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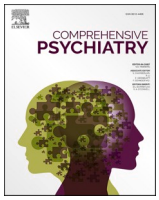

Personality, motivations, and gaming disorder symptoms: A large-scale comparative study of esports players, highly engaged gamers, and recreational players.

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ABSTRACT

Background and aims: Esports playing (i.e., competitive videogaming) is an ever-growing activity but has a variety of risks or harms associated with problematic consumption. The aim of the present study was to investigate the extent to which esports is associated with different indicators of problematic consumption and how motivations for playing videogames reflect differences between esports players, recreational players, and highly engaged gamers.

Methods: Self-report data were collected regarding personality, psychopathological symptoms, and gaming behavior among 14,727 gamers (mean age = 24.1 years [SD = 7.0]; 89.3 % male) comprising 557 esports players (mean age = 21.5 years [SD = 6.5]; 95.9 % male), 5101 recreational players (mean age = 26.1 years [SD = 7.5]; 87.8 % male), and 9069 highly engaged gamers (mean age = 23.2 years [SD = 6.4]; 89.7 % male).

Results: Comparing all three groups, esports players were more likely to be male, younger in age, and were more likely to have a competitive personality. When compared to highly engaged gamers with regard to gaming motivation, esports players showed lower mastery, stimulation, and escapism motives. Highly engaged gamers displayed higher sensation seeking, higher negative affectivity, and lower sociability compared to the other two groups.

Conclusion: Esports players tend to have a balanced psychological profile, which indicates that esports themselves are not necessarily associated with problematic use characteristics. Highly engaged gamers showed potentially harmful characteristics in terms of higher perceived stress and depression, and motivations to play (escapism). Interventions are encouraged to protect and support this group of gamers.

1. Introduction

Videogaming has become an increasingly popular form of entertainment over the past 50 years. Some of the most influential earlier videogames such as *Pong*, *Space Invaders,* and *Pac-Man* have helped shape the industry as it stands today [50]. Estimates from Newzoo's [47] Global Games Market Report 2024 reported that the total number of videogamers was around 3.3 billion in 2023, expecting to rise to 3.75 billion by 2027, with mobile gaming being a major factor in this growth. Over time, videogaming has evolved into a heavily commercialized industry, especially in the form of competitive videogaming, which is known as electronic sports ('esports') [17,25].

Esports players have been defined as *"competitive [videogame] players that are involved in organized tournaments, as well as participating, training, and preparing for them"* ([45]; pp. 116). Although the term, 'esports' was not used until 2000 with the birth of the *Korean Esports Organization*

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[10], organized esports tournaments can be traced back to the 1970s, with Stanford University hosting the world's first videogame tournament in 1972, and *Atari* hosting the world's first major gaming tournament for their videogame *Space Invaders in* 1978 [37]. The current industry leaders in popularity and viewership are *Riot Games' League of Legends*, with their 2023 world championships peaking at 6.4 million concurrent viewers, and *Mobile Legends: Bang Bang* with 530 million hours in watch time for its esports events recorded in 2023 [16].

The evolution of competitive gaming has also been accompanied with a range of new career opportunities including professional esports players and coaches, television experts and analysts, esports psychologists, commentators, and event organizers [6]. In a study of 190 participants (mean age = 21.6 years), age and career planning to become an esports player displayed a marginally significant association, indicating that younger players tend to seek out professional esports opportunities more than older players [6]. Moreover, there has been an increased scope for socializing involved in esports titles, given the multiplayer nature of them, in the form of team-based socializing, and self vs. opponent socializing.

Research into the socializing aspects, and the possible long-term relationships stemming from multiplayer games can be dated back to at least as early as Griffiths et al.'s [22] exploratory 'benchmarking' study which highlighted the attractiveness of social elements of online gaming. This was followed up with a survey showing that social aspects of gaming were the most important factor in online gaming for some gamers [23], and supported by Cole and Griffiths [13] in their study examining social interactions in multiplayer online role-playing games (MMORPGs). In interviews (n = 23) with Chinese university students about their motivations and reasons for participating in esports, Feng [18] found that some of the most common reasons for college students to be involved in esports were to (i) have fun and to relax, (ii) have a sense of belonging in communities and groups, (iii) experience a different life, and (iv) escape reality. Socializing has been a well-documented motivation for esports players' consumption of esports titles [44].

Socializing in esports games, especially the ones that have unranked and social game modes, can be a great way for some players to recreationally play videogames while connecting with their friends and loved ones. To cater to these recreational players, many popular esports titles (e.g., *Counter Strike 2, EA Sports FC, Valorant, Rocket League*, etc.) have unranked, social or casual game modes that allow less competitively driven or high-achievement driven players to participate and play. These game modes often also serve as a way for more highly skilled players to enjoy the games with their friends who just play recreationally and fosters a positive, fun and relaxed environment. These properties of multiplayer titles could make them attractive for recreational players just as much as someone aiming to become a professional esports player. The same multiplayer aspect of videogames might also attract a more competitive audience compared to traditional single-player games. Apart from social motives, competitiveness and skill development were also found to be strong motivations in a study of 190 gamers aspiring to be esports professionals [6]. Greenberg et al.'s [21] findings regarding gaming motivations emphasized that gaming in general *"serves to increase one's level of competitiveness, that more avid game players become more competitive in other social activities, and that winning becomes an even more important social goal for them"* (pp. 253).

