

## **An Investigation of Depression and Addiction Between Online and Offline Players: And the Moderation Effect of Perceived Social Support**

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## **Abstract**

Albeit having its positive aspects, gaming can result in addiction if it is extreme and interferes with daily functioning. In the field of game addiction, low social support and comorbid depression are common in game-addicted players. However, very little research has been conducted regarding gaming mode, and none of them investigated the potential moderation role of perceived social support. Therefore, the current thesis aims to compare online and offline players in terms of their gender, depression, perceived social support, and game addiction scores as well as examine the moderation influence of perceived social support on the aforementioned variables. The study utilized a sample consisting of 513 subjects as decided by G\*Power analysis. The subjects were included in the data analysis only if they were between 18 and 29 ages and played video games from any electronic device at least once a month. After giving their informed consent, they filled out a demographic form, the Game Addiction Scale, Multidimensional Scale of Perceived Social Support, and the short form of Depression Anxiety Stress Scale. The data was analyzed by utilizing SPSS 26 and PROCESS MACRO extension of SPSS 26. The findings suggested that online games and low perceived social support culminated in high gaming addiction scores. Furthermore, men played online games more than offline whereas women did not show a preference between the two. Lastly, players high on depression were more likely to engage in online gameplay when their levels of perceived social support were low.

**Keywords:** Depression; gaming addiction; gaming mode; gender; perceived social support

## **INTRODUCTION**

In this section, a literature review regarding gaming disorder (GD), depression, perceived social support (PSS), and gaming mode will be presented. Then, the theoretical foundation of the study will be laid out. After that, the aim of the study will be stated along with the research hypotheses.

### **Gaming Disorder**

Gaming is a popular activity, with a global report estimating 3 billion online gamers in 2022 (Newzoo, 2022). In the U.S., 80% of gamers are over 18 (ESA, 2022). While gaming offers benefits like emotion regulation (Ream et al., 2013) and online socializing (Trepte et al., 2012), excessive gaming can harm psychological well-being (Burleigh et al., 2013; Ostinelli et al., 2021). Problematic gaming, defined by terms like "video game dependency" and "pathological video game use" (Pontes & Griffiths, 2014), involves loss of control, prioritizing gaming over daily activities, and continued gaming despite negative outcomes (WHO, 2019). The DSM-V does not differentiate between gaming modes, but ICD-11 distinguishes online, offline, and mixed types.

A global study reported GD prevalence between 0.21% and 57.50% in general populations and 3.20% to 91% in clinical populations (Darvesh et al., 2020). GD is linked to issues like depression (Tham et al., 2020), anxiety (Nazari et al., 2023), ADHD (Möble & Rehbein, 2013), escapism (Kaczmarek & Drażkowski, 2014), neuroticism (Király et al., 2023), and poor academic performance (Brunborg et al., 2014).

Research suggests males are more likely to develop GD than females (Ferreira et al., 2023). Men are five times more likely to develop GD, with reactive aggression predictive for both genders and proactive aggression predictive only for men (Lau et al., 2018). Boys spend more time gaming and have higher addiction rates, with nearly two-thirds of addicted gamers having other psychopathologies (Ferreira et al., 2023). In Turkey, predictors of gaming addiction differ between genders: poor school performance and dysfunctional families for girls, and game violence, computer self-efficacy, low impulse control, and psychosocial problems for boys. Lack of social comfort indirectly affects boys' GD (Irmak & Erdoğan, 2019).

### **Depression**

Depression is a widespread mental health issue affecting millions globally, with over 300 million people impacted, and women having a 50% higher risk than men (WHO, 2017). According to the DSM-V, a major depressive disorder diagnosis requires persistent depressed mood or loss of interest in enjoyable activities, plus at least five of the following symptoms occurring most of the day, nearly every day, for two weeks:

1. Depressed mood.
2. Markedly diminished interest or pleasure in activities.
3. Significant weight loss or gain, or appetite changes.
4. Insomnia or excessive sleeping.
5. Psychomotor agitation or retardation.
6. Fatigue or loss of energy.
7. Feelings of worthlessness or excessive guilt.
8. Difficulty concentrating or making decisions.
9. Recurrent thoughts of death, suicidal ideation, or suicide attempt (American Psychiatric Association, 2013).

Depression negatively affects well-being (Fabbri et al., 2023; Ouyang et al., 2021). Ouyang et al. (2021) found that depression mediates the relationship between stressful life events (SLE) and subjective well-being (SWB), with perceived social support (PSS) moderating this effect. Fabbri et al. (2023) identified depression as a major factor influencing well-being scores, along with neuroticism and loneliness.

Depression often co-occurs with other mental disorders such as anxiety, OCD, alcoholism, borderline personality disorder, and panic disorder (Mimura, 2001). Anxiety disorders are so frequently comorbid with depression that they are grouped under "internalizing diseases" (Kalin, 2020). A global survey found that 45.7% of patients with lifetime major depressive disorder also had at least one-lifetime anxiety disorder (Kessler et al., 2015). Contributing factors include childhood adversity, problematic parenting, and recent stress (Kalin, 2020).

