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The moderating role of motivations in problematic use of online gaming: A study of live streaming viewers of Twitch

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Abstract

While the Internet continues to integrate with modern lives, the risks of negative outcomes resulting from problematic use (PU) are also increasing. Although psychological well-being and use motivations have been shown to play major roles in Internet PU, understanding the moderating mechanism is critical for advanced knowledge. The present study employed survey data from users of a live video-game streaming service (LVGS) that is an area rarely been studied. Result concluded a positive moderating effect of escapism motive (EM) on the association between loneliness and the PU of LVGS, while the moderating mechanism between EM and stress was not indicated. A moderating effect of information seeking (IS) on the relationship between stress and the PU of LVGS was found negative, but no mechanism between IS and loneliness was indicated. This study highlights how the interplay of different motivation and pathologies may induce or prevent video-game-related addiction.

1. Introduction

Internet addiction (also termed excessive use or PU of Internet) has been described as an impulse-control disorder wherein an individual uses the Internet problematically despite experiencing negative outcomes [1], and an extensive body of literature has been written on this topic since the late 1990s.[2] Due to the wide variety of activities that occur online, the umbrella term "Internet addiction" has been criticized for lacking specificity.[3]

Addiction to online gaming was included in the Diagnostic and Statistical Manual of Mental Disorders as a tentative disorder.[4] The PU of online games thus became a popular research subject. However, LVGS platforms, which are becomingly increasingly popular, have rarely been examined. On such platforms, streamers broadcast real-time video and audio content from the games they are playing. Viewers on a streamer's channel can comment on their performance or simply interact with other viewers and the host via instant chat. According to recent data, more than 100 million unique users use Twitch monthly, making it the

world's leading LVGS platform for gamers. Approximately half of Twitch users spend more than 20 hours a week watching live streams on the platform.[5] A new hub, FB.gg, introduced by Facebook is also attempting to capitalize on the growing audience for gaming live streams.[6] Despite their popularity, the literature still lacks comprehensive works examining the PU of LVGS.

Most research on PU of Internet or online gaming has employed perspectives used for compulsive behaviors caused by psychological syndromes. Many studies have revealed an association between addictive phenomena and various mental disorders, such as low self-esteem, loneliness, stress, depression, and anxiety.[7-12] However, the argument has also been made that motivations for going online may be better predictors for PU.[13] Internet addiction occurs because the Internet affords what individuals want or need, such as providing a space for them to cope with problems in real life or alleviating dysfunctional moods[14-18]; however, in doing so, some people may become addicted, whereas others may experience positive outcomes.[19,20] Accordingly, motive-oriented approaches to the subject have become dominant within the literature alongside compulsion-centered perspectives.[2,14] Relaxation and EM have been noted as key predictors of Internet or online game PU.[15,21-24] This indicates that players who go online to escape from or avoid real-life problems are more likely to experience negative outcomes. Kuo, Lutz, and Hiler [19] distinguished passive EM from active EM; passive EM refers to psychological immersion in order to escape a troublesome reality, whereas active EM is the physical enactment of a fantasy or mental participation through witnessing an act of fantasy. Most studies on EM and video games have focused on what Kuo, Lutz, and Hiler defined as passive EM, and this is why EM has been associated with online game addiction. However, active EM is associated with positive outcomes of affirmation and empowerment.

IS is an important motivation for going online. This motivation, also known as "instrumental use," was shown to be unrelated to PUs, in contrast to "ritual use" (i.e., use motivated by relaxation or escape), which is a crucial factor in Internet addiction.[25] Similar results were noted in a study of compulsive YouTube use.[26] By contrast, both uses were found to be associated with smartphone dependence.[27] In a study on the PU of general video streaming services, IS was associated with PUs, whereas entertainment seeking was not.[14] Regarding research on online gaming, IS has not been considered as a predictor due to the nature of most games. However, LVGS platforms are an ideal scenario for studying the influences of both information-oriented and escape-oriented use of online games because viewers on such platforms are able to learn skills and strategies for their favorite games as well as relax by watching games and socializing with other users.

Both psychological and motivational approaches to Internet addiction have focused on direct effects (i.e., main effects) models of psychological factors or motivations. However, an alternative perspective regarding compensatory Internet use argues that analytical focus should transcend direct effects models and move toward interaction effects models, such as exploring how motivations moderate the relationship between psychosocial well-being and Internet addiction. This view asserts that excessive Internet use may be more properly conceptualized and investigated as a compensation or coping strategy rather than compulsion.[2,28] According to this view, individuals use the Internet as a coping behavior to alleviate dysfunctional moods or distract attention from real-life problems. The effects of psychological risk factors may be moderated by such coping behaviors. In other words, individuals with maladaptive coping behavior may be more likely to experience PU. Based on this framework, EM has proved to be a moderator of the relationship between psychological risk factors and PU. That is, the relationship between psychological risk factors and PU is positively associated with EM or avoidance coping.[2,16,29] However, the moderating role of IS has not been examined with regard to video games. This study explored the moderating role of both IS-oriented and EM-oriented motivations to examine whether it is possible to develop an effective, nondisruptive coping strategy for those at risk of video-

game addiction. Because they have both instrumental and experimental uses, LVGS offer a valuable opportunity to investigate the moderating role of both motivations. Two indicators of psychological well-being, namely loneliness and stress, were selected from previous studies on Internet PU to form the following hypotheses:

H1. EM moderates the relationship between loneliness and PU.