However, although esports titles cater to both recreational players and esports players, there appear be other types of gamers, who engage in these esports titles for long sessions and are committed to the game, but are not pursuing an esports career and do not want to become esports players. These, 'highly-engaged gamers' find gaming to be an important component of their daily lives, and can be used as an activity to relieve stress, to escape, to socialize with people from other cultures, and/or to develop their skills [51]. These types of gamers, might be gaming excessively and highly engaged in videogaming, but have very different motivations compared to esports players and recreational players.

Growing interest, popularity and opportunities in esports also mean that potential harms and risks might be associated with esports consumption as identified and discussed by Czakó et al. [14]. These include physical health issues such as poor posture and carpal tunnel syndrome, and mental health issues such as burnout, stress, depression, sleep disorders, addiction, and body image issues. Specific motivations to play videogames might also lead to harms among both esports and recreational videogame players. For instance, Bányai et al. [5] found escapism to be a predictor for gaming disorder among both these groups. Billieux et al. [8] also identified a problematic cluster of online gamers (n = 229 out of 1057; 21.67 %) described as '(unregulated) escapers' who were likely driven to excessively play videogames to escape other real-life problems. In addition, the other problematic cluster of online gamers in the study were 'unregulated achievers' (n = 175; 16.55 %) who were primarily motivated by in-game achievement and exhibited poor impulse and self-control. Finally, their cluster of highly problematic 'hard-core gamers' (n = 167; 15.80 %) were also primarily motivated by escape motives, in addition to achievement motives but also considered role-playing to be an important motivation. While this group reported a high level of self-esteem, they also reported a high-level of escapism. When compared to the two remaining non-problematic clusters (combined n = 486, 45.98 %) the three aforementioned clusters showed significantly more adverse consequences of playing and addictive patterns. Also, the 'unregulated escapers' displayed the highest levels of negative affect, followed by unregulated achievers and hard-core gamers.

Some of these findings were supported by Wang et al.'s [53] longitudinal study of 923 gamers which compared 'escapers' and 'achievers' to 'recreational' gamers. They found both escapers and achievers to have problematic gaming tendencies including being at a higher risk of social withdrawal, but escapers also exhibited a higher risk of depression and anxiety syndromes. Additionally, given the increasing research regarding problematic gaming (e.g., [24,29,34,35,41,43,46]) and videogame-related gambling [20,42,55], a possible concern might be that training to be a professional esports gamer could act as a convenient excuse to mask problematic videogame use among some users.

Such instances could potentially lead to other behavioral addictions, for instance, Macey and Hamari [40] reported a positive association between problematic videogaming and esports betting (i.e., betting on outcomes in or of professional videogame matches). This aforementioned 'excuse' could effectively legitimize excessive videogaming among younger audiences and naturally pose as a potential risk factor through hampering development in other areas (e.g., education, social skills development, physical education). Younger gamers may state to their parents or guardians that they were pursuing a career to be an esports player while gaming excessively.

Consequently, the aim of the present study was to explore the differences between esports players, and regular gamers of different levels of gaming involvement. More specifically, the study investigated the extent to which esports itself is associated with different indicators of problematic consumption, and to what extent the motivations for playing videogames reflect differences between esports players, heavy videogame players, and recreational players. It was hypothesized that for esports players (compared to non-esports players), competitive and social motivations would play a greater role than more indicative emotion regulation motivations such as immersion or escape motives. The study also aimed to identify possible variables that might help predict the different types of gaming involvement, and understand relevant differences among these groups.

Most of the existing literature regarding potential problematic videogame or esports consumption tends to focus on understanding the level of risk participants might possess, and the factors, personality traits, and behaviors associated with problematic videogaming or esports. With the addition of esports players and recreational gamers in the present study rather than just highly engaged gamers, by examining three different groups of gamers, it makes it easier to identify which

groups require help in minimizing any harm that they might be exposed to or experiencing. More specifically, the present study focuses on understanding the psychological profiles of the three groups, especially esports players and if the activity of engaging in esports training is associated with problematic behavior, or if there are any concerning psychological characteristics among the different types of gamers. There are very few large-scale comparative studies that examine the possible relationships between harmful behaviors and different types of gaming (i.e., from recreational gaming through to competitive gaming [esports]).