The link between depression and gaming disorder (GD) is well-documented (Darvesh et al., 2020; Mößle & Rehbein, 2013; Ropovic et al., 2023). Darvesh et al. (2020) found depression to be the most reported health condition associated with GD. Mößle and Rehbein (2013) reported that children with problematic gaming exhibited higher levels of

depression and received less parental care. Burleigh et al. (2018) found that 31.4% of the variance in GD scores was predicted by depression.

### **Perceived Social Support**

Social support is divided into perceived (PSS) and received social support (RSS). PSS refers to an individual's subjective view of their support network, while RSS measures the actual support received (Grey et al., 2020). PSS is more strongly associated with mental health than RSS.

PSS is linked to various psychosocial constructs such as well-being, school adaptation, hope, and emotional intelligence. Studies show that PSS improves academic success, which enhances well-being (Tomás et al., 2020). Additionally, students with higher PSS tend to have more hope (Xiang et al., 2020). PSS also mediates the relationship between emotional intelligence and well-being (Malinauskas & Malinauskiene, 2020).

The connection between PSS and depression is well-documented. PSS negatively correlates with depression, aloneness, irritation, and anxiety, and acts as a protective factor against insomnia and depression (Grey et al., 2020). PSS moderates the impact of stress on depression, reducing its effect (Ouyang et al., 2021). Among unemployed Chinese youth, higher PSS reduces depression, even when accounting for emotion regulation and self-efficacy (Hua & Ma, 2022).

Research on PSS and gaming shows mixed results. Kaczmarek and Drajzkowski (2014) found that gamers who heavily escape to MMORPGs have more online than real-life support, and low real-life support predicts high escapism and low well-being. Online support partially compensates for the lack of real-life support. Tham et al. (2020) reported that disordered gamers have fewer offline friends, and real-life support correlates with less depression, unlike online support. Wartberg et al. (2017) found that addicted gamers have lower PSS and more online friends.

Trepte et al. (2012) suggested that online gaming could lead to real-life social support through developed familiarity and social closeness among gamers. However, a Turkish study found no relationship between PSS and gaming disorder (GD), though more expert gamers had higher PSS in the friends dimension (Yildiz-Durak et al., 2023). These studies indicate that the distinction between offline and online support is becoming increasingly blurred.

## **Gaming mode**

The relationship between offline (i.e., electronic games without an Internet connection) and online gaming (i.e., games utilizing an Internet connection, allowing players to interact in real-time) and their potentially differential associations with adverse real-life outcomes have been studied very little. These two types have many common characteristics in common except for the opportunity to interact with other players in online mode (Paulus et al., 2018). There is a consensus among researchers that online gaming is more addictive than offline (Bodi et. al., 2021; Montag et al., 2021; Smyth, 2007). A possible explanation is that online games create the occasion to socialize while retaining anonymity and invisibility, eliminating the element of anxiety during interactions (Király et al., 2023). One of the earlier studies showed that MMORPG gamers were more likely to play for longer hours, be less healthy, and have sleeping problems than offline gamers (Smyth, 2007). Comparing the maladaptive cognitive patterns between the two types of gamers, Bodi et al. (2021) reported that online players had more maladaptive thoughts. They also spent longer hours gaming and used gaming to be praised and acknowledged by others. Finally, girls spend less time on gaming and prefer offline gaming mode more than boys in the same study. Smohai et al. (2017) also found similar findings that female adolescents are less likely to engage in problematic gaming and online gaming than male ones. Montag et al. (2021) revealed that gaming online resulted in a longer time spent gaming; and players using desktop computers (compared to tablets, smartphones, and laptops) were more likely to engage in problematic gaming and spend long hours in front of the screen. Lemmens and Hendricks (2016) put forward that males were more likely to play online and be more addicted to gaming. Besides, they compared addicted and non-addicted gamers and found that addicted ones spent twice the amount of time playing online games. Yet, disordered gamers also played a little more offline games than non-disordered ones (Lemmens & Hendricks, 2016). A study provided evidence that online players were more irritable, angrier, and craved more to play games (Limone et al., 2023). The study also pointed out that access to the internet and chatting opportunities were connected to disordered use of games. Finally, it was demonstrated that the need to socialize, loneliness, and depression were among the risk factors that opened the door for addiction (Limone et al., 2023). Lastly, Nazari et al. (2023) looked into the relationship between gaming mode and psychosocial

difficulties. They testified that elevated levels of anxiety and difficulties in regulating emotions were more related to online mode while offline gamers had fewer social ties. Additionally, they revealed that the two gamer groups did not have a significant difference in their levels of depression.

### **Theoretical Framework**

One issue with game addiction literature is its atheoretical nature. However, several theoretical frameworks have been proposed (Brand et al., 2016; Davis, 2001; Kardefelt-Winther, 2014; Przybylski et al., 2010).

