

Exploring Personality Traits of Excessive Online Game Users in Japan

Tatsuya Nomura

Dept. Media Informatics, Ryukoku University
Otsu, Shiga 520-2194, Japan
nomura@rins.ryukoku.ac.jp
+81-77-544-7136

Yuma Goto

MFK Ltd.
Kobe, Hyogo 651-1121, Japan
fururi@hotmail.co.jp

ABSTRACT

For the aim at exploring differences on personality traits between excessive online game users and non-excessive users in Japan, an online survey was conducted using psychological scales measuring addictive tendencies for online gaming, depressive tendencies, aggression, and self-concealment. The results revealed that that excessive online game users having addictive tendencies in Japan had lack of self-esteem as one of depressive tendencies, high aggressive tendencies, and low tendency of self-disclosure, in contrast with non-excessive users. Moreover, it was suggested that these users had a confidence in the society based on contributive behaviors in multi-player groups of online gaming.

Author Keywords

Online gaming; Addiction; Personality traits; Questionnaire survey.

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces - Ergonomics.

General Terms

Human Factors; Measurement.

INTRODUCTION

The Internet has recently provided with a new type of playground, called “online games” with a variety of game genres. On the other hand, it has been reported that this playground has been causing addictive behaviors in some users, influencing their daily-life activities [7, 9, 12]. For example, Yee’s survey results [12] for 30,000 users of Massively Multi-User Online Role-Playing Games (MMORPGs) revealed that nearly half of respondents considered themselves to be addicted to the MMORPG environment.

Recently, Kuss and Griffiths [9] reported based on the review of 58 literatures that empirical studies on online

gaming addiction have proliferated over the last few years, and these studies can be positioned on the line of etiology – pathology – ramifications. The etiological issues include personality traits of excessive game users as an internal risk factor for online gaming addictions. Their review found several personality traits associated with online gaming addiction, including loneliness, introversion, aggression, hostility, low self-esteem, narcissism, and anxiety.

The review by Kuss and Griffiths [9] also suggested that the main research on relationships between online gaming addiction and personality traits has been conducted in countries other than Japan, as well as its rapid increase. However, Japan is one of the advanced nations on information technologies [11], and it is estimated that there are potentially many online game users with addictive behaviors. In fact, some cases of online gaming addictions have been reported via mass media in Japan (e.g., [5]).

There have been only a few empirical studies clarifying relationships between online gaming addiction and personality traits based on a middle or large size of sampling in Japan. As one of these studies, Hirai and Kasai [4] found the relationships between addictive tendencies, depression, and aggression, based on two online surveys conducted on homepages related to online games ($N = 1312$). Another study for online gamers ($N = 1477$) by Fuji and Yoshida [3] revealed that sociable interactions during online gaming promoted sociability and decreased aggression in real life, although non-sociable and aggressive interactions decreased sociability and increased aggression. However, these existing studies did sufficiently not take into account differences of personality traits between excessive online game users and non-excessive users. These differences are considered as important for discrimination of addictive online gamers and understanding of their psychological states in Japan.

The research aims at exploring differences on personality traits between excessive online game users and non-excessive users based on sampling from both participant groups in Japan. Personality traits focused on the research are depressive tendencies [4] and aggression [3], of which association with online gaming addiction has been found in the existing studies [9]. Moreover, the research includes self-concealment [10]. It has been found that computer-

Copyright is held by the author/owner(s).

APCHI '12, August 28–31, 2012, Matsue-city, Shimane, Japan.

mediated communication can encourage self-disclosure which leads to psychological well-being [6]. Thus, it is effective to investigate self-concealment as an index for discrimination of well-being between excessive online game users and non-excessive users.

For the above aim, an online survey was conducted using psychological scales measuring addictive tendencies for online gaming, depressive tendencies, aggression, and self-concealment. The paper reports the analyses results and discusses about their implications for online game use.

METHOD

Date and Participants

The survey was conducted via online at February 2011. In order to assemble a large size of samples consisting of excessive online gamers, non-excessive gamers, and non-gamers among internet users, participants were recruited through a survey company. A total of 841 persons participated to the survey (male: 458, female: 383, mean age: 36.7 ($SD = 7.7$)).

