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RESEARCH ARTICLE

The association of online game content with well-being and self-esteem

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Aim: This study investigated the differences in self-esteem and well-being of gamers who prefer different categories of online games, including cooperative, competitive, educational and violent games, with a particular focus on *League of Legends* players. The aim was to find out whether the self-esteem and well-being of gamers in these game preference groups differ.

Methods: The data was collected via an online survey distributed across multiple social media platforms. The study used a combination of convenience and snowball sampling techniques to recruit participants. The variables examined included demographic data (gender, age, nationality), gaming habits (game type, playing time, impact), well-being and self-esteem.

Results: The survey was completed by 445 participants (68.2% male) with a median age of 22 years (interquartile range 18-26), predominantly from the Middle East (n=230, 51.4%). Results showed no significant association between game content and gamers' self-esteem or well-being (P>0.05 for all comparisons). However, *League of Legends* players were a notable exception, showing lower scores in the areas of personal growth and self-direction and overall self-esteem, and higher scores in the areas of psychological distress and relationship struggles, compared to players of other games.

Conclusion: In this study we found no association between game type and individual self-esteem and well-being. Future research should explore the motivations for engaging in different types of games and the wider impact of competitive gaming environments on mental health.

Study registration: https://osf.io/cf5r3/

Keywords: competitive games; cooperative games; game content; self-esteem; video games; well-being

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Introduction

Online gaming has become an important part of adolescents' daily leisure time around the world. It has become a significant cultural phenomenon, with around 3.32 billion active video gamers worldwide (updated 18 July 2025) (*1*). While gaming is associated with many negative effects such as addiction and aggression (*2*), some studies point to positive effects such as creative, social and emotional benefits (*3*). In the Asian region, home to 1.4 billion gamers (*4*), online gaming is now increasingly accessible via mobile devices, reflecting its far-reaching impact on people's lives and identities (*5*). Of the 8- to 25-year-olds who took part in the Digital Youth Index survey, 47% reported playing online games, with a higher prevalence among boys (51%), particularly among 8- to 10-year-olds (53%). In addition, 87% of young gamers play online at least three times a week (*6*). Young people aged 12-25 have more access to computers and video games, which increases their chances of participating in multiplayer environments (*7*). Concerns about the potentially negative impact of gaming on mental health persist. Nevertheless, the interaction between gaming and well-being is not yet fully understood (*8*, *9*). Games can be associated with addiction, social problems and escapism, but they also provide social opportunities, teamwork and skills such as self-confidence and communication (*10*).

Excessive gaming can lead to isolation, reduced social skills and distorted reality as well as emotional dysregulation and stress (*11*). At the same time, video games can alleviate symptoms of depression and anxiety (*12*), with moderate frequency gaming improving mood and motivation (*13*). Ryan et al. (*14*) found that video games can increase self-esteem by promoting autonomy, competence and relatedness. Players who felt competent and autonomous in their gaming experience exhibited higher self-esteem and a more positive mood, indicating that gaming can provide psychological benefits by fulfilling intrinsic psychological needs.

The fantasy elements of *World of Warcraft*, such as avatar creation, can improve self-esteem by allowing players to portray their ideal selves, especially in players with high depression scores (*15*). Self-esteem is critical to psychological well-being (*16*), and girls report lower self-esteem and more depressed moods than boys, despite playing less (*17*). Huppert and So (*17*) emphasized the importance of competence, emotional stability and self-esteem for well-being. Video games have been shown to improve self-confidence and self-esteem in children suffering from sadness (*18*) by aligning the ideal self with the actual self and providing personal growth (*15*). Online socializations, especially in massively multiplayer online role-playing games (MMORPGs), play a crucial role in young people's well-being (*19*) by fostering social bonds and emotional connections (*20*–*22*).

While the effects of gaming on mental health and social behavior have been widely researched (*23*, *24*), the relationship between different types of gaming content and psychological outcomes such as well-being and self-esteem is still less known. Most studies focus on general gaming habits, such as frequency of gaming, behavioral patterns or lifestyle factors, overlooking the potential influence of different gaming genres. Matias et al. (*25*), for example, investigated the relationship between gaming and mental health, sleep and physical activity, but did not distinguish between the types of games played. Games that promote violence, competition or cooperation can have very different effects on players'

mental well-being. For example, one study indicated that self-directed play in general can promote feelings of vitality and optimism when play is motivated by genuine interest, as opposed to compulsive or addictive behavior (*26*). However, the extent to which different types of games, such as cooperative or competitive games or educational and violent games, influence well-being is still poorly understood.

