

## Screen addicts: A meta-analysis of internet addiction in adolescence

Raquel Lozano-Blasco<sup>a</sup>, M<sup>a</sup>Pilar Latorre-Martínez<sup>b</sup>, Alejandra Cortés-Pascual<sup>c</sup>

<sup>a</sup> PhD Student, Faculty of Human and Educational Sciences, University of Zaragoza, Spain

<sup>b</sup> Faculty of Social and Labor Sciences, University of Zaragoza, Spain

<sup>c</sup> Faculty of Education, University of Zaragoza, Spain

### ARTICLE INFO

#### Keywords:

Internet  
Addiction  
Adolescence  
Meta-analysis

### ABSTRACT

Currently, the incidence of Internet addiction is growing among teenagers. However, most review studies do not differentiate between the adolescent and young adult population. The sample of this meta-analysis consists of 20 studies ( $K = 28$ ) comprised of 21 878 adolescents whose mean age was 15.13 years. Regarding the methodology, the protocol of registration of the research of the Cochrane systematic review manuals in Higgins and Green (2011) and PRISMA (2015) was followed. The results show a high heterogeneity. Thus, the Random Effects Model has been necessary followed. The effect size of the Internet addiction is  $Z = 16.04$ ;  $p = 0.000$  with a 95% confidence interval (3.164 – 4.045). In other words, the population does not suffer from severe Internet addiction, although the incidence is still alarming. Moderator variables, such as age, explained 24% of variance; instrument explained 31% of variance, in particular CIAS ( $Z = 1.75$ ;  $p = 0.07$ ) and IGD-20 ( $Z = 4.53$ ;  $p = 0.00$ ); and finally culture explained 47%, and more concretely, the international sample ( $Z = -1.71$ ;  $p = 0.00$ ). Thus, Internet addiction is inversely proportional to age and is influenced by the geographical area in which one resides. On the other hand, it should be noted that there is no agreement on the diagnosis of Internet addiction or on the instruments used to measure it. It is necessary to build an explanatory and intervention model for this pathology based on an international framework. The absence of clear criteria has generated multiple psychometric instruments around which there is no solid consensus. Finally, a complex etiology is presented in which educational, socio-familial, cultural and individual variables are involved.

### 1. Introduction

Internet addiction is a complex field of study given the lack of unanimity in its definition, reported symptoms, diagnosis, and etiology. Indeed, it has not been determined whether one can correctly call it an addiction (Reinerman, 2005; Widianto & Griffiths, 2007). Billieux et al. (2015) stated that humans are currently facing overpathologizing of daily life activities. Although such findings continue to be debated by the scientific community, it is undeniable that the time adolescents spend on the Internet has serious repercussions for their mental health, and social, educational, and emotional development (Kirmayer et al., 2013; Pies, 2009). Table 1.

Young (1998, 2009) emphasized the concept of Internet addiction at the end of the 20th century. The study affirmed that there is growing (psychological and social) concern, as well as labor discomfort in pregnant women caused by online activities. Internet addiction has been defined as a behavioral, non-chemical addiction that is interpreted based on the man-machine metaphor (Błaszczynski, 2006). Scientific literature on Internet addiction exposes the extent of addiction to new

information and communication technologies in both adolescents and adults. However, globalized diagnostic criteria are lacking in the field.

The World Health Organization (WHO) and the American Psychiatric Association (APA) do not recognize Internet addiction as a disorder, except for Internet gaming disorder (IGD) in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013). In a study by Cash, Rae, Steel, and Winkler (2012), it is necessary to agree on a definition and symptoms that allow for treatment and counseling of the target population. This situation has led to the proliferation of definitions, terms, and measurement instruments that aim to respond to this growing need. It is common to find terms such as “excessive Internet use”, “problematic Internet use” (PIU), Internet addiction disorder (IAD) (El Asam, Samara, & Terry, 2019), and Internet addiction (IA) (Müller et al. 2016). All these terms refer to the concept initiated by Young (1998), which defined Internet addiction as a man-machine behavioral addiction. Although a priori, the various terms named above seem to be synonymous because they study the same reality, they differ in their diagnostic criteria, which generates heterogeneity in the psychometric instruments of evaluation and diagnosis (Caci,

E-mail addresses: [rlozano@unizar.es](mailto:rlozano@unizar.es) (R. Lozano-Blasco), [latorrep@unizar.es](mailto:latorrep@unizar.es) (M. Latorre-Martínez), [alcortes@unizar.es](mailto:alcortes@unizar.es) (A. Cortés-Pascual).

<https://doi.org/10.1016/j.chilyouth.2022.106373>

Received 1 December 2020; Received in revised form 30 December 2021; Accepted 10 January 2022

Available online 25 January 2022

0190-7409/© 2022 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Table 1**  
Sociodemographic data.