Davis (2001) pioneered a cognitive-behavioral model focusing on pathological internet use (PIU), distinguishing between generalized PIU (aimless internet use) and specific PIU (purposeful use like gaming). He suggested that cognitive distortions could lead to both types, while social factors like low social support primarily result in generalized PIU. Psychopathologies, past or present, were seen as prerequisites for PIU.

Building on Davis's work, Dong and Potenza (2014) developed a cognitive-behavioral model specifically for gaming addiction, identifying three key factors: motivation for reward and stress relief, behavioral control, and decision-making regarding problematic internet use. Their model also explores how gaming alters brain regions, impacting cognitive control, but omits social factors.

Brand et al. (2016) proposed the Interaction of Person-Affect-Cognition-Execution (I-PACE) Model, emphasizing four factors in gaming disorder (GD) development: personal inclinations (e.g., impulsiveness, low social support), changes in emotional and cognitive processes post-gaming, behavioral control, and gaming outcomes. A noted shortcoming is the lack of consideration for gamers' motivations.

Przybylski et al. (2010) applied self-determination theory (SDT), focusing on personal motivations. They argued that gaming satisfies three basic needs: competency, self-determination, and connectedness, which perpetuates gaming behavior and affects well-being. Satisfying these needs leads to immersion, pleasure, and future playtime, enhancing self-esteem, vigor, and affective responses.

Kardefelt-Winther (2014) introduced the compensatory use model, viewing gaming as a response to real-life problems rather than a compulsive act. This model suggests examining

the mediating and moderating effects of motivations on the relationship between psychological variables (e.g., depression, anxiety) and gaming addiction.

This study adopts the compensatory use model due to the emphasis on social motivations differentiating online from offline gaming (Paulus et al., 2018). It also incorporates the assumption that psychopathologies precede GD, aligning with Davis's (2001) and the I-PACE models (Brand et al., 2016). The roles of social motivations and support are examined, considering both direct and indirect relationships between perceived social support (PSS) and GD, excluding Dong and Potenza's (2014) model's lack of focus on social factors.

### **The Present Study**

This study aims to contribute to the literature by investigating gaming mode via its connection with perceived social support, depression, gaming addiction, and gender. Following the model of compensatory use (Kardefelt-Winther, 2014), we will also investigate the moderation effect of PSS in the relationships mentioned above. Moreover, the present research will be the first one to study these relationships with a Turkish emergent adult population (18–29 years old), considering this age group's susceptibility to developing gaming addiction (Burleigh et al., 2018).

The research hypotheses are as follows:

- H1: Males will be more addicted to gaming than females.
- H2: Male players will predominantly play online games.
- H3: Female players will predominantly go for offline games.
- H4: Online gamers will have higher GD scores than offline gamers.
- H5: Online players will have a higher level of PSS than offline players.
- H6: Depression rates of online gamers will be above those of offline gamers when the influence of PSS is controlled.
- H7: Depressed individuals will gravitate more toward online gaming when the PSS levels are low.
- H8: When PSS levels are high, depressed individuals will prefer offline gaming more than the online type.



H9: In the high PSS condition, online gamers will have higher GD scores than offline gamers.

H10: When the PSS is low, offline gamers will have higher GD than online gamers.

H11: The predictive power of depression on GD will be stronger when PSS is low.

H12: High PSS will weaken the connection between depression and GD.

## **Method**

In this part, the methodological framework of the research will be outlined. To start with, participant characteristics and data collection procedures will be presented. Then, research instruments and their properties will be explained in detail. Afterwards, statistical methods will be outlined.

## **Participants**

For each statistical analysis, an a priori power analysis was conducted, employing G\*Power 3.1.9.7. (Faul et al., 2007). The moderation analysis that tested H11 and H12 required the highest number of participants. As the power analysis indicated, 528 participants were required to achieve 90% power to spot a small effect (.02) at the alpha level of .05. In the end, 620 participants were sampled in the study. Only those participants who provided complete information on research instruments were included in the study. Those whose ages were not between 18 and 29, and who do not play video games (via game console, laptop, desktop computer, smartphone, or tablet) at least once a month were excluded from the analyses. After applying these exclusion criteria, the final sample was comprised of a total of 513 participants, whose characteristics were given in Table 1.

## **Procedure**

First, the ethical committee approval was taken from the Yeditepe University Ethics Board of Social Sciences and Humanities. Then, research instruments were combined into one Google Forms document and sent to participants through social media platforms (i.e., Facebook, Instagram, Twitter), WhatsApp instant messaging application, and Reddit (i.e., a social news and discussion website). The convenience sampling method was designated as the data collection strategy. At the beginning of the questionnaire, participants gave their informed consent electronically. No private information was collected from the participants while collecting data. Lastly, the participants were provided with explanations concerning the aim and potential contributions of the study by means of debriefing forms.

## **Instruments**

Data collection instruments will be introduced and detailed in this section. The instruments are the participant demographics form, the Game Addiction Scale (GAS), Depression Anxiety Stress Scale- Short Form (DASS-21), and the Multidimensional Scale of Perceived Social Support (MSPSS), respectively.

