



# Fear of Missing Out, Gaming Disorder and Internet Gaming Disorder: Systematic Review

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## Abstract

**Purpose of review** Internet gaming disorder (IGD), Gaming disorder (GD) and fear of missing out (FoMO) share a dysfunctional use of technology. Despite the increased academic interest in the relationship between these constructs, no attempts have been made to synthesize extant knowledge on it. Therefore, this paper presents a systematic review following the PRISMA protocol assessing 13 manuscripts.

**Recent findings** Overall, studies have confirmed a correlation between FoMO and IGD or GD, a direct effect of FoMO on IGD or GD, and a mediating role of FoMO with IGD/GD and psychosocial variables.

**Summary** In conclusion, FoMO is a complex construct and must be studied further to determine its components and forms such as trait-FoMO, and state-FoMO, and applied to the online context in order to properly understand this construct. This could have practical implications for the intervention and prevention of GD/IGD and FoMO.

**Keywords** Fear of missing out · FoMO · Internet gaming disorder · IGD · Gaming disorder · GD · Systematic review

## Introduction

### Background

People currently frequently experience “Fear of Missing Out” (FoMO), which is defined as the “pervasive apprehension that others might be having rewarding experiences from which one is absent” [1]. Research on FoMO suggests that this construct is associated with several other negative emotional states [2] which in turn can lead to behavioral responses to avoid missing out [3, 4]. This phenomenon, in addition to predicting stress, has been associated with several other problems such as posttraumatic stress disorder, and cyberstalking [5–7]. Likewise, it has been linked to ‘smartphone addiction’, and the excessive use of social networking sites and the Internet [8, 9], which could in turn lead to behavioral addictions such as Gaming disorder (GD)

and Internet gaming disorder (IGD). IGD is the only one among the set of behavioral addictions related to the use of the Internet, that has been included in the Section 3 of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and in the DSM-5-TR as a condition that needs further study before being recognized as an independent clinical disorder [10, 11]. Additionally, GD has also been included in the ICD-11 [12] and is characterized by a pattern of as repeated gaming (online or offline) manifested by impaired control over gaming, increasing priority given to gaming over other activities, continuous and escalated gaming despite the negative consequences, and functional impairment or marked distress. Both definitions of IGD in the DSM-5 and GD in the ICD-11 are distinct, highlighting the importance of considering them separately. In the DSM-5, a diagnosis of IGD requires meeting five out of nine criteria within a year, including preoccupation, withdrawal, tolerance, loss of control, and continued use despite negative consequences. In contrast, the ICD-11 requires individuals to exhibit three main symptoms to be diagnosed with GD. Additionally, while the DSM-5 includes biological concepts such as withdrawal and tolerance, the ICD-11 emphasizes functional impairment and pathological behaviors in its diagnostic criteria. These differences underscore the need for distinct approaches in understanding

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and addressing these gaming-related disorders [13]. Moreover, previous studies have suggested that non-online video games, especially those without multiplayer components, are less associated with the development of gaming disorders compared to online video games, especially those played socially [14–16]. These games typically involve less interactive and social reward factors compared to online multiplayer games, which are known to pose a higher risk of addiction. However, it is recognized that excessive gaming, regardless of format, may still lead to problematic behavior and warrants consideration based on established diagnostic criteria such as those outlined in DSM-5 or ICD-11. For these reasons, in the present study we will consider them as distinct terms. Furthermore, it is important to note that in the literature there are other terms used to refer to these constructs, such as pathological gaming [17] or problematic gaming [18, 19]. However, these terms do not provide a precise definition like those given in the DSM-5 and ICD-11, and therefore 'problematic' or 'pathological' may encompass various and vague criteria. Thus, it is important to adhere to the frameworks provided by the DSM-5 and ICD-11 in order to achieve consensus and clear recognition of this issue.

