

# How effective are psychological treatments for internet gaming disorder? An umbrella review

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## Abstract

Behavioural addictions such as Internet addiction (IA) and, more specifically, Internet gaming disorder (IGD) or video game addiction, have increased their prevalence in recent years in the child and adolescent population. The aim of the present study was to review and synthesise the existing evidence on the effectiveness of psychological treatments for addressing this addiction, as well as to compare them with other types of treatment. To this end, an in-depth search for systematic reviews and meta-analyses was carried out across different databases (WOS, Scopus, Pubmed, Cochrane), inclusion and exclusion criteria were set, and guidelines for the search strategy were defined, as well as the study selection method. A total of 14 reviews and meta-analyses were reviewed. The results showed that cognitive behavioural therapy (CBT) was the most studied psychological treatment, consistently showing effectiveness in reducing the symptoms and severity of IA/IGD. Furthermore, CBT appeared to be more effective when combined with other types of treatment such as pharmacological treatment. It is concluded that there is a need to investigate the effectiveness of psychological treatments for IA/IGD separately in order to provide appropriate interventions to reduce the severity of addiction and improve the quality of life and well-being of children and adolescents.

*Keywords: internet addiction; internet gaming disorder; treatment; therapy; review.*

## Resumen

¿Qué eficacia tienen los tratamientos psicológicos para el trastorno de juego por internet? Una revisión de revisiones. Las adicciones conductuales como la adicción a internet (IA) y, concretamente, el trastorno de juego por internet (IGD) o adicción a videojuegos, han aumentado su prevalencia en los últimos años en población infanto-juvenil. El objetivo del presente estudio fue realizar una revisión de revisiones para agrupar y sintetizar la evidencia existente acerca de la efectividad de los tratamientos psicológicos para abordar este tipo de adicción, así como compararlos con otros tipos de tratamiento. Para ello, se realizó una búsqueda exhaustiva de revisiones sistemáticas y/o meta-análisis en diferentes bases de datos (WOS, Scopus, Pubmed, Cochrane), se establecieron los criterios de inclusión y exclusión, y se definió la estrategia de búsqueda, así como el método de selección de los estudios. En total se revisaron 14 revisiones y meta-análisis. Los resultados evidenciaron que la terapia cognitivo-conductual (TCC) fue el tratamiento psicológico más estudiado, mostrando consistentemente efectividad para reducir los síntomas y la severidad de IA/IGD. Además, la TCC parece ser más efectiva cuando se combinaba con otros tipos de tratamiento como el farmacológico. Se concluye la necesidad de investigar la efectividad de los tratamientos psicológicos para IA/IGD de manera diferenciada con el objetivo de establecer intervenciones adecuadas que permitan reducir la gravedad de la adicción y mejorar el bienestar y la calidad de vida de los niños y adolescentes.

*Palabras clave: adicción a internet; trastorno de juego por internet; tratamiento; terapia; revisión.*

The increased use of information and communication technologies (ICT) has led to new types of behavioural addictions (Xu et al., 2021). Internet addiction (IA) includes different subtypes that involve problematic internet use, such as internet gaming disorder (IGD) or video game addiction (Kuss et al., 2021; Xu et al., 2021; Zajac et al., 2017). Due to the increase in internet addiction (IA) and its negative health consequences, criteria for its diagnosis have been defined, and it is now regarded as a health problem (Zajac et al., 2020).

The American Psychiatric Association (APA) included IGD in the

appendix of the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013), further investigating which criteria would best describe this disorder (Zajac et al., 2020). More recently, the World Health Organization (WHO) included it in its 11th revision of the International Classification of Diseases manual (ICD-11; WHO, 2018). The criteria for the diagnosis of IGD in these manuals are different; however, they both include increased hours of gaming, withdrawal symptoms, impaired ability to control gaming behaviour, prioritisation of gaming over other activities and daily life

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interests, and the continuation of gaming despite suffering negative consequences (APA, 2013; WHO, 2018). Both manuals also establish a minimum duration of 12 months and clinically significant distress (APA, 2013; WHO, 2018).

