Drivers for video games perceived addiction among console and smartphone users

Factores que fomentan la percepción de adicción a los videojuegos entre los usuarios de consolas y smartphones

Camarero, C., Jiménez, N., San-José, R., & San-Martín, S.

Carmen Camarero. Universidad de Valladolid (Spain)
Professor of Marketing at the Universidad de Valladolid. Her research focuses on relationship marketing, consumer behavior, and marketing in cultural organizations.
https://orcid.org/0000-0002-5252-4581, carmen.camarero@uva.es

Nadia Jiménez. Universidad de Burgos (Spain)
Associate Professor of Marketing at the Universidad de Burgos. Her main research areas are consumer trust, digital commerce, cross-cultural consumer behavior, and cyberbullying in online brand communities.
https://orcid.org/0000-0001-5771-2971, nhjimenez@ubu.es

Rebeca San-José. Universidad de Valladolid (Spain)
Associate Professor of Marketing and Market Research at the Universidad de Valladolid. Her research lines are consumer behaviour, commercial communication, and digital marketing.
https://orcid.org/0000-0002-9161-6657, rebecasc@uva.es

Sonia San-Martín. Universidad de Burgos (Spain)
Professor of Marketing at the Universidad de Burgos. Her main lines of research are electronic commerce, mobile commerce, omnichannel commerce, consumer behavior, tourism, and new technologies.
https://orcid.org/0000-0002-5030-9669, sanmargu@ubu.es

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ABSTRACT: Purpose. This study aims to determine whether perceived addiction to video games is affected by the type of device used to play (smartphone *versus* console), paying special attention to the drivers for playing. Considering the theoretical framework of motivation, a structural model is proposed that considers three drivers (self-efficacy, challenge, and need for escapism) and an inhibitor (subjective norms) to explain the time spent on video games and perceived addiction. **Methodology.** We used a minimum partial squares (PLS) approach to estimate the structural equation model using first-hand information from 547 gamers in Spain. **Findings.** The results suggest that, regardless of the user's device, the two main factors determining whether they perceive being addicted to video games are the amount of time they spend playing and their need for escapism. We found that, specifically for console gamers, perceived self-efficacy and challenge affected how much time they spent playing. The perception of videogame addiction has increased because of the need for escapism, especially among smartphone gamers, because gaming applications and smartphones are portable and allow infinite time and space usage. **Contribution.** This work contributes to the existing literature by focusing on the

type of device video gamers use and determining that there are indeed differences in how self-efficacy and challenge variables influence the time spent playing and perception of addiction. However, the need for escapism is the most determining factor for the perception of addiction to video games in players with both devices.

Keywords: device; video games; addiction; time playing; drivers.

RESUMEN: Propósito. Este estudio tiene como objetivo determinar si la adicción percibida a los videojuegos se ve afectada por el tipo de dispositivo utilizado para jugar (smartphone versus consola), prestando especial atención a los factores que motivan a jugar. Considerando el marco teórico de la motivación, se propone un modelo estructural que considera tres impulsores (autoeficacia, desafío y necesidad de escapismo) y un inhibidor (normas subjetivas) para explicar el tiempo dedicado a los videojuegos y la adicción percibida. **Metodología.** Utilizamos un enfoque de mínimos cuadrados parciales (PLS) para estimar el modelo de ecuaciones estructurales con información de primera mano de 547 jugadores en España. **Resultados y conclusiones.** Los resultados sugieren que, independientemente del dispositivo del usuario, los dos factores principales que determinan que se perciba adicción a los videojuegos son la cantidad de tiempo dedicado a jugar y la necesidad de escapismo. Encontramos que, específicamente para los jugadores con consola, su autoeficacia percibida y el desafío afectan a la cantidad de tiempo que pasan jugando. En el caso de la percepción de la adicción a los videojuegos, ésta se incrementa debido a la necesidad de escapismo, especialmente entre los jugadores con móvil, porque las aplicaciones de juegos y el propio teléfono móvil son portátiles y permiten un uso sin límites de tiempo y espacio. **Aporte original.** Este trabajo contribuye a la literatura existente al centrarse en el tipo de dispositivo que utilizan los video jugadores y determina que, efectivamente, existen diferencias en cómo las variables de autoeficacia y desafío influyen en el tiempo dedicado a jugar y la percepción de adicción. Sin embargo, la necesidad de escapismo es el factor más determinante para percibir adicción a los videojuegos en jugadores con ambos dispositivos.

Palabras clave: dispositivo; videojuegos; adicción; tiempo de juego; motivadores.

1. Introduction and research questions

According to Statista (2025a), global video game sales could reach US$365 billion by 2025. Spanish video game companies have found allies in the new technology business models of this growing market. In particular, the industry's most significant partner these days is the Internet. Digital sales accounted for over 60% of video game firms' income in 2024 (Statista, 2025a). The digital game market has successfully incorporated new media platforms. Among these, the most relevant are game applications (apps) designed to be played on smartphones (Shchiglik et al., 2016). Eight of the ten gamers affirmed that video games provide a way to escape and socialize (AEVI, 2023). Despite the efforts of the industry to show that video games represent a healthy kind of entertainment (AEVI, 2023), caution about the possibility of developing gaming disorders is patent in addiction literature (Hew et al., 2024; Sánchez-Llorens et al., 2023). Spanish gamers played video games for an average of 8 hours a week last year (Agencia EFE, 2025), that is, full-time work or school days. Also, if we inquire about the devices most used to play in our country, consoles and smartphones have the highest penetration (Statista, 2024).