### **Participant Demographics Form**

Participants' age, gender, and education level were taken as demographic information to assess sample characteristics and check whether they satisfied the inclusion criterion (18-29 years of age). To add, a question was added to the form asking whether participants play video games at least once a month, which was another inclusion criterion. Lastly, participants answered the question "What kind of video games do you play?" by choosing one of the two options: predominantly online, and predominantly offline.

### **The Game Addiction Scale (GAS)**

GAS was created by Lemmens et al. (2009) and entails 21 items, scored on a 5-point Likert scale. It consisted of 7 subscales, each having three items. Subscales were salience (dominance of gaming in gamers' thinking), tolerance (less joy when gaming, resulting in longer playing hours), relapses (going back to the early patterns of gaming), withdrawal (emotional, physical, and cognitive symptoms stemming from decreasing or stopping gaming), conflict (conflicting with others because of gaming), mood modification (subjectively felt sedative or mood-enhancing effects of gaming), and problems (problems in real life accentuated by excessive gaming). The beginning of each item is "How often do you...?"; the answers are as follows: "0 never, 1 seldom, 2 occasionally, 3 often, 4 very often". Loadings of the items were more than 0.50 on the original scale (Lemmens et al., 2009). Lemmens et al. (2009) analyzed the reliability of the whole scale by using two samples. Cronbach's alpha levels of the first and the second sample were 0.94 and 0.92, respectively. The scale adaptation to the Turkish language was conducted by Baysak et al. (2016). They reported that factor loadings of items ranged from 0.56 to 0.91, and Cronbach's alpha level of the scale was 0.96.

### **Depression Anxiety Stress Scale- Short Form (DASS-21)**

The original scale "DASS-42" was developed by Lovibond and Lovibond and consisted of 42 items (1995a; 1995b). Items were constructed on a 4-point Likert scale, with higher

scores implying higher distress. DASS-21 was created by Lovibond and Lovibond (1995a), using DASS-42 as the basis to save participants' time. It comprised 21 items: 7 for depression, 7 for anxiety, and 7 for stress subscales. Total scores were multiplied by two to match the scores of the original scale. According to the reliability and validity study carried out by Henry and Crawford (2005), Cronbach's alpha levels for the subdimensions were the following: depression 0.88, stress 0.90, and total 0.93. Antony et al. (1998) reported the Cronbach's alpha level of the anxiety subscale as 0.87. The adaptation study of the DASS-21 to the Turkish language was conducted by Sariçam (2018). As the study indicated, Cronbach's alpha levels were the following: anxiety 0.85, depression 0.87, and stress 0.81. Additionally, factor loads of the items ranged between .42 and .72, demonstrating good psychometric properties (Sariçam, 2018).

### **The Multidimensional Scale of Perceived Social Support (MSPSS)**

MSPSS was developed by Zimet et al. (1988) to measure three facets of perceived social support: family, friend, and significant other. Each factor is measured by four items, constituting 12 items on a 7-point Likert scale. Cronbach's alpha levels were the following: significant other 0.91, family 0.87, and friends 0.75. The full scale had Cronbach's alpha level of 0.85. Eker and Arkar (1995) carried out the Turkish adaptation study, which employed five samples: students, students who applied to a hospital, renal patients, psychiatric patients, and the control group. All samples displayed Cronbach's alpha levels higher than 0.80 for the whole scale. Re-assessment of the psychometric features of the Turkish version was done by Duru in 2007. His study indicated that the internal consistency of the whole scale was .87. Cronbach's alpha values of partner, family, and friends subscales were .90, .85, and .88, respectively. The exploratory factor analysis (EFA) indicated that factor loadings were between .77 and .89. Furthermore, the confirmatory factor analysis (CFA) results provided support for the 3-factor structure of the scale (Duru, 2007).

### **Statistics**

Data analyses of the study were performed via SPSS 26.0. Skewness and kurtosis scores were obtained to ensure that parametric statistics could be utilized. All skewness and kurtosis varied between  $\pm 2$  range, the normality assumption was satisfied, and parametric tests were carried out (George & Mallery, 2010).

## RESULTS

In this section, the results of the SPSS analyses are divided into three categories: reliability check, hypothesis testing, and post-hoc analyses. Reliability analyses will demonstrate if scales are available for use. Descriptives will be presented to provide a general idea about research variables. Hypothesis testing will be carried out by inferential statistical methods. Finally, post-hoc analysis will be performed similarly.

### Reliability Check

The results of the reliability analyses are presented in Table 2. As illustrated in the table, all scales had good reliability scores as designated by their Cronbach's alpha values.

### Hypothesis Testing

A between-subjects t-test was carried out to compare female and male gamers in terms of gaming addiction (H1). The results pointed out that males ( $M = 2.26, SD = .69$ ) did not display a significant difference in their addictedness from females ( $M = 2.24, SD = .76$ ),  $t(508) = .28, p > .05$ . Henceforth, H1 was rejected.

