Internet Gaming Disorder Tendency and Game Engagement among Esports Players

YAMAMOTO Kohsuke[†], SOGA Chiaki[†], MENANT Julien[††]

eスポーツプレーヤーにおけるゲーム依存傾向とゲーム没入感

山　本　晃　輔[†]，曽　我　千亜紀[†]，ムナン・ジュリアン[††]

Abstract

Since the World Health Organization announced the adoption of internet gaming disorder as an addictive behavioral disorder, such as gambling dependence, in the ICD-11 in 2018, research on its determinants and prevention is required. One factor related to the pathophysiology of internet gaming disorder that contributes to dependence on games is the sense of 'game engagement.' In this study, we examined esports players who were predicted to have an extremely high level of engagement in games, and compared their sense of engagement in games, as measured by the Game Engagement Questionnaire (GEQ), after dividing them into groups according to game-dependence tendencies. The results showed that each factor of the GEQ were significantly higher in the problematic game player group than in the healthy game player group. These results suggest that game engagement is related to internet gaming disorder tendencies.

要　約

　2018年，WHOがICD-11においてギャンブル依存などの嗜癖行動症の1つとして，ゲーム障害の採用を発表して以降，その規定要因や予防に関する研究が求められている。ゲーム障害の病態とも関連し，またゲームへの依存に寄与する1つの要因として，ゲーム没入感（Game engagement）が挙げられる。本研究では，ゲームへの没入感が極めて高いと予測されるeスポーツプレーヤーに注目し，ゲーム依存傾向の群分けをした上でGEQ（Game Engagement Questionnaire）によって測定されるゲーム没入感の比較，検討を行った。その結果，GEQの各因子はいずれもゲーム依存傾向の高い群が健常群よりも有意に

高かった。これらの結果から，ｅスポーツプレーヤーにおけるゲーム没入感はゲーム依存傾向と関連することが示唆された。

Introduction

Since the World Health Organization（WHO）announced the adoption of internet gaming disorder（IGD）as an addictive behavioral disorder in the ICD-11 in 2018（WHO, 2018）, there has been a lot of research on its determinants and prevention（for review, see Yokomitsu et al., in press）. IGD is a psychiatric disorder in which people are immersed in online and video games, leading to negative life and health indicators, and the problem has further emerged with the popularity of online games. Meta-analyses of prevalence studies in various countries estimate that approximately 3% of the general adult population and 5% of the younger population have a gaming disorder（Stevens et al., 2021）.

One factor related to the pathophysiology of gaming disorders and which contributes to IGD is "game engagement." This concept indicates immersion or absorption in a game. Brockmyer's（2009）Game Engagement Questionnaire（GEQ）was used to measure individual characteristics. The Japanese version of the GEQ was developed recently and includes a four-factor model:（1）absorption,（2）immersion,（3）flow, and（4）presence（Yamamoto et al., 2021）. Psychological absorption describes total engagement in the gaming experience. Immersion has also been defined in terms of a game's capacity to induce the feeling of being a part of or "present" in the game environment. Flow is a term used to describe feelings of enjoyment that occur when a balance between skill and challenge is achieved during the process of performing an intrinsically rewarding activity. Presence is commonly defined as being in a normal state of consciousness and experiencing the inside of a virtual environment. Of these four factors, flow has been reported to be positively correlated with IGD trends（Li et al., 2021）.

In recent years, electronic sports（esports）has attracted a lot of attention. It is the

name given to individuals and teams who play these games in sports competitions （Wagner, 2006）. A small number of psychological studies on esport players are being conducted (e.g., Yokomitsu et al., in press). For example, studies comparing esports players with those who play games recreationally have consistently found that esports players spend more time playing games and are more likely to be considered game impaired （Bányai et al., 2019; Maldonado-Murciano et al., 2022）. If so, would higher game dependence tendencies in esports players lead to increased game engagement? To date, no study has examined the relationship between IGD and game engagement among esport players. In this study, we compared GEQ and game-playing time among esports players after dividing them into groups of game-dependent tendencies. If IGD and game engagement are related in esports players, it is expected that scores on each factor of the GEQ will be higher in the group with high gaming dependence than in the group with low dependence.

Methods

Ethical considerations: This study was approved by the Institutional and Local Research Committee of Osaka Sangyo University（2020-人倫-09）. The study was performed in accordance with the ethical standards outlined in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards, as well as the code of ethics and conduct of the Japanese Psychological Association. During screening, the contents of the research were explained to participants and their voluntary consent to participate was obtained.

Participants: A total of 1,000 registered members of an internet research company, aged 15-59 years, who had participated in an esports competition（official or unofficial） at least once before consented to participate in the survey. There were 935 valid responses. The mean age of the participants was 38.47 years（SD=10.87）, 600 male and 335 female, with an average esports history of 2.99 years（SD=4.44）, and a current average weekly game playing time of 315.73 minutes（SD=627.95）. Participants were rewarded according to the research company's regulations.

