Psychological Motives and Online Games Addiction: 
A Test of Flow Theory and Humanistic Needs Theory 
for Taiwanese Adolescents

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ABSTRACT

Obviously, the negative impact of online games has received much attention as well as having become a popular research topic. This research explored, from flow theory and humanistic needs theory, the psychological motivations of Taiwanese adolescents who are addicted to online games. The purpose of Study 1 was to investigate the relationship between players’ flow state and their online games addiction. The results indicated that flow state was negatively correlated with addictive inclination and it was not a significant predictor for players’ subsequent addictive inclination. Findings also revealed that the addicts’ flow state was significantly lower than the nonaddicts. Thus, flow state might not be the key psychological mechanism of players’ addiction. In Study 2, the results showed that the psychological needs of players of online games were close to the two-factor theory which depicts satisfaction and dissatisfaction dimensions. Addicted players’ need-gratification was similar to the feature of dissatisfactory factor. That is, the absence of playing online games is more likely to generate sense of dissatisfaction; the addicts’ compulsive use of online games seems to stem from the relief of dissatisfaction rather than the pursuit of satisfaction. In contrast, online games tend to provide the nonaddicts with a sense of satisfaction rather than a sense of dissatisfaction.

INTRODUCTION

The popularity of Internet has affected every aspect of human beings’ lives. According to iRate Internet viewership rating of Sproll Net in 2001, the Internet users who have played online games in Taiwan increased from 10.5% (600,000 people) in December of 2000 to 40.7% (2,900,000 people) in August of 2001. The speed of growth has been astonishing. The survey predicted that the market of online games in 2005 would reach US$2.9 billion. However, some negative effects are emerging at the same time, most noticeably the effect of Internet addiction. A significant percentage of adolescent online game enthusiasts spent much more time in cyber cafés than they did in school or on school-related activities. Online games addiction has thus become an issue worthy of extensive exploration.

Among the Internet users, adolescents are more likely to encounter the issue of Internet addiction. The adolescent students, in particular, are the highest at risk group. A significant percentage of teenage online game enthusiasts spent much more time in cyber cafés than they did in school or on school-related activities. Online games addiction has thus become an issue worthy of extensive exploration.

Some of the research on Internet use indicated that during the browsing of the Internet, persistent involvement might result in the occurrence of flow. In addition, based upon empirical evidence, researchers found out that the flow is an important factor for the users of online games.
proposed that the Internet users who encounter obstacles with interpersonal relationships are eager to intimately access to Internet. The advance of Internet technology allows the users to consistently learn how to overcome the challenges from which they obtain the need of personal achievement.\textsuperscript{13} Usage of online games is associated with the satisfaction of diverse needs for players.\textsuperscript{9} Therefore, this research aimed to probe into the online games addicts’ motives from the perspectives of flow theory and two-factor theory in humanistic psychology. With the exploration from diverse approach, the causes of online games addiction shall be further understood.

**Flow state and online games addiction**

In online games, continuous scoring, promotion, immediate feedback, and achievement of self-satisfaction have become the channels for upgrading individual self-esteem of the Internet generation.\textsuperscript{14,15} Computer games provide various means for the users to express themselves, to explore the world and seek self-recognition. The Internet, which possesses anonymous and diverse characteristics, is an important channel for expanding friendship and seeking belonging.\textsuperscript{9} The above statements and research findings indicated that online games might offer positive and optimal experience to the players. However, excessive flowing in this optimal experience might result in negative outcome. This paradox is worthwhile of intense exploration.