2. Methods

2.1. Participants and data collection

The present study utilized a secondary dataset from Király et al. [33]. Self-report data in the original study were collected using an online survey with questions regarding personality, psychopathological symptoms, and videogame playing behavior of players in the spring of 2020, partially during the COVID-19 pandemic. Participants were briefed about the objectives of the research project, the time it would take to complete the survey, and were provided with assurances regarding confidentiality and anonymity. Informed consent was obtained from all participants, including additional consent from parents of participants aged 14–17 years. The advertisement for this research was promoted by a popular Hungarian hardware and videogame-related magazine (*GameStar*). Those who completed the survey were also offered the possibility to enter into a prize draw to win shopping vouchers of various amounts, to incentivize study participation. Emails were only collected from those who wanted to participate in the draw, and were only used for contacting the winners. The original study which collected the data [33] was granted research ethics approval from the Institutional Review Board of the Faculty of Education and Psychology, Eötvös Loránd University, Budapest, Hungary (2020/53). The measures used in the present study are presented below.

A total of 20,300 participants started the survey, but cases with serious inconsistencies were excluded during the first phase of data cleaning. These cases included those who (i) did not consent to participate, (ii) were under the age of 14 years, (iii) had suspiciously high ages, (iv) had too much missing data (81 % or more), and (v) had answers that appeared unrealistic (e.g., incredibly high monetary spending in-game). These suspiciously high age cases included one 87-year-old, two 98-year-olds, and two 100-year-olds with a high number of missing values, and two 97-year-olds with completion time of less than 10 min. Participants were checked if they gave identical and/or unrealistic answers (values) to all items for gaming motives, and also to all items for the Positive and Negative Affect Schedule (PANAS) because PANAS has multiple reverse coded items. Participants who reported less than 10 missing values but completed the survey in under 10 min were also excluded. The survey was relatively long and required at least 20–25 min to complete, and it would not have been possible to properly complete in under 10 min without skipping a significant number of variables. Any additional responses made from the same email addresses were also removed. Participants were also removed if they stopped completing the questionnaire after the demographic and general game-related questions (game genre and game platform; i.e., those who did not answer any of the core questions regarding gaming motivations, problematic gaming, and personality variables, at all). Finally, if any participants reported 0 h of gaming time per week, they were also removed from the sample.

The final sample comprised 14,727 videogame players (89.3 % males, $n = 13{,}148$), with a mean age of 24.1 years (SD = 7.0; minimum age 14 years, maximum age 75 years) with an average of 13.03 years spent in education. Based on their reported relationship status data, 7105 were single at the time of the data collection (48.2 %), 2257 were in a relationship but not living together with their partner (15.3 %), 4166 were married/living with a partner (28.3 %), 75 were divorced (0.5 %), and 7 were widowed (<0.1 %). A total of 6927 were studying (47.0 %), and 9356 were working (63.5 %).

2.2. Measures

2.2.1. Socio-demographics

Players were asked questions regarding their age, gender, marital status, years spent in education, education status, and employment status.

2.2.2. Gaming behavior

Players were asked to report their average time spent playing videogames on weekdays and at the weekend in hours. To avoid providing unrealistic values (e.g., 24 h), The highest response option was limited to 12 h per day, and participants were instructed to report 12 h if they spent more time playing videogames a day. These data were used to calculate average weekly time spent playing videogames. The frequency of esports participation was assessed by the following question: *"How often have you participated in esports competitions in the past year?"*. The participants were able to choose from six response options, with lower scores indicating higher frequency of esports participation (1 = weekly or more frequently, 2 = several times a month, 3 = 6–11 times in the past year, 4 = 3–5 times in the past year, 5 = 1–2 times in the past year, 6 = I did not compete in the past year). Gaming behavior-related data were used to differentiate between distinct videogame user types (i.e., recreational players, highly engaged gamers and esports players; see further description in the 'Statistical Analysis' section).

2.2.3. Gaming disorder symptoms

Gaming Disorder (GD) symptoms were assessed using the Ten-Item Internet Gaming Disorder Test (IGDT-10; [31,32]). The IGDT-10 assesses the nine IGD criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013). Items in the IGDT-10 refer to videogaming in general, and not just internet gaming. Items are rated on a 3-point scale (*never, sometimes, often*) but were dichotomized for analysis ('*never*' and '*sometimes*' scoring 0 [no], and '*often*' scoring 1 [yes]) to correspond with the categorical nature of the DSM-5 items. To avoid double-barreled questions, the final criterion for IGD (i.e., *"Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in internet games")* was operationalized with two items. When performing the analysis, these two items were then merged in such a way that an 'often' response on either of the two items indicated a 'yes' for the merged criterion. Consequently, overall scores on the IGDT-10 ranged from 0 to 9, with 9 indicating maximum IGD symptoms, and 0 indicating none. Composite reliability for the IGDT-10 in the present study was 0.88.

2.2.4. Personality traits

Three personality traits were assessed (i.e., sociability, competitiveness, and sensation seeking). Sociability was assessed using five items proposed by Asendorpf and Wilpers [1]. Participants rated their agreement with several items (e.g., *"I find people more stimulating than everything else"*) describing their preference for social experiences on a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate a higher level of sociability. Cronbach's alpha for the five items in the present study was 0.82.

