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ORIGINAL SCIENTIFIC PAPER

In-game psychological needs satisfaction and passion for video games: associations with life satisfaction and problematic gaming

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ABSTRACT

The aim of this study was to explore the associations between in-game psychological needs satisfaction and different types of passion for playing video games in relation to life satisfaction and problematic gaming. The sample consisted of 305 participants from Croatia (M_{age} = 26.93 years, *SD* = 7.20; 64.6% men) who completed an online survey that included the Satisfaction with Life Scale (Diener et al., 1985), the Internet Gaming Disorder Scale – Short Form (Pontes & Griffiths, 2015), the Player Experience of Need Satisfaction Scale (Ryan et al., 2006) and The Passion Scale (Vallerand et al., 2003). Regression analyses showed that in-game autonomy, competence and relatedness satisfaction positively predicted harmonious passion, while in-game relatedness satisfaction was the only positive predictor of obsessive passion. In-game psychological needs satisfaction and passion for video gaming accounted for 17% of the variance in life satisfaction, with competence satisfaction emerging as a positive predictor and obsessive passion as a negative predictor. The same model accounted for 50.8% of the variance in problematic gaming, with harmonious passion emerging as a negative predictor and obsessive passion as a positive predictor. Mediation analyses indicated indirect association between in-game relatedness satisfaction and problematic gaming through both obsessive and harmonious passion, as well as an indirect association of autonomy and competence satisfaction with problematic gaming through harmonious passion. While in-game competence satisfaction showed a direct association with life satisfaction, in-game relatedness sat-

isfaction showed an indirect association through obsessive passion. This study suggests that integration of the Self-Determination Theory and the Dualistic Model of Passion provides a useful framework for understanding the mechanisms through which gaming is associated with contrasting psychosocial outcomes. The findings could help inform efforts aimed at preventing problematic gaming and promoting healthier gaming experiences.

Keywords: video games, in-game psychological needs satisfaction, life satisfaction, problematic gaming, passion

INTRODUCTION

So far, gaming has been predominantly studied in the context of its detrimental effects on mental health and its role as a risk factor for the development of problematic or addictive gaming behaviour (Ferguson et al., 2011; Gentile et al., 2017; Rosendo-Rios et al., 2022; Singh, 2018; Young, 2009). Empirical evidence showing that excessive gaming is associated with impaired daily functioning contributed to the inclusion of Internet Gaming Disorder (IGD) in the Diagnostic and statistical manual of mental disorders (DSM-V; American Psychiatric Association, 2013). In 2019, the World Health Organization also included Gaming Disorder into the International Classification of Diseases (ICD-11; World Health Organization, 2019). According to ICD-11, Gaming Disorder is characterised by lack of control over gaming activities, prioritising playing over other interests and daily activities, as well as continuous increase in play time, despite the occurrence of negative consequences. The diagnostic criteria for Gaming Disorder are considered met if this pattern of behaviour leads to significant impairment in personal, social, educational, occupational, or other important areas of life for at least 12 months (World Health Organization, 2019). In this context, findings from a study conducted among regular video game players showed that those who met the criteria for IGD reported higher levels of depression, stress, and anxiety symptoms, as well as lower levels of life satisfaction (Bargeron & Hormes, 2017), indicating that problematic gaming is not only associated with greater psychological distress, but also with poorer overall wellbeing.

Previous empirical findings point to the need to differentiate between gaming addiction and high engagement levels in gaming. For example, Brunborg et al. (2013) found that a greater risk of psychological health complaints was observed specifically among gaming addicts and problem gamers, but not among highly engaged gamers. In addition, although a wide range of studies have found positive associations between excessive gaming and psychosocial problems, as well as negative associations between problematic gaming and players' wellbeing (Bargeron & Hormes, 2017; Mentzoni et al., 2011; Teng et al., 2020), a considerable body of empirical evidence also indicates that moderate gaming can have beneficial effects on players' mental health and psychosocial wellbeing (Durkin & Barber, 2002; Halbrook et al., 2019; Iacovides & Mekler, 2019; Johnson et al., 2013; Jones et al., 2014). These contradictory findings are consistent with evidence suggesting that low levels of wellbeing may be a cause, rather than a consequence of problematic gaming (Johnson et al., 2013). Bargeron and Hormes (2017) argue that it is reasonable to assume that problematic gaming can lead to negative psychological outcomes. However, the same authors also suggested that higher levels of psychopathological symptoms and lower levels of life satisfaction may also function as risk factors for the development of problematic gaming, given that some individuals might use gaming as a form of escapism to avoid confronting the challenges and difficulties in real life. Finally, some studies suggest that playing video games may have positive effects on the mental health and psychosocial wellbeing of individuals across different age groups (Ellis et al., 2020; Johannes et al., 2021; Kowal et al., 2021; Steadman et al., 2014). Thus, authors in this field emphasise the importance of identifying factors that may contribute to a better understanding of the complex relationship between gaming and the mental health of players.

Life satisfaction refers to the subjective, cognitive-evaluative appraisal of one's life (Pavot & Diener, 2009) and is considered a key indicator of subjective wellbeing and mental health (Padmanabhanunni et al., 2023). Previous studies on the relationship between gaming and life satisfaction are characterised by mixed findings, partly depending on whether they focused on problematic gaming or gaming in general. For example, problematic gaming has been shown to have a negative association with life satisfaction (Bargeron & Hormes, 2017), as well as with later declines in different aspects of psychosocial wellbeing, including life satisfaction (Teng et al., 2020). In contrast, results of the study assessing data on players' objective game-related behaviour found little to no evidence for a causal relationship between game play and players' wellbeing (Vuorre et al., 2022). Finally, the results of a recent natural experiment study showed that console ownership and time spent playing video games are associated with improved mental wellbeing and life satisfaction (Egami et al., 2024). Taken together, these findings highlight the need to conduct further studies examining the underlying mechanisms that could explain the mixed associations between gaming and players' wellbeing. Ryan et al. (2006) emphasised that different motivational processes play an important role in understanding the circumstances under which gaming may be associated with positive or negative psychosocial outcomes. According to the Self-determination theory (SDT), intrinsic motivation is based on individuals' effort to satisfy basic psychological needs, that is, the need for competence, autonomy, and relatedness (Ryan & Deci, 2000a; 2000b). These psychological needs are innate and represent the basic motivating factors of human behaviour, regardless of cultural, environmental, and other situational determinants of one's life (Deci & Ryan, 2000). The satisfaction of basic psychological needs is associated with personal growth and development, better mental health and general wellbeing, as well as the absence of negative outcomes such as depression, anxiety, and somatic symptoms (Deci & Ryan, 2000). Although the satisfaction of psychological needs is important, the interaction of various environmental and personality factors can lead to significant interindividual differences in the degree of needs satisfaction (Ryan & Deci, 2017). If a person's everyday environment does not support the satisfaction of psychological needs, they may engage in compensational activities (Deci & Ryan, 2000). In line with this perspective, Przybylski et al. (2010) argued that the appeal and the positive effects of gaming on psychological wellbeing can be explained in the context of their potential for satisfying basic psychological needs. However, empirical findings suggest that when in-game psychological needs satisfaction is greater than real-life needs satisfaction, it represents a potential risk for the development of problematic gaming (Allen & Anderson, 2018).