Flow theory can be referred to as the “Psychology of Optimal Experience,”\textsuperscript{16} which in recent years has been applied to the behavior of Internet usage and e-commerce by some research.\textsuperscript{17–21} The experiences described by flow state\textsuperscript{20–22} such as clear objective and immediate feedback, challenge encounter and adequate skill, combination of action and consciousness, concentration, sense of control, curiosity, loss of self-consciousness, purposeful experience, and inner interests are the states which can be experienced and accomplished by online games. Hwang\textsuperscript{23} once explored college students’ Internet usage behavior in Taiwan through flow theory and found out that under general situations, the users would actually experience flow state when using the Internet. The more the users sense the premise aspects of flow, the more they will realize the flow experience of Internet. Moreover, they are more likely to proceed with related exploring behaviors. Choi and Kim\textsuperscript{24} found that people continue to play online games if they have optimal experience because flow state had impact on consumer loyalty. Consequently, the optimal experience of online games relatively complies with the psychological state of flow theory. Following this logic, are users who are more involved in flow state in online games more likely to become addicted? Furthermore, once the users are more addictive to online games, they would exclusively focus upon seeking flow experience.

Once the relationship between flow state and online games addiction is confirmed, it may provide suggestions for the intervention of pathological use of online games. Thus, the research questions in this study were as follows: Is flow state positively correlated with the addiction to online games? Is the correlation stable over time? Can players’ addicted orientation be predicted by their experienced flow state?

**Needs theory with two-factor model and online games addiction**

Based upon the perspective of need-motivation in humanistic psychology, motivation is the inner drive of an individual that can force people to carry out their actions. Based on Maslow’s hierarchy of human needs model,\textsuperscript{25,26} Suler\textsuperscript{27} attempted to elaborate the reasons that cause Internet addiction and pointed out that Internet can satisfy different hierarchy of human needs which are the sources of the users‘ motivation. As to further elaboration of the humanistic needs theory, the lower hierarchy of human needs refers to “dissatisfactory needs,” which includes physical, safety, belongingness, and self-esteem. The higher hierarchy of human needs means “satisfactory needs,” which consists of self-actualization and self-transcendence. According the concept, two-factor theory\textsuperscript{28} developed for depicting job motivation is very similar to the above classification which points out that satisfaction and dissatisfaction do not stand at the opposite sides of single continuum; instead, they are located in a different and independent scale. “Hygiene factors” are similar to “dissatisfactory needs.” Without them, it will result in dissatisfaction. However, their existence does not significantly affect the level of satisfaction. That is, “Hygiene factors” are the source that influences individuals’ sense of dissatisfaction. On the other hand, “motivators” are similar to “satisfactory needs.” They can enforce the level of satisfaction. However, without them, it will not result in dissatisfaction. These kinds of factors mainly affect people’s feeling of satisfaction.

The pathologic phenomenon of addicted usage of online games reveals that the addicts have to increase the time they spend on the Internet in order to obtain “tolerance.” The reduction of their time
consuming on Internet or the suspension of the act will result in withdrawal symptoms. In other words, the essence of the addicts' needs toward online games is more like “dissatisfaction.” Without them, the addicts will feel a sense of dissatisfaction, but their usage does not apparently reinforce a sense of satisfaction. Therefore, from the perspective of two-factor theory, the essence of the addicts' psychological motives toward online games should be more similar to “hygiene factors.” Thus, if the research findings indicate that players exhibit differential evaluations on satisfaction and dissatisfaction dimensions, the needs of online games are more approximate to the notion of two-factor theory. Furthermore, the addicts' essence of needs should be more similar to unsatisfactory factor, whereas the nonaddicts' essence of needs should be more similar to satisfactory factor. In contrast, if the research findings demonstrate that there is no differential effect on their evaluations on satisfaction and dissatisfaction dimensions, the psychological motives of online games will more uni-dimensional. Overall, findings in this research will allow us to further understand the essence of players' psychological needs of online games as well as to recognize whether the motivation of addicts and nonaddicts of online games is different.

STUDY 1

Study 1 was conducted with a longitudinal design survey. The main purpose was to investigate the relationship between flow state and online games addiction and to clarify the mutual impacts of two mental states.

Methods

Subjects and design. The initial sample included 199 high school and college adolescents (16–23 years old) who had online games experiences by purposive sampling. This sample was used for reliability analysis and scale validation. This research focused on the massive multi-player online role-playing games (MMORPGs) because the main feature of MMORPGs is its system of goal and achievement. Players may exhibit diverse motivations while playing of this online gaming. Besides, the MMORPGs is the most popular online gaming for Taiwanese adolescents.