A chi-square test was performed by utilizing the split file function of SPSS (i.e. based on gender) to examine if males played online games more than offline (H2), and if females played offline games more than online (H3). The test results showed men indeed preferred online gaming (58.47%) more than offline (41.3%),  $X^2(1, N = 354) = 10.17, p = .001$ . However, women did not show a specific preference for online (54.49) or offline gaming (45.51%),  $X^2(1, N = 156) = 1.26, p > .05$ . Thus, H2 was accepted while H3 was rejected.

It was hypothesized that online gamers would have higher PSS scores than offline gamers (H5). To test that hypothesis, an independent-sample t-test was conducted (Table 3). Yet, no significant difference was observed between online ( $M = 4.90, SD = 1.55$ ) and offline players ( $M = 4.89, SD = 1.38$ ) in their PSS levels,  $t(511) = .28, p > .05$ .

A one-way ANCOVA was performed to check whether online gamers had higher depression scores after controlling for PSS (H6). Online gamers ( $M = 8.29, SE = .28$ ) did not have significantly higher depression than offline gamers ( $M = 7.94, SE = .33$ ) even when the effect of PSS was controlled,  $F(1,510) = .67, p > .05$ . Thus, H6 was rejected (Table 3).

Another chi-square was carried out to investigate if depression (i.e. depressed vs. not depressed) had a differential effect on players' preference for online and offline games after layering for PSS (i.e., low vs. high PSS). In the low PSS condition, non-depressed individuals did not have a higher proportion of playing online games (50.4%) whereas depressed ones preferred online games in a higher percentage (62%),  $X^2(1, N = 513) = 3.28, p = .046$ . Therefore, H7 was accepted (Figure 1). On the other hand, in the high PSS condition, no such differentiation was detected between depressed and non-depressed participants regarding their inclination toward offline gaming (i.e., 42.9% vs. 41.7%, respectively),  $X^2(1, N = 513) = .03, p > .05$ . So, H8 was rejected.

In order to test whether PSS moderated the relationship between gaming mode and GD, a two-way between-subjects ANOVA was performed (Figure 2). There was a significant effect of social support on GD, where those with high PSS ( $M = 2.12, SE = .04$ ) had lower levels of GD than those with low PSS ( $M = 2.39, SE = .05$ ),  $F(1, 509) = 18.20, \eta^2 = .04, p < .001$ . To add, the effect of gaming mode on GD was significant as well (Table 3). Specifically, online gamers ( $M = 2.34, SE = .04$ ) had higher levels of GD than offline gamers ( $M = 2.17, SE = .05$ ),  $F(1, 509) = 7.50, \eta^2 = .02, p = .01$ . Conversely, the effect of the interaction between PSS and gaming mode on GD was insignificant,  $F(1, 509) = .04, \eta^2 = .00, p > .05$ . In other words, PSS did not influence the relationship between gaming mode and GD. Henceforth, H9 and H10 were rejected. However, H4 was accepted since the main effect of the gaming mode was significant.

Finally, a simple moderation analysis was carried out to measure the moderating effect of PSS on the relationship between depression and GD. The data was examined by using the PROCESS Macro extension of SPSS (Hayes, 2022). Overall, all of the predictor variables explained 22.7% of the variability in GD,  $R^2 = .227, F(3, 509) = 49.82, p < .001$ . Table 4 illustrates the unstandardized regression coefficients (see below). Nonetheless, the interaction effect was not significant,  $p > .05$ . To put it another way, PSS did not moderate the connection between depression and GD. So, H11 and H12 were rejected.

### **Post-hoc Analyses**

After the hypothesis testing, a simple mediation analysis was also conducted, inspired by ideas that emerged from initial test results. As the moderation analysis testing H11 and H12 failed to support the idea that PSS moderated the relationship between depression and GD,

it was hypothesized that PSS might mediate rather than moderate the link between the mentioned variables

To run the analysis, it was first ensured that PSS, depression, and GD scores were not multicollinear. A Pearson's correlation coefficient analysis was implemented to examine this assumption. As it was shown in Table 5, the correlation coefficient scores were below .08 (Barton & Peat, 2014). Therefore, the assumption of multicollinearity was met.

The mediation analysis was performed employing ordinary least squares path analysis via SPSS PROCESS Macro (Hayes, 2022). The results indicated that PSS did not mediate the connection between depression and GD. As depicted in Table 6, depression predicted PSS ( $a = -.134$ ); but PSS did not predict GD ( $b = -.023$ ). The bootstrap analysis, comprising 5000 resamples, yielded a confidence interval for the indirect effect ( $ab = .003$ ) that ranged from  $-.003$  to  $.009$ , encompassing zero. This result indicates that PSS does not serve as a mediator in the relationship between depression and GD.

## **DISCUSSION**

This study aimed to examine the association between gaming mode (online or offline), perceived social support (PSS), gaming disorder (GD), and gender, focusing on the moderation effect of PSS as suggested by the compensatory use model (Karddefelt-Winther, 2014). While we expected gender differences in gaming addiction and preferences, the only significant finding was that males preferred online games more than offline. We also anticipated differences in depression, GD, and PSS scores between online and offline gamers, but only found higher GD in online players. Our hypothesis that depressed individuals with low PSS would prefer online gaming was supported. However, PSS did not significantly moderate the relationship between (a) depression and GD, and (b) gaming mode and GD.