This gap in literature underscores the need to examine more closely the content of games and the ways in which they affect gamers' psychological experiences. Understanding the effects of different game genres on well-being and self-esteem can help to identify which types of content in games are more likely to be beneficial or harmful. The present study therefore seeks to address this gap by examining how different categories of online games, including violent, cooperative, competitive, and educational games, affect gamers' self-esteem and overall well-being. By focusing on content-specific analysis, this study aims to contribute to a deeper understanding of the psychological impact of online games. The results of this study can serve as a basis for future policies and intervention strategies to mitigate negative outcomes and promote positive ones.

Methods

The protocol for this study was pre-registered at the Open Science Framework (OSF) (https://osf.io/cf5r3/).

Survey description

The survey included sections on demographic information, gaming habits, psychological well-being and self-esteem. Each section was designed to capture specific aspects of participants' experiences and attitudes towards gaming.

Demographic data

The demographic data was collected using 8 questions. The following demographic variables were collected.

a) Gender (*male, female, prefer not to state*).

b) Age (self-reported in years (18+), using an open-response format).

c) Nationality was self-reported but categorized (Europe, Africa, Middle East, America, Asia). The questionnaire was completed in English. For participants whose first language was not English, no formal translation was provided, but the language level was kept simple to ensure accessibility.

   Europe: Sweden, Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, England, Finland, France, Germany, Greece, Hungary, Italy, Kosovo, Netherlands, Norway, Poland, Portugal, Romania, Scotland, Spain, Ukraine, Malta, and Ireland.

   Africa: Algeria, Morocco, and Libya.

   Middle East: Lebanon, Egypt, Saudi Arabia, Jordan, and Palestinian territories.

America: United States, Brazil, Canada, California, Trinidad and Tobago, Costa Rica, Mexico, and Ecuador.

Asia: India, Malaysia, China, and Pakistan.

d) One game played the most in the past month (open answer question).

e) Category of that game (*violent, cooperative, educational, competitive, other*). As a part of the questionnaire, the participants were asked to indicate the main reason they play games by selecting the category that best represents the content they usually engage with. the response options included cooperative, competitive, educational and violent games. Based on this self-reported categorization, participants were divided into groups to analyze potential differences in self-esteem and well-being. During data collection, *League of Legends* emerged as the most frequently played game by the participants. Therefore, in addition to the primary analysis based on the game categories, a further comparison was made between **League of Legends** players and non-players.

f) Time spent playing games daily (*I don't play daily, less than 1 hour, 1 hour, 2–5 hours, 5–7 hours, 7–10 hours, more than 10 hours*).

g) Optional question for those who are not active daily: the frequency of playing (3 times a week or more, 1–2 times a week, 1–2 times a month, every few months, I don't play at all).

h) Has played games affected their lives (*yes, no, I don't know*).

Questionnaire

Self-Esteem

The Rosenberg Self-Esteem Scale (*27*) is one of the most used scales for measuring self-esteem in the adult population. The scale consists of 10 items, 5 of which are negatively worded. Although it was originally constructed as a Guttman-type scale (i.e., items with an ordinal pattern on the attribute), most researchers use a 4-point response format ranging from strongly agree to strongly disagree. The scale is the standard measure of self-esteem in psychological research. The scale provides a short, straightforward and practical method for measuring global self-esteem. In 150 adolescents, internal consistency reached 0.89 (*28*), and Martín-Albo et al. (*29*) conducted two evaluations that yielded Cronbach's alpha values of 0.85 and 0.88. More recent research by Wongpakaran and Wongpakaran (*30*) supports these findings, reporting that the revised version of the Rosenberg Self-Esteem Scale (RSES) maintained a comparable level of reliability while demonstrating improved construct validity and better model fit indices in a Thai adolescent sample.