Three items (e.g., *"I am a competitive person"*) of the Revised Competitiveness Index [26,28] were used to assess the competitiveness of the players. Responses were rated on a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*) with higher scores indicating a more competitive personality. Cronbach's alpha for the three items in the present study was 0.84.

Sensation seeking, describing a tendency of pursuing new and thrilling experiences was assessed using four items of the UPPS Impulsive Behavior Scale (UPPS-P; [7]; Hungarian version: [56]). All items (e.

g., *"I generally seek new and exciting experiences and activities"*) were rated on a four-point scale from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher scores indicating a higher tendency for sensation seeking. Cronbach's alpha for the four items in the present study was 0.80.

2.2.5. Negative affectivity

Three types of negative affectivity were assessed (i.e., depression, perceived stress, and negative emotionality) and the scores were then combined for overall negative affectivity. Symptoms of depression in the past three months were assessed using a short version of the Center of Epidemiological Studies-Depression Scale (CES-D; [49]). The six items (e.g., *"I felt sad"*) were rated on a four-point scale from 1 (*rarely*) to 4 (*most of the time)* with scores ranging from 4 to 24. Higher scores indicate more depressed mood and more severe symptoms of depression. Cronbach's alpha for the six items in the present study was 0.81.

The Perceived Stress Scale (PSS; [11,12]) was used to assess how unpredictable, uncontrollable, and overwhelming participants found their lives. The scale contains four items (e.g., *"In the last month, how often have you felt that you were unable to control the important things in your life?"*) which were rated on a five-point scale from 1 (*never*) to 5 (*very often*). The total score ranges between 5 and 20, with higher scores indicating higher level of perceived stress. Cronbach's alpha for the four items in the present study was 0.77.

The trait version of the Positive and Negative Affect Schedule (PANAS; [54]) was used to assess negative emotionality. Only the 10 negative affect items were used. Items (e.g., irritable, distressed, upset) were rated on a five-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*). The total score ranges from 10 to 50, with higher scores indicating stronger negative emotions. Cronbach's alpha for the ten items in the present study was 0.86. A composite index of negative affectivity was created from the summed scores of depression symptoms, perceived stress, and the negative affect items of the PANAS scale using principal component analysis (PCA).

2.2.6. Motives for videogame playing

The 88-item Gaming Motivation Inventory (GMI; [33]) was used to assess the main videogame play motives. Participants were asked to rate their agreement on items referring to their videogame use (e.g., *"I play videogames…"; "I like videogames that…"*). Items were rated on a seven-point scale from 1 (*It does not correspond at all*) to 7 (*It corresponds exactly*). Higher scores indicate a stronger drive to play videogames for the specified motive. The GMI assesses 26 theoretically proposed motivational factors which clustered into six higher-order motivational factors (i.e., competition, mastery, social, immersion/escapism, habit/boredom, and stimulation). The factor scores of these higher-order motivational dimensions were derived from an exploratory structural equation modeling (ESEM) analysis; for more details see Király et al. [33].

2.3. Statistical analysis

To explore the factors associated with different types of videogaming, participants were divided into three independent groups based on their reported past experience of esports participation and average time spent playing videogames. The first group consisted of players who did not report frequent (at least 6 times a year) involvement in esports competitions and played less than 20 h a week (recreational players; $N = 5101$; 34.6 %); the second group comprised players, who also did not compete in esports events frequently, but played more than 20 h per week (highly engaged gamers; $N = 9069$; 61.6 %); the third group contained players who reported competing in esports competitions at least 6 times during the past year (esports players; $N = 557$; 3.8 %). This grouping of gamers was adapted from Bányai et al.'s [5] study where the authors split the total sample into esports players and recreational gamers based on their frequency of involvement in esports competitions. The present study further differentiated between esports players and the highly engaged gamers using the same variable of frequency of involvement in esports competitions resulting in the three standalone groups of gamers. It should also be noted that 20 % of gamers categorized as esports players in the present study ($n = 112$) played less than 20 h a week, and only 1.4 % of the esports players reported playing less than 10 h a week. This suggests there were some amateur esports players in than sample, rather than full-time professionals. This group was not large enough in number to be analyzed separately.

The three groups' demographic, personality motivation, and gaming behavior variables were compared using analysis of variance (ANOVA), followed-up by post-hoc analyses for variables where there were significant differences. Here, the Games-Howell test was used to compare group differences between the three groups. Absolute values of the effect sizes between the groups for all reported variables were reported using Cohen's *d* (for comparing means between the continuous variables), and Cohen's *h* (for comparing proportions between the categorical variables). Multinomial logistic regression models were constructed to identify potential predictors of esports player status compared to both recreational players and highly engaged gamers. In addition, predictors of highly engaged gamer status compared to recreational players were also explored. All analyses were performed using IBM SPSS statistics version 28.