In the formal sample, 177 adolescents (16–24 years old) were recruited to participate in this survey with the longitudinal design. The population was stratified into three demographic areas: Northern, Central, and Southern Taiwan. Subjects were asked to finish a series of questionnaires about their flow state in online games and online games addiction in the pretest. Additionally, they were also asked to fill in the first English code and the last four codes of I.D. as “Identification Code” for the matching of pretest and posttest. After a period of 6 months, they were informed of the notification of posttest. By excluding the data with major missing value, serious response bias, and mismatch between pretest and posttest, there were 127 adolescents who served as the formal sample.

The aims of study one was to investigate the relationship between flow state in online games and online games addiction as well as determine whether the relationship is non-recursive or recursive. For this purpose, the cross-lagged panel design was used as the framework of data collection and subsequent data analysis (Fig. 1). “Variable A” is the flow state in online games, whereas “variable B” is the online games addiction. Subtitled numbers of variables specify the time of measurements: “1” denotes the pretest and “2” denotes the posttest. Test-retest reliability coefficients are computed by the correlation of A1 and A2 for flow state and the correlation of B1 and B2 for online games addiction. The correlations of A1B1 and A2B2 are de-
fined as the stable coefficients, which are used to examine if the relationship of two test variables are stable and consistent over time. The correlations of $A_1B_2$ and $B_1A_2$ are defined as the panel coefficients. Their statistical significance and difference could provide the information about the relative predictability of two test variables.

**Measures.** Participants’ flow state while playing online games was measured by the scale developed by Choi et al.\(^3\) The questionnaire for measuring the level of optimal experience consisted of six items: two questions to measure intrinsic interest, two questions to measure curiosity, one question to measure control, and one question to measure attention focus. Participants received the definition of flow with a short description at the beginning of the questionnaire and subsequently proceeded with the measurement.

Although the reliability and validity of this scale has been established by previous studies,\(^2\)\(^,\)\(^3\)\(^2\) the initial sample was employed to conduct reliability analysis and scale validation in order to examine if the data is appropriate for further analysis. The Cronbach alpha of the whole scale is 0.89 and the test-retest reliability coefficient was 0.54 ($p < 0.01$). As to scale validation, all the item-total correlations were significance (range 0.53–0.64; $p < 0.01$), which indicates satisfactory internal consistency. The explanatory factor analysis (EFA) was also performed to test the construct validity. The results indicated that six scale items converged into only one single factor with explained variance of 66%.

The Internet Addiction Scale for high schoolers in Taiwan (IAST) developed by Lin and Tsai\(^3\)\(^4\) was modified into an Online Games Addiction Scale for Adolescents in Taiwan (OAST) by substituting the subject, Internet, through online games. OAST employed a four-point scale with 29 items and four subscales: compulsive use and withdrawal (10 items, $\alpha = 0.96$), tolerance (seven items, $\alpha = 0.92$), related problems of family, school, and health (eight items, $\alpha = 0.91$), and related problems of peer interaction and finance (four items, $\alpha = 0.93$). The reliability of the whole scale is 0.92. As to scale validation, OAST shows a satisfactory internal consistency in item-total correlations (range, 0.69–0.84).

The confirmatory factor analysis (CFA) was performed to test the construct validity of the 29 items for online games addiction. The goodness of fit summary for the CFA indicates that the measurement model is acceptable, Normed chi-square = 1.98 ($\chi^2 = 734.58/df = 371$), GFI = 0.94, AGFI = 0.91, NFI = 0.90, NNFI = 0.89, and RMSR = 0.062. Finally, a contrasted-group method was employed to test the criterion-related validity. Addicts and nonaddicts were selected from the initial sample with depth-interview screening. The results showed that the addicts’ ($n = 31, M = 101.23$) scored significantly higher than the nonaddicts ($n = 42, M = 47.88$, $t = 11.89$, $p < 0.01$), which revealed that the OAST would be effective in discriminating the addicts and the nonaddicts of online gaming.