These constructs, IGD, GD and FoMO, represent both a dysfunctional component of Internet use, because they are associated with disruption of daily social and academic activities, and a social component of relating to others, because in both there might be a need to maintain a sense of belonging, and to compensate for the lack of offline relationships [20]. Thus, video games can be a safe space to disconnect from reality and address the fear of missing out on enjoyable experiences [21], so vulnerable people who experience negative emotions and FoMO are also more likely to view online games as a way to get positive social approval and acceptance [21]. Additionally, some studies have highlighted the strong social component of online video games, particularly those that are massively multiplayer online games (MMORPGs) [22, 23]. These games not only provide entertainment, but also facilitate new forms of social interaction and social identity development. MMORPGs attract adults and adolescents from diverse backgrounds, who spend considerable time in these environments, suggesting a significant impact on socialization, especially among the most dedicated players. These games promote group interaction, involvement, flexibility, and mastery, which can result in meaningful friendships and personal empowerment. In addition, MMORPGs require players to collaborate and work as a team, which strengthens their relationships through mutual dependence and provides a deep understanding of teamwork. This aspect of collaboration and relationship building within the game sometimes translates into meaningful friendships and relationships in real life [22, 23]. In this sense, another systematic review examined the

adaptive psychosocial well-being outcomes of MMORPGs for adolescent and adult gamers [24]. The research suggested that playing MMORPGs can foster one's social well-being both in virtual worlds and in offline life, providing opportunities for social contact that can be as valuable as other leisure and sporting activities in the real world. This provides opportunities to meet social needs but also involves FoMO. This can be explained by the fact that when players leave the online multiplayer game, they may feel guilty about leaving their fellow players behind and also experience FoMO [1]. To cope with worrying about losing their online social status and progression in line with their gaming group, gamers may feel the urge to play more frequently to prevent FoMO and may be more likely to continue playing, resulting in more IGD-related symptoms [1, 21]. Therefore, FoMO, GD and IGD share several characteristics. While FoMO is not a societal problem itself, it may lead to IGD or other Internet Use Disorders and can be considered a mechanism or risk factor. GD and IGD constitute normative phenomenon and public health issues that can have several psychosocial consequences for the affected individual and for society as a whole.

Furthermore, this connection between these constructs has been explained in the literature from the Person-Affect-Cognition-Execution (I-PACE) theoretical framework of maladaptive Internet use [25] which considers that there are certain dispositional variables that have an important influence on problematic Internet use. These background, dispositional variables include personality traits, psychopathology, basic cognitions, and biological predispositions. Furthermore, this model theorizes that such dispositional variables can lead to cognitive and affective responses such as coping styles, impaired executive functioning, mood dysregulation, and cognitive biases in Internet use such as FoMO, which again strongly influence problematic Internet use. Along with this theory, the constructs of this study are also embedded in self-determination theory (SDT) [26]. SDT theorizes that the satisfaction of basic needs leads to optimal levels of well-being, while dissatisfaction with needs such as relatedness online and offline, which is associated with GD and IGD, leads to lower levels of well-being [27, 28]. Similarly, FoMO is understood to be characterized by relatedness dissatisfaction or frustration.

## Aims

Previous research has examined the relationship between these constructs [29, 30]. However, despite increased academic interest, no attempts have been made to synthesize extant knowledge on the relationship between FoMO and GD/IGD. To address this gap, a systematic review (SR) on the relation of FoMO and GD/IGD is presented.