In this regard, one of the most critical topics in human-computer interaction studies is understanding why gamers become addicted to online video games (Guo et al., 2022). As Sanmartín et al. (2022) suggested, exploring all drivers that may constitute factors for the appearance of these pathological behaviors related to using devices and video games is a priority. In this sense, our research question is twofold.

What are the drivers of developing perceived addiction to video games?

What are the differences in perceived addiction to video games between console and smartphone gamers?

2. Background and hypothesis

The importance of video games has entered the realm of academia, with numerous researchers interested in the subject, particularly the positive (Guo et al., 2022; Tichon & Mavin, 2017) or negative aspects of video game use (Marco & Chóliz, 2014; Prot et al., 2014; Sánchez-Llorens et al., 2023). Video games have been shown to provide gamers with a wide range of benefits (Velez & Hanus, 2016), particularly educational, prosocial, exergames, or interactive games that involve some exercise when played (Prot et al., 2014). Yet researchers have also drawn attention to the "dangers" of such games. The adverse effects explored include the aggressiveness and violence they engender (Adachi & Willoughby, 2011; Lemmens et al., 2011), absenteeism (Tsitsika et al., 2011), poor academic performance (Gentile, 2009), attention deficit problems (Hastings et al., 2009), and particularly problematic use of devices (Lemmens et al., 2011) and addiction (Hew et al., 2024; Jeong et al., 2017; Sánchez-Llorens et al., 2023; Tsitsika et al., 2011), a variable that provides the focus of attention for the present research.

Indeed, according to Király et al. (2017), the increasing popularity of video games has turned specific attention towards gamers who play intensely and who display addiction-like symptoms, such as losing control when gaming, conflicts with other people (particularly with family members), or underperforming at school or in other work-related activities (Király et al., 2017; Kuss & Griffiths, 2012). Addiction to video games is a form of addiction to technology (Andreassen et al., 2016), a type of behavioral addiction that involves human-machine interaction and is non-chemical (Balakrishnan & Griffiths, 2019; Sánchez-Llorens et al., 2023). According to the ICD-11, Internet Gaming Disorder "is characterized by a pattern of persistent or recurrent gaming behavior ('digital gaming' or 'video gaming') that is primarily conducted over the internet and is manifested by impaired control over gaming, increasing priority given to gaming over other life interests and daily activities; and continuation or escalation of gaming despite the occurrence of negative consequences" (WHO, 2025). Therefore, video game addiction is a type of Internet addiction that includes maladaptive psychological dependency on a specific family of technological devices (such as video game consoles and smartphones) (Balakrishnan & Griffiths, 2019; Xu et al., 2012).

This study aimed to explore the drivers that lead to perceived video game addiction and, second, to analyze whether it varies depending on the device used during the game (video game console *versus* smartphone). Chatterjee et al. (2025) and Lopez-Fernandez et al. (2018) have shown that smartphone gaming is distinct from online gaming on personal devices (e.g., consoles). Recent studies have suggested that addiction to video games should be examined as a function of the device employed (Hew et al., 2024; Paik et al., 2017). We can summarize the research gap by stating that in the past, video gaming literature mainly developed research models focusing on one device (especially on the smartphone) (Chen et al., 2020; Lopez-Fernandez et al., 2017; Menéndez et al., 2022), but comparative differences generated by the device employed to play video games have been explored less.

This gap leads us to examine whether there are differences between games played on "fixed" terminals (or video game consoles) (e.g., Xbox and PlayStation[1]), which generally require connection to an electrical supply and television or display screen (pc screen) when compared to "mobile" terminals (e.g., app games played on smartphones mainly). The ubiquitous nature of smartphones and relatively low price of apps make almost every consumer a potential gamer (Chi et al. 2022). A priori, we presume that these differences will exist because the characteristics of the mobile device (smartphone) differ from those of the video game console device (i.e., screen size, capacity, and portability) (Gao et al., 2015; Yang & Kim, 2012), which depend on the features of the display to which it is connected. Thus, gaming experience may differ depending

[1] Nintendo Switch represents a hybrid device since it combines the at-home aspects of console gaming with the portability of mobile games, but it does not need a smartphone to play.

on the device the gamer is playing, and seminal evidence suggests that maladaptive mobile (or smartphone) gamers and maladaptive computer gamers could differ (Skripkauskaite et al., 2022).

3. Perceived addiction to video games

Perceived video game addiction is understood as individuals' awareness of their own "state of maladaptive psychological dependence on games that is manifested through the obsessive-compulsive pattern of seeking and use behaviors that take place at the expense of other important activities" (Xu et al., 2012). To achieve our aim, we first focus on one of the most widely studied variables in the literature on addiction: time spent playing. Most authors report a strong relationship between these variables (Lemmens et al., 2015; Männikkö et al., 2015), the current to which we subscribe. If addiction implies a disproportionate interest in a hobby, understood as an activity or occupation that people engage in merely for fun during their free time, it is logical to assume that the greater the amount of time spent on the game, the greater the individual's perceived addiction or dependence on it. Furthermore, past studies have demonstrated that the time spent playing video games might indicate problematic gaming behavior (Cudo et al., 2019; Inoue et al., 2022; Skripkauskaite et al., 2022). Chatterjee et al. (2025) confirm that playing video games regularly for a long time helps someone form a habit that leads to addiction. Considering the above, we propose the first hypothesis in our study:
Time spent playing video games positively influences perceived addiction to video games (H1).

However, perceived addiction to video games varies depending on whether consoles or smartphone gamers are involved. Paik et al. (2017) affirm that the usage patterns of gaming devices, such as the time dedicated to each device, may significantly impact gaming behavior and behavioral disorders, such as gaming addiction. This variation occurred because each device had unique interface features and characteristics.