Questionnaire

The questionnaire in the survey consisted of the face sheet and three groups of items. Table 1 shows the three item groups and examples of the items included in each group.

The face sheet included items to ask:

1. Age and gender
2. How each participant used online games (1: I have been using, 2: I have recently not using although I had used previously, 3: almost never, 4: never).
3. Degrees to which she/he had been enthusiastic about online gaming (1: Much enthusiastic, 2: a little

enthusiastic, 3: not much enthusiastic, 4: not enthusiastic at all).

4. Average hours that she/he spent for online gaming per day if she/he was an online game user.

Symptoms of online gaming addiction include denial of problematic use [9]. Thus, the questionnaire did not include any item to directly ask participants to answer whether she/he was addicted to online games. Instead, the research assumed that those having higher scores of the online gaming addiction scale in enthusiastic gamers were “excessive online game users”.

Online Gaming Addiction and Depressive Tendencies

Twenty two items were prepared to measure participants’ online gaming addiction and depressive tendencies. This item group consists of four factors; impact of online gaming in daily life (7 items), affective dependence on online gaming (7 items), lack of self-esteem (4 items), and confidence in the society (4 items). According to the original study [4], each item was scored on a five-point scale (0: strongly disagree – 2: agree a little – 4: strongly agree).

These items were selected and validated through a pilot survey conducted at July, 2010. One-hundred and forty three university students participated to the pilot survey. Items were prepared from some existing studies including Hirai and Kasai [4], with addition of some novel items. Then, factor analysis and item analysis extracted the above 22 items and 4 factors having correlations with anxiety.

Aggression

The Buss-Perry Aggression Questionnaire (BAQ) [2] was used to measure participants’ aggressive tendencies. In the

Table 1. Item Groups in the Questionnaire and Examples of the Items
(Note: the item sentences are formally not back-translated.)

Item Group	Subscales (#. Items)	Item Examples
Online Gaming Addiction and Depressive Tendencies (Mainly from [4])	Impact of online gaming in daily life (7)	My excessive use of online games has been negatively affecting outcomes in my school or job.
	Affective dependence on online gaming (7)	I have felt powerful or happy during online gaming.
	Lack of self-esteem (4)	I will not be in a high position since I do not have any specific talent.
	Confidence in the society (4)	I am one of persons who can do jobs helpful in the society.
Aggression (Japanese version of BAQ [1,2])	Impatience (6)	I have a tendency to speak loudly even in a small dispute.
	Hostility (6)	I sometimes feel as if others laugh at me behind my back.
	Bodily aggression (6)	I sometimes have a desire to hit others.
	Linguistic aggression (6)	If my opinion is opposed to others’ ones, I will continue to talk the problem out.
Self-Concealment (The Self-Concealment Scale [7])	One factor (13)	I cannot disclose my secret to others since it is very disgusting.

survey, the Japanese version of BAQ [1] was adopted. This psychological scale consists of twenty four items and four subscales: impatience (6 items), hostility (6 items), bodily aggression (6 items), and linguistic aggression (6 items). Each item was scored on a five-point scale (1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree).

Self-Concealment

The Self-Concealment Scale [7] was used to measure participants' tendencies of self-concealment. This psychological scale consists of thirteen Japanese items with one factor structure. Each item was scored on a five-point scale (1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree).

Procedures

About ten thousands persons were randomly selected from about one million and forty hundreds thousands persons who registered to the survey company. Then, the selected persons were asked to participate to the survey via e-mail. The participants answered the questionnaire on a WEB page. To maintain counter balance, the three groups of the items were provided in a random order for individual participants.

RESULTS

Participants Classification

A total of 841 participants were classified based on the answers on how they used online games and degrees to which they had been enthusiastic about online gaming, into the following five groups:

1. Enthusiastic online game users (EOG): participants who were currently enthusiastic about online gaming.
2. Non-enthusiastic online game users (NEOG): participants who were currently using online games, but not enthusiastically.
3. Non-online gamers who had previously been enthusiastic (PEOG): participants who had been enthusiastic about online gaming, and currently stopped to use online games.
4. Non-online gamers who have ever used online games (EXP): participants who were not online gamers, but had ever used sometimes.
5. Non-online gamers who have hardly used online games (NEXP).