Satisfaction of the need for autonomy occurs when an individual is engaged in an activity that reflects their interests, preferences, and desires, that is, when they participate in an activity they consider personally important (Ryan et al., 2006). The need for autonomy implies having the opportunity to make choices regarding one's engagement and regulation of behaviour, holding themselves responsible for actions, as well as identifying with such behaviour and accepting it (Sheldon & Gunz, 2009). Situational factors that enable the satisfaction of the need for autonomy include the possibility of choice, and the use of informational aspects such as feedback and instructions that do not impair one's sense of control over their actions (Ryan et al., 2006). In the context of video games, player autonomy is supported by the possibility to choose among different playing strategies, the flexibility of advancement through the game in various ways, and the freedom to choose goals and means related to their achievement.

The need for competence represents an innate tendency toward personal growth that includes seeking and overcoming optimal challenges, which leads to the advancement of current knowledge and the acquisition of new skills and abilities (Ryan et al., 2006; Sheldon & Gunz, 2009). The possibility of satisfying the need for competence in video games is supported

by a gradual increase in the complexity of challenges, which contributes to the development of skills and opens new possibilities for action. The perception of advancement in video games can create a sense of accomplishment (Ellis et al., 2020) and increase players' self-efficacy, which is associated with greater enjoyment in the activity (Trepte & Reinecke, 2011). The imbalance between the challenges presented in video games and players' abilities may restrict or prevent the satisfaction of the need for competence. For example, player's abilities exceeding the demands of a video game may lead to boredom, while lower player skill levels relative to game challenges may lead to frustration (Przybylski et al., 2010).

An individual's psychological need for relatedness is satisfied through developing close emotional connections that are characterised by acceptance, understanding, and mutual respect (Sheldon & Gunz, 2009). According to the SDT, seeking activities that enable relatedness satisfaction, such as inclusion in larger social structures, is an adaptive mechanism related to greater levels of general wellbeing (Deci & Ryan, 2000). Multiplayer video games have the potential to satisfy the need for relatedness through interactions with real people in virtual environments (Ryan et al., 2006): the satisfaction of this need in video games fosters a sense of presence, enhances enjoyment, and increases one's motivation to continue playing. In their review of the positive effects of gaming, Johnson et al. (2013) presented a range of empirical evidence pointing to the significant social capital of videogames and argued that video games enable the development of friendship and emotional connections that contribute to players' psychosocial wellbeing. Consistent with previous research, the results of the latest Global Video Games Report (Entertainment Software Association, 2025) show that more than two thirds of young players acknowledge that playing video games makes them feel less lonely, enables them to stay connected to friends and family, and helps them meet new friends and partners.

Aiming to understand the mechanisms underlying the positive and negative psychosocial effects of gaming, recent research has introduced the concept of passion. Vallerand et al. (2003) defined passion as a strong orientation toward an activity that a person likes, considers important, and believes is worthy of investing time and energy. Passion involves emotional arousal, that is, an emotional evaluation of the object of passion, which is why emotions and passion are closely linked. However, passion represents a more permanent determinant that strongly connects the person and the object of passion, and hence, over time, the passionate activity becomes an important part of one's personal identity (Vallerand, 2010). Vallerand (2016) highlights the importance of distinguishing between positive and negative types of passion, implying that passionate activities may also have a detrimental effect on the individual. Accordingly, the Dualistic Model of Passion (DMP; Vallerand, 2010) defines harmonious and obsessive passion, each having distinct characteristics and outcomes (Carpentier et al., 2011; Vallerand, 2010).

Harmonious passion arises from autonomous internalisation of an activity into an individuals' identity, encouraging them to voluntarily engage in activities that they enjoy (Vallerand, 2010). Such activities are usually aligned with other activities in daily life and are related to positive psychosocial outcomes (Vallerand, 2012). On the other hand, obsessive passion is based on controlled internalisation, evoking a compulsive need to engage in a particular activity. Obsessive passion is characterised by a lack of control on the time spent in the activity and a rigid persistence in the activity, even when it leads to negative consequences (Vallerand, 2010). Due to the inability to control the impulse to engage, obsessive passion is often associated with addictive behaviours and other negative psychosocial outcomes (Stenseng et al., 2011; Vallerand, 2010; 2012).

In the context of wellbeing, the way individuals approach playing video games is more important than the specific type of game they choose to play (Johnson et al., 2013). Przybylski et al. (2009) found that lower levels of satisfaction of basic psychological needs in everyday life are associated with obsessive passion,

while higher levels of real-life needs satisfaction are related to harmonious passion for gaming. An analysis of the moderating role of passion, playtime, psychological needs satisfaction, and players' wellbeing showed that longer playtime was negatively associated with wellbeing, specifically in the context of obsessive passion. In addition, the above-mentioned study revealed that the direct effect of passion on players' wellbeing was weak after controlling for the effects of psychological needs satisfaction, and that high levels of obsessive passion toward gaming may lead to longer playtime and less enjoyment (Przybylski et al., 2009).

Research shows that two types of passion for playing video games tend to be associated with contrasting outcomes: harmonious passion positively predicts life satisfaction, while obsessive passion is linked to problematic gaming (Johnson et al., 2022; Lalande et al., 2017). Lalande et al. (2017) demonstrated that needs satisfaction within the passionate activity contributes to the development of both types of passion, with a stronger association observed for harmonious passion. According to the authors, lack of psychological needs satisfaction outside the passionate activity (e.g., in key life domains, or in daily life, in general) may lead to compensatory use of this activity and, consequently, the development of obsessive passion. Conversely, harmonious passion was not associated with psychological needs satisfaction outside the passionate activity. In the context of gaming, Formosa et al. (2022) found that in-game psychological needs satisfaction was positively associated with both types of passion. In the same study, real-life psychological needs satisfaction was positively associated with life satisfaction and negatively associated with problematic gaming (Formosa et al., 2022). Although the relationship between real-life psychological needs satisfaction and life satisfaction is well documented in the literature (e.g., Martela & Sheldon, 2019), the relationship between in-game needs satisfaction and life satisfaction is more ambiguous and remains understudied (Formosa et al., 2022; Johnson et al., 2022; Lalande et al., 2017; Ryan et al., 2006). Previous research has shown that in-game psychological needs satisfaction may be associated with both harmonious and obsessive passion (Formosa et al., 2022). What remains unclear is how in-game autonomy, competence, and relatedness satisfaction, together with harmonious and obsessive passion, can relate to adaptive and maladaptive psychosocial outcomes, as well as whether these associations may operate partly through distinct types of passion. The present study addresses this gap by integrating SDT and DMP to examine how in-game needs satisfaction and passion for video gaming are associated with life satisfaction and problematic gaming.

CURRENT STUDY

There is limited empirical evidence on the complex interplay between in-game psychological needs satisfaction and different types of passion in shaping players' wellbeing. Thus, the main aims of the present study were to determine the relationship between life satisfaction and problematic gaming, to explore how in-game psychological needs satisfaction relates to harmonious and obsessive passion for playing, as well as how these potential motivational pathways are associated with life satisfaction and problematic gaming.