## Methods

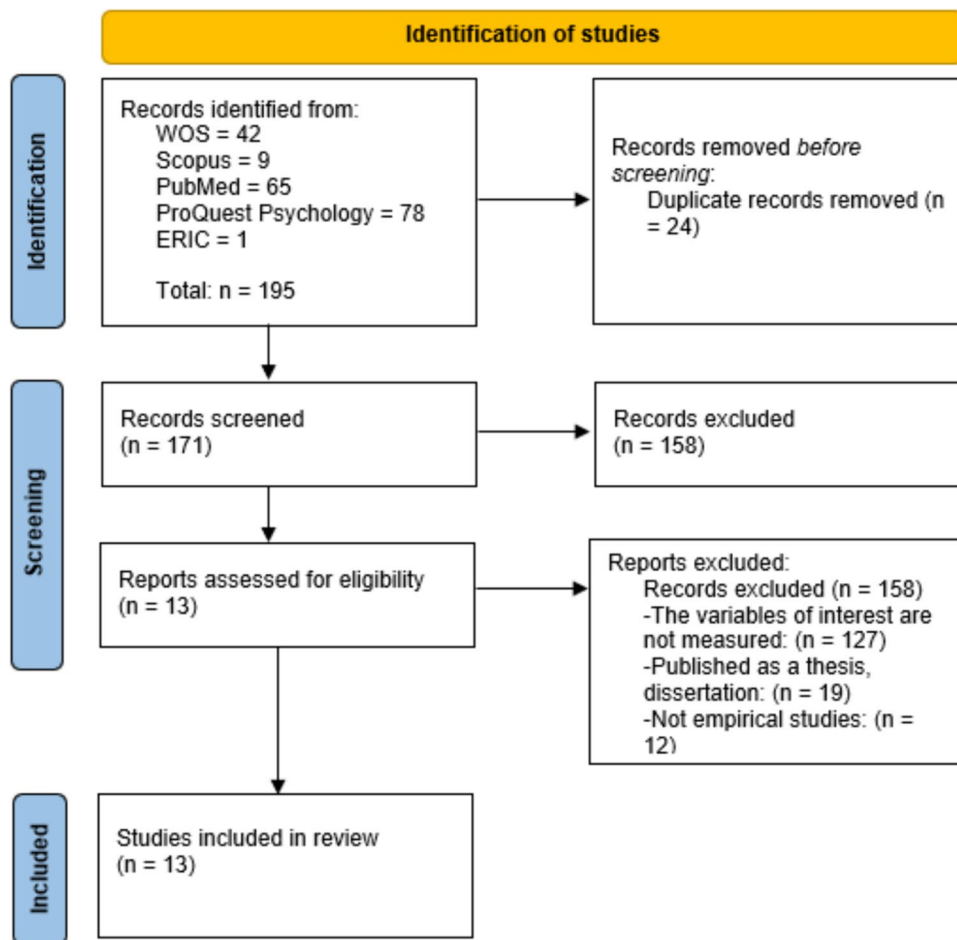
This SR was conducted in line with the structured Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [31] and was sent to Prospero [CRD42023493983]. The authors chose the Scopus, Web of Science, ERIC, ProQuest Psychology, PubMed and Google Scholar databases since they followed several published articles in top-ranking journals [32, 33]. The search was performed on the title, abstract and keywords. The following keywords were used in the systematic search, and constituted the full search term used: “(IGD OR GD OR Gaming disorder OR Internet gaming disorder OR Internet gaming addiction OR Internet game addiction OR Online game addiction OR Internet game disorder OR Video game addiction) AND (Fear of missing out OR FoMO)”. The choice of keywords is determined by the objective of this systematic literature review research, which is to determine the relationship between FoMO and GD/IGD (Fig. 1).

Studies were eligible if they satisfied the following criteria: 1) a focus on “Internet gaming disorder”, “gaming disorder”, “Internet gaming addiction”, “Internet game

addiction”, “Online game addiction”, “Internet game disorder”, “Video game addiction” (the latter includes a dysfunctional online and/or offline use of videogames (e.g., computer and console games)), “GD” and “IGD” as a borrowed nomenclature from the DSM-5 [10], and “Fear of missing out” or the nomenclature “FoMO”; 2) were published within the given time interval (from 2013 to June 28, 2024); 3) included either of the search terms for both, IGD or GD and FoMO in the title, keywords or abstract; 4) studies were quantitative and original empirical studies published in a peer reviewed journal; 5) included in its empirical analysis one of the keywords mentioned before for both, IGD and FoMO; and 6) studies of the general population and clinical samples were included.