Table 2 shows the numbers of samples on these participant groups. χ^2 -test found no statistically significant gender bias on the participant groups, although it was at a statistically significant trend level.

On the average hours that online game users in the participants spent for gaming per day, the mean in the group EOG was 3.9 ($SD = 3.3$, min: 1, max: 21), and that in

Table 2. Numbers of Samples on the Participant Groups

Group	Male	Female	Total
EOG	43	29	72
NEOG	97	114	211
PEOG	41	28	69
EXP	121	94	215
NEXP	156	118	274
Total	458	383	841

EOG : Enthusiastic online game users

NEOG: Non-enthusiastic online game users

PEOG: Non-online gamers

who had previously been enthusiastic

EXP: Non-online gamers who have ever used them

NEXP: Non-online gamers who have hardly used them

(Gender bias: $\chi^2(4) = 8.582$, $.05 < p < .1$)

the group NEOG was 2.0 ($SD = 1.4$, min: 1, max: 12). T-test found a statistically significant difference on the average hours spent for online gaming between these two participant groups ($t(80) = 4.705$, $d = 1.052$, $p < .001$).

Online Gaming Addiction

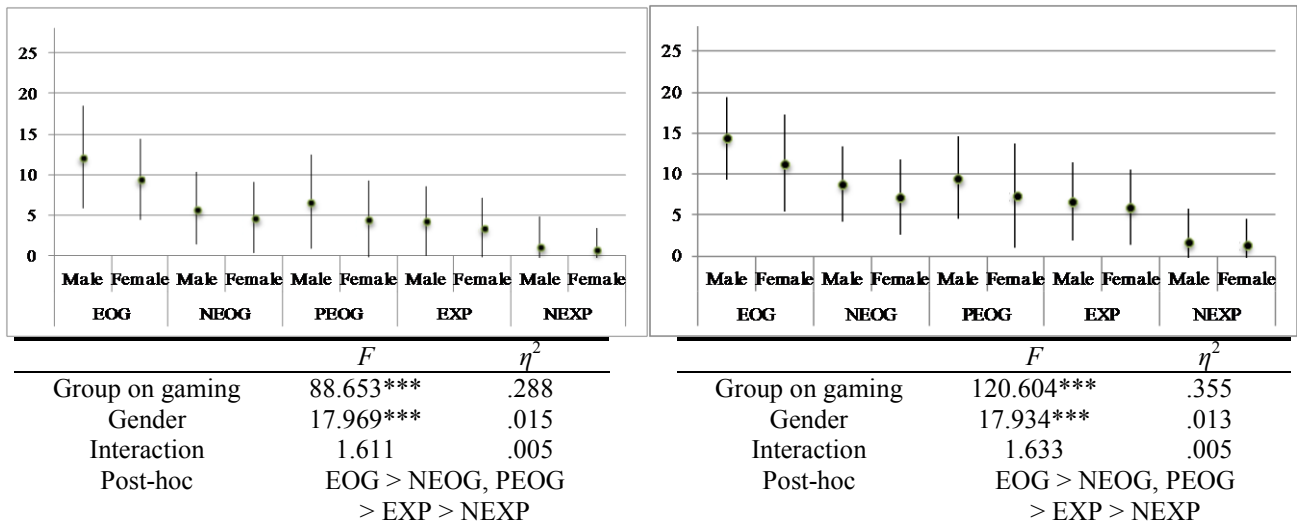
On the subscales of online gaming addiction, Cronbach's reliability coefficients α were .885 for impact of online gaming in daily life, and .889 for affective dependence on online gaming. The scores of these subscales were calculated as sums of the corresponding item scores. Thus, the maximum and minimum scores were 28 and 0 in both the subscales. There was a strong level of correlation between these two scores (Pearson's correlation coefficient $r = .821$, $p < .001$).