In the current study, we examined the relationship between life satisfaction and problematic gaming. Based on previous findings linking problematic gaming to poorer wellbeing (Bargeron & Hormes, 2017; Teng et al., 2020), we hypothesised that:

— H1.1: Life satisfaction will be negatively related to problematic gaming.

Next, we examined how in-game psychological needs satisfaction and the two types of passion are related to life satisfaction and problematic gaming. This research question was guided by previous studies showing that gaming can satisfy psychological needs. While some findings suggest that in-game needs satisfaction may contribute to players' wellbeing (e.g., Przybylski et al., 2010; Ryan et al., 2006), other studies indicate that, in the context of low real-life needs

satisfaction, in-game needs satisfaction may also be associated with problematic gaming (Allen & Anderson, 2018). Previous research has yielded mixed findings regarding harmonious passion. Although harmonious passion tends to be associated with higher life satisfaction (Holding et al., 2021), its association with problematic gaming is less consistent, with some studies reporting no association with symptoms of behavioural addiction (Holding et al., 2021) and others finding a positive association with problematic gaming (Infanti et al., 2023). Finally, previous research suggests that obsessive passion is more closely associated with problematic gaming and less adaptive wellbeing outcomes (Holding et al., 2021; Johnson et al., 2022). Based on this literature, we formulated the following hypotheses:

— H2.1: Life satisfaction will be positively associated with in-game psychological needs satisfaction and harmonious passion, and negatively associated with obsessive passion.

— H2.2: Problematic gaming will be positively associated with in-game psychological needs satisfaction, as well as obsessive and harmonious passion.

Empirical studies suggest that individuals with higher versus lower life satisfaction may be characterised by different motivational and symptom profiles (Allen & Anderson, 2018; Holding et al., 2021; Phan et al., 2020; Teng et al., 2020). Thus, we examined how they differ with respect to problematic gaming, in-game psychological needs satisfaction, and different types of passion experienced while playing video games, leading to the following hypothesis:

— H3: Individuals with higher levels of life satisfaction will report significantly higher levels of in-game psychological needs satisfaction and harmonious passion for gaming, as well as lower levels of problematic gaming and obsessive passion.

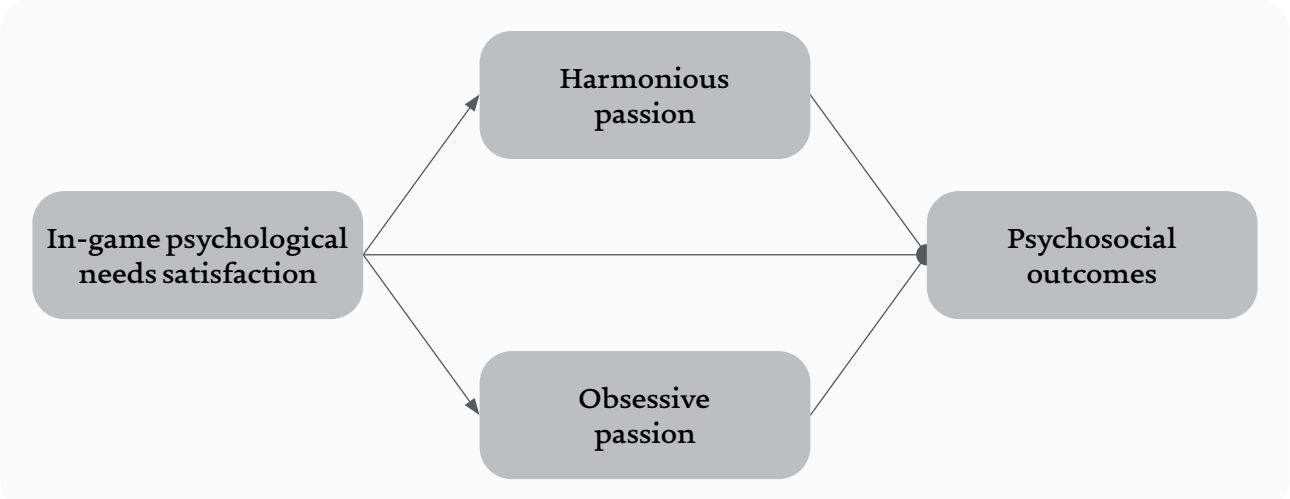
We also examined whether in-game psychological needs satisfaction and the two types of passion uniquely explained variance in life satisfaction and problematic gaming. Finally, we tested whether autonomy, competence, and relatedness satisfaction during play were directly and/or indirectly associated with these outcomes through harmonious and obsessive passion (Fig. 1). Based on previous empirical findings (Formosa et al., 2022; Holding et al., 2021), we hypothesised that:

— H4.1: In-game autonomy, competence, and relatedness satisfaction will be significant positive predictors of life satisfaction and problematic gaming.

— H4.2: Harmonious and obsessive passion will account for additional variance in life satisfaction and pro-

Figure 1

Conceptual parallel mediation model for in-game psychological needs satisfaction and psychosocial outcomes



blematic gaming beyond in-game autonomy, competence, and relatedness need satisfaction.

— H4.3: In-game autonomy, competence, and relatedness will account for a significant amount of variance in both harmonious and obsessive passion.

— H4.4: In-game autonomy, competence, and relatedness satisfaction will have significant indirect effects on life satisfaction and problematic gaming through harmonious and obsessive passion.

METHOD

Participants and procedures

The study included 305 adult participants from Croatia – 197 men (64.6%) and 108 women (35.4%) - who completed an online survey assessing gaming behaviour, psychological needs satisfaction, passion for gaming, problematic gaming, and life satisfaction. The participants ranged in age from 18 to 60 years (M_{age} = 26.93, SD = 7.20). Almost half of the participants were employed (47.5%), followed by students (45.2%) and unemployed participants (7.2%). A large proportion of participants reported that they had completed high school (46.6%), while others had completed post-secondary (27.2%) and higher education (24.3%). A smaller number of participants reported that they had completed primary school (1.3%) and doctoral studies (0.7%). Most participants (49.1%) reported living in large cities (100,000 + residents), while the rest reported living in smaller cities or towns (21.3% of participants live in a place with up to 5000 residents, 8.9% live in a smaller town with 5000 to 10,000 residents, and 20.7% live in medium-sized city with up to 100,000 residents).

Participants reported that, on average, they spend 17.11 hours (SD = 12.94) gaming per week, with one gaming session lasting on average 2.88 hours (SD = 1.49). While a majority of participants (41 %) reported playing both single- and multiplayer video games equally often, 36.1% reported playing singleplayer games more often and 23% reported playing multiplayer games more often. Most participants prefer role-playing (37.7%) and action/shooter games (24.9%), followed by other genres (such as strategy, simulation, puzzle/card games, and so on). In the last 12 months prior to the study, a majority of the participants reported watching streams of other players (74.1%), browsing webpages with gaming content (80.3%), and/or reading forums related to video games (63%). The least popular game-related activities among players were writing reviews of video games and writing blogs/tutorials on how to play the games. In the year prior to the study, only 6.2% of the participants reported that they had not engaged in any game-related activities.