Authors of the study	Sample	Mean Age	Male	Female	Instrument	Country	Geographi -cal area	Distribution of participants
Biraglia et al. (2017)	469	17.71	138	331	IAT Internet Addiction Test	Italy	Europe	From a secondary school and first-year undergraduate students in one of the largest cities in Italy.
Bozkurt et al. (2018)	169	11.84	66	103	IAS Internet Addiction Scale	Turkey	Euro-Asia	Children and adolescents who were referred by the Department of Pediatrics at Tokat Gaziosmanpasa University.
Černja et al. (2019)	352	17.06	195	157	IAT Internet Addiction Test	Croatia	Europe	Multistage probabilistic cluster sampling.
Chou et al. (2018)	300	12.8	259	41	CIAS Chinese Internet Addiction Scale	Taiwan	Asia	Children and adolescent psychiatric clinics of two medical centers in Kaohsiung.
El Asam et al. (2019)	1814	12.6	962	852	PIUQ The Problematic Internet Use Questionnaire (PIUQ; 18 items)	UK	Europe	6 public secondary schools representing only northern and central UK.
Feng, Ma, & Zhong (2019)	1634	14.73	1152	482	CIAS Chinese Internet Addiction Scale	China	Asia	Students at four middle schools in Changsha, Changde, Yueyang, and Loudi of Hunan Province were investigated.
Jia et al. (2018)	747	13.73	382	365	IAT Internet Addiction Test	China	Asia	Three middle schools in Henan province.
Li et al. (2018) b	863	14.34	388	475	Young's (1998) Internet Addiction Diagnostic Questionnaire	China	Asia	Two middle and two high schools in Shanxi Province, China.
Li et al. (2019) a	1545	14.88	696	849	IAT Internet Addiction Test	China	Asia	An urban school district in South China.
Li et al. (2019) b	1545	14.88	696	849	IAT Internet Addiction Test	China	Asia	An urban school district in South China.
Li et al. (2019) c	1545	14.88	696	849	IAT Internet Addiction Test	China	Asia	An urban school district in South China.
Lin et al. (2020)	1825	15	914	911	IAT Internet Addiction Test	China	Asia	11 middle and high schools in Shenzhen, Guangdong Province, China, which were identified via stratified cluster sampling.
Lu et al. (2018)	1385	15.1	757	628	The Internet Addiction Test (IAT)	China	Asia	Two regions: Anhui (predominantly Han Chinese by ethnicity) and Qinghai (an agricultural region).
McNicol & Thorsteinsson, (2017)	163	17.5	80	81	AICA-S The Assessment of Internet and Computer Game Addiction Screener		International	51.0% of participants resided in North America (USA or Canada), 39.9% in Australia or New Zealand, 4.5% in Asia, and 4.7% in Europe.
Mo et al. (2018)	862	13.5	467	392	CIAS Chinese Internet Addiction Scale	China	Asia	Secondary school students in Hong Kong.
Park et al. (2017)	114	17.91	Blank	Blank	IAT Internet Addiction Test	Korea	Asia	Two alternative schools for North Korean defectors located in Seoul, South Korea.
Peng et al. (2019)	2785	13.53	Blank	Blank	IA Internet Addiction Diagnostic Questionnaire	China	Europe	Ten middle schools through stratified and random cluster sampling in Guangdong Province, China.
Schimmenti et al. (2017)	358	18.36	154	204	IAT Internet Addiction Test	Italy	Europe	The schools were located in Enna, a relatively small urban area comprising about 1,70, 000 citizens.
Stavropoulos et al. (2017) a	648	15.57	300	307	IAT Internet Addiction Test	Greece	Europe	Chi-square analysis confirmed that the sample did not differ from the original population based on the area of residence and the type of school.
Stavropoulos et al. (2017) b	648	15.57	300	307	IAT Internet Addiction Test	Greece	Europe	Chi-square analysis confirmed that the sample did not differ from the original population based on the area of residence and type of school.
Torres-Rodríguez et al. (2018)	31	14.97	31	0	IGD-20 Internet Gaming Disorder Test	Spain	Europe	Two public mental health centers in the Barcelona metropolitan area.
Uçar et al. (2020) a	73	14.64	33	40	IAS Internet Addiction Scale	Turkey	Euro-Asia	All participants were medication naive and not undergoing any psychological therapy.
Uçar, et al. (2020) b	73	14.64	33	40	DGAS Digital game addiction scale	Turkey	Euro-Asia	All participants were medication naive and not undergoing any psychological therapy.
Wang et al. (2018)	527	15.15	250	277	IAT Internet Addiction Test	China	Asia	Two middle schools and three high schools in Wuhan and Shanghai.