The severity of IA appears to be higher in the adolescent population compared to other age groups (Malinauskas & Malinauskiene, 2019). Also, the prevalence of IA and IGD appears to have increased among children and adolescents in recent years (Chang et al., 2022). However, results are inconsistent due to cultural differences (Kuss et al., 2021; Zajac et al., 2020) and, in the case of IGD, a lack of shared diagnostic criteria (Zajac et al., 2020). An increase in prevalence has also been observed as a result of the COVID-19 pandemic and containment measures (Chang et al., 2022).

For this reason, several studies have examined the most effective treatment approaches for this type of addiction, including several systematic reviews and meta-analyses. Therefore, this review aims to summarise the existing evidence on the efficacy of psychological treatments compared to other types of treatment for IA and IGD in children and adolescents, as well as to identify similarities and differences between the results of the different research studies and provide an updated synthesis on the subject (Aromataris, 2015; Biondi-Zoccai, 2016).

## Method

The book “Umbrella Reviews: Evidence Synthesis with Overviews of Reviews and Meta-Epidemiologic Studies” (Biondi-Zoccai, 2016) and the PRISMA 2020 Statement (Yepes-Nuñez et al., 2021) were used as the main references for this study.

### Inclusion and exclusion criteria

All included studies met the following criteria: (1) include evidence on the effectiveness of treatments for IA and IGD; (2) systematic review or meta-analysis design; (3) child and adolescent population (<29 years); (4) publication date between 2012-2022 (last 10 years); (5) published in English or Spanish.

The studies excluded were: (1) papers that lacked a systematic review or meta-analysis design; (2) papers that included only adults (> 29 years old); (3) published before 2012; or (4) in a language other than English or Spanish.

### Research strategy

The databases used to search the publications were: Web of Science (WOS), Scopus, PubMed, and Cochrane Library. The terms and connectors used were the same in all four databases; however, due to their characteristics, in some databases, it was possible to narrow the search to just the title (WOS) and in others to the title, abstract, or keywords (Scopus, PubMed). The search string was as follows: (“internet gaming disorder” OR “internet addiction”) AND (“systematic review” OR meta-analysis) AND (“psychological intervention” OR “psychological treatment” OR “therapy”). Additionally, filters were used to refine the search, including the type of work (systematic review and meta-analysis), date of publication (last 10 years), and language (English and Spanish).

The WOS, Scopus, and PubMed databases were searched at two time points (May and June 2022). The first was to identify the appropriate codes for an effective search. The second search was conducted based on the order of keywords, codes, and filters to be used and how to apply them in each database to achieve the optimal article selection.

As Cochrane Library is a reference source for review articles, a subsequent search was performed to identify articles that did not appear in the previous ones.

### Selection of studies

The method used to select the studies was established collaboratively by the four authors and was as follows: (1) database selection; (2) establishing inclusion and exclusion criteria; (3) selection of keywords and connectors; (4) screening, filtering and selection of articles through Covidence (Veritas Health Innovation, 2022) (Figure 1). In WOS, a total of 1210 articles were found, which, after the application of the described filters, were reduced to 106; in Scopus, 118 were found and reduced to 66; in PubMed, 4 articles were found; and in the Cochrane Library, no additional articles were identified. The initial number of articles was 176. A total of 61 duplicate articles were automatically removed with the Covidence software. Of the remaining 115 articles, 97 were considered irrelevant in the title and abstract screening. The remaining 18 articles were read in full text, discrepant results between the authors were resolved, and 15 articles were finally selected. At this stage, one study that was found to fit the inclusion criteria had to be discarded due to the inability to access the full text (Lampropoulou et al., 2022). As a result, the present review comprises 14 studies.

### Data extraction

The three authors extracted the key data from each study independently into an Excel table, which included: (1) study reference following APA guidelines; (2) design; (3) number of studies included and whether they address the treatment of IA or IGD; (4) keywords; (5) sample size; (6) participant age groups (children, adolescents, adults); (8) dates included in the systematic review or meta-analysis; (9) PICO principle (population, intervention, group comparison, and outcomes); (10) type of interventions (psychological or pharmacological or other treatments) included; (11) results; (12) effect size for meta-analyses; (13) quality of the systematic review and meta-analysis; (14) reporting biases; (15) significant additional observations; (16) team member who extracted the data. Subsequently, a collaborative review of these data was performed.