Well-being

The psychological well-being of the participants was assessed using a questionnaire with a 6-point Likert scale and 18 items. The psychological well-being scale was originally developed by the psychologist Carol D. Ryff, with 42 items (*31*). The Psychological Well-being Scale (PWB) measures six aspects of well-being and happiness: autonomy, environmental mastery, personal growth, positive relationships with others, meaning in life, and self-ac-

ceptance (*31*). A shortened version with 18 items (*31*) was used in this study, as it is quicker to administer. The subscales of this version have correlation coefficients between 0.70 and 0.89. In the search for an understanding of well-being, six theory-driven dimensions were identified (*31*):

- *Self-acceptance* reflects one's own attitude towards oneself. Those with high self-acceptance embrace their complexity and recognize both their strengths and weaknesses. Example of an item: "*I like most parts of my personality*."
- *Positive relationships* with others highlight the importance of social connections. Building warm, trusting relationships fosters a deep sense of belonging and mutual support. Example of an item: "*Maintaining close relationships has been difficult and frustrating for me*."
- *Autonomy* enables individuals to shape their lives according to their own ideas, to resist social pressure and to remain true to their personal values and convictions. Example of an item: "*I tend to be influenced by people with strong opinions*."
- *Environmental mastery* involves effectively managing one's surroundings, seizing opportunities and creating an environment that aligns with personal needs and values. Example of an item: "*The demands of everyday life often get me down*."
- *Purpose in life* gives meaning and direction to existence by directing actions and decisions towards meaningful outcomes. Example of an item: "*Some people wander aimlessly through life, but I am not one of them*."
- *Personal growth* is an ongoing journey of self-discovery and self-development characterized by openness to new experiences and the development of greater self-awareness and effectiveness (*32*). Example of an item: "*For me, life has been a continuous process of learning, changing, and growth*."

Data collection

Procedure

The survey was conducted using the Google Forms platform and consisted of 8 different sections with a total of 38 questions. Of these, 37 questions were mandatory. The only non-mandatory question was "If you are not active every day, how often do you play video games?

The participants were first presented with a consent form in which they were informed about the purpose of the study, the voluntary participation and the assurance of confidentiality. They then confirmed their age and their willingness to take part in the study.

The questionnaire was advertised on Discord servers, Reddit communities, WhatsApp, Facebook and TikTok. It was also shared and promoted by friends. After the data collection was completed, the survey links were deleted from social media. The data collection lasted approximately two weeks from 19 February 2024.

Participants

The target population of the study comprised people aged 18 and older who played online games. After completing the questionnaire, participants received a confirmation message confirming the successful submission of their answers and containing contact information for further questions. The target group consisted of individuals aged 18 years and older who currently play or have previously played video games. Socio-demographic data was collected to describe the sample, including assigned gender at birth (male, female, prefer not to specify), age (open-ended) and nationality (open-ended, later grouped by region).

Piloting and refinement

The questionnaire underwent a pre-test phase to ensure its clarity and relevance to the objectives of the study. This process involved several iterations with adjustments to the questionnaire based on the feedback received. The pretest method used a small sample of individuals who met the criteria for the study, i.e., were at least 18 years old (n=5) and actively participated in gaming. Feedback from the pretest participants was obtained online or in a face-to-face interview. The number of repetitions of the pretest varied depending on the extent of revisions required to refine the questionnaire. Overall, the pretest process served to increase the validity of the questionnaire by ensuring that it effectively captured the intended constructs and minimized potential sources of bias or misunderstanding among participants.

The eligibility criteria for participants were that they were over the age of 18 and that they played games or had played games in the past. The sampling techniques used were convenience and snowball sampling.

Ethical considerations

Prior to conducting the research, the Ethics Committee of the Faculty of Humanities and Social Sciences in Split gave approval for the study (Reg. No.: 2181-190-24-00004). The participants were informed about the study and gave their consent before taking the survey.

Statistical analysis

For descriptive statistics, the key variables were summarized using the median for the central value and the 95% confidence interval (CI). The normality of the distribution was tested using the Shapiro-Wilk test. Statistical significance was set at $\alpha = 0.05$ ($P < 0.05$).

The Kruskal-Wallis test was used to examine the differences in self-esteem and well-being scores between the groups of participants who preferred different types of games (violent, cooperative, educational, competitive). For additional analyses between the two groups, e. g. *League of Legends* players and others, Mann-Whitney U test was used. The correlation between the two latent factors was examined using Pearson's correlation coefficient. Statistical analysis was performed using the JASP program (JASP Team, 2024).

Results

Most of the respondents were male and from the Middle East, with an average age of 22 years. The demographic characteristics of the participants, the genre they played most frequently and the daily amount of video games played are shown in **Table 1**.

