usage pattern of SNS games as predictors. As shown in Table 3, the discriminant analysis was significant (p

Table 3. Discriminant analysis of SNS-game addiction with demographics, loneliness, leisure boredom, self-esteem, and usage pattern of SNS-games [a]

Predictor	Structure Coefficients
Demographics:	
Gender (female=0)	.11
Age	-.18
Year in school	-.04
Family income	-.20
Loneliness	.35***
Leisure boredom	.63***
Self-esteem	.26
Level of SNS-game use [b]	.81***
Eigenvalue	.23
Canonical correlation	.43
Degree of freedom	8
Wilk's Lambda	.82
Significance	$p < .001$
Group centroids:	
Addicts	.84
Non-addicts	-.27
Cases correctly classified	73.1%

Notes: SNS-game addicts were coded 1 and non-addicts were coded 0; N=342

< .001, Wilk's Lambda = .82). Table 3 reports standardized canonical coefficients, which may be interpreted like beta weights in multiple regression. The structure coefficients reported are analogous to loadings in factor analysis and represent the correlation of a variable with the underlying function. Pehadzur (1982) suggests that the structure coefficients or the function loading values of .30 and above were treated as meaningful in interpreting as significant predictors. Thus, results indicated great influences from level of SNS-game use, leisure boredom and loneliness in discriminating the SNS-game addicts and non-addicts. However, little influence from self-esteem and demographics was found. Such results suggest that SNS-game addicts may be characterized as being lonely, often leisurely bored, spending much time playing SNS games every day, frequently logging in to SNS games and often stealing products from friends.

Predicting SNS-game Usage

To assess how demographics, perceived gratification, loneliness, leisure boredom, self-esteem, where students play SNS games and how long they have been playing influence SNS-game use, a regression analysis was run. Use of SNS games was a combined measure in the

frequency of game use, status checking, and stealing products from others every day using a 5-point scale. Results in Table 2 show that the level of SNS-game use was significantly predicted by (in the order of the predictive power as indicated by the beta weights) length of time they have played ($\beta = .31$, $p < .001$), played in the dormitory ($\beta = .18$, $p < .001$), loneliness ($\beta = .17$, $p < .01$), achievement ($\beta = .17$, $p < .01$), entertainment ($\beta = .13$, $p < .05$), and leisure boredom ($\beta = .13$, $p < .05$). This indicates that frequent users of SNS games were more likely to be experienced players who have been playing for a long time, often in their dormitory room, and sought to have fun and to achieve a higher game level to alleviate loneliness and leisure boredom. The regression equation explained 32% of the variance.

Predicting SNS-game Addiction

In order to examine the predictive power of demographics, perceived gratification, loneliness, leisure boredom, self-esteem, where students play SNS games and how long they have been playing on the degree of SNS-game addiction, a regression analysis was conducted. Results in Table 2 show that achievement ($\beta = .49$, $p < .001$) and inclusion ($\beta = .17$, $p<.001$) gratifications were significantly related to SNS-game addiction. This indicates that users who felt gratified in maintaining and enlarging their interpersonal relationships, achieving higher game status and gaining more game money were more likely to be addicts of SNS games. In psychological predictors, leisure boredom ($\beta = .17$, $p < .01$) and loneliness ($\beta = .09$, $p < .05$) were also found significant predictors to SNS-game addiction. Such results again give support to the hypothesis, indicating that lonely and leisurely bored Chinese college students were more likely to be addicted to SNS games. For the demographic variables, only gender (being male) was found to have a significant relationship with SNS-game addiction ($\beta = .13$, $p < .01$). The equation explained 47% of the variance. In sum, achievement gratification was the most influential predictor, followed by inclusion, leisure boredom, and gender.

DISCUSSION AND CONCLUSION

The purpose of this study was to identify the predictors of SNS-game addiction and SNS-game use with a focus on gratification, loneliness, leisure boredom and self-esteem among Chinese college students. First, most players played SNS games to achieve a high score in the game, earn more virtual money, gain a sense of belonging, relax and maintain interpersonal relationships. SNS games are specialized in many of their interactive features, such as the process of growing vegetables online and the ability to steal products in Happy Farm. Such activities provide players with greater opportunities to interact, compete and exchange game ideas to further enhance and expand their social network. Using Young's (1996) classic eight-item Internet Addiction Test, this study found that 24% of the college students were addicted to an SNS game. However, we believe that the figure may be even higher because the survey was conducted in class under the teachers' supervision, and some students might have been worried about being stigmatized as an addict to an SNS game.