The survey was administered via the Google Forms platform. The data were collected between July and November 2021. An invitation for participation in the study was distributed through e-mail, Croatian gaming forums, and social media groups, as well as Croatian web portals specialising in gaming content, with the aim of recruiting a convenience sample of adult Croatian gamers. Before the questionnaire, participants were presented with an introduction and instructions for participation. Electronic informed consent was obtained from each participant before access to the survey was granted. The data reported in the present study were collected as part of a subsequent phase of a research protocol approved by the Council of the Department of Psychology, Faculty of Croatian Studies, University of Zagreb, during its 17th regular session in March 2020.

Measures

The survey included the following measurement scales: *Satisfaction with Life Scale* (Diener et al., 1985), *Internet Gaming Disorder Scale – Short Form* (Pontes & Griffiths, 2015), *Player Experience of Need Satisfaction Scale – PENS Scale* (Ryan et al., 2006), and the *Passion Scale* (Vallerand et al., 2003). In addition, participants were asked to report on their socio-demographic characteristics and gaming habits (average playtime, preferred genres and types of games, and gaming-related activities). The Satisfaction with

Life Scale has been used and validated in a Croatian sample (Komšo & Burić, 2016), while the remaining scales were translated from English to Croatian using a standard forward-backward translation procedure (Beaton et al., 2000). All mentioned scales showed a factor structure consistent with the original versions, as well as satisfactory reliability.

Life satisfaction: The *Satisfaction with Life Scale* (SWLS; Diener et al., 1985) was developed to measure a component of subjective wellbeing, namely, general life satisfaction. In previous research, this scale has shown a high level of reliability in adult samples (Gouveia et al., 2009; Vera-Villarroel et al., 2012), as well as in samples including gamers (Bargeron & Hormes, 2017; Cudo et al., 2020). The SWLS comprises five items (e.g., "*If I could live my life over, I would change almost nothing.*") rated on a 7-point scale, ranging from 1 (Strongly disagree) to 7 (Strongly agree). A higher total score indicates a greater life satisfaction. In the present study, the scale showed good internal consistency (α = .90), in line with previous findings based on Croatian samples (e.g., Komšo & Burić, 2016).

Problematic gaming: The *Internet Gaming Disorder Scale* (Pontes and Griffiths, 2015) was developed based on DSM-V criteria for identifying problematic gaming (APA, 2013). The Short Form of the scale was used in the present study and it consists of nine items assessing the prevalence of symptoms of problematic gaming, including preoccupation with playing video games, tolerance and withdrawal, lack of interest in other activities, inability to control playing time, as well as loss of significant relationships due to gaming (e.g., "*Have you lost interest in previous hobbies and other entertainment activities as a result of your engagement with the game?*"). Participants reported on the prevalence of above-mentioned symptoms in the year prior to the study and rated their responses on a scale from 1 (Never) to 5 (Very often). The total score on the scale is calculated as a linear combination of all nine items, with higher results indicating higher levels of problematic gaming. In line with previous research (De Pasquale et al., 2020; Evren et al., 2018; Pontes & Griffiths, 2015), the scale showed satisfactory reliability based on the sample of Croatian gamers in the present study (α = .85).

In-game psychological needs satisfaction: To assess in-game satisfaction of basic psychological needs, Ryan et al. (2006) developed the *Player Experience of Needs Satisfaction Scale* (PENS Scale). The PENS scale is comprised of five subscales, measuring player experiences of autonomy, competence, relatedness, presence/immersion, and intuitive controls in games. For purposes of the present study, the first three subscales were used, after obtaining permission from the authors. Participants were instructed to recall their gaming experiences and indicate their agreement with three statements in each subscale (for example, autonomy – "*The game provides me with interesting options and choices*"; competence – "*I feel very capable and effective when playing.*"; relatedness – "*I find the relationships I form in this game fulfilling.*"). Their responses were rated on a scale ranging from 1 (Do not agree) to 7 (Strongly agree). After reverse-coding one relatedness item, subscale scores were calculated as the mean of the corresponding items, with higher scores indicating higher levels of in-game psychological needs satisfaction. Cronbach alpha values in the present study ranged from .82 to .88 across the subscales.

Passion for gaming: The Passion Scale (Vallerand et al., 2003) was developed to measure the levels of two different types of passion toward a given activity. In the present study, the scale was used to determine levels of harmonious and obsessive passion toward playing video games, hence, the formulation of each item was adapted to "*Playing video games*", instead of "*This activity*". The scale consists of two 7-item subscales, assessing harmonious (e.g., "*Playing video games allows me to live memorable experiences.*") and obsessive passion (e.g., "*I am emotionally dependent on playing video games.*") on a scale ranging from 1 (Do not agree at all) to 7 (Completely agree). The total result on each subscale is calculated as the mean of corresponding items, with higher results indicating higher levels of a specific type of passion toward gaming. In the present study, both subscales showed satisfactory reliability (α_{HP} = .79; α_{OP} = .91).

Table 1

Descriptive statistics and Pearson correlation coefficients between observed variables (N = 305)

	M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*
SWL (1)	22.34	7.53	–					
PG (2)	17.38	5.85	- .30***	–				
IG competence (3)	5.62	1.03	.29***	- .02	–			
IG autonomy (4)	5.99	1.14	.24***	.01	.41***	–		
IG relatedness (5)	4.39	1.50	.13*	.08	.29***	.28***	–	
Harmonious passion (6)	5.09	1.00	.16**	.12*	.42***	.63***	.36***	–
Obsessive passion (7)	2.68	1.42	- .22***	.70***	.13*	.10	.19**	.35***

Note: IG, in-game; PG, problematic gaming; SWL, life satisfaction; * $p < .05$; ** $p < .01$; *** $p < .001$

Statistical analyses

A total of 329 participants completed the survey. All participants between the ages of 18 and 60 years who indicated that they lived in Croatia and actively played video games were included in the analysis. A total of 19 participants reported living in another country and 5 were excluded based on age, resulting in the final sample of 305 participants. Because the survey required complete responses prior to submission, no missing data were present in the final sample. Prior to conducting the regression analyses, the assumptions for multiple regression were examined and found to be met, including normality of residuals, and absence of significant multicollinearity, linearity, and homoscedasticity. Next, to explore the hypothesis related to differences between participants with different levels of life satisfaction, the sample was divided into two groups, according to SWLS interpretative categories (Pavot & Diener, 2009), reflecting participants' levels of life satisfaction.

To examine the role of in-game psychological needs satisfaction (i.e., competence, autonomy, and relatedness), as well as harmonious and obsessive passion for gaming in explaining the variance of life satisfaction and problematic gaming, two hierarchical regression analyses were conducted. Next, three mediation analyses per outcome were performed in order to explore the potential mechanism through which psychological needs satisfaction can explain life satisfaction and problematic gaming based on the two types of passion. Three models were estimated for problematic gaming and life satisfaction, respectively, with each in-game psychological need satisfaction used individually, after controlling for other two needs, and with harmonious and obsessive passion included as parallel mediators (Fig. 1). All analyses were conducted using IBM SPSS Statistics (Version 24) with the PROCESS macro (Version 4.2, Model 4), after bootstrapping with 5,000 samples and showing 95% confidence intervals for each effect (Hayes, 2022).