**Statistical analysis.** The cross-lagged panel analysis\(^3\)\(^2\) was utilized to examine the research questions. In this framework, the stable coefficients were computed to examine the relationship between flow state and addiction orientation of online games. The panel coefficients (flow state in pretest and online games addiction in posttest; online games addiction in pretest and flow state in posttest) were used to examine the recursive relationship between the test variables.

**Results**

Results of the cross-lagged panel analysis are shown with a correlation matrix in Table 1. Concerning the relationship between flow state and online games addiction, the stable coefficients, which are used to examine if the relationship of two test variables are stable and consistent over time, were computed as $-0.41a*$, $0.54b*$, $-0.15c$, and $0.35a*$.

### Table 1. Cross-Lagged Panel Analysis of Flow State and Online Game Addiction

<table>
<thead>
<tr>
<th>Variables</th>
<th>$A_1$</th>
<th>$B_1$</th>
<th>$A_2$</th>
<th>$B_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow in pretest ($A_1$)</td>
<td></td>
<td></td>
<td>-0.41a*</td>
<td></td>
</tr>
<tr>
<td>Online games addiction in pretest ($B_1$)</td>
<td></td>
<td></td>
<td></td>
<td>-0.15c</td>
</tr>
<tr>
<td>Flow in pretest ($A_2$)</td>
<td></td>
<td>0.54b*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online games addiction in posttest ($B_2$)</td>
<td></td>
<td></td>
<td>0.54b*</td>
<td>-0.35a*</td>
</tr>
</tbody>
</table>

aStable coefficients.
bCoefficients of test-retest reliability.
cPanel coefficients.
*p < 0.01.
line games addiction, the stable coefficients of pretest and posttest data were both significant ($r_{A1B1} = -0.41$ and $r_{A2B2} = -0.35$ respectively; $p < 0.01$). These findings indicated that the relationship of flow state and online games addiction was stable and consistent over half-year period and they also showed that flow state was negatively correlated with online games addiction. Furthermore, subjects with an average score higher than 3 on the OAST of pretest data were classified into addicts (69 subjects, 46%). Additionally, the addicts' scores on the flow state scale were significantly lower than those nonaddicts ($t = 3.11, p < .001$).

The panel coefficients in two predictive directions were both insignificant. Specifically, the prior flow state was not associated with the subsequent online games addiction ($r_{A1B2} = -0.12, n.s.$); and the prior online games addiction was not correlated with the subsequent flow state in online games ($r_{B1A2} = -0.15, n.s.$). These findings indicated that the mutual predictive relations of flow state and online games addiction dose not exist. Addictive inclination might not be predicted by the prior flow state in the playing of online games and vice versa.

**STUDY 2**

The aim of study 2 was to examine whether the addicts' essence of needs is more like dissatisfactory factor and if nonaddicts’ essence of needs is more similar to satisfactory factor. A survey method was employed for data collection.

**Methods**

Subjects and design. Subjects of this study were 182 adolescents (16–22 years old) who identified themselves as highly frequent players of the MMORPGs on a screening questionnaire. Their stratification of population was similar to Study 1. The respondents were asked to complete the questionnaires of about their attitudes toward online games addiction and evaluations on the two-factor dimensions of psychological needs for the playing of online games.

Measures. The subjects' addition of the MMORPGs was assessed by the OAST, which was also utilized in Study 1. The reliability and validation of this measurement have been addressed in Study 1. Those with an average score higher than 3 on the OAST (four-point scale), a total of 84 (46%), were defined the addicted players of the MMORPGs. The remaining 98 subjects (54%) were below the cut-off score and considered as non-addictive players. The subsequent data analysis was based upon this classification.