Second, SNS-game addiction was largely influenced by the gratification of inclusion and achievement. This suggests that gaining more virtual money, gaining gratifications from winning, getting attention from friends, being able to communicate with classmates and friends, and enjoying the feeling of leveling up are the primary reasons that students are addicted to SNS games. As SNS users are directly or indirectly connected, games on SNS websites allow college students to maintain and enlarge their interpersonal networks. In mainland China, college students are bounded by strict university rules and many complain that college life is not as exciting as they expected. They have limited opportunity to see the world beyond campus.

As a result, students are tempted by the sense of immersion, connection, and gratification through playing games--feelings they cannot get from their studies.

Third, leisure boredom and loneliness were predictors of SNS-game addiction and level of SNS-game use, which are consistent with previous research that "leisure boredom is related to other forms of addiction and has been implicated in detrimental behaviors" (Caldwell & Smith, 1995; Iso-Ahola & Crowley, 1991). Being away from home and perhaps not having built up a large social network, many college students have too much free time and too little to do. College students encounter boredom easily, as boredom is a fleeting emotional state in which someone lacks interest and is unable to concentrate (Fisher, 2003). Thus, students need to participate in various activities in order to overcome it (Harrison, 2005). SNS games provide an appropriate platform wherein leisurely bored and lonely students can pass time. Students may check their game status and wait for the right time to steal or grow products in SNS games. As previous research suggested, lonely students were more likely to go online to relax, talk to others with similar interests or find support (Morahan-Martin & Schumacher, 2000). For college students in China, playing SNS games with friends in the virtual system has perhaps become one of the most popular ways for lonely students to alleviate lonely feelings because of its high interactive features.

Fourth, among demographic variables, only gender was found having influence on SNS-game addiction. This means that male students are more vulnerable to be addicted, as SNS games offer excitement, recognition gaining, and respect.

Fifth, it is interesting to note that despite the significant relationships between achievement and SNS-game addiction and use, entertainment was significant only in predicting SNS-game use and inclusion significant only for SNS-game addiction. Such findings suggest that to relax and have fun are primary motivations for spending much time in playing the game, while the need for attention and the sense of belonging are key reasons that students get addicted, especially when they lose control over their amount of use.

Sixth, no significant relationship was found between self-esteem and SNS-game addiction and degree of SNS-game use. Such findings indicate that perceived self-worth has no impact on the level of SNS-game use and would have no impact on becoming an SNS-game addict.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Although this research has some interesting findings, there are also limitations. Firstly, there are no tested gratification items for SNS games that we can adopt, so the gratification items were constructed by using the responses from the focus group and the literature. As the alpha score for some factors were not exceptionally high, future studies should refine the items for better reliability. Secondly, although 500 questionnaires were sent out, only 342 were valid. Many of them were partially finished. This may be because the questionnaire was long, with 78 items. Many students might easily get bored with these items and might not have identified some items carefully. Thirdly, the data were gathered in only two colleges in Shandong province in China. The results may be biased, not be representative of rural China, and no causal relationships are implied. Fourth, the design of the questionnaire was in English, but the questionnaire was translated into Chinese before fielding, which may result in inaccurate translation. Finally, with the advancement of technology, new interactive SNS-games will be developed. Future research should examine the addiction phenomena of new SNS-games to better understand the motives and predictors of SNS-game addiction and usage patterns. Furthermore, to prevent the possible negative impact of SNS games in students' academic performances, future studies should investigate the symptoms of SNS-game addiction so that

preventive measures can be taken by university administrators to reduce the likelihood of addiction among students.

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ENDNOTES

1. Figures based on information retrieved on December 17, 2011 from http://www.blogger-insight.com/blog/barcamp-shanghai-chinese-netizen-speak