3. Results

3.1. Demographic, personality and motivational variables

Demographic, personality, and motivational variables are presented separately for the three groups in Table 1. The results show that when compared to the other two groups, esports players were more likely to be male and younger in age, and exhibited the highest levels of sociability and competitiveness. Social and competition motives were also higher for this group.

When comparing social motives, the effect sizes of highly engaged gamers and esports players were statistically different from recreational players (0.36 vs. 0.85, respectively; $z = 26.4$, $p < .001$). Additionally, the effect sizes for the competition motive were also statistically different among the same groups (1.49 vs. 0.52, respectively; $z = 17.6$, $p < .001$) (see Table 1).

3.2. Weekly time spent gaming and gaming disorder symptoms

When comparing (i) the self-reported time weekly spent gaming between the participants, and (ii) gaming disorder symptoms, there was no significant difference between highly engaged gamers and esports players on either variable (see Table 2).

3.3. Prediction of player status using personality traits

When all three groups of gamers were compared, male gender, younger age, higher sensation seeking, higher negative affectivity and lower sociability were associated with greater likelihood of being a highly engaged gamer compared to recreational players. Esports player status compared to the recreational player group was predicted by male gender, younger age, and competitive personality. The same factors were also significant when esports players were compared to highly engaged gamers (Table 3).

3.4. Prediction of player status using motives to play

In the second model, where group membership was predicted using gaming motives, younger age and male gender were predictive of being both esports player and highly engaged gamer compared to being a recreational videogame player. Higher level of mastery, immersion/escapism, competition and social motives, and lower stimulation motives were predictive of being a highly engaged gamer, but only higher

Table 1
Comparisons of different gamer groups: Demographic, personality and motivational variables.

	Recreational players $N = 4504$ to 5101	Highly engaged gamers $N = 7854$ to 9068	Esports players $N = 446$ to 557		Compared groups	|ES|
	%/Mean (SD)	%/Mean (SD)	%/Mean (SD)	χ^2/F		
Demographic variables						
Gender (male)	87.8[a]	89.7[b]	95.9[c]	38.7***	RPs vs. HEGs	0.05
					RPs vs. ESPs	0.30
					HEGs vs. ESPs	0.25
Age	26.1 (7.5)[a]	23.2 (6.4)[b]	21.5 (6.5)[c]	327.9***	RPs vs. HEGs	0.43
					RPs vs. ESPs	0.63
					HEGs vs. ESPs	0.27
Relationship status (single)	38.2[a]	53.6[b]	54.3[b]	477.8***	RPs vs. HEGs	0.31
					RPs vs. ESPs	0.32
					HEGs vs. ESPs	0.01
Studying	42.1[a]	48.9[b]	61.4[c]	109.3***	RPs vs. HEGs	0.16
					RPs vs. ESPs	0.38
					HEGs vs. ESPs	0.22
Working full-time	60.3[a]	46.0[b]	34.8[c]	343.7***	RPs vs. HEGs	0.20
					RPs vs. ESPs	0.50
					HEGs vs. ESPs	0.30
Personality variables						
Sensation seeking	10.1 (2.6)[a]	10.3 (2.7)[b]	11.2 (2.6)[c]	44.1***	RPs vs. HEGs	0.08
					RPs vs. ESPs	0.43
					HEGs vs. ESPs	0.34
Sociability	14.7 (4.5)[a]	14.4 (4.7)[b]	15.9 (4.4)[c]	25.4***	RPs vs. HEGs	0.07
					RPs vs. ESPs	0.27
					HEGs vs. ESPs	0.32
Competitiveness	9.3 (3.3)[a]	9.3 (3.4)[a]	12.0 (2.8)[b]	146.1***	RPs vs. HEGs	0.00
					RPs vs. ESPs	0.82
					HEGs vs. ESPs	0.81
Negative affectivity (z)	−0.09 (0.95)[a]	0.06 (1.03)[b]	−0.08 (1.00)[a]	32.2***	RPs vs. HEGs	0.15
					RPs vs. ESPs	0.01
					HEGs vs. ESPs	0.14
Motives to play						
Mastery	4.0 (1.1)[a]	4.4. (1.1)[b]	4.5 (1.0)[b]	234.2***	RPs vs. HEGs	0.36
					RPs vs. ESPs	0.47
					HEGs vs. ESPs	0.09
Immersion/Escape	3.6 (1.0)[a]	4.1 (1.1)[b]	3.8 (1.1)[c]	335.2***	RPs vs. HEGs	0.50
					RPs vs. ESPs	0.14
					HEGs vs. ESPs	0.27
Competition	3.1 (0.9)[a]	3.6 (1.0)[b]	4.4 (0.9)[c]	673.3***	RPs vs. HEGs	0.52
					RPs vs. ESPs	1.49
					HEGs vs. ESPs	0.82
Stimulation	4.2 (1.0)[a]	4.5 (0.9)[b]	4.4 (0.9)[c]	105.6***	RPs vs. HEGs	0.32
					RPs vs. ESPs	0.20
					HEGs vs. ESPs	0.11
Social motives	3.5 (1.3)[a]	4.1 (1.3)[b]	4.8 (1.1)[c]	541.9***	RPs vs. HEGs	0.36
					RPs vs. ESPs	0.85
					HEGs vs. ESPs	0.46
Habit/Boredom	3.1 (0.8)[a]	3.2 (0.8)[b]	3.3 (0.9)[c]	39.3***	RPs vs. HEGs	0.13
					RPs vs. ESPs	0.24
					HEGs vs. ESPs	0.12