Nowadays, consoles allow users to engage in more comprehensive activities other than playing (e.g., watching downloaded movies, etc.). However, their primary use is playing, unlike smartphones, where this is not the case. In addition to playing, smartphones offer a broader array of possibilities (receiving calls, surfing the Internet, accessing social networks, receiving instant messages, checking email, downloading content, watching videos, listening to music, etc.) and are often used almost simultaneously (Chatterjee et al., 2022). This means that the time an individual devotes to a video game on a console can be linked to their addiction to video games. In contrast, in the case of smartphones, such perception diminishes and may even be partly related to dependence on the smartphone itself rather than on playing. Consequently, we propose the following hypothesis:
Time spent playing has a greater effect on console gamers' perceived addiction to video games than smartphone gamers' (H1.1).

4. Drivers to perceived addiction to video games

Following Király et al. (2017), to analyze the problematic use of video games and perceived addiction, the literature simultaneously finds different drivers of spending time and addiction (i.e., neurobiological, personality, and motivational aspects). This study focuses on motives. A recent paper by Gursesli et al. (2024) identified 12 motivational factors for playing video games. Still, it highlights that three drivers were common reasons to play among addicted and non-addicted video game users (i.e., achievement, social interaction, and escapism). Thus, this study focuses on self-efficacy, challenge, the need for escapism, and subjective norms. Since previous research has revealed that the development of video game addiction is influenced by different drivers of play, it seems necessary to consider several motives (Hasriandry & Wahyuni, 2021; Melodia et al., 2022). One helpful framework for identifying the relevant drivers is the

Player Motivation Factors Model proposed by Yee (2006). This author identified two players' motivations, achievement and immersion. Our proposal is based on the sub-components of these motivations. Specifically, we consider self-efficacy, challenge, and need for escapism as drivers of perceived behavioral disorders related to video games (Hasriandry & Wahyuni, 2021; Király et al., 2017; Xu et al., 2012; Yee, 2006). While self-efficacy and challenge are related to achievement motivation, the need for escapism is related to immersion motivation.

Bandura (1977) defined self-efficacy as the conviction that one can successfully execute the behavior required to produce a particular outcome. In our context, according to Klimmt and Hartmann (2006), we consider video gaming self-efficacy as an individual's perception of their chances of success in video gaming, their possibilities of mastering the mechanics of the games, and the conviction that they are expert players. In this sense, Cudo et al. (2019) found that the sense of exercise-specific control within the game, as a consequence of how quickly games respond to each player's movement, motivates players to keep playing (time devoted playing) and affects the perception of problematic video gaming behavior. Challenge refers to gamers' need to reaffirm their status as experts or to rise to challenges that can improve their skills. Yee (2006) expresses this as advancement and competition, and Badrinarayanan et al. (2014) refer to challenge as the extent to which a game's environment provides adequate opportunities for action. Prior literature shows that consumers associate challenging video games with addictive video games and games in which gamers play longer (Balakrishnan & Griffiths, 2019). Finally, the need for escapism alludes to the need to avoid thinking about real-life problems by immersing oneself in video games (Xu et al. 2012). According to Caplan et al. (2009), the need for an escapism driver is the deliberate use of video games to escape reality, immersion in a fantasy world, and avoidance of real-world issues. Thus, the definition of escapism emphasizes the abandonment of reality. In a study on gaming addiction, Melodia et al. (2022) found that seeking temporary escape from real-life situations is one of the most critical determinants of gaming disorder and spending time playing. In summary, we propose the following hypotheses:
Self-efficacy (H2), challenge (H3), and need for escapism (H4) positively influence the time spent playing video games (a) and perceived addiction to video games (b).

The "ports" or video games transferred from one platform to another are expected to be adapted to the device's characteristics. Given smartphones' smaller capacity and size, simplicity should prevail in smartphone games (ease of use is one criterion for measuring app usability) (Rahmat et al., 2017), which would also be extensible to game mechanics. The effect of sub-component achievement (self-efficacy and challenge) on playing time and addiction is, therefore, expected to be greater in the case of video game consoles than in gaming apps for smartphones, because the complexity of games requires greater involvement from the individual. By contrast, because they always carry the device with them, individuals may perceive a greater sense of addiction in response to the need for escapism because they can use smartphone app games as a means of distraction and diversion whenever they want. Therefore, we put up subsequent hypotheses:
Self-efficacy has a greater effect on the time spent playing video games (H2a.1) and on perceived addiction to video games (H2b.1) in console gamers than in smartphone gamers.
Challenge has a greater effect on the time spent playing video games (H3a.1) and on perceived addiction to video games (H3b.1) in console gamers than in smartphone gamers.
The need for escapism has a greater effect on the time spent playing video games (H4a.1) and perceived addiction to video games (H4b.1) in smartphone gamers than in console gamers.