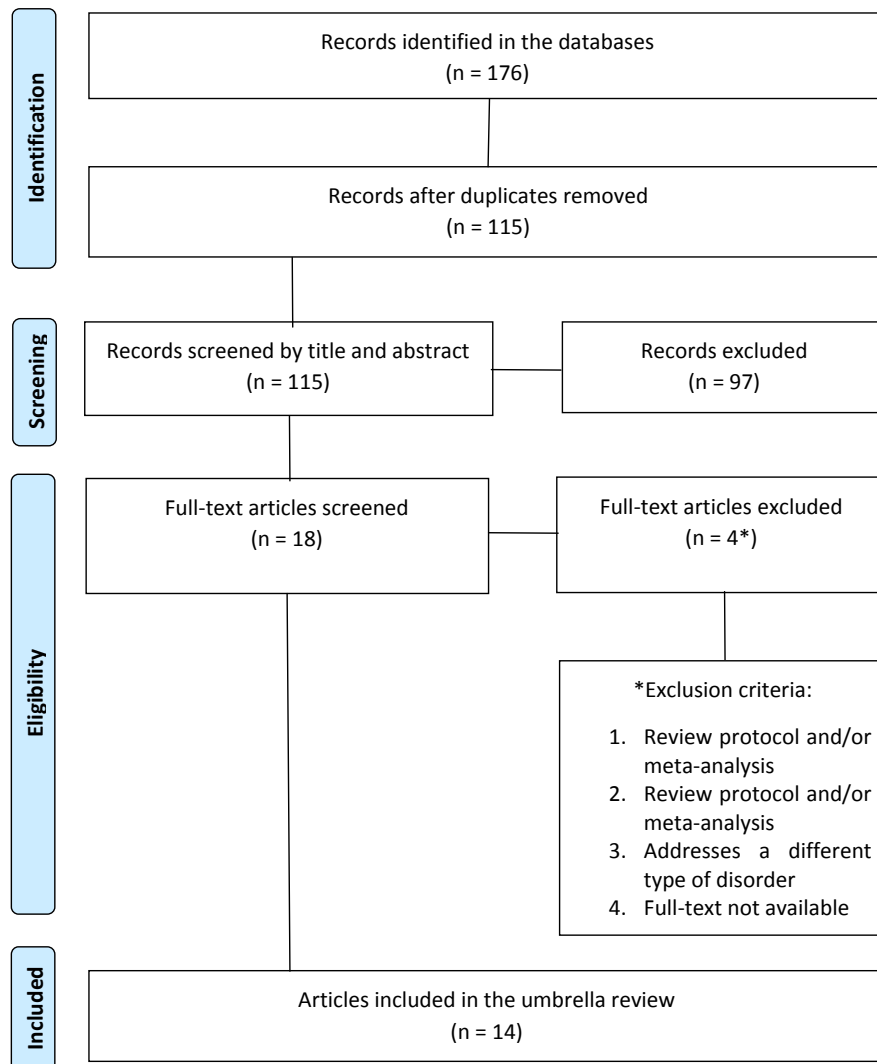
### Assessment of publication bias

The present study may be subject to certain biases worth mentioning. Firstly, language was one of the filters used, which may exclude relevant papers in other languages. Secondly, due to the number of publications identified, there has been no systematic analysis of which empirical studies may be repeated in the different systematic reviews and meta-analyses. Finally, availability bias, although only one study could not be accessed (Lampropoulou et al., 2022).

### Assessing certainty of the evidence

The assessment of the certainty of the evidence was conducted using two instruments recommended by Biondi-Zoccai (2016) to assess the quality of systematic reviews: A Measurement Tool to Assess Systematic Reviews (AMSTAR; Shea et al., 2007) and Overview Quality Assessment Questionnaire (OQAQ; Oxman & Guyatt, 1991). AMSTAR is a 16-item questionnaire with several response options: “yes”, when the result is positive; “no”, when the result is negative; and “partial yes”, when the described standards are partially met. The result is an assessment of the overall confidence level of the review, with four levels: critically low, low, medium or high (Shea et

Figure 1. Flow chart



al., 2017). OQAQ consists of 10 items: the first 9 are questions about aspects of the review and have three possible response options (yes, no or partially/can't tell), and question 10 is an assessment of the overall quality of the study on a 7-point Likert-type scale (1-3 indicate a significant number of weaknesses and 5-7 indicate minimal flaws in the study) (Biondi-Zoccai, 2016).