Table 1. Demographic characteristics of participants, perceived genre of games played most frequently and daily amount of video games play (n=445)*

Variables		No. (%)
Sex:	Male	305 (68.2)
	Female	123 (27.5)
	Prefer not to say	17 (3.8)
Age:	(Md, IQR)	22 (18-26)
Nationality category:	Europe	156 (34.9)
	Africa	6 (1.3)
	Middle East	230 (51.4)
	America	40 (10.3)
	Asia	11 (2.4)
	Australia	2 (0.4)
Perceived game genre:	Cooperative	247 (54.8)
	Violent	91 (20.2)
	Educational	34 (7.5)
	Competitive	63 (14.1)
	Other	10 (2.2)
Time playing daily:	I do not use games on daily basis	51 (11.3)
	Less than 1 hour	28 (6.2)
	1 hour	86 (19.1)
	2–5 hours	191 (42.4)
	5–7 hours	60 (13.3)
	7–10 hours	14 (3.3)
	>10 hours	15 (3.3)

*The demographic characteristics for each question included in the survey can be found at the OSF project website (https://osf.io/cf5r3/).

Reliability and validity of the measures

An exploratory factor analysis (EFA) was conducted with 18 items of the Well-being scale using an oblimin rotation. Two items ("I live from one day to the next and don't really think about the future" and "In general, I feel that I am responsible for the situation I live in") were excluded due to low uniqueness and factor loadings. The analysis was continued with the remaining 16 items. The adequacy of the data was confirmed by Bartlett's test for sphericity ($\chi^2_{(120)} = 1552.794$, $P < 0.001$), indicating sufficient correlations between the items for factor analysis. Based on the analysis, a two-factor solution was retained, explaining 31.1% of the total variance, with Factor 1 accounting for 19.6% and Factor 2 accounting for 11.5%. The chi-square test of the model was significant ($\chi^2_{(89)} = 173.116$, $P < 0.001$), confirming the adequacy of the model.

A confirmatory factor analysis (CFA) was conducted to evaluate the hypothesized two-factor model using the diagonally weighted least squares (DWLS) estimator with robust standard errors. The aim of the model was to assess the underlying factor structure of the measured constructs. The overall model fit was examined using several goodness-of- fit indices. The chi-square test was significant ($\chi^2_{(100)}$ = 444.90, P < 0.001) indicating that the factor model fit the data better than the base model, although chi-square is sensitive to sample size. Other indices indicate an acceptable fit: the Comparative Fit Index (CFI) was 0.88, the Tucker-Lewis Index (TLI) was 0.86, and the Bentler-Bonett Normed Fit Index (NFI) was 0.85. The Parsimony Normed Fit Index (PNFI) was 0.8. The root mean square error of approximation (RMSEA) was 0.086 (90% CI 0.078–0.095, P < 0.001) and the standardized root mean square residual (SRMR) was 0.069, indicating an adequate fit. All factor loadings were statistically significant (P < 0.001). The standardized loadings for the first factor ranged from -0.97 to 1.08 and for the second factor from 0.60 to 1.02, reflecting moderate

Table 2. Exploratory factor analysis for Well-being part of the survey

Scale item	Loadings		Communality
	Personal Growth and Self-Direction	Psychological Distress and Relational Struggles	
I think it is important to have new experiences that challenge how I think about myself and the world.	0.716		0.513
For me, life has been a continuous process of learning, changing, and growth.	0.680		0.462
I like most parts of my personality.	0.600		0.360
I have confidence in my own opinions, even if they are different from the way most other people think.	0.581		0.338
I judge myself by what I think is important, not by the values of what others think is important.	0.564		0.318
People would describe me as a giving person, willing to share my time with others.	0.558		0.311
I sometimes feel as if I've done all there is to do in life (R).	-0.439		0.193
I gave up trying to make big improvements or changes in my life a long time ago (R).	-0.429		0.184
I am good at managing the responsibilities of daily life.	0.334		0.112
Some people wander aimlessly through life, but I am not one of them.	0.306		0.094
In many ways I feel disappointed about my achievements in life.		0.707	0.500
The demands of everyday life often get me down.		0.552	0.305
Maintaining close relationships has been difficult and frustrating for me.		0.475	0.226
When I look at the story of my life, I am pleased with how things have turned out so far.		-0.462	0.213
I have not experienced many warm and trusting relationships with others.		0.333	0.111
I tend to be influenced by people with strong opinions.		0.320	0.102
Total Variance		31.1%	
Cronbach's Alpha (95% confidence interval)	0.81 (0.79–0.83)	0.66 (0.60–0.72)	

negative relationships between the observed variables and their latent factors. Both factors showed satisfactory reliability (**Table 2**).