ANOVAs with the participant groups on online gaming \times gender for the subscale scores found statistically significant main effects of these factors. It found no interaction effects. Figure 1 shows the means and standard deviations of the subscale scores and the results of the ANOVAs. The male participants had higher scores on impact of online gaming in daily life and affective dependence on online gaming, although the effect sizes were small. Post-hoc analyses with Bonferroni's method revealed that the participant group of enthusiastic online game users had the highest scores on these subscales.

Moreover, Pearson's correlation coefficients showed a moderate level of positive correlations of the average hours spent for online gaming with the scores on impact of online gaming in daily life and affective dependence on online gaming ($r = .277$ ($p < .001$) and $r = .299$ ($p < .001$) respectively).

Depressive Tendencies

On the subscales of depressive tendencies, Cronbach's reliability coefficients α were .671 for lack of self-esteem, and .830 for confidence in the society. Although the reliability value was low on lack of self-esteem, it was



(****p* < .001)

Impact of Online Gaming in Daily Life

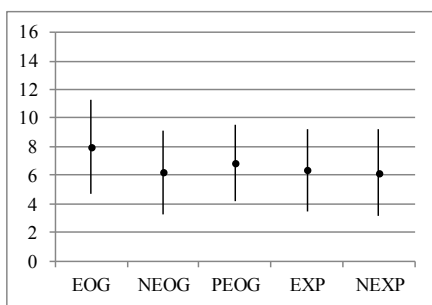
Affective Dependence on Online Gaming

EOG : Enthusiastic online game users, NEOG: Non-enthusiastic online game users, PEOG: Non-online gamers who had previously been enthusiastic, EXP: Non-online gamers who have ever used them, NEXP: Non-online gamers who have hardly used them

Figure 1. Means and Standard Deviations of Subscale Scores on Impact of Online Gaming in Daily Life and Affective Dependence on Online Gaming, and Results of ANOVAs

adopted by considering the small number of the corresponding items. The scores of these subscales were calculated as sums of the corresponding item scores. Thus, the maximum and minimum scores were 16 and 0 in both the subscales. Note that higher scores on lack of self-esteem mean higher depressive tendency and higher scores on confidence in the society mean lower depressive tendency.

ANOVAs with the participant groups on online gaming x gender for the subscale scores found a statistically



EOG : Enthusiastic online game users
 NEOG: Non-enthusiastic online game users
 PEOG: Non-online gamers who had previously been enthusiastic
 EXP: Non-online gamers who have ever used them
 NEXP: Non-online gamers who have hardly used them

Figure 2. Means and Standard Deviations of Scores on Lack of Self-Esteem

significant main effect of the participant groups in lack of self-esteem ($F = 5.715, p < .001, \eta^2 = .027$) and a statistically significant main effect of gender in confidence in the society ($F = 14.027, p < .001, \eta^2 = .016$). It found no other main effects or interaction effect Figure 2 shows the means and standard deviations of the scores on lack of self-esteem. Post-hoc analyses with Bonferroni's method revealed that the participant group of enthusiastic online game users had higher scores on this subscale than the groups of non-enthusiastic game users, non-online gamers who have ever used them and non-online gamers who have hardly used them.

Although the male participants had higher scores on confidence in the society (Mean: 7.1, *SD*: 3.5) than the female participants (Mean: 6.2, *SD*: 3.2), the effect size was small.

Aggression and Self-Concealment

On the subscales of the Japanese version of BAQ, Cronbach's reliability coefficients α were .794 for impatience, .762 for hostility, .773 for bodily aggression, and .666 for linguistic aggression. Cronbach's α of the Self-Concealment Scale was .920. The scores of these scales were calculated as sums of the corresponding items with inversion of some items.