## Results

### Characteristics of the studies

The main characteristics of the included studies are presented in Table 1. In terms of design, a total of seven systematic reviews (King et al., 2017; Kuss et al., 2021; Lam & Lam, 2016; Lemos et al., 2014; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020), four meta-analyses (Chang et al., 2022; Goslar et al., 2020; Malinauskas & Malinauskiene, 2019; Winkler et al., 2013), two systematic reviews and meta-analyses (Liu et al., 2017; Stevens et al., 2019) and one integrated review were included (Kim & Noh, 2019).

As for the number of empirical papers included, two of the reviews included less than 10 (Lam & Lam, 2016; Malinauskas & Malinauskiene, 2019); three included between 10-20 papers (Kim & Noh, 2019; Stevens et al., 2019; Winkler et al., 2013); five included between 20-30 papers (Chang et al., 2022; King et al., 2017; Lemos et al., 2014; Zajac

et al., 2017; Zajac et al., 2020); and four studies included more than 30 papers (Goslar et al., 2020; Liu et al., 2017; Kuss et al., 2021; Xu et al., 2021). The publication dates of the papers included in the reviews varied widely, ranging from a starting date of 2005 to an end date of 2019, with one article lacking this information (Kim & Noh, 2019).

Only 10 studies reported the number of participants, totalling 16,752 participants (Chang et al., 2022; Goslar et al., 2020; Lam & Lam, 2016; Lemos et al., 2014; Liu et al., 2017; Kim & Noh, 2019; King et al., 2017; Malinauskas & Malinauskiene, 2019; Stevens et al., 2018; Winkler et al., 2013). Regarding gender, six studies reported a higher male participation, one study reported male and female participation without specifying its distribution (Lam & Lam, 2016), and six studies either failed to report this data or partially reported it (Chang et al., 2022; Lemos et al., 2014; Kuss et al., 2021; Liu et al., 2017; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020). As for participants' age, one study reported the mean age, which was 21 years (Goslar et al., 2020); three studies reported age ranges: 11-56 years (Kim & Noh, 2019), 19-50 years (Lam & Lam, et al., 2016) and 12-21 years (Malinauskas & Malinauskiene, 2019); eight studies reported the age groups, comprising infant-juvenile, adolescent and adult (King et al., 2017; Kuss et al., 2021; Lemos et al., 2014; Liu et al., 2017; Winkler et al., 2013; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020); and, finally, two studies provided no information (Chang et al., 2022; Stevens et al., 2019).

Table 1. Characteristics of the systematic reviews and meta-analyses included in the overview of reviews

Authors and publication date	Design	No. of studies included	No. of participants	Gender	Age	Dates of the reviews	AMSTAR	OQAQ
Chang et al. (2022)	Meta-analysis	29	5601	-	Juvenile	2005-2017	Critically low	6
Goslar et al. (2020)	Meta-analysis	91 (55 IA)	3531 (2427 IA)	76% men	Mean age 21	Until 2019	Low or critically low	7
Kim & Noh (2019)	Systematic review	11	658	More men	Nov-56	-	Critically low	3
King et al. (2017)	Systematic review	30	1880	68% men	Adolescent and adult	2007-2017	Critically low	5
Kuss et al. (2021)	Systematic review	64 (11 IGD)	-	-	Juvenile and adult	2013-2019	Critically low	5
Lam & Lam (2016)	Systematic review	3	115	Men and women	19-50	Hasta 2016	Critically low	3
Lemos et al. (2014)	Systematic review	23	541	-	Adolescent and adult	Hasta 2013	Critically low	5
Liu et al. (2017)	Systematic review and meta-analysis	58	2871	-	Adolescent and adult	Hasta 2016	Critically low	7
Malinauskas & Malinauskiene (2019)	Meta-analysis	6	305	More men, except for 1 equity study	Dec-21	2010-2019	Low	6
Stevens et al. (2018)	Systematic review and meta-analysis	12	580	More men	-	2007-2018	Critically low	6
Winkler et al. (2013)	Meta-analysis	16	670	80.26% men	Juvenile and adult	2005-2010	Low	7
Xu et al. (2021)	Systematic review	31	-	-	Juvenile and adult	2007-2020	Critically low	4
Zajac et al. (2017)	Systematic review	26 (13 IA + 13 IGD)	-	-	Juvenile	2007-2017	Critically low	5
Zajac et al. (2020)	Systematic review	22	-	-	Juvenile and adult	2009-2018	Critically low	5