Studies were excluded if 1) FoMO and/or GD-IGD were not investigated empirically in the article; 2) they were published as a conference paper, review, thesis, book/chapter, or dissertation in a magazine or trade journal; 3) they were published in a language other than English and Spanish; 4) they analyzed Internet use as a whole rather than IGD or GD; and/or 5) they examined IGD/GD but not FoMO or vice versa.

Fig. 1 PRISMA flow diagram based on PRISMA 2020 statement [31]



After using that search equation and the criteria for articles published from 2013 (the year in which FoMO was defined [1] and IGD appeared in the DSM-5) to June 28, 2024, a total of 195 articles were found. After the removal of duplicate articles (24 articles), a final sample of 171 articles remained. The review process independently applied the inclusion and exclusion criteria by two researchers, who, after comparing the results, reached an agreement of 100%. Therefore, this screening resulted in 13 articles that made up the final SR sample.

## Results

The final literature corpus included 13 articles. These studies have been performed in UK ( $n=1$ ), China ( $n=8$ ), Turkey ( $n=1$ ), Germany ( $n=1$ ), between Canada and United states ( $n=1$ ), and cross-cultural with Italy, Spain, Ecuador, and Peru ( $n=1$ ). The most used methods were cross-sectional, descriptive, and correlational studies, using a quantitative methodological design and questionnaires as a data collection instrument ( $n=9$ ). Only two studies used a longitudinal design (Table 1).

Regarding the participants, studies have focused mostly on university students [30, 34–36, 37, 38], middle school students [40], high school students [41], vocational schools students who play videogames [42], adults (age 18+ years) [43, 44], and gamers of massively multiplayer online role playing games with ages ranging from  $\leq 17$  to  $\geq 30$  [45]. The number of participants ranged from 283 to 1635. More specifically, the number of participants ranged between 283 and 812 in 5 surveys [37, 38, 40, 41, 43–45] and between 1060 and 1635 in the other 5 surveys [30, 34–36, 39, 42]. Regarding sex, the percentage of females was greater than 50% in 4 of the samples, ranging from 50.1% to 75.7% [30, 34–37, 43, 44]. While in the other samples, the percentage was between 42% and 49.7% [35, 39–41] and of 5% and 13.3% when the sample considered only gamers [42, 45].

Assessments of GD or IGD and FoMO included validated self-reported measures in  $n=12$  and  $n=13$  respectively. In the case of IGD, specific instruments were used to measure the online gambling disorder construct. Moreover, in five studies the instrument used measures GD (online and offline videogame play). In addition, one study [42] assessed Internet activities (thereby segregating the sample into SNSs users and gamers) and used the German version of The Compulsive Internet Use Scale (CIUS) [46] to assess symptoms of Internet Use Disorder (IUDs). Moreover, another study [41] used the nine diagnostic criteria proposed by the DSM-5 to measure IGD, which is used in a previous study by the same authors [47], but no details of the validation of the instrument are provided in either study. Regarding FoMO, most studies ( $n=8$ ) used the internationally validated and

widely used “FoMO scale” which was developed by Przybylski et al. [1]. However, five studies used the Trait-State Fear of Missing Out Scale (T-SFoMOS) [48] which is composed of two factor: one factor is trait-FoMO, while the other is related to online FoMO and is called state-FoMO. In terms of theory, most of the articles used either the I-PACE model ( $n=7$ ) or self-determination theory ( $n=2$ ), with both being used in two studies. Furthermore, another study used the compensatory theory of Internet use in addition to the I-PACE model [38]. Additionally, one study used the social identity and the need to belong theories [45] and another study used the “Big Five” Theory [44].