RESULTS

As shown in Table 1, life satisfaction was negatively correlated with problematic gaming and positively correlated with in-game psychological needs satisfaction. The two types of passion related to playing video games showed opposite patterns of correlation with life satisfaction: harmonious passion showed a positive association, while obsessive passion showed a negative association. Problematic gaming showed a weak positive correlation with harmonious passion, as well as a strong positive correlation with obsessive passion. In contrast to life satisfaction, problematic gaming showed no significant correlation with in-game psychological needs satisfaction.

Next, based on the results from the Satisfaction with Life Scale (Diener et al., 1985), participants were categorised into two groups following the criteria pro-

Table 2

Analysis of the differences in problematic gaming, in-game psychological needs satisfaction, and different types of passion between participants who reported high and low life satisfaction (N = 292)

	High life satisfaction (n = 193)		Low life satisfaction (n = 99)		t-test (df = 290)
	M	*SD*	*M*	*SD*	
PG	16.33	5.11	19.56	6.56	- 4.622***
IG autonomy	6.13	1.15	5.76	1.02	2.724**
IG competence	5.85	.91	5.26	1.10	4.919***
IG relatedness	4.48	1.55	4.26	1.38	1.184
Harmonious passion	5.20	1.04	4.92	.87	2.317*
Obsessive passion	2.49	1.34	3.10	1.49	- 3.555***

Note: IG, in-game; PG, problematic gaming; * $p < .05$; ** $p < .01$; *** $p < .001$

posed by Pavot and Diener (2009). The first group included participants who were generally satisfied with life (results ranging from 21 to 35), and the second group included participants who reported low life satisfaction (results ranging from 5 to 19). Participants at the mid-point of the scale (n = 13) who reported being equally satisfied and dissatisfied with their life (i.e., those with a score of 20) were excluded from the analysis.

The analysis of between-group differences is presented in Table 2. Participants with higher life satisfaction scored significantly higher in terms of in-game autonomy and competence satisfaction. Compared to participants who reported lower life satisfaction, those who reported being satisfied with life had significantly higher scores for harmonious passion and lower scores for obsessive passion. In line with our expectations, participants with higher life satisfaction reported less problematic gaming.

In order to examine the contributions of in-game psychological needs satisfaction and two types of passion for gaming in explaining life satisfaction and problematic gaming, we conducted two different two-step hierarchical regression analyses (Table 3).

In-game psychological needs satisfaction explained a modest proportion of the variance in life satisfaction. Based on the results, higher levels of life satisfaction may be expected among individuals who report higher levels of in-game competence and autonomy needs satisfaction. Harmonious and obsessive passion explained additional variance in life satisfaction ($p < .001$), with obsessive passion being identified as a significant negative predictor. It is important to note that the role played by in-game autonomy satisfaction was no longer significant when the two types of passion for gaming were entered into the model.

As shown in Table 3, in-game psychological needs satisfaction did not significantly predict problematic gaming, while in the second step, both harmonious and obsessive passion were significant negative and positive predictors, respectively. In total, 50.8% of the variance in problematic gaming was explained by the model, with obsessive passion being the strongest predictor of problematic gaming.

Next, to explore the role of in-game psychological needs satisfaction in predicting the two types of passion for gaming, we conducted a regression analysis with in-game psychological needs satisfaction as predictors of obsessive and harmonious passion for gaming.

The results presented in Table 4 show that in-game psychological needs satisfaction explained a substantial proportion of the variance in harmonious passion for gaming. Higher levels of harmonious passion are expected among players who report higher levels of in-game needs satisfaction, with in-game autonomy emerging as the strongest predictor. On the other hand, in-game satisfaction of basic psychological

Table 3

Role of in-game psychological needs satisfaction and passion for gaming in explaining the variance in life satisfaction and problematic gaming (N = 305)

Step		Life satisfaction	Problematic gaming
		β	β
1.	IG competence	.225***	- .053
	IG autonomy	.145*	.008
	IG relatedness	.023	.097
	R^2_{corr}	.095	< .001
	F(3, 301)	11.59***	.953
2.	IG competence	.233***	- .080
	IG autonomy	.111	.071
	IG relatedness	.058	.003
	Harmonious passion	.082	- .160**
	Obsessive passion	- .304***	.760***
	R^2_{corr}	.170	.508
	F(5, 299)	14.64***	63.813***

Note: IG, in-game; * $p < .05$; ** $p < .01$; *** $p < .001$

needs explained only a small proportion of the variance in obsessive passion for gaming, with relatedness emerging as the only significant predictor.

Finally, we conducted a series of mediation analyses to test whether the two types of passion mediate the associations between each variable related to in-game psychological needs satisfaction, as well as life satisfaction and problematic gaming. After controlling for autonomy and relatedness needs satisfaction, and including harmonious and obsessive passion as mediators, the results showed a significant direct association between in-game competence and life satisfaction (Fig. 2). In addition, an indirect association was observed between in-game relatedness and life satisfaction through obsessive passion (- .0486, 95% CI [- .0873, - .0141]). Hence, participants with higher levels of in-game competence satisfaction reported higher life satisfaction. Furthermore, higher levels of in-game relatedness predicted higher levels of obsessive passion, which in turn predicted lower levels of life satisfaction.

None of the three needs satisfaction variables had a significant direct association with problematic gaming (Fig. 3). However, in-game autonomy (- .0831, 95% CI [- .1548, - .0196]), competence (- .0247, 95% CI [- .0528, - .0042]), and relatedness (- .0277, 95% CI [- .0558, - .0061]) satisfaction were indirectly associated with problematic gaming through harmonious passion. Therefore, higher levels of autonomy, competence, and relatedness satisfaction were associated with higher harmonious passion, which was in turn negatively associated with problematic gaming. The association between in-game relatedness satisfaction and problematic gaming was mediated by obsessive passion (.1215, 95% CI [.0337, .2031]), serving as a significant positive predictor of obsessive passion, which in turn predicted higher levels of problematic gaming.

DISCUSSION

The main aims of the study were to explore the relationship between life satisfaction and problemat-

Table 4

Role of in-game psychological needs satisfaction in harmonious and obsessive passion for gaming (N = 305)

	Harmonious passion	Obsessive passion
	β	β
IG competence	.154**	.069
IG autonomy	.519***	.028
IG relatedness	.173***	.160**
R^2_{corr}	.448	.032
F(3, 301)	83.191***	4.349**

Note: IG, in-game; * $p < .05$; ** $p < .01$; *** $p < .001$

ic gaming, and to examine how in-game psychological needs satisfaction and different types of passion for playing video games are associated with life satisfaction and problematic gaming.

In line with our first hypothesis (H1), the results showed a negative association between life satisfaction and problematic gaming. This finding is consistent with previous research in the field (e.g., Bargeron & Hormes, 2017; Ferguson et al., 2011; Formosa et al., 2022) showing that life satisfaction and problematic gaming are inversely related. Current literature suggests two potential pathways underlying this association: lower life satisfaction may increase vulnerability to problematic gaming, and problematic gaming may, in turn, deter overall wellbeing (Bargeron & Hormes, 2017). The results of a longitudinal study conducted by Teng et al. (2020) supported the interpersonal impairment hypothesis by showing that higher levels of problematic gaming predicted poorer psychosocial wellbeing over time, whereas psychosocial wellbeing did not predict subsequent IGD diagnoses.