In terms of intervention types, seven studies compared different types of psychological intervention (Kim & Noh, 2019; Kuss et al., 2021; Lam & Lam, 2016; Lemos et al., 2014; Liu et al., 2017; Malinauskas & Malinauskiene, 2019; Stevens et al., 2019); three compared psychological and pharmacological interventions (Winkler et al., 2013; Zajac et al., 2017; Zajac et al., 2020); and four compared psychological, pharmacological and a combination of both (Chang et al., 2022; Goslar et al., 2020; King et al., 2017; Xu et al., 2021). Concerning the design of the empirical studies included in each review, five included only randomised control trials (Chang et al., 2022; King et al., 2017; Lam & Lam, 2016; Liu et al., 2017; Malinauskas & Malinauskiene, 2019); seven included randomised and non-randomised control trials (Goslar et al., 2022; Kim & Noh, 2019; Stevens et al., 2018; Winkler et al., 2013; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020); and two did not provide information (Kuss et al., 2021; Lemos et al., 2014).

## Results of the reviews

**Cognitive behavioural therapy (CBT).** CBT is the most studied psychological treatment. However, it encompasses different practices that must be differentiated to compare the results. For example, in the meta-analysis by Chang et al. (2022), this type of therapy included positive psychology interventions, psychological interventions, traditional psychology interventions, and an integrated IA prevention programme; while Lam & Lam (2016) described CBT as relaxation

sessions, simulation of high-risk situations and sound-assisted cognitive reconstruction; Liu et al. (2017) explained that CBT focused on the association of behaviours-thoughts-emotions to try to find triggers for addictive behaviour; and Winkler et al. (2013) described CBT focused on emotional regulation, communication, social competence, cognitive restructuring, adoption of alternative behaviours, and psychoeducation. Some studies do not describe the type of CBT or its goals or components (Goslar et al., 2020; Kim & Noh, 2019; King et al., 2017; Malinauskas & Malinauskiene, 2019; Stevens et al., 2018; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020).

Overall, CBT seems to show good results in reducing symptoms of both IA (Chang et al., 2022; Goslar et al., 2020; Kim & Noh, 2019; King et al., 2017; Lam & Lam, 2016; Lemos et al., 2014; Liu et al., 2017; Xu et al., 2021; Zajac et al., 2017), and IGD (Lemos et al., 2014; King et al., 2017; Kuss et al., 2021; Stevens et al., 2018; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020). Additionally, it is shown to be effective in reducing the severity of IA (Malinauskas & Malinauskiene, 2019; Winkler et al., 2013) and more effective in reducing time spending online than other types of treatment (Winkler et al., 2013). Positive effects are observed when administered individually and in groups for IA (Zajac et al., 2017) and IGD (Kim & Noh, 2019) and online to reduce IGD symptoms (Zajac et al., 2017).

**CBT in combination with other treatment types.** Combining CBT with other treatments appears to have a positive effect in reducing the severity and symptoms of IA/IGD (Chang et al., 2022; Lemos et al., 2014; Xu et al., 2021; Zajac et al., 2020). When combined with

the use of medication, such as bupropion, the treatment produced better results in reducing IA (Chang et al., 2022; Xu et al., 2021; Zajac et al., 2020) and IGD (Chang et al., 2022; Zajac et al., 2020), and also improved when complemented with electroacupuncture treatment (Lemos et al., 2014; Zajac et al., 2017). Also, combined with family therapy (interventions focused on improving family functions and relationships through parenting education) reduced IA symptoms and, together with family therapy and teacher interventions, reduced excessive internet use even six months after treatment (Xu et al., 2021).