H2. EM moderates the relationship between stress and PU.

H3. The relationship between loneliness and PU is not moderated by IS.

H4. The relationship between stress and PU is not moderated by IS.

2. Materials and Methods

2.1 Recruitment and sample

To reach the targeted subjects (i.e., users of LVGS), information of this study and a link to an online survey were posted on Twitch and its Facebook page. A total of 508 participants completed the questionnaire, and 100% were valid data. Of these 508 participants, 58.8% were male, and their ages ranged from 16 to 47 years (mean = 20.42, SD = 3.85).

2.2 Measurement

The instrument was adapted from well-established constructs in the literature to ensure item reliability and validity. The online questionnaire contained 22 questions assessing demographic variables regarding gender, age, psychosocial well-being, motivations, and negative outcomes caused by PU of LVGS. Five-point Likert scales were used throughout (1 = strongly disagree and 5 = strongly agree); a higher score was considered to indicate a higher strength for the factor.

Psychological factors.   Loneliness and stress were assessed using validated measurements from previous studies. Loneliness was measured using a shortened three-item loneliness scale30 (e.g., I often feel like I lack companionship). Stress was measured using a four-item short form of the Perceived Stress Scale.[31] (e.g., I often feel that I am unable to control the important things in my life). The Cronbach's alpha for the present study was acceptable at .75 for loneliness and .70 for stress.

Motivations.   EM was evaluated with four items adapted from Yee's gaming motivations inventory.[23] (e.g., I watch game streaming to forget about my troubles). The motivation of IS was evaluated with four items adapted from the measurement by Song et al.[25] (e.g., I watch game streaming to get new ideas about gaming). Exploratory factor analysis ensured that the items for each variable were loaded on the same factor (all factor loadings > .70). The Cronbach's alpha was also acceptable at .76 for EM and .78 for IS.

PU.   PU was assessed with five items of negative consequences that were adapted for online gaming research from previous studies.[1,2,32] (e.g., I have lost contact with some friends because I would rather spend time watching video game live streams). Exploratory factor analysis confirmed that all five items were loaded on the same factor (all factor loadings > .80). The Cronbach's alpha of .92 was excellent.

2.3 Statistical analyses

Data were analyzed using SPSS (version 22), and the variables employed for analysis were derived by calculating the average number of items for each measurement. In order to identify motivation orientation, k-means cluster analysis was performed for the two motivation variables: EM and IS. A cluster analysis splits data into clusters so that objects of the same group are more similar to each other than those in other groups, and k-means is a widely used clustering technique.[33] Regression models with interaction terms were fitted

to verify the research hypotheses. Predicted regression coefficients for PU from independent variables of psychological factors (loneliness and stress) and motivations (EM and IS) were used to plot the significance of any interaction effects. To reduce multicollinearity, the independent variables were standardized using a centering method.[34,35] If a significant interaction effect between psychological well-being and motivation was indicated, a simple slope test was conducted to verify how the different levels of motivation moderated or changed the relationship between the psychological factor and PU. Simple slope testing was conducted using free software, *Interaction*,[36] which provides superior interaction effects interpretation with data and figures than SPSS does.

3. Result

3.1 Descriptive statistics and k-means cluster analysis

The normality assumption was justified by the measurement of all skewness and kurtosis between 1 and -1, as shown in Table 1 that presents the descriptive statistics, distributions, and correlation coefficients.

Table 1. Descriptive statistics and correlation coefficients between variables

	1	2	3	4	5
1.PU	1				
2.Loneliness	.09*	1			
3.Stress	-.03	-.20**	1		
4.EM	.12**	-.52**	.18**	1	
5.IS	.14**	.18**	.11*	-.22**	1
Mean	2.46	3.26	2.75	2.75	2.94
Standard deviation	.96	.73	.61	.73	.82
Skewness	.02	.44	-.17	.04	-.16
Kurtosis	-.86	-.02	.39	.38	-.49

$^*p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Two clusters were identified by k-means analysis (Table 2). Cluster 1 consisted of 233 participants that were characterized by higher levels of EM; this group was labeled the "EM-oriented group" (EMOG) and used to analyze H1 and H2 regarding the moderating effects of psychological well-being and EM motivations. Cluster 2 contained 275 participants that were characterized by higher levels of IS; this group was labeled the "IS-oriented group" (ISOG) and used to analyze H3 and H4 to test the moderating effects of psychological factors and IS motivations.