Furthermore, findings on the role of FoMO in IGD or GD are inconsistent and while the results of some studies suggest a relationship between both variables [21, 38, 39, 43, 45], others propose FoMO as a mediator or moderator between other variables (e.g. social identity or depression) and GD or IGD [37, 38, 40, 45], and others treat FoMO as a predictor variable or one that exerts a direct effect on GD or IGD [30, 38, 41]. The combined analysis of the literature of this SR reveals three lines of analysis for understanding these phenomena: correlation, mediating effect or direct effect. In Table 1, the studies that saturate in one, two or three of these lines of analysis will be analyzed. That said, it will be explained below what it has been found in each of these lines of analysis.

### Correlation between FoMO and IGD

There are eleven articles that present correlations, but one of them does not find a direct correlation between FoMO and IGD or an indirect correlation with a third variable [36] and another presents a positive and significant correlation between FoMO and Internet addiction but not GD or IGD [44]. Six of the eleven articles related FoMO to GD [30, 34, 35, 39, 40, 43]. One correlates IUDs with state FoMO and trait FoMO [42]. Three studies have shown a positive relationship between FoMO and IGD [37, 38, 41]. Furthermore, one of these three studies differentiated between trait-FoMO and state-FoMO and found significant correlations of both with online game addiction, but a stronger edge for trait-FoMO [39].

### Mediating role of FoMO

Six studies examined the mediating role of FoMO in the relationships between this variable and other variables, such as depression, anxiety, stress, health anxiety, social identity, mental health, IGD, GD, online game addiction and Internet Use Disorder, in gamers. More specifically, FoMO has been shown to mediate the relationships between depression, anxiety, and stress and IGD [40]. However, another study revealed that FoMO was not a significant mediator between

**Table 1** Main results obtained by the authors on the relationship between FoMO and IGD or GD

First author/ Year of publi- cation	Country of the sample	SS (N)	Sex (% women)	Sample age (M and SD)	DS	IGD	FoMO	Theory	Results	
									Correlation	Mediator role of FoMO
Duman (2021) [45]	Turkey	318 (MMORPGs)	5%	Appr. 22.52 ± NG	CS	OGAS	FoMO scale	SI TNB	-	SI → FoMO → OGA FoMO → OGA
Elhai (2021) [43]	Canada and United States	812	50.1%	44.45 ± 17.21	CS	GDT	FOMO scale	I-PACE	↑FoMO ↑GD	HA → FoMO → GD -
Gao (2024) [38]	China	367 (US)	-	-	Lo	OGAS	FOMO scale	I-PACE	↑FoMO ↑OGA	Lone → FoMO → OGA FoMO → OGA
Li (2020) [30]	China	1127 (US)	57.58%	20.1 ± 1.6	CS	CGDS	T-SFoMOS	SDT	↑FoMO ↑GD	-
Li (2021) [34]	China	1288	59.16%	20.0 ± 1.6	CS	CGDS	T-SFoMOS	SDT & I-PACE	↑FoMO ↑GD	-
Li (2021) [35]	China	1635	44.16%	19.65 ± 1.52	CS	GDT	T-SFoMOS	SDT & I-PACE	↑FoMO ↑GD	-
Li (2023) [39]	China	1364 (US)	48.30%	19.7 ± 1.5	CS	GDT	T-SFoMOS	I-PACE	↑FoMO ↑GD	-
O'Brien (2022) [36]	UK	1060 (US)	55%	22.46 ± 6.48	CS	IGDS9-SF	FOMO scale	I-PACE	FoMO, IGD (NS)	-
Roettinger (2021) [42]	Germany	1040 (gamers, VS)	13.3%	20.49 ± 4.10	CS	IA, CIUS	T-SFoMOS	I-PACE	↑Trait-FoMO ↑IUDs ↑State-FoMO ↑IUDs	↓MH → Trait- FoMO → IUD ↓MH → State- FoMO → IUD State-FoMO → Trait- FoMO → IUD
Varchetta (2024) [44]	Italy, Spain, Ecuador, and Peru	675	62.81%	22.73 ± 4.05	CS	IGDS9-SF	FOMO scale	Big Five Theory	↑FoMO ↑IA	-