**Pharmacological treatment.** Seven studies include pharmacological treatment to address IA and IGD (Chang et al., 2022; Goslar et al., 2020; King et al., 2017; Winkler et al., 2013; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020). Overall, positive results indicate that antidepressants ameliorate the overall severity of IA (Goslar et al., 2020), and bupropion can decrease symptoms of IGD (Zajac et al., 2017; Zajac et al., 2020). Pharmacological treatment (bupropion, escitalopram, and methylphenidate) also appears effective in reducing the severity of IA and the amount of time spent online (Winkler et al., 2013). However, King et al. (2017) also reported some negative consequences (e.g., nausea, headache, insomnia), and Zajac et al. (2017) observed that escitalopram did not perform better than placebo in reducing IA symptoms.

**Other types of treatment.** Some studies have focused on other types of psychological treatment such as: (1) *virtual reality therapy*, showing positive effects on reducing symptoms and severity of IA (Kuss et al., 2021; Lam & Lam, 2016; Zajac et al., 2017) and IGD (Kuss et al., 2021; Xu et al., 2021), as well as reducing internet-related impulsivity (Xu et al., 2021); (2) *mindfulness*, which shows positive effects in reducing IA (Kuss et al., 2021) and IGD symptoms (Kuss et al., 2021; Zajac et al., 2017), IGD and cognitions related to gaming and anxiety, combined with cognitive restructuring (Xu et al., 2021); (3) *behavioural intervention* (focused on the identification of craving and its associated irrational beliefs), which has been found to be effective in reducing the severity of IGD symptoms and craving (Xu et al., 2021); (4) *family therapy*, which appears to improve IA (Xu et al., 2021; Zajac et al., 2017) and IGD symptoms (Zajac et al., 2017), as well as the family relationship itself (Xu et al., 2021); (5) *family-based intervention* (family therapy and multifamily group therapy), which reduced the severity of the addiction, internet time and gaming time (Kim & Noh, 2019); (6) *counselling programmes*, which decreased IA symptoms (Kim & Noh, 2019; Liu et al., 2017), addiction severity (Kim & Noh, 2019), interpersonal and health problems, tolerance and compulsive internet use in both the short and long term (Liu et al., 2017); (7) *home-based log-in intervention*, which helps reduce IA symptoms and internet time (Zajac et al., 2017); (8) *self-discovery camp*, which decreases IGD symptoms, even three months after treatment (Zajac et al., 2017); (9) *motivational interviewing*, which improves problematic behaviours stemming from IA and IGD (King et al., 2017), even when conducted online (Lam & Lam, 2016); (10) *sand play therapy*, which has been associated with decreased severity of IA (Malinauskas & Malinauskiene, 2019); (11) *educational programmes* based on school-based coaching to increase academic motivation and efficient use of leisure time, which have also been associated with improved severity of IA (Malinauskas & Malinauskiene, 2019); and (12) *sports intervention*, which appears to be effective in reducing IA in both the short and long term, particularly in the adolescent population compared to the juvenile population (Liu et al., 2017).

**Combinations of other types of treatment.** In addition to the various treatments discussed above, combinations of some treatments also have a positive effect on IA and IGD: (1) *the combination*

*of virtual reality therapy and mindfulness exercises* was found to be associated with a decrease in IGD symptoms even three months after treatment (Xu et al., 2021); and (2) *family therapy combined with motivational interviewing* was also found to decrease IGD symptoms (Zajac et al., 2017).

## Summary of results

There is great consistency among studies regarding the efficacy of CBT in reducing IA/IGD symptoms and their severity; even when diverse practices and therapeutic components have been studied (Chang et al., 2022; Goslar et al., 2020; Lam & Lam, 2016; Lemos et al., 2014; Liu et al., 2017; Kim & Noh, 2019; King et al., 2017; Kuss et al., 2021; Malinauskas & Malinauskiene, 2019; Stevens et al., 2018; Winkler et al., 2013; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020). Combining CBT with other types of treatment also appears to be effective, for instance in combination with bupropion (Chang et al., 2022; Xu et al., 2021; Zajac et al., 2020) or electroacupuncture (Lemos et al., 2014; Zajac et al., 2017), with no contradictions between studies.