Given the inconsistent findings of previous empirical studies (e.g., Formosa et al., 2022; Johnson et al., 2022; Johnson et al., 2021; Lalande et al., 2017; Ryan et al., 2006), we examined how in-game needs satisfaction and different types of passion relate to life satisfaction. The results supported the first part of our second hypothesis (H2.1) by showing positive associations between in-game psychological needs satisfaction and life satisfaction. Building upon previous research on the positive psychosocial effects of gaming (e.g., Johannes et al., 2021; Kowal et al., 2021), these findings point to the importance of psychological needs satisfaction within the preferred activity. Furthermore, we found that higher levels of harmonious passion were associated with higher life satisfaction. By contrast, obsessive passion was associated with significantly lower life satisfaction. Consistent with Vallerand's (2010) conceptualisation of the DMP, our findings suggest that the quality of internalisation, that is, harmonious versus obsessive passion toward an activity, could have important implications for general life satisfaction (Vallerand, 2012).

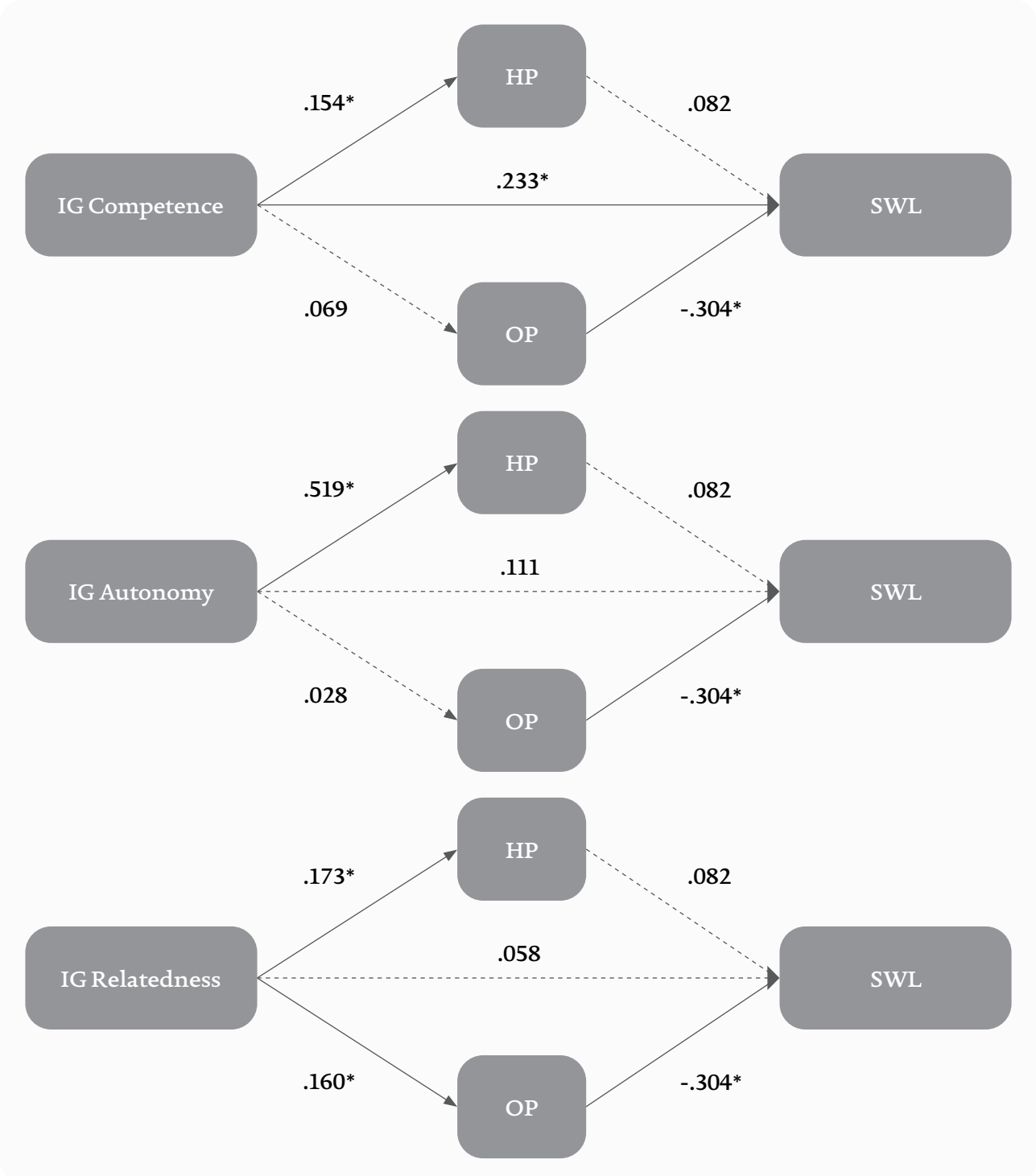
Problematic gaming showed a strong positive association with obsessive passion, that is, the type of passion that is characterised by rigid persistence and controlled internalisation (Vallerand, 2010), as well as a weak positive association with harmonious passion. The results are in line with previous studies linking obsessive passion to negative psychosocial outcomes. According to Infanti et al. (2023), there could be a small positive association between harmonious passion and problematic gaming because some characteristics of problematic gaming (e.g., salience, mood modification, tolerance) can reflect high engagement that is compatible with harmonious passion and not necessarily pathological. Since in-game psychological needs satisfaction was not significantly related to problematic gaming, H2.2 was only partially supported.

Next, we examined the differences in in-game psychological needs satisfaction and passion for gaming

https://doi.org/10.31299/ksi.34.1.3

Figure 2

Three parallel mediation models testing the associations between each in-game psychological needs satisfaction variable and life satisfaction via harmonious and obsessive passion (N = 305)