Measures: The Game Addiction Scale（Japanese version; GAS7-J）and Game Engagement Questionnaire（GEQ-J）were used in this study. Lemmens et al.（2009）

developed the original Game Addiction Scale (GAS-7) which has been used in many studies on gaming addiction (as a review, see King et al., 2020). In this study, the GAS7-J was used to assess gaming addiction levels, classify participants into problematic and healthy gamers, and draw comparisons between each variable. The GAS7-J comprises seven items rated on a 5-point Likert scale (1=never; 5=very often), with higher scores reflecting a greater tendency toward problematic gaming addiction (Koga & Kawashima, 2018). Participants were classified as problematic gamers when responses were rated 3 (sometimes) on the 5-point continuum scale for more than four of the seven items. The GAS7-J has been shown to have good internal consistency (Cronbach's a =0.87) and a one-factor structure. A fair degree of validity was confirmed by a weak significant correlation (r= .19, p < .01) between the GAS7-J and the loneliness scale, and a significant correlation (r= .32, p < .01) between the GAS7-J and game play duration.

Brockmyer et al. (2009) developed the original version of the Game Engagement Questionnaire (GEQ), which measures engagement in video-game playing. The Japanese version of the GEQ (GEQ-J) comprises 15 items rated on a 5-point Likert scale (1=No, 2=A little, 3=Some, 4=Almost, 5=Yes), with higher scores reflecting increased degrees of game engagement (Yamamoto et al., 2021). The GEQ-J has a four-factor model: (1) absorption (a = .86), (2) immersion (a = .74), (3) flow (a = .83), and (4) presence (a = .74). The scale demonstrated acceptable reliability. The models performed well in terms of goodness-of-fit ($RMSEA$= .05, GFI= .95, $AGFI$= .93, and NFI= .95). A significant correlation (r= .13 – .21, p < .01) was observed between each factor of the GEQ-J and the aggression scale, and a significant correlation (r= .21 – .48, p < .01) was observed between each factor of the GEQ-J and the dissociative experience scale, indicating a fair degree of validity of the GEQ-J.

Procedure: The survey was conducted online. After screening for esports participation experience, respondents were asked whether they mainly played team or individual games, and their average weekly game-playing time was recorded. The 'games' here included video games (e.g., PlayStation 3, 4, Nintendo Switch), mobile games (e.g., 3DS, PlayStation Vita), smartphone app games, PC, and other media-based games. The GAS-7 and GEQ-J tests were then administered.

Results and Discussion

The data were analyzed using SPSS（Version. 27）. Problematic gamers were assigned according to the GAS7-J screening criteria. The results showed that 454（48.56%）of the participants fell into the problematic gamers group, while the remaining 481 participants were considered the healthy gamers group. Although approximately half of the participants in this survey were problematic gamers, there is still insufficient evidence to conclude that half of all esports players are problematic game players. Further studies and careful discussions are needed for this interpretation. The mean scores of the scales were calculated for each group, and *t-tests* were conducted to examine differences（Table 1）.

Table 1　Means and *t-test* results per group

	Non-problematic gamers	Problematic gamers	t (933)
GAS7-J	12.39 (3.46)	21.69 (3.34)	41.80[*]
GEQ-J			
Absorption	13.43 (5.48)	20.07 (5.05)	19.23[*]
Immersion	7.51 (2.85)	9.51 (2.19)	11.98[*]
Flow	3.95 (1.85)	5.83 (1.81)	15.77[*]
Presence	7.74 (2.81)	9.84 (2.41)	12.27[*]
Game playing time（minutes）	236.11 (351.28)	400.08 (817.56)	4.03[*]

※[*]$p < .001$,　parentheses are *SD*. GAS7-J, Japanese version of the Game Addiction Scale; GEQ-J, Japanese version of the Game Engagement Questionnaire

A significant difference was found between the groups on the GAS7-J, suggesting the validity of grouping manipulation. Each factor of the GEQ was significantly higher in the problematic gamers group than in the healthy gamer group. In other words, it was suggested that problematic game players were more easily assimilated, immersed, experienced more flow, and felt more spatial presence in the games than healthy game players. Similar findings have been reported in a study of general game players. Yamamoto et al.（2021）examined the relationship between game dependence tendency

and game engagement during COVID-19, focusing on the fact that game playing increased during that time. They reported that, similar to this study, problematic gamers had higher scores on all GEQ factors than healthy gamers. These results suggest that game engagement is associated with IGD tendencies.

The results of the game playing time comparisons between groups showed that problematic game players spent significantly more time playing games than healthy game players, with a difference of approximately six hours. As one of the major causes of IGD in previous studies (Yokomitsu et al., in press), it may be necessary to first control the duration of game playing to prevent IGD.