Table 1 (continued)

First author/ Year of publi- cation	Country of the sample	SS (N)	Sex (% women)	Sample age (M and SD)	DS IGD	FoMO	Theory	Results			
								Correlation	Mediator role of FoMO	Direct influence	
Wang (2022) [40]	China	324 (Ad)	49.7%	13.07 ± 0.76	CS	IGD scale	I-PACE	↑FoMO ↑IGD	FoMO → DASS → IGD	-	
Yuan (2021) [37]	China	341	75.7%	21.24 ± 2.72	Lo	IGD scale	I-PACE	↑FoMO T2 ↑IGD T3	FoMO → D → IGD (NS)	FoMO → IGD	
Zhang (2023) [41]	China	283	42.0%	16.89 ± 0.65	CS	9 items DSM- V	FOMO scale	SDT	↑FoMO ↑IGD	-	FoMO → IGD

SS Sample size, DS design, M and SD Mean and Standard deviation, MMORPGs Massively Multiplayer Online Role Playing Games, Appr approximately, NG Not given, US University students, VS vocational schools, Ad adolescents, OGAS online game addiction scale [56], GDT The Gaming Disorder Test [57], CGDS The Chinese Gaming Disorder Scale [30], IGDS9-SF The nine-item Internet Gaming Disorder Scale-Short-Form [58], IA Internet activities (through which the sample is segmented into SNSs users and gamers), CIUS Compulsive Internet Use Scale [46], Internet gaming scale [59], IGD scale Chinese Internet Gaming Disorder Questionnaire [60], 9 items DSM-V Nine items of the diagnostic criteria proposed for Internet Gaming Disorder in the DSM-5 [10, 47], FoMO scale Fear of Missing Out scale [1], T-SFoMOS Trait-state fear of missing out scale [48], ST TNB Social identity and The need to belong theory [61], HA Health Anxiety, Lone Loneliness, IA Internet Addiction, I-PACE model [25], SDT Self-determination theory [26], OGA online game addiction, GD gaming disorder online and offline ↑: from higher to higher (correlation), NS Non-significant, IUDs Internet use disorders, DASS depression, anxiety, stress, D depressive symptoms, MH Mental health

depressive symptoms and IGD symptoms [37]. Regarding online game addiction, other authors [45] found that FoMO fully mediated the effect of social identity on online game addiction. Additionally, another study found that FoMO was a partial mediator between loneliness and OGA [38]. Moreover, in regard to GD, FoMO mediates the relationship between health anxiety and GD [43]. Finally, another study differentiated between state-FoMO and trait-FoMO and found that both mediate the relationship between mental health and problematic Internet use symptoms in the gaming population. Additionally, it was found that state-FoMO plays a mediating role in the relationship between trait-FoMO and problematic Internet use symptoms among gamers [42].

## Direct influence of FoMO to IGD

There are seven studies identified in this systematic review that found a direct effect of FoMO on IGD, some of which found a significant direct effect [34, 41] and even when mediated by another variable such as impulsivity [34], while this effect was nonsignificant in others [37]. In another study, it was found that FoMO is a critical predictor of online game addiction [45]. Additionally, another study also found that FoMO predicted OGA four months later [38]. The results of studies that differentiate between trait-FoMO and state-FoMO are varied. Another study [30] revealed nonsignificant direct effects between trait FoMO and GD, although indirect effects were found via impulsivity and playing time. On the other hand, between state-FoMO and GD, the direct effects were significant, and the indirect effects were mediated by the aforementioned variables. Finally, other authors [42] also found a significant direct effect between both trait and state FoMO and symptoms related to IUDs among gamers. However, these findings are from cross-sectional studies and causality cannot be inferred.