(continued on next page)

Cardaci, Scrima, & Tabacchi 2017; Pontes, Kuss, & Griffiths, 2015; Ryan, Chester, Reece, & Xenos, 2014). Various authors, including Akin (2012), Smahel, Brown, and Blinka (2012), Tonioni et al. (2012), Müller et al. (2016), and Lin et al. (2018), have considered the existence of addictive Internet activities other than online games. According to Chou, Chang, and Yen (2018), there are important differences between the activities carried out on the Internet. They concluded that sex and age lead to significant differences between “online gaming,” “online chatting,” “online watching,” and “online studying.” In this regard, Mo, Chan, Chan, and Lau (2018) and Schimmenti et al. (2017) referred to the differential use of the Internet based on sex, while McNicol and Thorsteinsson (2017) conferred a determining value upon age.

Internet addiction is, therefore, a man–machine addiction in which the same behavior that underlies other addictions, such as online gambling, exists (Blaszczynski, 2006; Young, 1998). However, its etiology or cause still remains unclear since there is a discrepancy if Internet addiction is the cause or consequence of other pathologies. It is difficult to unravel the cause and role of Internet addiction because it presents high levels of comorbidity with other disorders including depression, anxiety, stress, obesity, internalizing and behavioral problems, alexithymia, hyperactivity, and traumatic events in children (Lozano-Blasco & Cortés-Pascual, 2020 [details removed for peer review]; Stanković, Nešić, Čičević, & Shi, 2021; Tas, 2019; Yang, Wu, Qi, & Zhou, 2020; Zhai et al., 2020).

Newer literature on the subject indicates that both individual and environmental variables play important roles in determining the level of Internet addiction. Among the individual factors that predispose an individual to suffer from an addiction to new technologies, as well as to suffer “emotional and cognitive Internet concern” (Černja et al., 2019) and feel constantly judged (Biraglia, Brizi, Salvati, Metastasio, & Mannetti, 2017) is the attributional disadaptive nature of Internet addiction marked by rumination and scarce “self-care” (McNicol & Thorsteinsson, 2017). Personality elements such as introversion, inhibition, submissiveness, self-evaluation, interpersonal sensibility, obsessive–compulsive tendencies, phobic anxiety, hostility, paranoia, borderline personality, and low self-esteem precipitate Internet addiction (Peng et al., 2019; Stavropoulos, Kuss, Griffiths, Wilson, & Motti-Stefanidi, 2017; Torres-Rodriguez, Kuss, Griffiths, Wilson, & Motti-Stefanidi, 2018; Zhou et al., 2017). However, elements such as friendliness and responsibility serve as protectors (Zhou et al., 2017). Difficulties in emotional management also consistently favor addictive behaviors (Mo et al., 2018; Peng et al., 2019; Schimmenti et al., 2017; Wang et al., 2018).

Others have studied how Internet addiction is a consequence of other pathologies. Adolescents who have suffered childhood trauma use the Internet as a form of escape, spending a large number of hours in front of the screen (Park, Lee, & Jun 2017; Schimmenti et al., 2017). Loneliness and the desire to relate to others also increase their screen time, thus making it addictive (Zhang et al., 2018). As a result, adolescents with greater psychological security (Jia et al., 2018), self-control, responsibility to complete their schoolwork (Černja et al., 2019), and good guidance (Biraglia et al., 2017) are less likely to suffer from addiction.

Although at first glance, it may seem that addiction is an individual problem, the importance of the environment—especially family and school—must be taken into account. Dysfunctional families with

conflicts, poor communication, the absence of social support, and boredom are risk factors for the development of addiction to new technologies (Peng et al., 2019; Schimmenti et al., 2017; Wang et al., 2018; Zhou et al., 2017). Clear and precise rules at home seem to be a protective element against addiction, so parents must understand that spending more than three hours a day playing online games and using social networking sites can lead to addiction (Bozkurt, Özer, Şahin, & Sönmezgöz, 2018; Stavropoulos et al., 2017). The school environment can also serve as a protective factor against addiction, since maintaining a good relationship with one’s educational center (Peng et al., 2019), the absence of stress and cyberbullying, and academic success and physical activity (El Asam et al., 2019; Lin et al., 2020) reduce the probability of suffering from Internet addiction.