The two latent factors were negatively correlated (r = -0.39, $P < 0.001$). The R-squared values for the individual items varied between 0.12 and 0.46, which means that the factors explained between 12% and 46% of the variance of the observed variables. In summary, the two-factor model showed an acceptable fit to the data, with most items contributing significantly to their respective factors. The non-significant loading of one item suggests that it may not adequately represent the construct and needs to be reconsidered in future research.

Game characteristics comparison

Most participants believe that playing games has influenced their lives (**Table 3**). Most of the sample participants played cooperative games and spend two to five hours a day playing games (**Table 3**).

Table 3. Participant's characteristics related to weekly playing duration, life quality and self-esteem and wellbeing scales

Variable		No (%)	Median (interquartile range)
Time playing	Daily:	394 (88.7%)	
	3 times per week or more	15 (3.3)	
	1–2 times per week	21 (4.6)	
	1–2 times per month	9 (2.0)	
	Every few months	2 (0.4)	
	I am not playing at all	4 (0.8)	
Has playing games affected your life?	Yes	240 (53.9)	
	No	111 (24.9)	
	I don't know	94 (21.1)	
	Well-being subscales		
	Personal Growth and Self-Direction		4.3 (3.8–5.4)
	Psychological Distress and Relational Struggles		3.7 (3.0–4.2)
	Self-Esteem		25 (23–26)

The scores on both Personal Growth and Self-Direction (W = 0.958, $P < 0.001$) and Psychological Distress and Relational Struggles (W = 0.974, $P < 0.001$) deviated significantly from normality. Self-Esteem also showed a significant deviation from normality (W = 0.974, $P < 0.001$). These results indicate that the distributions of these variables were not normally distributed, which is also evidenced by the values for skewness and kurtosis (Personal Growth and Self-Direction: skewness = 0.36, kurtosis = -0.83; Psychological Distress and Relational Struggles: skewness=–0.12, kurtosis=1.03; Self-esteem: skewness = 0.31, kurtosis = -0.02).

Table 4 shows the median scores and 95% confidence intervals for two Well-being subscales (Personal Growth and Self-Direction and Psychological Distress and Relational Struggles) and overall self-esteem for different types of online games (cooperative, competitive, violent, educational). There were no statistically significant differences between the game categories for any of the measured variables. These results indicate that the type of online game played in this sample is not significantly associated with differences in well-being or self-esteem.

Table 4. Comparison of Well-being and Self-Esteem scores (median, 95% confidence interval) across different game content categories

Psychological scales	Perceived game genre				*P* value (Kruskal-Wallis test)
	Cooperative	Competitive	Violent	Educational	
Personal Growth and Self-Direction	4.2 (4.0–4.4)	4.1 (3.9–4.6)	4.6 (4.2–5.1)	4.85 (4.0–5.6)	0.165
Psychological Distress and Relational Struggles	3.6 (3.5–3.6)	3.6 (3.3–3.8)	3.6 (3.5–4.0)	3.5 (3.1–4.0)	0.757
Self-Esteem Total	25 (24–25)	25 (24–25)	25 (24–26)	24.5 (23–27)	0.908

Table 5 shows the comparison between well-being subscales and self-esteem for *League of Legends* players and non-players. The gamers reported lower scores on the Personal Growth and Self-Direction subscales and higher scores on the Psychological Distress and Relational Struggles subscales of Well-being scale compared to non-gamers ($P < 0.001$), indicating lower perceived well-being in these domains. The difference in self-esteem was lower, but still significant ($P = 0.008$). These results suggest that engagement with *League of Legends* may be negatively associated with various aspects of well-being.

Table 5. Comparison of self-esteem and well-being scores (median, 95% confidence interval) between gamers who play *League of Legends* and those who do not

Psychological scales	Playing *League of Legends* game		*P* value (Mann Whitney test)
	Yes	No*	
Well-being subscales			
Personal Growth and Self-Direction	4.3 (4.3–4.5)	3.9 (3.9–4.1)	< 0.001
Psychological Distress and Relational Struggles	3.5 (3.3–3.7)	3.9 (3.9–4.1)	< 0.001
Self-Esteem Total	25 (24–25)	25 (25–26)	0.008

*Other games included: *Fashion and Gacha*, *Open world survival/horror*, *Incremental, Single player*, *Fun*, *AI*, *Adult Visual Novel*, *De-stressing*, *Strategy*, *Driving/Looting Game*.