## Discussion

Playing online video games makes people experience a variety of emotions ranging from healthy and controlled use, that can provide a sense of belonging, relatedness, and ultimately a multitude of cognitive, psychological and personal benefits, to potential addiction and problematic use. In this sense, the study of IGD and GD has gained importance among researchers, as it addresses a public health issue whose recognition as clinical disorders in the DSM-5 is yet to be realized [10]. According to the I-PACE theoretical model and SDT, a cognitive bias and consequence of unsatisfied relatedness that is linked to IGD or GD is FoMO [25, 26]. FoMO is another recent problem that has worried researchers in the last decade. Both constructs share characteristics and can have severe psychosocial consequences. Therefore,

previous research has examined the relationship between the two. However, knowledge on the relationship between both problems has not been synthesized. Therefore, this SR aimed to fill this gap, because in order to promote healthy online videogames play and prevent IGD is crucial to comprehend the relationships between variables like FoMO on specific variables of PIU such as IGD [29].

Findings show some points of discrepancy but also allow to synthesize some common frameworks of convergence. The studies found seem to confirm a correlation between FoMO and IGD. Only one study does not confirm a such a relationship between the two constructs [36]. In addition, the correlation exists even when it comes to GD and for state and trait FoMO. This can be explained by the fact that, as mentioned above, both constructs share a socializing component, which corresponds to a motive for gamers in the case of IGD, and a side-product of relatedness frustration in the case of FoMO [41].

Regarding the role of FoMO as a mediator, a significant effect on depression, anxiety and stress has been found [40]. However, depending on the psychological construct assessed, the effect is different. For example, anxiety and stress in comparison with depression have been found to have a higher effect on IGD (mediated by FoMO). A possible explanation may be that individuals suffering from depression maintain less contact with others and pay more attention to themselves rather to what others are doing [40]. This is consistent with what was found in another study, in which FoMO does not significantly mediate between depressive symptoms and IGD [37]. Another possible explanation for this result is that individuals with depression may play video games as a form of relaxation rather than to keep increasing their ranking or improve, thus reducing the likelihood of developing IGD [37]. Another study found that FoMO serves as a partial mediator in the relationship between loneliness and online game addiction [38]. This suggests that individuals who feel lonely and have unmet socialization needs may experience heightened susceptibility to FoMO, fearing they might miss out on important information [49].

On the other hand, and consistent with the I-PACE model, cognitive responses such as FoMO serve as a mechanism to partially explain relationships between variables such as trait health anxiety during COVID-19 and GD symptoms [43]. Sometimes FoMO serves as a mediator making a relationship that existed when this construct was not taken into account disappear. For example, this occurs in the case of the relationship between social identity and online game addiction [45]. This can be explained by the fact that players of multiplayer online role-playing games see themselves as members of the same social category, which is more of an internal situation for the individual, and this increases addiction. Nevertheless, FoMO would not intervene in this social identity as is an external process that depends more

on what others do [45]. In addition, the importance of distinguishing between trait-FoMO and state-FoMO as distinct constructs to explain problematic Internet use in gamers is highlighted [42]. On the one hand, trait-FoMO is associated with low mental health and maladaptive beliefs, and on the other hand, state-FoMO corresponds to a specific cognition during online gaming that is associated with socially rewarding Internet use and the development of Internet use disorder symptoms. Additionally, there appear to be differences in the strength or nature of the correlation between GD or IGD and trait-FoMO versus state-FoMO. Trait-FoMO may have a more stable or enduring correlation with GD or IGD, reflecting a stable characteristic in the individual, while state-FoMO may show more variable correlations depending on momentary circumstances, such as recent loneliness or social interaction [39].