5. Inhibitors to perceived addiction to video games

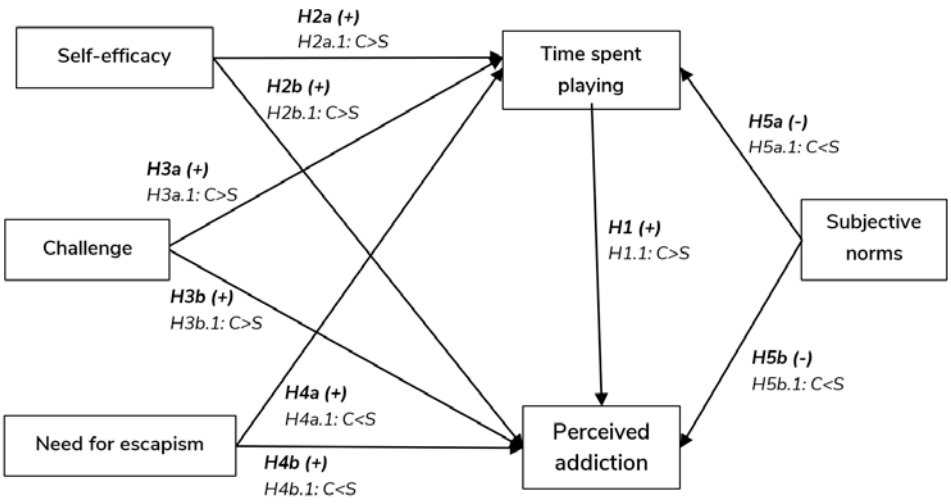
On the other hand, subjective norms inhibit the time devoted to gaming and addiction, that is, the influence of the referent group and the drive to comply with the expectations of these referents. Subjective norms refer to how people behave based on important people's beliefs to win their

acceptance or support (Chen, 2020). Thus, subjective norms comprise people's perceptions of the social consequences of a particular behavior (Chatterjee et al., 2025). Subjective norms address the function of referents (person or group), and it has been suggested that people are encouraged to adopt behaviors accepted by referents in the information system and addiction literature (Chen, 2020; Sun & Zhang, 2021). In the context of gaming addiction, users with a higher awareness of subjective norms show a higher willingness to avoid problematic behaviors (Chen et al., 2020; Wang et al., 2017). Social pressure against gaming has a significant impact as an inhibitor of socially undesirable behaviors. Thus, when video gamers observe that other important people refer to playing video games as a particularly questionable behavior, they may conclude that doing so affects their status inside the group. They may refrain from playing video games and develop an overuse of video games. We propose that:
Subjective norms negatively influenced the time spent playing video games (H5a) and perceived addiction to video games (H5b).

Likewise, regarding subjective norms, we consider that being able to play at any time and place with a smartphone (Chen, 2020) may expose individuals to more visibility among referents than when they play at home on a video game console; that is, we assume that the effect of subjective norms on gamers' behavior will be greater for smartphone gamers. In addition, awareness of the developing behavioral problems has increased around the overuse of smartphones (Busch & McCarthy, 2021), which could increase social pressure against the overuse of this specific device (smartphone) for gaming and other activities (more than in the case of consoles). Thus, we suggest that:
Subjective norms have a greater effect on the time spent playing video games (H5a.1) and on perceived addiction to video games (H5b.1) in smartphone gamers than in console gamers.

Figure 1 shows the research model of the study:

Figure 1. Research model: Console gamers (C) versus Smartphone gamers (S)



Source: Own elaboration.

6. Methods

6.1. Sample

Information was gathered using a questionnaire. A non-probabilistic sampling method was used to collect data by combining convenience sampling and snowball sampling. Several studies in the field of consumer behavior have used this procedure to obtain a specific consumer profile (Al-Qudah et al., 2024; de Azambuja et al., 2023; Garrouch and Mzoughi, 2025).

We distributed the questionnaire to undergraduate students of two Spanish higher education institutions in two urban cities, all of whom had experience in using games. We recruited students because statistics on videogame use indicated that young people use them intensively (Statista, 2025b). A group of gamers was contacted, and each was asked to answer a questionnaire and collect two additional questionnaires from other gamers they knew. The questionnaire was delivered in print to ensure greater control over responses. Two screening questions were explicitly incorporated to choose participants for the questionnaire: engaging in gameplay at least once a month and possessing access to a console or smartphone with gaming capability. Participation in this process was voluntary, although participation involved commitment to collecting supplemental questionnaires with participants who accomplished the criterion selection considered in the survey. They were asked to choose individuals from their families, friends, and acquaintances, preferably of different ages, to gather information from other player profiles. Although this implies a convenient snowball sampling process, the procedure allows us to identify the target.

Two versions of the questionnaire were designed: one for individuals who identified primarily as console gamers, and another for those who identified as smartphone gamers. The questionnaire was divided into three sections. The first section asked about the type of games played, time spent playing, perceptions of subjective norms, self-efficacy, challenge, need for escapism, and perceived addiction when playing. The second section asked about their video game purchasing behavior and the last section asked for demographic information.

Following this process, 547 valid questionnaires were collected: 178 from console video gameplayers and 369 from smartphone app players in two urban Spanish capitals. The questionnaire did not include any personal data (name, email, etc.) to avoid identifying participants in the anonymous sample, and data were used in an aggregated manner. Ethical guidelines for protecting personal information were followed throughout the entire information collection process; nonetheless, institutional ethical approval was not required. Table 1 provides a description of the sample. Table 2 shows the types of games played.

Table 1. Sample description

Type of device	Gender (%)		Age (%)		
	Men	Women	12 to 20	21 to 25	Over 25
Consoles	68,4%	31,6%	24,3%	53,1%	22,6%
Smartphone	38,6%	61,4%	45,4%	40,0%	14,6%

Source: own elaboration.

Table 2. Sample description

Games (Mean*)	Console games	Smartphone games
Fighting	2.11	1.51
First-person shooter	2.72	1.50
Platform games	2.05	1.86
Strategy games	2.41	2.21
Simulation	2.61	2.41
Inventive or cognitive	2.26	3.04
Racing	2.65	2.04
Adventure or thrillers	2.37	1.64
Role-playing games	2.02	1.60
Sports	2.99	2.03
Dancing and music	1.66	1.77
Party games	1.86	1.93

Source: Own elaboration.
(*) How often do they play different kinds of games? Five-point scale (1: Never or hardly ever; 2: Low frequency; 3: Medium frequency; 4: High frequency; 5: Very high frequency).