Discussion

This study investigated the differences in the self-esteem and well-being of gamers who prefer different types of online games. In various samples, no significant differences were found between these groups in terms of self-esteem and well-being.

This finding differs from research findings such as those of Ryan et al. (*14*), who emphasized that games that promote autonomy, competence and connectedness can increase self-esteem and well-being. Although Przybylski et al. (*26*) reported that self-regulated, interest-driven play is associated with greater vitality and optimism, our findings suggest that a genre-based categorization may not adequately capture these motivational differences. Perhaps exploring the various personal reasons gamers have for gaming, such as playing for fun, to escape stress, to socialize, or to challenge themselves, could provide more insight or explanation. Although some studies, such as those from Genc et al. (*10*) and Cole & Griffiths (*20*) highlight the social and emotional benefits of cooperative or social online gaming, our study found no significant advantage of preference for cooperative games over others in promoting well-being or self-esteem. This challenges the idea that preference for cooperative and educational content may be associated with better mental health outcomes, and suggests that individual differences (e.g., personality traits, coping strategies, or play style) may play a more important role.

However, when analyzing one game that had the most participants in the study, *League of Legends*, significant differences were found. Compared to non-players, *League of Legends* players reported lower scores for personal Growth and Self-Direction and higher scores for psychological stress and relational struggles, as well as lower self-esteem. These findings echo the concerns of Kök & Örsal (*11*) and Grüsser et al. (*2*), who found a link between excessive or competitive gaming and emotional dysregulation, stress and lower social performance. As a fast-paced and competitive game, *League of Legends* can lead to increased pressure, toxic communication or addictive patterns of play, all of which can affect psychological well-being. Interestingly, this aligns with the research findings of Bessière et al. (*15*), who found that avatar-based games (e. g. *MMORPGs*) can promote self-expression and self-esteem, but their effects are moderated by the player's mental health status. Players with higher depressive tendencies may seek refuge in escapism, leading to negative outcomes despite the game's potential for identity expression. The negative correlation found in this study between the two latent wellbeing factors also reflects this complexity, as individuals with high levels of psychological distress may simultaneously report lower levels of personal growth. Gender differences observed in the literature, with girls reporting lower self-esteem and more depressed mood (*33*), may also have influenced responses, particularly if certain genres or games such as *League of Legends* were more likely to be played by male participants. However, further gender-specific analysis would be required to investigate this interaction.

In conclusion, while the preference for the type of game (cooperative, violent, educational, competitive) did not show a significant association with well-being or self-esteem, the specific content and dynamics of individual games, as seen in the case of *League of Legends*, appear to have a meaningful psychological role. These findings support the argument made by Kuss & Griffiths (*8*) and Qu (*9*) that the relationship between gaming and mental health is nuanced and multifaceted. Future research should move beyond genre labels to investigate player motivation, social context, and emotional investment, as these may better explain the diverse psychological outcomes associated with online gaming.

Despite the insights gained from this study, several limitations should be recognized. First, the sample may not be fully representative of the diverse gaming population, as it may be biased toward certain demographic characteristics, limiting the generalizability of the results. The analysis represented the deviation from protocol, the dominance of *League of Legends* players among participants could skew the results and potentially miss nuances of how other gambling types relate to well-being and self-esteem. It should be noted that the comparison between *League of Legends* players and non-players was not part of the original study design but was introduced in response to the high prevalence in the sample. Therefore, this analysis is exploratory in nature, and the results should be interpreted with caution. In addition, the method of participant recruitment, which was mainly via Discord, may have unintentionally led to a bias towards cooperative gamers. This bias could have impacted on participants classifying their game genres based on personal reasons rather than the game genres defined by the developers. In addition, the current approach of requiring participants to select only one genre may have limited their ability to accurately describe the versatility of some games.