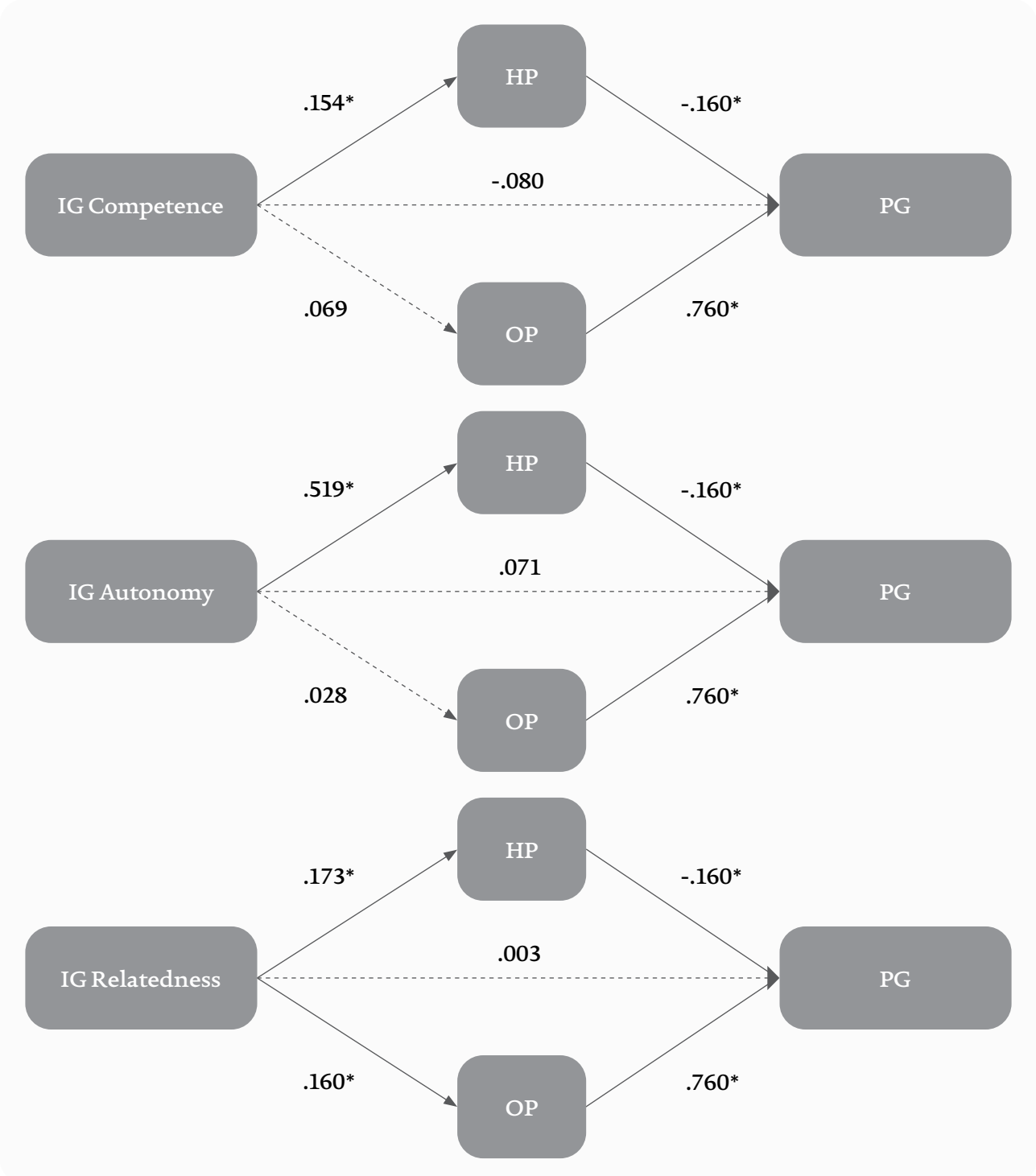


Note: * p < .05; HP, harmonious passion; IG, in-game; OP, obsessive passion; SWL, satisfaction with life.
All coefficients are standardised. Insignificant paths are represented by dotted lines; significant paths are represented by solid lines; significant indirect effects are reported in text. Each mediation model included the other two in-game psychological needs as covariates.

https://doi.org/10.31299/ksi.34.1.3

Figure 3

Three parallel mediation models testing the associations between each in-game psychological needs satisfaction variable and problematic gaming via harmonious and obsessive passion (N = 305)



Note: * p < .05; HP, harmonious passion; IG, in-game; OP, obsessive passion; PG, problematic gaming.
All coefficients are standardised. Insignificant paths are represented by a dotted line; significant paths are represented by a solid line; significant indirect effects are reported in text. Each mediation model included the other two in-game psychological needs as covariates.

between individuals who reported higher and lower levels of life satisfaction (H3). In line with our expectations, participants with higher life satisfaction reported greater in-game autonomy and competence satisfaction, higher harmonious passion, lower obsessive passion, and less problematic gaming. The absence of group differences in in-game relatedness satisfaction suggests that the role of this psychological need satisfaction may depend on additional factors that were not assessed in the present study. Previous research indicates that in-game relatedness satisfaction may enhance feelings of immersion, presence, and enjoyment by fostering a sense of connection with others (ESA, 2025; Ryan et al., 2006). Given that relatedness reflects the experience of interpersonal connection, its association with players' wellbeing may be more dependent on contextual factors such as the social features of the game, the extent of interaction with other players, and players' broader interpersonal experiences. Therefore, future research should examine the conditions under which in-game relatedness satisfaction is associated with psychosocial wellbeing.

Furthermore, we examined the role of in-game psychological needs satisfaction and passion for gaming in predicting life satisfaction and problematic gaming. The results partially confirmed H4.1, showing that in-game autonomy and competence satisfaction, but not relatedness satisfaction, significantly predicted life satisfaction. In line with the SDT (Deci & Ryan, 2000), the results highlight the role of competence and autonomy needs satisfaction in achieving positive psychosocial outcomes. Overall, our research supports the notion that in-game satisfaction of psychological needs, as basic motivational factors in an intrinsically chosen activity, may contribute to positive psychosocial outcomes (Deci & Ryan, 2000). Passion for gaming explained additional variance in life satisfaction beyond in-game psychological needs satisfaction. In the final model, only in-game competence satisfaction and obsessive passion remained as significant predictors of life satisfaction. According to the results, feelings of effectiveness and mastery experienced during gaming may have an important role in understanding positive associations between gaming and psychosocial wellbeing. In contrast, the negative associations of obsessive passion with life satisfaction may be understood in the light of its maladaptive features, particularly its tendency to foster persistent engagement in the activity, despite potential negative consequences (Przybylski et al., 2009; Vallerand, 2010).

In the problematic gaming model, H4.1 was not supported. The expected role of in-game psychological needs satisfaction in explaining problematic gaming stemmed from the assumption that needs satisfaction within a preferred activity may serve as a compensatory mechanism linked to escapism and the avoidance of real-life challenges (Bargeron & Holmes, 2017), thereby exacerbating problematic gaming. However, the present study did not include real-life psychological needs satisfaction, which may be important for understanding the contexts in which in-game needs satisfaction is associated with problematic gaming. Previous research suggests that gaming-based needs satisfaction may be more strongly linked to problematic gaming when real-life needs satisfaction is low (Allen & Anderson, 2018). Hence, future research may benefit from examining the relative and combined effects of real-life and in-game psychological needs satisfaction in explaining problematic gaming.

The inclusion of harmonious and obsessive passion in the model revealed that both types of passion significantly contributed to predicting levels of problematic gaming. In line with our hypotheses and previous empirical findings (Johnson et al., 2022; Lalande et al., 2017), obsessive passion emerged as the strongest positive predictor of problematic gaming, while harmonious passion showed a weak negative association. Consistent with prior research (Stenseng et al., 2011; Vallerand, 2010; Vallerand, 2012), our results exemplify the role of passion in predicting maladaptive outcomes of gaming. According to Przybylski et al. (2009), obsessive passion is associated with negative psychosocial outcomes due to a strong urge to engage, despite negative consequences or the lack of enjoyment in the activity. The unique negative con-

tribution of harmonious passion is consistent with its definition (Vallerand, 2010). This type of passion encourages individuals to autonomously engage in a chosen activity based on their preference, without compromising the other activities in their life. Overall, our findings support the view that different types of passion toward gaming are associated with distinct psychosocial outcomes, and these associations vary according to the strength and prominence of each type of passion (Johnson et al., 2022; Lalande et al., 2017).