ANOVAs with the participant groups on online gaming x gender for the scores found no statistically significant main effect of the participant groups or interaction effect. The main effect of gender was found in hostility ($F = 4.383, p$

Table 3. Pearson's Correlation Coefficients between Scale Scores of Online Gaming Addiction and Personality Traits and Results of Tests of Equality between Participant Groups

		Lack of self-esteem	Confidence in the society	Impatience	Hostility	Bodily aggression	Linguistic aggression	Self-concealment
Impact of online gaming in daily life	EOG	.521***	.168	.473***	.394**	.282*	.208	.411***
	NEOG	.380***	-.029	.196**	.267**	.108	-.033	.141*
	PEOG	.073	.049	.202	.037	.086	.136	.254*
	EXP	.242***	.054	.092	.077	.098	.030	.098
	NEXP	.243***	.058	.052	.119*	.149*	-.058	.074
$\chi^2(4)$		12.133*	2.274	13.135*	10.096*	2.302	5.576	8.564
Affective dependence on online gaming	EOG	.554***	.348**	.389***	.267*	.081	.240*	.327**
	NEOG	.365***	.057	.160*	.227***	.104	.006	.214**
	PEOG	.046	.129	.313**	.059	.115	.117	.180
	EXP	.236***	.079	.019	.077	.099	.042	.020
	NEXP	.239***	.073	.022	.106	.148*	-.031	.057
$\chi^2(4)$		14.504**	5.508	13.651***	4.531	.467	4.845	15.097**

(* $p < .05$, ** $p < .01$, *** $p < .001$)

EOG : Enthusiastic online game users, NEOG: Non-enthusiastic online game users, PEOG: Non-online gamers who had previously been enthusiastic, EXP: Non-online gamers who have ever used them, NEXP: Non-online gamers who have hardly used them

$< .05$, $\eta^2 = .005$), bodily aggression ($F = 15.993$, $p < .001$, $\eta^2 = .019$), and linguistic aggression ($F = 12.988$, $p < .001$, $\eta^2 = .015$). Although the male participants had higher scores on these types of aggression than the female participants, the effect sizes were small.

Correlations between Online Gaming and Personality Traits

To investigate differences on associations of online gaming addiction with user personality traits such as depression, aggression, and self-concealment between excessive users, non-excessive users, and non-users, Pearson's correlation coefficients between the scale scores were calculated in each of the participant groups on online gaming. Then, tests of equality between these correlation coefficients were conducted. Table 3 shows these coefficients and results of the tests.

Among the participant group, there were statistically significant inequalities on the correlation coefficients between impact of online gaming in daily life and lack of self-esteem, that and impatience, that and hostility. Moreover, there were statistically significant inequalities on the correlation coefficients between affective dependence on online gaming and lack of self-esteem, that and impatience, and that and self-concealment. A strong level of correlations between online gaming addiction and lack of self-esteem were found only in the participant group of enthusiastic online game users. Moreover, a moderate level of correlations between online gaming addiction and impatience were found only in this participant group, except for the group of non-online gamers who had previously been enthusiastic. A moderate level of

correlation between impact of online gaming in daily life and hostility, and between affective dependence on online gaming and self-concealment were also found only in the participant group of enthusiastic online game users.

In addition, there was a moderate level of correlation between affective dependence on online gaming and confidence in the society only in the participant group of enthusiastic online game users, although no statistically significant inequality was found. The correlation coefficient in the participant samples except for enthusiastic online game users was $r = .038$ (*n.s.*). Test of equality between the participant group of enthusiastic online game users and the participant group except for enthusiastic gamers revealed that this correlation in the former group was higher than that in the latter group ($Z = 2.589$, $p < .01$).

DISCUSSION

The results of the ANOVAs for the subscale scores of online gaming addiction revealed the differences between the participant groups classified based on the use of and enthusiasm for online gaming. It suggests the validity of these subscales on measuring online gaming addiction. Under this validity, it is estimated that excessive online gamers exist in the participant group of enthusiastic online game users, in particular, at the position of higher scores of these subscales.

The correlation analyses suggest that in the participant group of enthusiastic online game users, gaming addiction was associated with a depressive tendency as lack of self-esteem, aggressive tendencies as impatience and hostility. It is consistent with the results of some existing studies [8]. Moreover, it is suggested that gaming addiction was

associated with self-concealment. It means that excessive online game users tend not to do self-disclosure which leads to psychological well-being.