The Two-factor Evaluation on Needs for Online Games (TENO) was developed to measure the intensity of psychological needs on satisfaction and dissatisfaction dimensions. Based upon psychological needs of Internet addicts proposed by the needs theory of humanistic psychology, 27 subjects were received an elaborated definition of four psychological needs (safety, love and belonging, self-esteem, and self-actualization). Subsequently, they were asked to read the description with regard to the meanings of “satisfaction” and “dissatisfaction” based on four psychological needs generated by online games, and to evaluate the intensity of “satisfaction” and “dissatisfaction” of the four kinds of needs that they experienced from online games on “non-graded scale.” Participants’ responses were later quantified by measuring the distance from the lower end of the scale to the mark and were then standardized on a 100-point scale. Using the scale of “dissatisfaction” as an example, “1” signifies that “the intensity of dissatisfaction is none without usage of online games” and “100” refers to “extreme sense of dissatisfaction.” As to the evaluation of “satisfaction,” “1” means that “the intensity of satisfaction is none with usage of online games” and “100” refers to “extreme sense of satisfaction.” Based upon this scoring, the participants had the scores of “satisfaction” and “dissatisfaction” with respect to the four kinds of psychological needs.

The reliability coefficient for satisfaction dimension of the TENO is 0.93, whereas the reliability coefficient for dissatisfaction dimension is 0.88. The item-total correlations showed a satisfactory internal consistency for both dimension (ranging from 0.76 to 0.83 for satisfaction and ranging from 0.49 to 0.55 for dissatisfaction dimension respectively).

The criterion-related validity was performed to test if participants’ usage frequency and monthly expense of the MMORPGs is associated with their evaluations on satisfaction and dissatisfaction. Players’ usage frequency was positively correlated with their evaluations on satisfaction ($r = 0.59, p < 0.01$), whereas it was negatively correlated with their evaluations on dissatisfaction ($r = 0.37, p < 0.01$). In addition, players’ monthly expense was positively correlated with their evaluations on satisfaction ($r = 0.43, p < 0.01$), whereas it was negatively correlated with their evaluations on dissatisfaction ($r = 0.52, p < 0.01$). The data indicate that the TENO is reliable and valid to proceed to further analysis.
Statistical analysis. To examine if the intensity difference between satisfaction and dissatisfaction dimensions is contingent upon the kinds of psychological needs, an analysis of variance (ANOVA) of a 2 (satisfaction vs. dissatisfaction) × 4 (four kinds of psychological needs) within-subjects factor design was conducted.

Results

Two-way interaction was not significant \( (F[3, 537] = 0.20, \text{n.s.}) \) and this indicated that the difference between two dimensions was not dependent on the psychological needs. Thus, summated scores of four kinds of psychological needs were utilized in the subsequent analysis with respect to satisfaction and dissatisfaction dimensions. The descriptive statistics of study 2 are shown in Table 2.

According to the ANOVA of 2 (between-subjects factor: addicts vs. nonaddicts) × 2 (within-subjects factor: satisfaction vs. dissatisfaction) mixed-factor design, the differential intensity of satisfaction and dissatisfaction was obtained \( (F[1, 179] = 32.40, p < 0.01) \). This result indicated that the psychological needs for online games are close to two-dimensional rather than one-dimensional. A non-ordinal interaction was found \( (F[1, 180] = 31.02, p < 0.01) \) and the finding indicated that the differential intensity of two dimensions was contingent upon addiction of online games. A further analysis indicated that the addicted players’ scores on dissatisfaction dimension \( (M = 154.48) \) were greater than the satisfaction dimension \( (M = 130.04, F[1, 83] = 5.72, p < 0.001) \). In contrast, the scores of nonaddicts on the satisfaction dimension \( (M = 162.46) \) were greater than the dissatisfaction dimension \( (M = 112.97, F[1, 97] = 33.04, p < 0.001) \).

Table 2. Two-Factor Evaluations on Needs in Addicts and Nonaddicts

<table>
<thead>
<tr>
<th>Online game addiction</th>
<th>Two-factor evaluations on needs</th>
<th>Dissatisfaction</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonaddicts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>112.97</td>
<td>162.46</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>83.86</td>
<td>91.87</td>
<td></td>
</tr>
<tr>
<td>Addicts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>154.48</td>
<td>130.04</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>96.76</td>
<td>107.58</td>
<td></td>
</tr>
</tbody>
</table>

The cell means are summated scores of satisfaction and dissatisfaction (range of 4–400).