Finally, future research directions are discussed. In recent years, cognitive-behavioral therapy (CBT) has gained attention as a way to prevent and ameliorate IGD (Stevens et al., 2019). The reduction of stress and anxiety through CBT has been shown to be a direct and indirect clinical approach to IGD. Numerous studies have shown that CBT is effective for various cardiac conditions, including stress-related disorders (Stevens et al., 2019). In the future, both direct and indirect approaches should be considered when applying CBT to IGD; as Rajab et al. (2020) showed, peer pressure, sleep deprivation, poor academic performance, low self-esteem, and reward-seeking behaviors are also important factors that increase IGD risk. Therefore, support for these behaviors at an everyday level is also an important intervention.

In addition, this study did not examine what types of games esports players play. Not all video games promote game involvement, and Maroney et al. (2019) reported that different game genres have different effects on IGD, making it important to identify the specific games and genres that promote involvement. If we can identify the genres that promote engagement, they use could be regulated for minors to some extent, even as a precautionary measure. In addition, a preliminary investigation of these gamers may lead to the early detection of serious diseases. In the future, we would like to utilize the results of this study in research on preventive measures against IGD.

References

Bányai, F., Griffiths, M. D., Demetrovics, Z., & Király, O.（2019）. The mediating effect of motivations between psychiatric distress and gaming disorder among esport gamers and recreational gamers. *Compr. Psychiatry*, *94*, 152117.

Brockmyer, J. H., Fox, C. M., Curtiss, K. A., McBroom, E., Burkhart, K. M., & Pidruzny, J. N.（2009）. The development of the game engagement questionnaire: a measure of engagement in video game-playing. *J. Exp. Soc. Psychol.*, *45*, 624–634.

King, D. L., Delfabbro, P. H., Billieux, J., & Potenza, M. N.（2020）. Problematic online gaming and the COVID-19 pandemic. *J. Behav. Addict.*, *9*, 184–186. doi: 10.1556/2006.2020.00016. PMID: 32352927; PMCID: PMC8939428.

Koga, Y., & Kawashima, D.（2018）. Development and validation of Japanese version of the game addiction scale for adolescents. *Jpn. J. Personal.*, *27*, 175–7.

Lemmens, J. S., Valkenburg, P. M., & Peter, J.（2009）. Development and validation of a game addiction scale for adolescents. *Media Psychol.*, *12*, 77–95.

Li, L., Niu, Z., Griffiths, M. D., & Mei, S.（2021）. Relationship between gaming disorder, self-compensation motivation, game flow, time spent gaming, and fear of missing out among a sample of Chinese university students: a network analysis. *Front. Psychiatry*, *12*: 761519. doi: 10.3389/fpsyt.2021.761519.

Maldonado-Murciano, L., Guilera, G., Montag, C., & Pontes, H. M.（2022）. Disordered gaming in esports: Comparing professional and non-professional gamers. *Addict. Behav.*, *26*. doi: 10.1016/j.addbeh.2022.107342.

Maroney, N., Williams, B.J., Thomas, A., Skues, J., & Moulding, R.（2019）. A Stress-Coping Model of Problem Online Video Game Use. *Int. J. Ment. Health Addiction*, *17*, 845–858. doi.org/10.1007/s11469–018–9887–7.

Rajab, A. M., Zaghloul, M. S., Enabi, S., Rajab, T. M., Al-Khani, A. M., Basalah, A., Alchalati, S. W., Enabi, J., Aljundi, S., Billah, S. M. B., Saquib, J., AlMazrou, A., & Saquib, N.（2020）. Gaming addiction and perceived stress among Saudi adolescents. *Addict. Behav. Rep.*, *4*, 11:100261. doi: 10.1016/j.abrep.2020.100261. PMID: 32467850; PMCID: PMC7244928.

Stevens, M. W. R., Dorstyn, D., Delfabbro, P. H., & King, D. L.（2021）. Global prevalence of gaming disorder: A systematic review and meta-analysis. *Aust. N. Z. J. Psychiatry*, *55*, 553–568.

Stevens, M. W. R., King, D. L., Dorstyn, D., & Delfabbro, P. H. (2019). Cognitive-behavioral therapy for Internet gaming disorder: a systematic review and meta-analysis. *Clin. Psychol. Psychother, 26*, 91–203. doi: 10.1002/cpp.2341. Epub 2018 Nov 13. PMID: 30341981

Wagner, M. (2006). On the scientific relevance of eSport. In: *Proceedings of the 2006 International Conference on Internet Computing and Conference on Computer Game Development. Las Vegas*, Nevada: CSREA Press, pp. 437–440.

World Health Organization. (2018). The ICD-11 Classification of Mental and Behavioral Disorders: Diagnostic Criteria for Research. World Health Organization: Geneva, Switzerland.

Yamamoto, K., Soga, C., & Menant, J. (2021). Reliability and validity of the Japanese version of the Game Engagement Questionnaire (GEQ). *Jpn. J. Personal., 29*, 87–90.

Yokomitsu, K., Irie, T., Shinkawa, H., Tanaka, M., & Yamamoto, K. (in press) Perspectives on the Prevention of Severe Game Behavior: Clinical Psychological Considerations Based on Diverse Playing Styles. *Jpn. J. Clin. Psychol.*