6.2. Instruments

In most cases, we employed scales that have been validated in previous studies. Table 2 presents the indicators and their respective descriptive statistics. To objectively measure the time spent playing video games, we asked how many hours the users played each week. For the remaining variables, we used five-position reflective scales. Perceived addiction to video games was measured using a scale proposed by Xu et al. (2012). Perceived self-efficacy consisted of four items adapted from Bandura (2006) and Dang (2009). Challenge was measured using the four-item scale proposed by Badrinarayanan et al. (2014). A three-item scale developed by Xu et al. (2012) was used to measure the need for escapism. Finally, subjective norms were measured using a two-item semantic differential scale based on Bagozzi et al. (2002).

To avoid or at least minimize common method variance (CMV) bias, we followed the recommendations of Podsakoff et al. (2003) when designing the questionnaire: item wording was revised to avoid ambiguous or unfamiliar terms, different response formats were used, and the question order did not match the causal sequence in the model. In addition, the Harman's single-factor test was performed. Exploratory factor analysis with all indicators resulted in a solution in which five factors were extracted with an eigenvalue greater than one, accounting for less than 64.9% of the explained variance and with the first factor explaining only 17.9% of the variance. In summary, the procedural remedies applied, and the results of the Harman test suggest that CMV was not a significant concern in this study.

6.3. Statistical analysis

Table 3. Measurement of variables

	Console gamers			Smartphone gamers		
	Mean	SD	Loadings	Mean	SD	Loadings
Self-efficacy						
I find it very easy to get used to how a video game works	**3.69**	1.032	0.789	**3.55**	1.073	0.666
I know how to overcome most of the challenges that emerge during the game	**3.34**	0.890	0.825	**3.20**	1.005	0.784
I have developed a "sixth sense" to discover tricks and challenges in a video game	**2.81**	1.112	0.766	**2.54**	1.088	0.801
I consider myself a high-level player	**3.11**	1.132	0.861	**2.58**	1.113	0.830
Challenge						
Playing video games challenges me to develop my skills	**3.22**	1.106	0.843	**2.83**	1.089	0.820
Playing video games poses a challenge to me	**2.81**	1.287	0.823	**2.13**	1.107	0.809
Playing video games broadens my skills	**2.85**	1.135	0.900	**2.54**	1.095	0.898
Playing video games allows me to put my skills to the test	**3.22**	1.107	0.891	**2.81**	1.151	0.863
Need for escapism						
Playing video games allows me to forget real-life worries and problems	**3.63**	1.197	0.833	**2.98**	1.312	0.815
I usually play to relax from the stress of work or daily study	**3.69**	1.218	0.792	**3.26**	1.287	0.759
I usually play to get away from the problems of the real world	**2.47**	1.270	0.829	**2.21**	1.283	0.918
Subjective norms. Most of the people who are important to me ...						
... think I shouldn't carry on playing video games	**2.95**	0.970	0.732	**3.09**	1.079	0.751
... disapprove of me playing video games	**3.42**	1.085	0.824	**3.54**	1.110	0.792
Time spent playing						
About how long do you spend playing video games during the week?	**8.59**	9.828	1.000	**4.90**	6.144	1.000
Perceived addiction						
My love of video games has affected my social life on occasions	**1.76**	1.110	0.777	**1.48**	0.961	0.804
My love of video games has interfered with my work or studies on occasions	**2.13**	1.255	0.706	**1.82**	1.086	0.707
I feel agitated when I am not playing	**1.38**	0.857	0.699	**1.31**	0.771	0.757
I have tried unsuccessfully to cut down on the time I spend playing video games	**1.53**	0.903	0.773	**1.37**	0.836	0.752
I have had arguments at home because of the time I spend playing video games	**2.08**	1.228	0.731	**1.56**	0.981	0.743
I often sleep less than I should, or I skip meals as a result of playing video games	**1.63**	1.087	0.742	**1.31**	0.762	0.676

Source: Own elaboration.

The model was estimated using Partial Least Squares Structural Equation Modelling with SmartPLS software (Hair et al., 2018; Hair et al., 2011). Specifically, we used PLS multigroup analysis to compare video game console gamers and smartphone gamers. PLS-SEM is appropriate for small sample sizes and makes no distributional assumptions regarding underlying data (Hair et al., 2018). Specifically, we used PLS multigroup analysis to compare video game console and smartphone gamers, that is, to evaluate whether the differences between the path coefficients of each group were significant.

Table 3 shows the standardized factor loadings resulting from the estimation of each construct. Comparing the relationships between groups requires measurement model invariance. Because full metric invariance is highly unlikely (Steenkamp & Baumgartner, 1998), partial metric invariance is commonly used for meaningful group comparisons. As shown in Table 3, configural invariance was accepted. Metric invariance was achieved for most items. These results prove that there is sufficient group equivalence to make cross-group inferences.

Table 4 shows Cronbach's α coefficient values, composite reliability, and average variance extracted (AVE). All scores were above the recommended thresholds, allowing us to conclude that these scales exhibited sufficient reliability.