On the other hand, the correlation analyses also suggest that in the participant group of enthusiastic online game users, affective dependence on online gaming was positively associated with confidence in the society. Although the cause cannot be clarified within the survey results, it is estimated that gaming with multi-players, one of the characteristics of online games in Japan, constructs a social group and contributive behaviors in the group lead to excessive gamers' confidence in the society. To investigate this estimation, however, it is needed to conduct many case studies with interview methods as well as survey studies.

SUMMARY AND FUTURE WORKS

The results of the survey revealed that excessive online game users having addictive tendencies in Japan had: (1) lack of self-esteem as one of depressive tendencies, (2) high aggressive tendencies, and (3) low tendency of self-disclosure, in contrast with non-excessive users. Moreover, it was suggested that these users had a confidence in the society based on contributive behaviors in multi-player groups of online gaming.

The survey reported in the paper has some problems to be solved. Firstly, the scale for measuring online gaming addiction consisted of only two factors. To investigate wider characteristics of excessive online gamers, it is needed to construct a novel psychological scale having criterion-related validity and construct validity.

Secondly, the survey was limited to online sampling in Japan. Thus, there is a concern on whether the sample of online gamers in the survey is the representative of actual gamers. Moreover, cultural differences on the nature of gaming addiction, personality traits associated with gaming addiction, and their relationships themselves should be explored. Future works must take into account cross-cultural surveys using paper-pencil methods or structured interviews for real addicts.

Finally, we should consider clinical implications of the survey results. If excessive online gamers are really at a paradoxical state with lack of self-esteem and confidence in the society, it is needed to take into account its meaning in clinical context while considering their aggressive tendencies. In this sense, survey researchers and clinicians should collaborate each other in future works.

REFERENCES

1. Ando, A., Soga, S., Yamazaki, K., Shimai, S., Shimada, H., Utsuki, N., Oashi, O., and Sakai, A. Development of the Japanese Version of the Buss-Perry Aggression Questionnaire (BAQ). *The Japanese Journal of Psychology* 70, 5 (1999), 384-392 (in Japanese).
2. Buss, A. H., and Perry, M. The aggression questionnaire. *Journal of Personality and Social Psychology* 63 (1992), 452-459.
3. Fuji, K., and Yoshida, F. The influences of interaction during online gaming on sociability and aggression in real life. *The Japanese Journal of Psychology* 80, 6 (2010), 494-503 (in Japanese).
4. Hirai, D., and Kasai, M. Clinical Psychological Problems Caused by Addictive Tendencies for Online Games. *Journal of Japanese Clinical Psychology* 24, 4 (2006), 430-441 (in Japanese).
5. Japanese Housewives, Online Gaming Addicts. <http://kotaku.com/5514922/japanese-housewives-online-gaming-addicts>.
6. Joinson, A. N. *Understanding the Psychology of Internet Behaviors: Virtual World, Real Lives*. Palgrave Macmillan, Hampshire, 2002.
7. Kalwar, S., Heikkinen, K., and Porras, J. Finding a Relationship between Internet Anxiety and Human Behavior. In *Proc. HCII 2011*, Springer (2011), 359-367.
8. Kawano, K. The self-concealment scale and the inhibitive conversational attitude scale: Descriptive statistics and factor analysis. *Bulletin of Tokai Gakuen University, B, Humanities and Human Wellness* 13 (2008), 45-52 (in Japanese).
9. Kuss, D. J., and Griffiths, M. D. Internet Gaming Addiction: A Systematic Review of Empirical Research. *International Journal of Mental Health and Addiction* 10 (2012), 278-296.
10. Larson, D. G., and Chastain, R. L. Self-concealment: Conceptualization, measurement, and health implications. *Journal of Social and Clinical Psychology* 9 (1990), 439-455.
11. The Economist Intelligence Unit. The 2007 e-readiness rankings. *The Economist* (2007). http://graphics.eiu.com/files/ad_pdfs/2007Ereadiness_Ranking_WP.pdf
12. Yee, N. The Demographics, Motivations and Derived Experiences of Users of Massively-Multiuser Online Graphical Environments. *PRESENCE: Teleoperators and Virtual Environments* 15 (2006), 309-329.