Note: The post hoc test is the Games Howell test. Different superscript letters indicate significant differences between the values on a $p < .05$ level; ***$p < .001$. (z) = standardized score. |ES|: Absolute value of effect sizes (comparing means: Cohen's *d*, comparing proportions: Cohen's *h*). RPs = Recreational players. HEGs = Highly engaged gamers. ESPs = Esports players.

Table 2
Comparisons of different gamer groups: Weekly time spent gaming and gaming disorder symptoms.

	Recreational players (n = 4983–5101)	Highly engaged gamers (n = 8734–9096)	Esports players (n = 526–557)	F[#]	Compared groups	|d|
Weekly time spent gaming (in hours) Mean (SD)	13.88 (3.98)[a]	34.85 (13.08)[b]	34.95 (17.22)[b]	4060.0***	RPs vs. HEGs	1.96
					RPs vs. ESPs	3.20
					HEGs vs. ESPs	0.01
Mean gaming disorder symptoms value Mean (SD)	0.39 (0.85)[a]	0.87 (1.30)[b]	0.86 (1.38)[b]	252.7***	RPs vs. HEGs	0.42
					RPs vs. ESPs	0.52
					HEGs vs. ESPs	0.01

Note: [#]Brown-Forsyth robust test. The post hoc test was the Games Howell test. Different superscript letters indicate significant differences between the values on a $p < .05$ level. ***$p < .001$. |d|: Absolute value of Cohen's *d*). RPs = Recreational players. HEGs = Highly engaged gamers. ESPs = Esports players.

level of competition and social motives, and lower stimulation motives were associated with being an esports player compared to recreational players. When esports players were compared to highly engaged gamers, male gender, higher competition and social motives, and lower mastery, stimulation, and immersion/escapism motives were predictive for being an esports player (Table 4).

Table 3
Comparisons of different gamer groups: A multinomial regression analysis.

Explanatory variables	Highly engaged gamers[#1] $N = 7826$ OR [95 %CI]	Esports players[#1] $N = 443$ OR [95 %CI]	Esports players[#2] N = 443 OR [95 %CI]
Gender; Males (Ref: Females)	**1.340***** [1.191–1.507]	**2.419***** [1.518–3.856]	**1.806*** [1.137–2.868]
Age	**0.945***** [0.939–0.950]	**0.924***** [0.908–0.941]	**0.978*** [0.961–996]
Personality variables			
Sensation seeking (z)	**1.018*** [1.003–1.034]	1.037 [0.995–1.081]	1.018 [0.978–1.060]
Sociability (z)	**0.876***** [0.841–0.913]	0.938 [0.842–1.044]	1.071 [0.964–1.189]
Competitiveness (z)	0.973 [0.933–1.014]	**2.335***** [2.060–1.647]	**2.401***** [2.122–2.175
Negative affectivity (z)	**1.077***** [1.034–1.122]	1.112 [0.998–1.240]	1.033 [0.929–1.148]

Note. $N = 12{,}760$; the sample size differs from the original sample size ($N = 14{,}727$) due to missing values on predictor variables. [#1]The reference group is the recreational players ($N = 4495$). [#2]The reference group is highly engaged gamers. (z) = standardized score. Nagelkerke $R^2 = 8.3$ %. Ref. = reference group. OR = Odds ratio. CI = confidence interval. *$p < .05$; **$p < .01$, ***$p < .001$.

Table 4
Comparisons of different gamer groups along the motives of use: A multinomial regression analysis.

Explanatory variables	Highly engaged gamers[#1] $N = 8931$ OR [95 %CI]	Esports players[#1] $N = 529$ OR [95 %CI]	Esports players[#2] N = 529 OR [95 %CI]
Age	**0.964***** [0.958–0.969]	**0.956***** [0.941–0.972]	0.993 [0.977–1.009]
Gender Males (Ref: Females)	**1.282***** [1.140–1.441]	**2.298***** [1.466—3.601]	**1.793***** [1.151–2.792]
Mastery	**1.067*** [1.007–1.131]	0.879 [0.749–1.032]	**0.824*** [0.705–0.963]
Immersion/ Escape	**1.478***** [1.404–1.555]	0.957 [0.838–1.092]	**0.647***** [0.570–0.736]
Competition	**1.241***** [1.175–1.311]	**3.179***** [2.783–3.631]	**2.561***** [2.255–2.909]
Stimulation	**0.878***** [0.833–0.926]	**0.739***** [0.641–0.853]	**0.842*** [0.733–0.967]
Social motives	**1.356***** [1.288–1.428]	**1.961***** [1.687–2.278]	**1.446***** [1.249–1.674]
Habit/Boredom	1.017 [0.960–1.078]	0.923 [0.803–1.062]	0.908 [0.794–1.038]

Note. N = 14,535. #1: The reference group is the recreational players ($N = 5075$). #2: The reference group is highly engaged gamers. Nagelkerke $R^2 = 17.5$ %. Ref. = reference group. OR = Odds ratio. CI = confidence interval. * $p < .05$; ** $p < .01$, *** $p < .001$.