Regarding pharmacological treatment, the use of antidepressants (bupropion and methylphenidate) has been associated with reduced symptoms of IGD (Zajac et al., 2017; Zajac et al., 2020) and reduced severity of IA (Goslar et al., 2020). Despite the consistency between the results observed in the different studies, only one study reported negative consequences (King et al., 2017).

Finally, other types of treatment that have shown good results in addressing the symptoms and severity of IA and IGD in at least two different reviews or meta-analyses were: virtual reality therapy (Kuss et al., 2021; Lam & Lam, 2016; Xu et al., 2021; Zajac et al., 2017), mindfulness (Kuss et al., 2021; Xu et al., 2021; Zajac et al., 2017), family therapy (Xu et al., 2021; Zajac et al., 2017) and counselling programmes (Kim & Noh, 2019; Liu et al., 2017).

## Risk assessment and bias of reviews and meta-analyses

The systematic reviews and meta-analyses included in this review have reported several important limitations. First, some report the impossibility of generalising the results obtained due to the homogeneity of the samples (Chang et al., 2022; Kim & Noh, 2019; Kuss et al., 2021; Malinauskas & Malinauskiene, 2019; Liu et al., 2017; Winkler et al., 2013; Xu et al., 2021) or due to small sample sizes (Xu et al., 2021; Zajac et al., 2017). Second, most report limitations related to statistical results due to either not explicitly reporting the results by providing the data (Kim & Noh, 2019; Zajac et al., 2017) or using different measurement methods to obtain and report the results (Kim & Noh, 2019; Stevens et al., 2018; Xu et al., 2021; Zajac et al., 2020). Also, one systematic review reported that the studies included did not provide information on the methodological procedures used (King et al., 2017), and two reported a lack of studies with a rigorous design (Kim & Noh, 2019; Xu et al., 2021). Third, four studies reported limitations resulting from the inclusion of reviews solely written in English (Kim & Noh, 2019; Malinauskas & Malinauskiene, 2019; Zajac et al., 2017; Zajac et al., 2020). Fourth, two studies reported publication bias (i.e., study results are more likely to be published if they are positive) (Zajac et al., 2017; Zajac et al., 2020). Fifth, the majority also reported limitations due to a lack of common diagnostic criteria and definitions for IA and IGD (King et al., 2017; Liu et al., 2017; Stevens et al., 2018; Winkler et al., 2013; Xu et al., 2021).

In addition, some studies report particular limitations that should be noted. Kim & Noh (2019) and Malinauskas & Malinauskiene

(2019) reported limitations derived from the few studies included in their review. King et al. (2017) reported limitations related to the low quality of the included studies, excluding case studies, grey literature, and publications prior to 2007. Kuss et al. (2021) reported that most of the studies included in their review use self-report measures, making them more vulnerable to psychometric problems and biases. Liu et al. (2017) reported that potential publication bias was not detected due to the non-inclusion of studies that would allow for proper detection of publication bias. Chang et al. (2022) and Stevens et al. (2018) reported limitations due to the lack of a follow-up period after the treatment to allow for a comparison of results. Zajac et al. (2017) reported that many studies did not compare the treatment of the active group with the control group, which did not allow conclusions to be drawn on treatment efficacy, and the included studies did not differentiate between treatments to address IA or IGD. This is also mentioned by Chang et al. (2022), who also note that in their meta-analysis they only included publications published as of 2017. Winkler et al. (2013) included studies that addressed other internet-related problems, as well as studies with methodological weaknesses and that used different assessment instruments. Goslar et al. (2020) also reported including studies with varying quality levels.

All meta-analyses conducted and included the assessment of risk of publication bias (Chang et al., 2022; Goslar et al., 2020; Liu et al., 2017; Malinauskas & Malinauskiene, 2019; Stevens et al., 2019; Winkler et al., 2013). All used funnel plots, either together with Egger's regression tests (Chang et al., 2022; Goslar et al., 2020; Liu et al., 2017; Malinauskas & Malinauskiene, 2019) or with results from the "Fail-safe N" method (Stevens et al., 2018; Winkler et al., 2013). Only one study was found to have a potential bias (Chang et al., 2022).