The next sections will detail and compare these findings with other studies, review the strengths and limitations of this research, and provide recommendations for future studies. We will also discuss the implications for clinical practice and conclude with final comments.

## **Findings and Comparisons with the Literature**

In this part, the findings will be divided into three categories: gender differences, online vs. offline gaming, and moderation analyses and post-hoc mediation analysis, which will be discussed in the given order.

### **Gender Differences**

Our study explored gender differences in gaming disorder (GD) and gaming preferences. Despite previous findings showing higher GD levels in men (Ferreira et al., 2023; Lau et al., 2018), our t-test results did not confirm this. Methodological and cultural variations, as well as evolving gender roles, could explain this discrepancy. For instance, our sample comprised Turkish emerging adults, differing from previous studies on Russian adolescents (Nazari et al., 2023) or Canadian clinical populations (Lau et al., 2018).

The social roles theory suggests gender-specific roles stem from rather than cause gender differences (Eagly & Wood, 2000). Our finding of no GD difference between genders aligns with this idea, reflecting shifting societal norms where both genders exhibit similar gaming behaviors.

Regarding gaming preferences, while males favored online games as expected, females did not show a preference for offline games. This contrasts with some previous studies that found a slight preference for offline games among females (Bodi et al., 2021). Our results support males' preference for online games but not females' preference for offline games. Aging might shift the dynamics as offline games are more popular among children (Paulus et al., 2018). Thus, some females might also transition to online games while aging due to the social gender roles are becoming less rigid than before.

### **Online vs. Offline Gaming**

Several studies have indicated that online gaming tends to be more addictive than offline gaming (Bodi et al., 2021; Montag et al., 2021; Smyth, 2007). Our study aimed to replicate these findings (H4). The disparity in addiction levels between online and offline gamers can be explained by several factors. According to the cognitive-behavioral model (Davis, 2001), distortions in thinking may lead to disordered internet use, including gaming. This could result in online players having more distorted thoughts than offline players, contributing to their gaming disorder (GD). Supporting this, Bodi et al. (2021) found that online players tended to think more about gaming, plan future gaming sessions, rely on games for positive feelings, and seek recognition from others more than offline players.

Additionally, the self-determination theory (Przybylski et al., 2010) suggests that gaming addiction stems from fulfilling three needs: social connection, competence, and self-governance, which may be more pronounced in online gaming where players can fulfill these needs more readily. Indeed, Nazari et al. (2023) found that online players had more social connections than offline players. Moreover, the addictive nature of online games could be attributed to their in-game features, such as multiplayer modes, which enhance excitement and engagement (Montag et al., 2021).

Regarding perceived social support (PSS) and gaming, we hypothesized that online players would have higher PSS than offline players (H5), but our results did not support this hypothesis. While online interactions may not always lead to strong real-life relationships that provide significant PSS, some studies suggest that online friendships can transition to offline settings (Trepte et al., 2012; Yildiz-Durak et al., 2023). Therefore, our participants might be among those who could not convert online interactions into real-life friendships. Our study also examined the relationship between gaming type and depression, finding no significant difference after controlling for PSS (H6). Possibly, depression may drive online or offline GD rather than the other way around, as suggested by the cognitive-behavioral model (Davis, 2001). Indeed, our findings that depressed participants with low PSS preferred online gaming confirm this direction of causality. Lastly, our findings were consistent with a study by Nazari et al. (2023), who could not find a difference between gaming modes in terms of depression. To replicate this result in a different cultural background is also important.

### **Moderation Analyses and Post-hoc Mediation Analysis**

Using the compensatory use model, we explored how perceived social support (PSS) moderates various variables in our study. We found that individuals with depression tended to favor online gaming when they felt their social support was lacking (low PSS), whereas those with high PSS did not show a preference for either gaming mode. The self-determination theory highlights social connectedness as a key need fulfilled by gaming (Przybylski et al., 2010). So, individuals with depression and low PSS may seek new relationships online. However, despite online gamers typically having more social ties (Nazari et al., 2023), our study did not find higher PSS or lower depression scores among them. Alternatively, online games might serve as an escape for those with high depression



and low PSS by providing a more immersive alternate reality, aligning with the compensatory use model where gamers compensate for life's inadequacies.

While it's known that online games are more addictive than offline ones (Montag et al., 2021), few studies have explored how PSS moderates this effect. We expected online gamers, with their stronger social ties (Nazari et al., 2023), to spend more time gaming to maintain these connections. However, we didn't find a difference in PSS between online and offline gamers. Therefore, more social connections might not necessarily result in higher PSS. Similarly, we didn't find a moderation effect of PSS on the link between gaming type and addiction. Instead, we observed a direct effect of PSS on gaming disorder (GD), where low PSS was associated with higher addiction levels, consistent with prior research (Tham et al., 2020; Wartberg et al., 2017). This contradicts Yildiz-Durak et al.'s (2023) study, which found no relationship between PSS and GD. This discrepancy might be explained by the dualistic model of passion, which claims that gaming can be either of obsessive (i.e., disordered, less pleasurable, and compulsory) or harmonious (i.e., healthy, pleasing, and controlled) nature (Przybylski et al., 2009). It might be possible that Yildiz-Durak et al.'s participants fit into the latter whereas our participants blend into the former category.