Furthermore, from the results found in the studies it can be deduced that FoMO has a direct effect on IGD and GD [34, 41, 45]. Moreover, one study found a direct effect of FoMO on online game addiction four months later [38]. Only one study found a non-significant effect of FoMO on IGD five months apart [37]. This can be explained by the fact that there is no distinction between trait-FoMO and state-FoMO. When distinguishing between the two types of FoMO as different constructs, it is observed that state-FoMO significantly predicts GD and IUDs in online video game players, while trait-FoMO is shown to be non-significant or significant but with a weaker effect than state-FoMO [30, 42]. Moreover, this is consistent with the fact that the state-FoMO dimension measures specifically online FoMO, since trait-FoMO corresponds to the predisposition to develop state-FoMO, and the latter evolves while utilizing internet communication applications [48].

## Limitations

Despite these existing studies, there is a gap in the literature in terms of examining the relationship between FoMO and IGD. First, prior studies have overwhelmingly focused on cross-sectional surveys, which cannot establish causality and provide only limited evidence [50]. Moreover, the greatest number of reviewed studies included participants from China ( $n=8$ ). This is a limitation in FoMO and IGD research since FoMO is an universal problem with patterns that vary across countries and cultures [3, 51]. Additionally, the same is true of IGD and GD, which is another global phenomenon, at least in developed countries; thus, there is a critical lack of geographically diverse studies that could help to understand the relationships between these constructs. Furthermore, another limitation found after performing this SR is the variety of instruments used to assess IGD possibly because it is a construct that has not yet been considered an independent clinical disorder in the DSM-5, as has been

included in Sect. 3, in the area of problematic gaming, as a behavioral addiction that needs further study [52]. On the other hand, the fact that GD is also measured to study IGD is a clear limitation since both constructs refer to clearly differentiated activities. For example, offline video games are essentially individual activities that do not have a clear social component, as do online video games, so they are not closely related to FoMO. Therefore, differentiating both constructs in the study of their relationships with FoMO is of utmost importance. Furthermore, a similar situation exists with GD, which was included in the ICD-11 in 2018. However, according to the WHO, diagnostic criteria for GD are still needed to guide public health and treatment strategies implemented worldwide to address this condition [53]. Another limitation is that most of the studies use the FoMO questionnaire [1], which does not focus on the online aspect; however, the use of the T-SFoMOS [48], which has a dimension for online FoMO, is not common. Therefore, the use of questionnaires that measure FoMO specifically in the online context is recommended. Finally, unlike in the context of IGD, in the FoMO construct, there are no cutoff points for indicating from what score an individual is classified as having a problem or being at risk of developing it; therefore, when FoMO is studied, its prevalence or severity cannot be extracted.

## Conclusions

Based on the gaps and limitations derived from the SR, longitudinal and cross-cultural studies of FoMO and IGD or GD are needed to understand the relationship between the constructs to deepen our understanding. In addition, the results obtained in this SR revealed that FoMO and IGD or GD are correlated, that FoMO seems to have a direct effect on IGD and GD, and that FoMO plays a mediating role in the relationship between IGD and GD and other psychosocial variables. However, FoMO is a complex construct and therefore must be studied in a specific way, considering it not in a general form but rather by delving deeper into its components and forms, such as trait-FoMO, state-FoMO, and application to the online context, so that this construct and its implications for Internet risks can be more accurately understood. This could have practical implications in the intervention and prevention of IGD and GD and in helping to identify and reduce FoMO. In this sense, prevention and intervention programs for Internet risks should include at least one session focusing on FoMO. Additionally, although there are many gaming platforms, for the Alpha and Z generations, smartphones are the dominant gaming platform, which makes nomophobia a key variable that is also closely related to FoMO [54, 55]. Therefore, it would be convenient to include both constructs in existing and new programs.

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**Data Availability** No datasets were generated or analysed during the current study.

## Declarations

**Competing interests** The authors declare no competing interests.

**Human and animal rights and informed consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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