### Certainty of the evidence

The quality assessment of the included reviews was evaluated using AMSTAR and OQAQ. The results, according to AMSTAR, were that 11 papers showed a critically low level of confidence (Chang et al., 2022; King et al., 2017; Kim & Noh, 2019; Kuss et al., 2021; Lam & Lam, 2016; Lemos et al., 2014; Liu et al., 2017; Stevens et al., 2019; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020); and three of them showed a low level (Goslar et al., 2020; Malinauskas & Malinauskiene, 2019; Winkler et al., 2013). None of the reviewed papers managed to obtain a positive assessment based on the AMSTAR requirement, as many of them met all the proposed criteria except for item 7, which refers to justifying exclusions (e.g. as a list of excluded studies) which was not included in any of the studies. Therefore, the assessment was conducted with a second tool, OQAQ, observing that only two studies obtained a final score of 3, which indicates the existence of major weaknesses (Kim & Noh, 2019; Lam & Lam, 2016); while the rest exceeded a score of 4-5, indicating a good review quality (Chang et al., 2022; Goslar et al., 2020; King et al., 2017; Kuss et al., 2021; Lemos et al., 2014; Malinauskas & Malinauskiene, 2019; Winkler et al., 2013; Xu et al., 2021; Zajac et al., 2017; Zajac et al., 2020). However, it should be noted that the final score obtained by each of the papers is subjective, considering whether or not they met most of the established criteria.

### Discussion

This umbrella review of systematic reviews synthesises some of the existing evidence on the efficacy of psychological treatments to address IA and IGD. CBT was the most researched psychological treatment, and all reviewed papers have noted its effectiveness in reducing IA/

IGD symptoms and severity. The second most studied treatment has been the pharmacological one (generally antidepressants), with bupropion being the most researched drug and demonstrating effectiveness in treating IA/IGD symptoms (Winkler et al., 2013; Zajac et al., 2017; Zajac et al., 2020). However, it is worth noting the contribution of King et al. (2017), who observed the negative consequences of this type of treatment. When it comes to the effectiveness of combining CBT with another types of treatment, some studies have reported even greater success rates than CBT alone (Chang et al., 2022; Lemos et al., 2014; Xu et al., 2021; Zajac et al., 2020); the most studied combination being CBT with pharmacological treatment (antidepressants). There is also evidence of the effectiveness of other treatments, such as virtual reality therapy, mindfulness, family therapy, and counselling programmes.

However, it is worth mentioning some common limitations among the different studies, such as the impossibility to generalise the results due to sample homogeneity (Chang et al., 2022; Kim & Noh, 2019; Kuss et al., 2021; Malinauskas & Malinauskiene, 2019; Liu et al., 2017; Winkler et al., 2013; Xu et al., 2021) or small sample sizes (Xu et al., 2021; Zajac et al., 2017), the lack of common criteria for the diagnosis of IA/IGD (King et al., 2017; Liu et al., 2017; Stevens et al., 2018; Winkler et al., 2013; Xu et al., 2021), the use of different measurement methods among the various studies (Kim & Noh, 2019; Stevens et al., 2018; Xu et al., 2021; Zajac et al., 2020) and the limitations of excluding studies that are not written in English (Kim & Noh, 2019; Malinauskas & Malinauskiene, 2019; Zajac et al., 2017; Zajac et al., 2020). In addition, the limitations mentioned above, particularly the quality of the studies included, should also be considered. The quality assessment results have been very diverse, which does not allow for overall conclusions on the quality of the studies. Added to this is the variety of treatments and the lack of explanatory details or the lack of information about the gender or age of the participants. These aspects hinder an adequate comparison of the results obtained with different types of treatment and in different populations.

### Conclusion

IA and IGD are recent problems, but they are increasingly present in the general population, particularly among children and adolescents. Despite the existing literature and scientific evidence on this type of addiction, further research is needed for an adequate detection and treatment proposal. Furthermore, the results support the need to establish common diagnostic criteria for IGD. It is also necessary to further study the different effective treatments for each type of problem (IA and IGD) in order to provide psychology professionals with specific and proven knowledge that can significantly help children and adolescents suffering from this type of addiction to reduce its severity and increase their wellbeing and quality of life.

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### Conflict of interest

The authors declare no conflict of interest.

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