While the link between depression and GD is established (Darvesh et al, 2020; Ropovic et al., 2023), no study has explored how PSS moderates this relationship. We hypothesized that high PSS would weaken the link between depression and GD, but our analyses didn't support this. Post-hoc analysis treating PSS as a mediator also showed insignificant effects. However, we found a direct effect of PSS on GD as predicted by the I-PACE model, which determines low PSS as a core element in developing GD. Thus, low PSS may cause GD, moderated by motivational factors such as escapism.

### **Strengths Limitations and Future Directions**

First, the data collection relied on participants' self-reports, which can be influenced by personal factors like mood or motivation, potentially contaminating the analyses. Using online platforms limited our control over situational variables affecting responses, and the lack of monetary incentives may have reduced participants' motivation to provide genuine answers. Additionally, the cross-sectional nature of the study prevents us from inferring causal relationships.

However, our sample size was sufficient for high statistical power. Unlike many psychological studies focusing on "white, educated, industrialized, rich, and democratic" (WEIRD) participants, our sample included individuals from diverse educational backgrounds, offering a more representative population (Table 1).

In this study, we examined the moderation effect of perceived social support (PSS). The self-determination theory of gaming highlights the importance of autonomy and competency needs, along with socialization (Przybylski et al., 2010). Future research could explore the mediation/moderation roles of these variables. We assumed PSS and socialization motivations were closely related, but our results suggest otherwise. Future studies could measure the ratio of participants' acquaintances and friends met online and offline for better precision.

Our data indicates that individuals tend toward online games when depressed and experiencing low PSS, possibly due to escapism. A 2014 study found higher online socialization levels were linked to greater escapism (Kaczmarek & Drażkowski). Future research might investigate PSS alongside escapist motivation, influencing preferences for online and offline gameplay. Longitudinal designs and examining sub-dimensions of PSS (family, partner, and friend) could provide further insights.

### **Clinical Implications**

Gaming disorder (GD) has mostly been treated with cognitive-behavioral therapy (CBT). Although CBT is considered effective, research on its efficacy and other treatments lacks methodological rigor (Zajac et al., 2020). Additionally, these studies often overlook the crucial role of family support, important in other addiction models (Zajac et al., 2020). Our study found perceived social support (PSS) to be a significant factor in GD, suggesting that incorporating family support into therapeutic interventions may be beneficial.

Our study also found no difference in social support accumulation between gaming modes. However, some research suggests that online social relationships can enhance well-being when transferred to real-life contexts (Trepte et al., 2012; Yildiz-Durak et al., 2023). Clinicians might encourage patients to meet online acquaintances offline.

Finally, our findings showed that online games are more addictive than offline games. Besides socialization opportunities, online games have features that increase immersion

(Montag et al., 2021). Therefore, clinicians may suggest offline games as alternatives to reduce GD levels.

## **CONCLUSION**

This study aimed to compare online and offline players regarding depression, perceived social support (PSS), and gaming disorder (GD), and to investigate the moderation effect of PSS. We found that online gaming and low PSS were linked to higher GD. Males preferred online games, while females showed no preference. Depressed gamers were more likely to play online when perceiving low social support. However, PSS did not moderate other variables. The I-PACE model (Brad et al., 2016) and the cognitive-behavioral model (Davis, 2001) suggest that low PSS is a distal cause of GD rather than a mediator.

Our study was the first to hypothesize moderation models related to gaming mode, influenced by various theoretical models and primarily based on the compensatory use model. Given the atheoretical nature of many studies in the field, our research provides a robust method to study the link between psychosocial factors and GD. While the literature focuses heavily on online gameplay, we recommend more attention to offline gaming to better understand GD and develop sophisticated clinical interventions.

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## Tables and Figures

**Table 1**

*Participant characteristics*

		N	%
Gender	Female	156	30.4
	Male	354	69.0
	Other	3	0.6
Education	Elementary	5	1.0
	Highschool	197	38.4
	Undergraduate	245	47.8
	Graduate	57	11.1
	Ph.D.	9	1.8
Gaming mode	Online	292	43.1
	Offline	221	56.9
Total		513	100

**Table 2**

*Cronbach's alpha values of the scales utilized in the present study*

Scale	Cronbach's alpha
Multidimensional Scale of Perceived Social Support (MSPSS)	.91
The Game Addiction Scale (GAS)	.92
Depression Anxiety Stress Scale- Short Form (DASS-21)	—
Depression	.89
Anxiety	.81
Stress	.84