Table 4. Reliability values

	Cronbach's Alpha		Composite reliability		AVE	
	Console gamers	Smartphone gamers	Console gamers	Smartphone gamers	Console gamers	Smartphone gamers
Perceived addiction	0.836	0.840	0.880	0882	0.550	0.555
Challenge	0.880	0.870	0.923	0.911	0.750	0.721
Need for escapism	0.761	0.803	0.862	0.875	0.676	0.700
Self-efficacy	0.834	0.802	0.886	0.862	0.660	0.612
Subjective norms	0.686	0.700	0.736	0.901	0.612	0.820

Source: Own elaboration.

Table 5 shows the correlations among the constructs for all variables included in our study. According to Fornell and Larcker's (1981) criterion, the square root of the reflective construct AVE is greater than its correlation with the remaining constructs, thereby confirming the discriminant validity of reflective scales. In addition, the approach recently proposed by Henseler et al. (2015) was applied, and it was confirmed that the heterotrait-monotrait ratio of correlations (HTMT criterion) is below 0.9. Thus, it can be concluded that the reflective constructs exhibited sufficient discriminant validity.

Table 5. Correlation matrix and HTMT criterion

Console gamers	Perceived addiction	Challenge	Need for escapism	Self-efficacy	Subjective norms
Perceived addiction	0.741	0.408	0.411	0.435	0.099
Challenge	0.356	0.866	0.510	0.619	0.090
Need for escapism	0.340	0.414	0.822	0.340	0.134
Self-efficacy	0.391	0.556	0.264	0.813	0.227
Subjective norms	-0.001	0.063	0.139	0.181	0.782
Time spent playing	0.409	0.266	0.121	0.299	0.049
Smartphone gamers	Perceived addiction	Challenge	Need for escapism	Self-efficacy	Subjective norms
Perceived addiction	0.745	0.396	0.361	0.272	0.167
Challenge	0.348	0.849	0.547	0.522	0.085
Need for escapism	0.347	0.451	0.837	0.367	0.066
Self-efficacy	0.255	0.453	0.268	0.782	0.069
Subjective norms	-0.124	-0.062	0.008	-0.002	0.906
Time spent playing	0.140	0.109	0.020	0.108	0.024

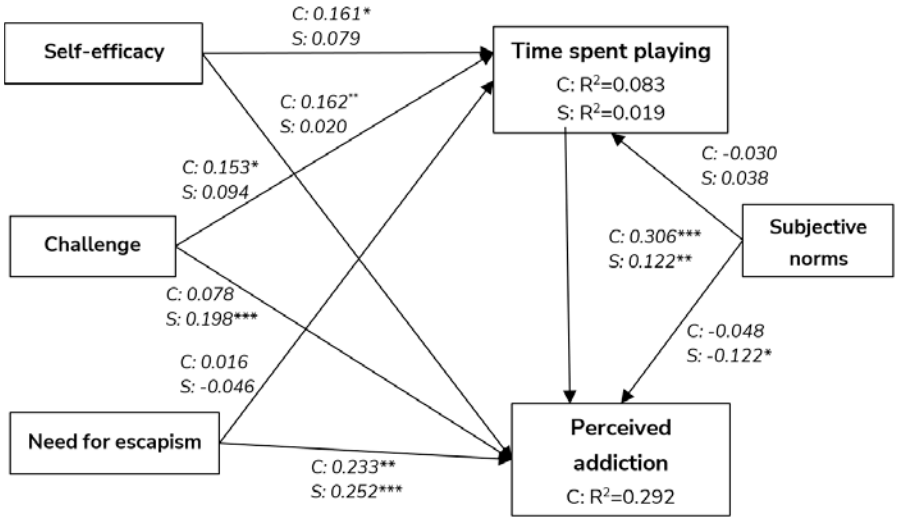
Source: Own elaboration.
Note: The diagonal shows the squared root of the AVE. The heterotrait-monotrait ratio is shown above the diagonal.

7. Results

First, as shown in Table 3, we conducted a difference-of-means test for each item in the measuring scales. In general terms, self-efficacy, challenge, need for escapism, and addiction items showed higher means in the subsample of video game console gamers than in the subsample of smartphone gamers. Moreover, console gamers played an average of eight hours a week, whereas smartphone gamers played less than five hours a week (4.90 h). Regarding perceived addiction, all mean values were between 1.3 and 2 (only two items were slightly above this figure for video game console gamers).

Figure 2 shows the results of the multigroup analysis (video game console gamers versus smartphone gamers) for the proposed relationships and the R^2 of the endogenous variables. To evaluate model fit, we examined the standardized root mean square residual (SRMR), unweighted least squares discrepancy (d_ULS), and root mean squared residual covariance matrix of the outer model residuals (RMS_theta). As observed, the R^2 values were considerably low in the case of the time spent playing. For smartphone gamers, none of the proposed variables determined the number of hours spent playing games; in the case of console gamers, the time spent playing was explained only marginally by perceived self-efficacy and the challenge of video games. However, this model explains a limited percentage of addiction (29.2% for console gamers and 22.3% for smartphone gamers). Nevertheless, we consider these results relevant because they allow us to identify some of the causes of gaming addiction, even though other possible determinants, such as personal and social conditions or other psychological characteristics of the individual, are not addressed in this study. In the Discussion section, we elaborate on the results and hypotheses acceptance or rejection.

Figure 2. Research model: Console gamers versus Smartphone gamers



C: Console Gamers; S: Smartphone gamers
(***) p<0.001; (**) p<0.01; (*) p< 0.05
Bold-type indicates significant differences between groups (p<0.05)
Source: Own elaboration.