DISCUSSION

Two studies were conducted to explore the psychological motives of online games with two motivational approaches. From the psychology of optimal experience, the relationship between flow state in online games and addictive orientation was examined. In addition, the essence of needs for online games was investigated from the two-factor theory. The results indicated that, in a short term, flow state in online games was negatively correlated with addictive inclination to online games. However, such finding seems to be contradictory to the expectation. Online games players with pathological use did not experience high level of flow state and their addiction to online games could not be explained by the flow experience. Moreover, the flow state might not be a significant predictor of players’ addiction to online gaming. Choi and Kim found that people continue to play online games if they have optimal experience. Compared to the findings in this research, the flow state of addicts was significantly lower than the nonaddicts. Thus, flow state might not play an important role of addiction to online games though it is positively correlated with customer loyalty. In general, flow state or optimal experience might not be the major motivation for the addicts’ playing of online games.

In addition, according to the definition of flow, skill and challenge are two crucial factors of flow theory. In order to enter the flow state, the users must maintain the balance between these two factors. A proposed model indicated that when skill overcomes the challenge, the users would become bored. On the other hand, when the users challenge is more powerful than their skill, they would feel anxious. Only with the balance of skill and challenge can the users enter the flow state. In Study 1, subjects’ interaction of skill and challenge were not assessed; future studies shall focus on skilled players in order to scrutinize the causal relation of flow state and online games addiction.

Based upon the perspective of humanistic needs theory, the findings of Study 2 indicated that the psychological need of players of online games is close to a two-dimensional model of “satisfactory and dissatisfactory.” Results in this research broaden the horizon of previous research on the motivation of Internet or online game addiction, because they only adopted the uni-dimensional framework of satisfaction. For example, researchers proposed, the more satisfied person who is more likely to become Internet addict; the more powerful the person’s motive is, the more he...
will be satisfied with Internet. Inconsistent with the one-dimensional notion, this research discovered that the psychological needs of addicts of online games were close to dissatisfactory factor with regard to the two-factor theory. Conversely, the non-addicts’ needs were similar to satisfactory factor. According the meaning of dissatisfactory factor, finding in this research indicated that the compulsive use of online games comes from the relief of dissatisfaction rather than the pursuit of satisfaction. And this is parallel to the findings of Armstrong et al., who found that the person with lower self-esteem were more likely to become addicted to Internet due to deficient social skills and insufficient self-confidence; the addicts would regard Internet as a means for compensation and avoidance. In general, findings in this research indicate that addicts of online games tend to be affected by the sense of dissatisfaction, and this might be the reason why they are compulsive users. In contrast, the non-addicts tend to seek enhancement of satisfaction and this might be the reason why they are capable of avoiding the obsession to online games.

On the other hand, the role-playing games allow the users to play roles as different alternative heroes through virtual world. They can thus fulfill the needs of self-actualization, which belongs to satisfactory factor. That is to say, different kinds of online games might satisfy different psychological needs of players. Although Study 2 pointed out that the differential intensity of satisfaction and dissatisfaction was not dependent on the kinds of psychological needs (safety, love and belonging, self-esteem and self-actualization), future research shall investigate if the differential impact was contingent upon various kinds of games.

Since this research merely employed the survey method, it might not reveal the authentic Internet situation. In the future, researchers could conduct field studies or field experiments to examine the convergent validity of findings obtained in this research. Additionally, the sampling of this research merely focuses upon high school and college adolescents. Elementary school students, in fact, are also the risky groups. The prospective research can employ the sampling of the students with cross ages or cohorts in order to examine the external validity of research findings. Additionally, there are many kinds of online gaming. This research only focused on the MMORPGs because of its representativeness and multiple-motivation engagement. Other kinds of online gaming, online causal games for example, might exhibit different picture of the relationship between players’ motives and addiction. Finally, future studies can adopt qualitative research with projective techniques, depth interview, college research, or metaphor analysis to collect the texts of psychological motives of online game addicts. The approach not only uncovers the unconscious motivations of addicted players, but also brings further insights into the interplay between conscious and unconscious plains. Through the comparison and complement of quantitative research and qualitative research, the psychological motives of online games addiction shall be fully understood.

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