4. Discussion

The present study explored the association between esports and different indicators of problematic consumption, as well as any differences explained by motivations for playing videogames between three different gamer groups (esports players, recreational players, and highly engaged gamers). The results indicated that the groups differed both behaviorally and psychologically. Esports players displayed unique psychological and motivational characteristics when compared to the other two groups. More specifically, esports players were characterized by stronger competitiveness when compared to the other two groups, and had lower negative affectivity than highly engaged gamers. Esports players were also characterized by stronger competition and social motives, with a low reliance on mastery and escape motives, when compared to highly engaged gamers. The substantial difference in effect sizes for the competition motive suggested that esports players exhibited significantly greater competitive motives compared to recreational players. Notably, the magnitude of this difference is greater than the difference observed between highly engaged gamers and recreational players, highlighting that esports players are more distinctively competitive in their motives compared to the two other groups. The aforementioned characteristics of negative affectivity, and reliance on mastery and immersion/escape motives to play videogames have previously been found to be associated with problematic videogame use and internet gaming disorder [36,39,48,52]. With the esports players in the present study showing lower levels in these characteristics than highly engaged gamers, it might signify that esports are not characterized by the same amount of problematic use characteristics.

Moreover, highly engaged gamers also displayed some distinct psychological characteristics. They differed considerably in the personality traits examined compared to the other two groups. More specifically, highly engaged gamers exhibited lower levels of sociability and higher negative affectivity compared to both other groups, while immersion/escape was a significant predictor compared to recreational players. This is noteworthy because no significant differences were found in the mean levels of gaming frequency or gaming disorder symptoms between highly engaged gamers and esports players. With high levels of the immersion/escape motive, it could be argued that training to become an esports player could be used as an excuse to hide problematic videogame use among some individuals, and some highly engaged gamers may just be using videogames as a form of escape, rather than gaming for a particular goal or training to become esports players.

Previously, and as discussed earlier in the paper, the escapism motive has consistently been reported to be a predictor of problematic videogame use and a mediator between psychiatric symptoms and problematic gaming [30,52]. It might be the case that recreational players purely view gaming as a hobby whereas esports players view gaming as an occupation which requires them to have a healthy work-life balance. This latter viewpoint is also reinforced by research from Giakoni-Ramírez et al. [19] who reported that over 92 % of the professional esports players they investigated had moderate to high amount of physical activity indicating an eagerness to lead a healthy life outside of their occupation.

It is also noteworthy that competitiveness was not a significant predictor of highly engaged gamers, when compared with recreational players, which could indicate that spending long hours gaming does not necessarily translate into an increased motivation to train for competitive videogaming. It was also observed that higher sensation seeking was a significant predictor of highly engaged gamers when compared to recreational players indicating that this group of gamers are more likely to be open to new and thrilling experiences. However, this could also mean that they are open to playing a lot of different videogames than the recreational group, that could potentially lead to possible negative consequences from excessive videogame play.

While being male and younger were statistically significant predictors of both highly engaged gamers and esports players when compared to recreational players, both of these were also significant predictors of esports players when compared to highly engaged gamers. This indicates that younger males are more likely to be driven by competitiveness and pursuing an esports career, compared to older males. This was also partly evident in Hedlund's [27] cluster analysis of esports players. Their cluster of 'competitive players' comprised the youngest gamers their sample consisting of five different types of esport players (i.e., competitive, casual, casual-social, casual-fun, and casual-competitive). Moreover, in a study by Greenberg et al. [21] among school-aged gamers, 11th graders (those aged 16–17 years; $n = 324$) reported the highest scores for competition as a primary motive for playing videogames compared to 5th graders ($n = 141$), 8th graders ($n = 227$) and university students ($n = 550$).

As noted by Lee [38], there might also be other reasons for an esports

career to be preferred by younger gamers (e.g., erroneous traditional beliefs such as player reflexes, agility, and hand-eye coordination slowing down in the mid-20s indicating that peak esports performance occurs at younger ages). Also, the amount of high intensity training required to maintain peak esports performance might not be worth the trade-off with making money as a professional player. Professional esports athletes in similar stages of life, such as those in their mid- to late-20s, might turn to other careers in the videogaming space such as live streaming and content creation, which have been shown to be some of the areas that financial sponsors might be more likely to invest their money in, due to higher perceived rates of return on their sponsorships and advertisements, in the current economy of the industry [15].