Table 2. Result of k-means cluster analysis

	Cluster 1 EMOG (n=233)		Cluster 2 ISOG (n=275)	
	M	SD	M	SD
EM	3.13	0.63	2.41	.65
IS	2.25	0.53	3.53	.50

3.2 Hypothesis analysis

To test the interaction effects between psychological well-being and EM, a multiple regression model with PUs as the dependent variable was fitted using the EMOG (Table 3). This model explained 29.7% of the variance for PU ($F_{7,225}=13.57$, $p < .001$). In support of H1, the data revealed a significant interaction effect between loneliness and EM (b= −.31, p < .01). However, no interaction effect between stress and EM was

found; therefore, H2 was rejected.

Table 3. Regression with interaction terms on PU for EMOG

	B	t
Gender	-.02	-.19
Age	.00	-.11
Loneliness	.33	3.33**
Stress	.33	3.06**
EM	.81	8.87***
Loneliness*EM	-.31	-2.87**
Stress*EM	-.24	-1.65
R2	.297	

$^{*}p < 0.05;\ ^{**}p < 0.01;\ ^{***}p < 0.001$

A simple slope test was performed to investigate how EM moderated the relationship between loneliness and PU (Figure 1). Table 4 shows that the relationship between loneliness and PU was positive when levels of EM were low (b= .40, t = 3.47, p < .001) and medium (b =.19, p < .01) but nonsignificant when levels of EM were high.
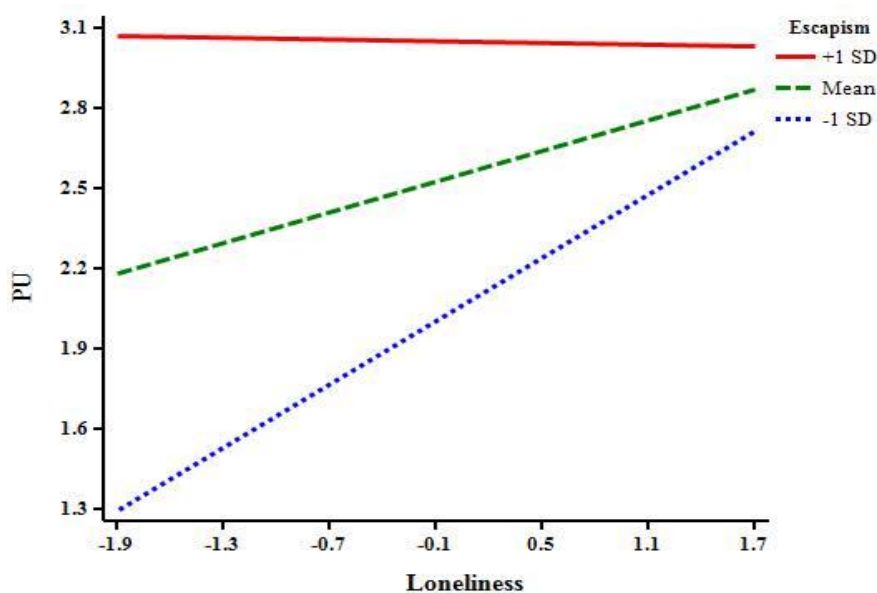

Figure 1. The join effects of EM and loneliness on PU

Table 4. Simple slope analysis of moderating effect by EM on loneliness and PU

Levels of Moderator	Intercept	b	t	95% CI
+1 SD	3.07	-.01	-.12	-.20, .17
M	2.55	.19	2.34*	.03, .36
-1 SD	2.03	.40	3.47**	.17, .63

$^{*}p < 0.05;\ ^{**}p < 0.01$

To test the interaction effects between psychological well-being and IS, a multiple regression model with PU of LVGS as the dependent variable was fitted using the ISOG (Table 5). This model explained 15.5% of the variance for the PU ($F_{7,267}=7.02$, $p < .001$). No significant interaction effect existed between loneliness and IS, supporting H3. However, an interaction effect was found between stress and IS ($b = .41$, $p < .05$); therefore, H4 was rejected.