8. Discussion

Because of the importance of the video game industry today, many researchers have focused their attention on video game use and drivers (Király et al., 2017; Rau & Ji, 2018; Yucra-Quispe et al., 2022); addiction is one of the most widely studied variables (Inoue et al., 2022; Lemmens et al., 2011; Paik et al., 2017). Given this context, this research seeks to go a step further by conferring a central role to the device with which the player interacts: console or smartphone. Specifically, this empirical study explores the time devoted to playing video games and addiction to video games, comparing the perceptions of smartphone gamers and console gamers.

We first found a positive and significant link between time spent playing and perceived addiction to video games (H1), both in the case of console and smartphone gamers. However, this effect differs (H1.1 is supported). Although there is a similar amount of time dedicated to gaming, perceived addiction is greater for console gamers than smartphone gamers. Hence, this study reinforces the adequacy of considering the device used (console versus smartphone) as a key moderating variable in behavioral studies related to gaming. Classical models of video game addiction should be refined to consider the contextual influence of the device used.

Second, from an academic perspective, authors should consider differentiated motivational pathways. The results suggest that motivational theories such as the one proposed by Bandura (1977, 2006) and others, such as the Uses and Gratifications Theory (Blumler, 1979), may function differently depending on the gaming device. This study has tried to determine how motivational constructs, such as self-efficacy, challenge, and the need for escapism, operate distinctly across platforms, and how they influence addiction.

In this sense, following Bandura's motivational theory, the positive effect of self-efficacy on time spent playing video games (H2a) and perceived addiction (H2b) is supported in the case of console gamers. By contrast, for smartphone gamers, self-efficacy had only a slight influence on perceived addiction. As we suspected, the effect of self-efficacy was greater in console gamers (H2a.1 and H2b.1). Console gamers seem to have a clear addiction profile motivated by their expertise. This result aligns with other authors, such as Cudo et al. (2019), who showed how games motivate players to keep playing (time devoted playing) and make them perceive problematic video gaming behavior, but only in the case of console gamers. Since smartphone use often involves simultaneous media consumption, this can affect smartphone game users who are not aware of their self-efficacy. This study opens a path for integrating findings from the media multitasking literature with game research to explore how variables such as cognitive load or engagement may alter self-efficacy and addiction perception.

Focusing on the challenge effect, we found a significant impact only on smartphone gamers' perceived addiction (H3b). However, we cannot confirm whether the relationship between the two variables is significantly different between the two types of video gamers. When a challenge is a driver, individuals are likely to play the app game in a more premeditated or proactive manner, thus intensifying their perceived addiction. Findings indicate that the motive to play as a challenge to develop individual skills is greater in video game console gamers, but that it does not affect the time spent playing or perceived addiction. However, in the case of smartphone gamers, we found a positive relationship between perceived challenge and perceived addiction (in contrast to the results reported by Király et al. (2017), in which skill development did not influence problematic online gaming but did impact gaming time).

The need for escapism does not influence the time spent gaming (H4a is rejected), but does impact perceived addiction (H4b) in the two cases (it is one of the strongest relations found). However, there were no significant differences between smartphone gamers and console gamers (H4a.1 and H4b.1). Therefore, getting away from reality through gaming entails a negative feeling or guilt, which translates to a greater perceived addiction. In contrast to the results reported by Király et al. (2017), we found no relationship between the need for escapism and the time spent playing, although we did see a link to perceived addiction. In addition, in the case of smartphone gamers, it is possible that smartphones allow them to escape from real life at any time and in any place, making individuals feel more dependent on them.

In this sense, future inquiry should explore which situations (game contexts or type of game) play for escapism may be linked to positive leisure without any risk of addiction. For example, following the decalogue of good practices for responsible use of video games of the AEVI (Asociación Española de Videojuegos), it is desirable in family dynamics to agree on rules of video gaming specifying days, hours, and times of fun, always prioritizing other activities such as responsibilities at home, school, and work (AEVI, 2019).

These findings related to escapism also highlight the possibility of distinguishing between situational (context-dependent) and trait-based (personality-related) escapism, as it can show different effects in enhancing addiction.

About subjective norms, a key variable in the Theory of Planned Behavior, and contrary to our expectations (Chen et al., 2020; Wang et al., 2017), it only reduces perceived addiction in the case of smartphone gamers (as pointed out, gaming is more "visible," such that the social norm has a greater influence than when playing on consoles) (H5b). Nevertheless, there are no significant differences between smartphones and console gamers; thus, H5a.1 and H5b.1 are rejected. Hence, it may be necessary to reconsider the role of subjective norms, as social visibility and context can play a critical role in self-perception of addiction and affect self-regulation in game contexts. Gamers can play anytime and anywhere in the presence of anybody, which may lead individuals to perceive a greater feeling of addiction than when playing at home in a private place or simultaneously.

The results of this study have several practical implications. The first implication of our research is that the awareness of addiction is lower when individuals play with apps on their smartphones, which may pose a potential risk. The amount of time console gamers devote to gaming is notably greater than that spent by smartphone gamers, and even though perceived addiction is low in both cases, it is significantly lower for smartphone gamers. However, although the influence of time spent playing on perceived addiction was positive in both cases, it was markedly higher for video game console gamers.

When using a smartphone, individuals might not feel guilty about the time spent playing smartphone games because the smartphone is often used, particularly for smartphone games, in downtime or empty time (for example, when waiting for something or someone, or on a train or bus journeys, etc.). However, playing console video games requires reserving physical and temporal space, implying that individuals have a greater awareness of the time invested and are aware that they are stealing time from other activities. In addition, when playing with a smartphone, individuals are likely to use the device's other functions almost simultaneously (such as other apps, chats, and social networks), which probably occurs less when playing on a video game console, where players tend to focus on the activity in hand.