To further explore this relationship, participants were asked to categorize their game content to determine their primary reason for playing. Selecting “cooperative” suggests that the focus is on social interaction, while “competitive” could indicate a goal-oriented mindset. This classification helps to understand how the perceived purpose of the game influences players’ behavior and emotional responses. Although half of the participants described their game play as cooperative, we do not know if their actual in-game behavior might appear competitive and toxic. Negative emotional experiences, such as competitiveness and perceived losses, can induce toxic behavior (*34*). When a team loses, players may become frustrated and aggressive towards their teammates, leading to communicative aggression. The high-stakes environment in games such as *League of Legends* creates intense emotions such as frustration and stress, which often lead to aggressive behavior towards teammates (*35*). This discrepancy between identified game content and behavior may be due to subjective perceptions that are influenced by personal motivations and may be at odds with exhibited behavior. For example, while some gamers claim to prefer cooperative play for social reasons, competitive elements may lead them to behave competitively, overshadowing cooperative intentions and affecting their well-being and self-esteem.

Future studies could increase accuracy by using a longitudinal design that better captures the long-term effects of gaming content on well-being and self-esteem. Tracking the mental health of gamers over time would provide deeper insights into the effects of continuous engagement with specific content. Alternative recruitment methods and offering different genres could reflect the diversity of gaming experiences. In addition, exploring players’ motivations for engaging with certain content and comparing this to competitive in-game behavior could provide valuable insights into the emotional and psychological impact of gaming.

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References:

1. Howarth J. How many gamers are there? (New 2025 statistics). Exploding Topics [Internet]; 2025. Available from: https://explodingtopics.com/blog/number-of-gamers
2. Grüsser SM, Thalemann R, Griffiths MD. Excessive computer game playing: Evidence for addiction and aggression? Cyberpsychol Behav. 2007;10(2):290–2. https://doi.org/10.1089/cpb.2006.9956
3. Johnson D, Jones C, Scholes L, Carras M. Videogames and wellbeing: A comprehensive review. Young and Well Cooperative Research Centre; 2013.
4. GilPress. How many gamers are there? (2024 statistics). What's the Big Data? [Internet] 2024 Jan 31. Available from: https://whatsthebigdata.com/number-of-gamers/
5. Crawford G, Gosling VK, Light B. Online gaming in context: The social and cultural significance of online games. London: Routledge; 2013.
6. Baynton T. Data deep-dive: The impact of video gaming on the wellbeing of young people. Digital Youth Index [Internet]; 2023 Nov 21. Available from: https://digitalyouthindex.uk/the-impact-of-video-gaming-on-young-people/
7. Brand JE. National research prepared by Bond University for the Interactive Games and Entertainment Association. Gold Coast: Bond University, Faculty of Humanities and Social Sciences; 2012.
8. Kuss DJ, Griffiths MD. Online gaming addiction in children and adolescents: A review of empirical research. J Behav Addict. 2012;1(1):3–22. https://doi.org/10.1556/JBA.1.2012.1.1
9. Qu X. An overview of online games and their effects on adolescents. Open J Soc Sci. 2023;11(11):310–20. https://doi.org/10.4236/jss.2023.1111021