Table 5. Regression with interaction terms on PU for ISOG

	B	t
Gender	.26	2.25[*]
Age	-.02	-1.40
Loneliness	.01	.11
Stress	-.50	-3.48[***]
IS	.49	4.14[***]
Loneliness*IS	.19	1.18
Stress* IS	.41	2.52[*]
R2	.155	

$p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

A simple slope test was performed to investigate how IS moderated the relationship between stress and PU (Figure 2). Table 6 shows that the relationship between stress and PU was negative when levels of IS were low ($b= -.47$, $p < .001$) and medium ($b= -.31$, $p < .001$), but the relationship was nonsignificant for high levels of IS.
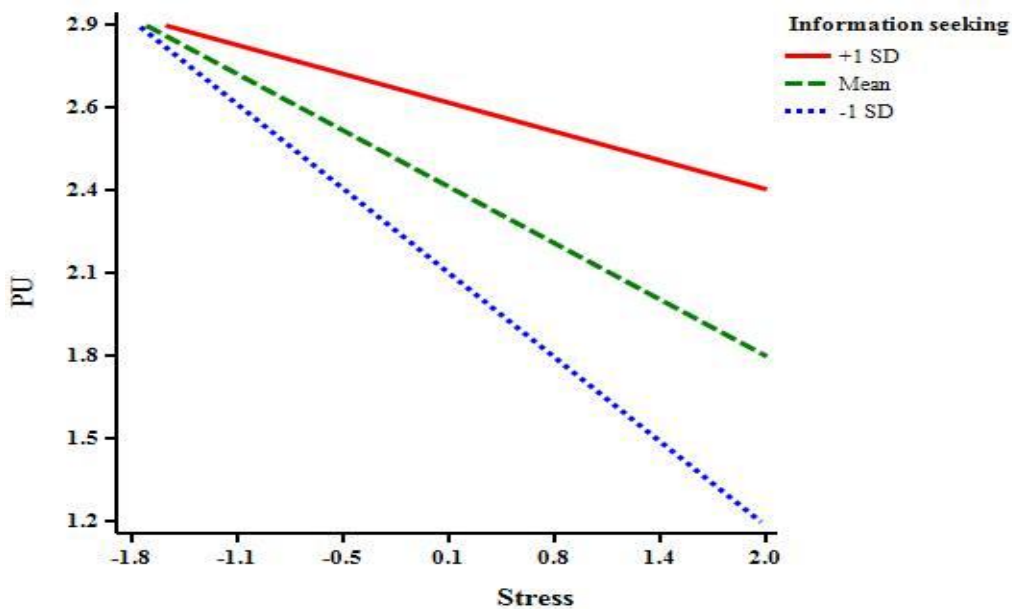

Figure 2. The join effects of IS and stress on PU

Table 6. Simple slope analysis of moderating effect by IS on stress and PU

Levels of Moderator	Intercept	b	t	95% CI
+1 SD	2.68	-.16	-1.46	-.37, .06
M	2.40	-.31	-3.50[***]	-.49, -.14
-1 SD	2.13	-.47	-4.01[***]	-.69, -.24

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

4. Discussion

Many studies have demonstrated the direct effect of psychopathology and Internet-use motivations on Internet addiction. Recently, several studies have highlighted the importance of investigating psychological factors in conjunction with motivations. The joint effects approach states that the moderating mechanisms of psychosocial disorders and motivations underlie any detrimental effects of excessive Internet use. Studies from this perspective have indicated that EM moderates the relationship between psychological risk factors and PU.[7-12] Given the lack of evidence regarding moderation through IS in the online gaming literature, this study examined whether the mechanism of moderation functions differently for IS-oriented motivation versus EM-oriented motivation and psychopathology, with the goal of determining a healthier strategy for intervention in cases of video-game-related addiction. Popular video-gaming live streaming platforms provide users with IS-oriented and EM-oriented motivations, and they were thus focused on as the target of this research.

The results confirmed H1, agreeing with the results of other studies that have revealed a moderating effect of EM.[2,16] By conducting a simple slope test to verify how EM moderates the relationship between loneliness and PU, the present study found that the moderating model is significant for individuals with low or moderate levels of EM. Overall, EM could be perceived as an unhealthy copying behavior. H2 was rejected because no moderating effect of EM on the relationship between stress and PU was found. Stress is often provoked in threatening environments.[37] Therefore, stress may predispose individuals to PU of Internet without any moderating mechanism.

This study specifically examined whether IS moderated the relationship between psychological factors and PU. H3 (no interaction effect between loneliness and IS) was supported but H4 (no interaction effect between stress and IS) was not. A simple slope test revealed that moderate or low levels of IS may buffer individual susceptibilities to PU when experiencing stress. The data in Table 5 show results that are consistent with those of previous studies, indicating a positive association between IS and Internet PU.[14,27] However, moderate or low levels of IS may attenuate the link between stress and PU from online-gaming-related activities. Thus, general rather than intense IS may be a promising intervention for reducing the negative effect of PU.

This study has several limitations. The generalizability may be limited due to the use of an online convenience sample. Moreover, the causal chain or direction of effects was not ascertained due to the correlational nature of the data. Thus, future studies should use longitudinal data for further investigation.

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