5. Limitations

The present study has a number of limitations. Firstly, the use of self-report measures means that the responses were open to various methodological biases (e.g., social desirability). Secondly, the cross-sectional nature of the study means that causal inferences from the observed relationships cannot be determined. Therefore, longitudinal studies are needed to further examine the groups and variables studied here over time. Thirdly, the majority of the individuals in the esports players group ($n = 529$) were not professional esports players (meaning that gaming was not their main occupation). Therefore, those classified as esports players also included amateur gamers who were aiming to become professionals and actively competing but not currently making a living from esports. This is understandable because esports professionals are a niche group, and it is highly challenging for researchers to recruit professional gamers for their research. Because professional gamers compete in high-stress and high performance-expected environments, this might also explain why negative affectivity was not a significant predictor of being esports players in the present sample. For example, over 75 % of Birch et al.'s [9] professional *Counter-Strike* players ($n = 51$) reported symptoms of anxiety/depression while around 25.5 % reported moderately severe and severe depression. Over half of their players also reported psychological distress (54.9 %), and 72.5 % reported low mental well-being. Researchers unable to access and recruit participants from samples of full-time professional esports players could potentially be assisted through creation of national and international central esports bodies, that work with both players and researchers, and could assist by being the liaison between esports players and researchers, to advance science and knowledge in the field. Finally, another key limitation was that all the gamers were from the Hungarian speaking gamer community (living in either Hungary or nearby countries such as Romania, or Slovakia) so it is not known if the findings are generalizable to gamers from other countries and cultures. Therefore, replication studies are needed in other countries to confirm the generalizability of the present study's findings.

6. Conclusions, implications and future directions

Although esports players reported very similar amounts of weekly time spent gaming and mean gaming disorder symptoms as highly engaged gamers, the results showed esports players tended to have a balanced psychological profile. They displayed non-problematic levels of negative affectivity (stress, depression and negative emotionality), exhibited a competitive personality and competitive motivations, and were not driven by immersion/escape motives to play videogames (and esports titles). On the other hand, highly engaged gamers showed relatively high negative affectivity, low sociability and were motivated to play videogames by immersion/escape, social, mastery, and competitive motives. Recreational players reported relatively lower gaming times and gaming disorder symptoms. In terms of demographics, esports players tended to be younger and male, followed by highly engaged gamers, who were a bit older in age, and recreational players, with both of the latter two groups having relatively more female gamers in their groups. Proportionally, sociodemographic findings also indicated a higher number of recreational players reported to be in full-time employment, followed by highly engaged gamers and esports players.

As an increasing number of studies have highlighted the potential harms that highly engaged gamers might experience, it is important to keep developing interventions to protect this group from gaming-related harms. This might also help in finding ways to develop healthier techniques in supporting and encouraging young gamers whose aim is to become esports professionals. These could be in the form of a social-responsibility code for gaming influencers, content creators, esports professionals (and esports organizations) where they could promote a healthy diet, exercise, lifestyle and the importance of healthy mental and physical states to excel in esports and videogame playing more generally. Government agencies around the world (e.g., Departments of Education) could also promote potential educational awareness campaigns for schools or parent groups, destigmatization of seeking assistance for gaming-related problematic behavior, encouragement to openly discuss gaming-related harms among their peers, and the availability of accessible adequate mental health services (such as counselors to assist problematic gamers).

Moreover, as suggested by Czakó et al. [14], checks and feedback systems incorporated into videogames themselves could also be a way forward in reducing videogame-related harm. Regulators or other government bodies could mandate videogame operators to implement harm-reduction techniques used by the online gambling industry. Examples of some measures include mandatory player breaks after playing videogames for long periods of time [4], personalized feedback to inform players regarding specific aspects of their high-intensity gaming sessions [2], and limit-setting where players are asked to set personal limits on how much time they want to spend playing per day, week, and month [3]. Researchers exploring problematic videogaming should also attempt to include esports players, and esports player motivations in their studies to further explore differences among these distinct gamer groups (i.e., highly engaged gamers vs. esports players/gamers aiming to build an esports career). This would further assist in understanding any potential relationships between esports playing and problematic videogaming use. There is a need for studies examining typology, behavior, and other psychological characteristics with samples of professional esport players.

CRediT authorship contribution statement

Harshdeep S. Mangat: Visualization, Conceptualization, Writing – original draft, Project administration. **Róbert Urbán:** Software, Data curation, Visualization, Formal analysis. **Patrik Koncz:** Writing – review & editing, Formal analysis. **Zsolt Demetrovics:** Writing – review & editing, Funding acquisition, Supervision, Conceptualization. **Andrea Czakó:** Supervision, Writing – review & editing, Project administration. **Mark D. Griffiths:** Writing – review & editing, Conceptualization, Supervision. **Orsolya Király:** Writing – review & editing, Methodology, Conceptualization, Validation, Investigation.

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Authors RU, OK and PK have nothing to declare for this study.

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