In line with H4.3, all three in-game psychological needs satisfaction variables positively predicted harmonious passion. Contrary to our expectations, the results showed that only a small proportion of the variance in obsessive passion can be explained by in-game psychological needs satisfaction. Previous research (e.g., Formosa et al., 2022, Holding et al., 2021) identified the effect of a single indicator of in-game psychological needs satisfaction on both types of passion. However, similar to our findings, Johnson et al. (2021) found that only relatedness was associated with obsessive passion, indicating the importance of studying the unique contributions of each psychological needs satisfaction. Accordingly, the above-mentioned authors highlighted the need to further examine the effects of videogames among players who mainly socialise through video games. Considering that harmonious and obsessive passion are two related, but distinct concepts, it is possible that other factors, besides in-game psychological needs satisfaction, play a more important role in explaining obsessive passion. Our findings suggest that in-game psychological needs satisfaction is more strongly associated with adaptive harmonious passion, whereas the emergence of obsessive passion may be more closely tied to other factors outside the gaming context (e.g., real-life psychological needs satisfaction). Further research is needed to identify factors related to the development of obsessive passion, as well as to understand the mechanisms underlying the less adaptive and harmful effects of engagement in gaming-related activities.

To further explore the associations between in-game psychological needs satisfaction, harmonious and obsessive passion, and the two distinct outcomes, namely, life satisfaction and problematic gaming, we conducted a series of mediation analyses. The results showed that in-game competence satisfaction was directly associated with life satisfaction, after controlling for in-game autonomy and relatedness satisfaction and including harmonious and obsessive passion as parallel mediators. Considering that need for competence is an innate tendency to advance one's skills and knowledge, thereby increasing one's sense of accomplishment and self-efficacy (Ellis et al., 2020; Trepte & Reinecke, 2011; Ryan et al., 2006; Sheldon & Gunz, 2009), its positive, direct association with life satisfaction is not surprising. The only significant indirect association with life satisfaction was observed for in-game relatedness satisfaction through obsessive passion. In-game relatedness significantly positively predicted obsessive passion, which in turn was associated with lower levels of life satisfaction. These results indicate that the effect of in-game relatedness satisfaction, although not significant on its own, may carry over to life satisfaction through obsessive passion. Therefore, when in-game relatedness is associated with obsessive passion, it may act as a means of rigid, non-adaptive identification with gaming, rather than serving an adapting purpose, thus, contributing to lower levels of life satisfaction.

Finally, we examined the role of harmonious and obsessive passion as mediators of the association between in-game psychological needs satisfaction and problematic gaming. Parallel mediation models showed a significant indirect association between each in-game psychological needs satisfaction variable and problematic gaming through harmonious passion, while controlling for the other in-game psychological needs satisfaction dimensions and using obsessive passion as a parallel mediator. Consistent with the DMP (Vallerand et al., 2003, Vallerand, 2011), our findings indicate that harmonious passion may serve as a protective mechanism through which in-game psychological needs satisfaction contributes

to lower levels of problematic gaming. Our results are consistent with recent research showing that the effects of psychological needs satisfaction on problematic gaming operate through passion, rather than having a direct effect (Formosa et al., 2022). The relationship between in-game relatedness satisfaction and problematic gaming was also mediated by obsessive passion. Therefore, when the need for relatedness is satisfied in the gaming context, it might contribute to higher levels of problematic gaming through obsessive passion. On the other hand, the association through harmonious passion might have an adaptive and protective role. These findings are consistent with previous research showing that in-game psychological needs satisfaction is associated with both harmonious and obsessive passion for gaming (Formosa et al., 2022; Formosa et al., 2025), which in turn are linked to adaptive and maladaptive psychosocial outcomes, respectively (Holding et al., 2021).

The present study contributes to the literature by integrating the SDT and the DMP in the examination of adaptive and maladaptive outcomes of gaming. The findings suggest that in-game psychological needs satisfaction may be linked to psychosocial outcomes both directly and indirectly, through different motivational pathways. In this context, harmonious passion appears to reflect a more adaptive pathway, whereas obsessive passion was more closely associated with problematic gaming and lower life satisfaction. From a practical point of view, the findings suggest that efforts to prevent problematic gaming and enhance players' wellbeing may benefit from supporting in-game psychological needs satisfaction and fostering harmonious passion. In this context, the results of the study may have implications for the design of gaming environments, as well as for efforts aimed at preventing problematic gaming and supporting players' well-being.

Limitations and future research

Because the study was conducted on a convenient, non-probabilistic sample, the findings cannot be generalised to the broader population of Croatian gamers. This limitation is particularly important when considering the gender imbalance in the present sample compared to previous research involving the gaming community in Croatia (e.g., Krolo et al., 2016; Lotar Rihtarić et al., 2022). In this study, each dimension of in-game psychological needs satisfaction was examined in a separate mediation model, while the other two needs satisfaction dimensions were included as covariates. Although this approach allowed us to account for shared variance and focus on the role of each in-game needs satisfaction dimension, it is less robust than examining all predictors simultaneously. Thus, the results should be interpreted as adjusted, rather than fully unique effects. Furthermore, the research design was cross-sectional, hence, the ability to infer causality is not possible. Future longitudinal research must focus on uncovering the nuances and causal relationships between life circumstances, gaming habits, and positive and negative psychosocial outcomes of gaming. In such research, problematic gaming pathways and antecedents of positive psychosocial outcomes of gaming can be distinguished, to help build a safer and flourishing environment for players based on their psychological needs satisfaction and developing adaptive types of passion toward gaming. The strength of the present study lies in exploring both adaptive and maladaptive outcomes of gaming, emphasising the need for a wide, general view of gamers and the gaming community.

The measures used in the present study were based on self-reports, which is often the only option in survey-based research. That said, we could not measure real player behaviour and in-game psychological needs satisfaction during gameplay. Acquiring the data during gameplay and measuring behavioural and emotional responses without delay would provide a more accurate representation of in-game psychological needs satisfaction, which would, in turn, strengthen the results and implications of the study. Therefore, future research should use experimental designs and include additional theoretically relevant variables that may be associated with life satisfaction

and problematic gaming in the context of video game play. Furthermore, as previously mentioned, simultaneous examination of in-game and real-life psychological needs satisfaction seems essential in future research, in order to uncover their unique and combined contribution to explaining various psychosocial outcomes of gaming.

CONCLUSION

Overall, our study showed that gaming is not necessarily associated with problematic outcomes, and it can also be related to higher life satisfaction. Both in-game psychological needs satisfaction and the two types of passion for gaming were relevant for understanding both psychological outcomes. However, passion emerged as a more consistent predictor of problematic gaming and life satisfaction, indicating the importance of understanding the different motivational mechanisms underlying gaming activity. The study provided support for the protective role of harmonious passion in the association between in-game psychological needs satisfaction and problematic gaming, whereas obsessive passion was shown to be more closely related to maladaptive outcomes. Interestingly, in-game relatedness satisfaction was associated with problematic gaming through different types of passion, contributing to lower levels of problematic gaming through harmonious passion, and higher levels of problematic gaming through obsessive passion. The findings suggest that social gaming experiences may relate to both positive and negative outcomes, depending on the type of passion for the activity.

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