10. Genc E, Çakmak FN, Çiftçi H, Hocaoğlu ZM. "Fiction is the reality": A qualitative study on digital game addiction and reality perception in young adults. Child Youth Serv Rev. 2024;157:107445. https://doi.org/10.1016/j.childyouth.2024.107445
11. Kök Eren H, Örsal Ö. Computer game addiction and loneliness in children. Iran J Public Health. 2018;47(10):1504–10.
12. Pine R, Fleming T, McCallum S, Sutcliffe K. The effects of casual videogames on anxiety, depression, stress, and low mood: A systematic review. Games Health J. 2020;9(4):255–64. https://doi.org/10.1089/g4h.2019.0132
13. Sternlicht LS, Sternlicht A. Video games, mental health, and addiction: The good, the bad, and the ugly. Family Addiction Specialist [Internet]; 2024 Jul 6. Available from: https://www.familyaddictionspecialist.com/blog/video-games-mental-health-and-addiction-the-good-the-bad-and-the-ugly
14. Ryan RM, Rigby CS, Przybylski AK. The motivational pull of video games: A self-determination theory approach. Motiv Emot. 2006;30:344–60. https://doi.org/10.1007/s11031-006-9051-8
15. Bessière K, Seay AF, Kiesler S. The ideal elf: Identity exploration in World of Warcraft. Cyberpsychol Behav. 2007;10(4):530–5. https://doi.org/10.1089/cpb.2007.9994
16. Mann M, Hosman CM, Schaalma HP, De Vries NK. Self-esteem in a broad-spectrum approach for mental health promotion. Health Educ Res. 2004;19(4):357–72. https://doi.org/10.1093/her/cyg041
17. Huppert FA, So TT. Flourishing across Europe: Application of a new conceptual framework for defining well-being. Soc Indic Res. 2013;110:837–61. https://doi.org/10.1007/s11205-011-9966-7
18. Hull KB. Computer/video games as a play therapy tool in reducing emotional disturbances in children [dissertation]. Lynchburg (VA): Liberty University; 2010.
19. Amichai-Hamburger Y, Kingsbury M, Schneider BH. Friendship: An old concept with a new meaning? Comput Human Behav. 2013;29(1):33–9. https://doi.org/10.1016/j.chb.2012.05.025
20. Cole H, Griffiths MD. Social interactions in massively multiplayer online role-playing gamers. Cyberpsychol Behav. 2007;10(4):575–83. https://doi.org/10.1089/cpb.2007.9988
21. Williams D, Ducheneaut N, Xiong L, Zhang Y, Yee N, Nickell E. From tree house to barracks: The social life of guilds in World of Warcraft. Games Cult. 2006;1(4):338–61. https://doi.org/10.1177/1555412006292616
22. Yee N. Motivations for play in online games. Cyberpsychol Behav. 2006;9(6):772–5. https://doi.org/10.1089/cpb.2006.9.772
23. Llabore MD, Delos Reyes LAL, Garcia RAA, Perol RAN, Parajas PJC, Dela Merced JJA, et al. Effects of digital gaming in the mental health and behavioral status among adolescents. Psychol Educ Multidiscip J. 2023;12:730–43. https://doi.org/10.5281/zenodo.8274883
24. Gonçalves D, Pais P, Gerling K, Guerreiro TJ, Rodrigues A. Social gaming: A systematic review. Comput Human Behav. 2023;147:107851. https://doi.org/10.1016/j.chb.2023.107851
25. Matias CN, Cardoso J, Cavaca ML, Cardoso S, Giro R, Vaz J, et al. Game on: A cross-sectional study on gamers' mental health, game patterns, physical activity, eating and sleeping habits. Comput Human Behav. 2023;148:107901. https://doi.org/10.1016/j.chb.2023.107901
26. Przybylski AK, Weinstein N, Ryan RM, Rigby CS. Having to versus wanting to play: Background and consequences of harmonious versus obsessive engagement in video games. Cyberpsychol Behav. 2009;12(5):485–92. https://doi.org/10.1089/cpb.2009.0083
27. Rosenberg M. Society and the adolescent self-image. Princeton (NJ): Princeton University Press; 1965.
28. Hagborg WJ. The Rosenberg Self-Esteem Scale and Harter's Self-Perception Profile for Adolescents: A concurrent validity study. Psychol Sch. 1993;30(2):132–6. https://doi.org/10.1002/1520-6807(199304)30:2<132::AID-PITS2310300205>3.0.CO;2-Z
29. Martín-Albo J, Núñez JL, Navarro JG, Grijalvo F. The Rosenberg Self-Esteem Scale: Translation and validation in university students. Span J Psychol. 2007;10(2):458–67. https://doi.org/10.1017/S1138741600006727
30. Wongpakaran T, Wongpakaran N. A comparison of reliability and construct validity between the original and revised versions of the Rosenberg Self-Esteem Scale. Psychiatry Investig. 2012;9(1):54–8. https://doi.org/10.4306/pi.2012.9.1.54

31. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol. 1989;57(6):1069–81. https://doi.org/10.1037/0022-3514.57.6.1069

32. Ryff CD, Keyes CL. The structure of psychological well-being revisited. J Pers Soc Psychol. 1995;69(4):719–27. https://doi.org/10.1037/0022-3514.69.4.719

33. Durkin K, Barber B. Not so doomed: Computer game play and positive adolescent development. J Appl Dev Psychol. 2002;23(4):373–92. https://doi.org/10.1016/S0193-3973(02)00124-7

34. Kou Y. Toxic behaviors in team-based competitive gaming: The case of League of Legends. In: Proceedings of the annual symposium on computer-human interaction in play; 2020 Nov; Virtual Event, Canada. New York (NY): ACM; 2020. p. 81-92.

35. Lee SJ, Jeong EJ, Jeon JH. Disruptive behaviors in online games: Effects of moral positioning, competitive motivation, and aggression in “League of Legends”. Soc Behav Personal. 2019;47(2):e7570. https://doi.org/10.2224/sbp.7570