**Table 3**

*Comparisons between online and offline participants on research variables*

DV	IV	N	$\bar{X}$	SE	Test	p
Gaming addiciton	Offline	221	2.17	.05	$F = 7.50$	.01
	Online	292	2.34	.04		
Depression	Offline	221	7.94	.33	$F = .67$	.41
	Online	292	8.29	.28		
PSS	Offline	221	4.89	1.38	$t = .28$	.75
	Online	292	4.90	1.55		

**Table 4**

*Summary of moderated regression analysis predicting gaming disorder*

	B	t	p	95% CI	
				Low	Up
Constant	2.26	52.17	.00	2.17	2.34
Depression (A)	.06	8.72	.00	.05	.08
PSS (B)	-.01	-.15	.88	-.13	.11
A x B	-.00	-.33	.74	-.03	.02

**Table 5**

*Correlation coefficient values regarding PSS depression and gaming addiction*

	1	2	3
1. Depression	—		
2. PSS	-.51**	—	
3. Gaming Addiction	.48**	-.28**	—

Note. \* p < .05, \*\* p < .01

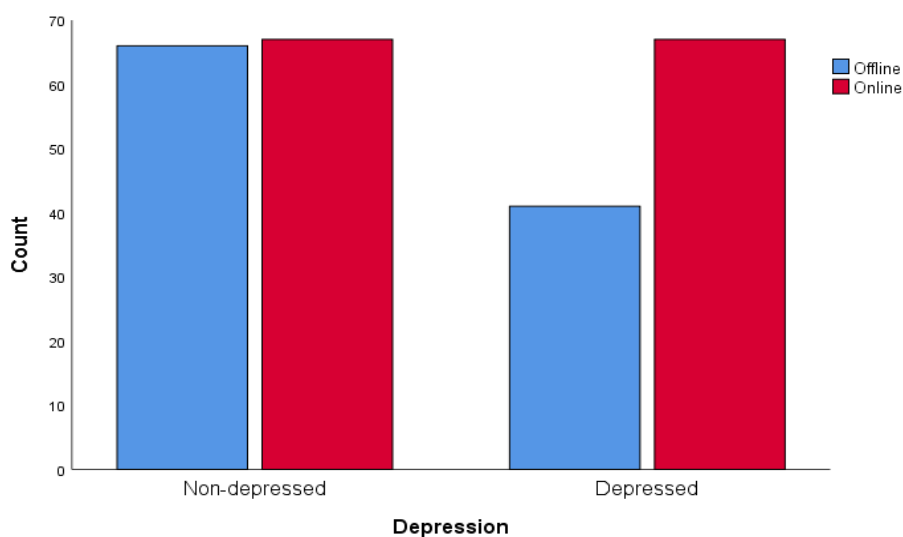
**Table 6**

*The outcome of the mediation analysis*

	M (Perceived Social Support)				Y (Gaming Addiction)			
Antecedent	<i>B</i>	<i>SE</i>	<i>p</i>	$\beta$	<i>B</i>	<i>SE</i>	<i>p</i>	$\beta$
X (Depression)	<i>a</i> -.134	.010	.000	-.509	<i>c'</i> .057	.006	.000	.452
M (PSS)	—	—	—	—	<i>b</i> -.023	.022	.291	-.048
	$R^2 = .259$				$R^2 = .228$			
	$F(1, 511) = 178.335$				$F(2, 510) = 75.521$			

**Figure 1**

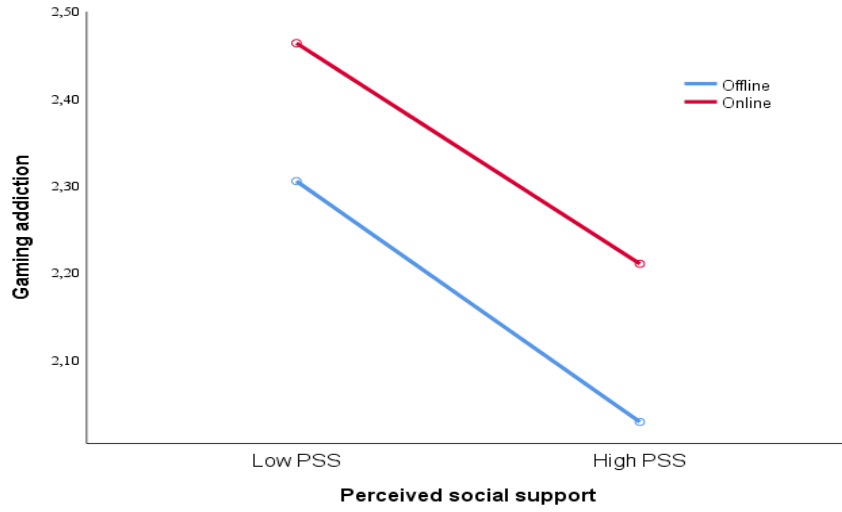
*The distribution of participants with low PSS based on gaming mode and depression*



**Figure 2**

*Gaming addiction among participants depending on gaming mode and PSS*

NOTE: This preprint reports new research that has not been certified by peer review and should not be used as established information without consulting multiple experts in the field.



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