The second implication is that perceived self-efficacy is a relevant driver of time and addiction for video game console gamers but not smartphone gamers. The greater 'personalization' of smartphone games, both in terms of native smartphone games (Pockémon GO, Candy Crush, etc.) as well as video game consoles adapted to the smartphone interface, may be auto-selecting players based on their level of expertise, that way perceived self-efficacy is not a determinant of perceived addiction in the case of smartphone gamers. Game developers should design platform-sensitive features to support healthy usage, such as adaptive difficulty for challenges or built-in reminders for escapism-prone players. Console games may benefit from session-time alerts, whereas smartphone games can include discrete nudges or gamified breaks.

Third, it is imperative to recognize their ethical obligation to caution against the potential of these products to induce consumers to flee from their reality, as is already mandated by legislation for other product categories (e.g., online gambling) to mitigate addictive behaviors. Marketers must recognize that addiction cues vary by device and adapt their communication strategies accordingly. Advertising that appeals to escapism or challenge may require stricter ethical scrutiny for mobile games, where users are more prone to compulsive behavior in informal contexts. As suggested before, technological firms and app stores should develop more nuanced parental control systems that reflect both game content and usage patterns (i.e., playing during school or working hours for smartphone games or the total session duration in the case of console gamers).

In sum, and beyond its theoretical contribution, this study offers managerial implications for companies and policymakers. In the former case, game developers and marketers should design

and offer safeguards (i.e., play-time reminders or adaptive difficulty possibilities) according to device-related usage patterns. Companies have a growing responsibility to indirectly promote overuse, especially when escapism or perceived challenge is a dominant driver. Corporate social responsibility initiatives could include mental health alliances, transparency in game performance, and support for families in establishing healthy limits (i.e., for mobile-based games that interfere with daily life in a subtle way). In the latter case, public health campaigns must recognize that the same motivational drivers can have different results in mobile versus console game contexts. In this regard, perceived self-efficacy- does not appear to be a good mitigator of problematic play among smartphone users. Policymakers should consider differentiated addiction profiles by device when designing regulations or educational campaigns because, while console gaming may need guidelines around play duration and family agreements, smartphone games might ensure public awareness of unconscious play.

9. Conclusion

This study advances the literature on video-game behavior by foregrounding the devices through which games are accessed and demonstrating that playing consoles versus smartphones is far from a trivial distinction. The objective of this study was to determine whether perceived addiction to video games is affected by the type of device used (smartphone *versus* console), considering different drivers for playing. These results allowed us to answer our research questions.

Collecting information from a sample of console and smartphone gamers, both the time invested in gaming and the need for escapism emerged as determinants of perceived addiction; however, the motivational pathways diverged according to the device used to play games. Console players reported higher self-efficacy-, devoted almost twice as many hours to gaming, and perceived a stronger link between time spent and addiction, suggesting that the more deliberate, spatially bounded nature of console play heightens their awareness of potential over-use. In contrast, smartphone gamers, who often dedicate short times to play, showed lower perceived addiction but felt more influenced by challenge or escapist motives. These results indicate that user experience, motivations, and addiction perceptions are closely tied to the device used.

The implications of our research lead us to seek profound insights into game addiction. This research shows that companies and policymakers must consider differences according to the device used to play games, as user behavior and motivations are not the same when playing games on a console or smartphone. In our opinion, it is imperative to emphasize that video games become problematic when utilized excessively. This investigation elucidates the elements that compel consumers to invest more time in video games and see themselves as addicted, thereby providing valuable insights for developers, marketers, and policymakers.

Although the findings contribute to the literature, some limitations require further examination and open new avenues for further research. First, the proposed model should be tested with specific segments of gamers to establish the differences in various gaming disorders. In this regard, distinguishing between individuals who are addicted to video games in general and those who are addicted to a specific app game would be helpful. Second, it would also be interesting to explore which part of addiction to app games responds to gaming in itself (game addiction) and which part involves dependence on the device (information technology addiction or smartphone addiction) (Carbonell et al., 2012; Nah et al., 2017). Lopez-Fernandez et al. (2018) have published a study that analyzes the relationship between gaming on smartphones and self-perceived problematic smartphones in the opposite direction. Their findings suggested that smartphone games do not predict problematic smartphone use.

Nevertheless, further study of the relationship between the two types of use-addiction behavior is worthwhile. Third, gamers were asked about the time invested in playing; that is, it is a subjective measure that could be inaccurate because of social desirability, recall bias, or exaggeration. In

addition, we asked about the time spent playing each week. Asking about the time spent playing each day could avoid a recall bias. Fourth, the sampling method was not probabilistic, thus making the results less generalizable to the population and calling for a wider and random sampling process. Fifth, another of our foreseen lines of research involves analyzing the profile of smartphone and video game console gamers, considering other variables related to personal traits, as a recent study has demonstrated its importance when studying gaming addiction (Sánchez-Llorens et al., 2023). Finally, future studies could investigate contextual factors (i.e., play location, social setting, and game genre) that may turn escapism or challenge into either healthy leisure or harmful excessive game engagement and should examine whether family gaming schedules and norms can effectively curb excessive use of game devices.

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11. Contributions

Roles	Author 1	Author 2	Author 3	Author 4
Conceptualization	X			
Formal analysis	X	X	X	X
Fundraising		X		X
Project management	X			X
Research	X	X	X	X
Methodology	X	X	X	
Data processing		X	X	
Resources	X	X	X	X
Software	X		X	
Supervision		X		X
Validation	X		X	
Data visualization		X		X
Writing - original draft	X		X	
Writing - review and editing	X	X		X

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