Regarding the roles of sociodemographic variables such as gender, age, and geographic region, existing literature shows several discrepancies. Gender presented the greatest disparity in the results. Numerous authors maintain that gender does not explain addiction (Chang & Man Law, 2008; Kuss, Griffiths, & Binder, 2013; Marino, Gini, Vieno, & Spada, 2018; Müller, Beutel, & Wölfling, 2014). However, recent literature argues that the use of the Internet and the social-emotional needs addressed by Internet addiction differ according to gender (Biraglia et al., 2017; Černja et al., 2019; Schimmenti et al., 2017). Age also plays a significant role in determining the use of the Internet (Capetillo-Ventura & Juárez-Treviño, 2015; Kuss et al., 2013; Li et al., 2013; Li, Zhang, Li, Zhen, & Wang, 2010; Liu, Zhang, Zhou, Li, & Fang, 2017; Müller et al., 2014; Poli & Agrimi, 2012; Yang et al., 2017; Zhi, Wang, Wang, & Hao, 2013). However, there is no majority position on the positive or negative effect of age on Internet addiction. In one way or another, the transcendence of the evolutionary stage should not be overlooked, since adolescence is in itself a transitional stage prone to the development of addiction (Hurd, Michaelides, Miller, & Jutras-Aswad, 2014; Luengo Kanacri et al., 2014).

Regarding culture, several meta-analyses have shed light on how, despite living in a globalized world with a strong multicultural character (Pacheco, 2020; Howard Ross, 2010), there are differences in the degree of prevalence of Internet addiction. Initially, there was a disparity between European (Durkee, et al., 2012) and Asian countries (Winkler, Kaess, Carli, & Parzer, 2013), and even between regions within the same country, such as China (Lei, Cheong, Li, & Lu, 2018; Lei, Li, Chiu, & Lu, 2018). Cheng and Li (2014) demonstrated that Internet addiction negatively correlates with life satisfaction and quality of environment. Other meta-analyses, such as Lozano-Blasco & Cortés-Pascual, 2020 [details removed for peer review], have revealed the absence of differences between European and Asian cultures. With this in mind, there is currently no meta-analysis to determine the prevalence of Internet addiction among adolescents.

Therefore, the present meta-analysis aims to examine the prevalence of Internet addiction in adolescents, focusing on the moderating variables of age, gender, geographic region, and measurement instrument. Recent literature notes that a high diversity among outcomes is necessary to ascertain the role of Internet addiction in today’s scenario.

## 2. Methods

The present meta-analysis was conducted following the protocol of

Table 1 (continued)

Authors of the study	Sample	Mean Age	Male	Female	Instrument	Country	Geographical area	Distribution of participants
Zhang et al. (2018)	214	18.31	103	111	CIAS Chinese Internet addiction scale	China	Asia	Postsecondary school in Shandong Province, using cluster random sampling.
Zhou et al. (2017)	1189	14.43	476	713	IADQ Internet Addiction Diagnostic Questionnaire	China	Asia	Participants were recruited from five middle schools in Jiangxi Province, China.

\* Some investigations are longitudinal or comparative studies and they have several samples. They are differentiated by a letter (a, b, c).

registration for research from the Cochrane Handbook for Systematic Review of Interventions by Higgins and Green (2011) and PRISMA (2015). The inclusion and exclusion criteria were established based on the work of Botella and Sánchez (2015) and Moreau and Gamble (2020). The inclusion criteria were as follows: (a) age (adolescents with an average age between 11.5 and 18 years), (b) methodological nature of the articles (experimental and quantitative articles to introduce the dates in the software), (c) Date of publication (2017 to 2020), (d) Methodological rigor of studies that are published in journals with a Q1 index (Scimago Journal & Country Rank) to avoid serious methodological biases and failures, (e) Standardized psychometric tests by means of academic publications so that the psychometric evaluation is standardized for the population, and (f) Language (research published in English to facilitate reading and reworking of all research). The exclusion criteria were as follows: (a) Adolescent population with special educational needs (SEN). However, research in which students with SEN are a standard measure based on the normal curve would be accepted, (b) Research without clear and precise quantitative data, with methodological errors, and instruments not conveniently scaled or adapted to the participating population (Friese & Frankenbach, 2020; Hunter & Schmidt, 2004).

For the search strategy, the parameters of Botella and Gambara (2002) were followed using three databases: PsycInfo, Scopus, and Science Direct due to research content of high reliability, academic quality in the English language, and specialization in educational sciences and educational psychology. A search was performed in March and April of 2020. After successive search strategies, it was concluded that BooleanAction best covered the terminology related to the research question including “Internet- addiction OR addictive-level AND Internet OR social network OR video-games” (see Fig. 1). The search yielded a large number of results, and therefore, to narrow them down, the following steps were taken.

In Scopus, “article title”, “abstract”, “keywords”, and “article” were used for the types of research. In PsycInfo, “age: adolescence 13–17 and adulthood 18 years & older”, “keywords”, “peer-reviewed journal”, “human”, “English”, and “test and measurement” were used. In Science Direct, the terms appeared in “title, abstract or keywords,” “research articles,” and “open access.” At the same time, a timeframe of 2017–2020 was established.

The studies were selected according to the criteria set forth by the Cochrane Handbook for Systematic Reviews of Interventions by Higgins and Green (2011) and PRISMA (2015), which detail the criteria for

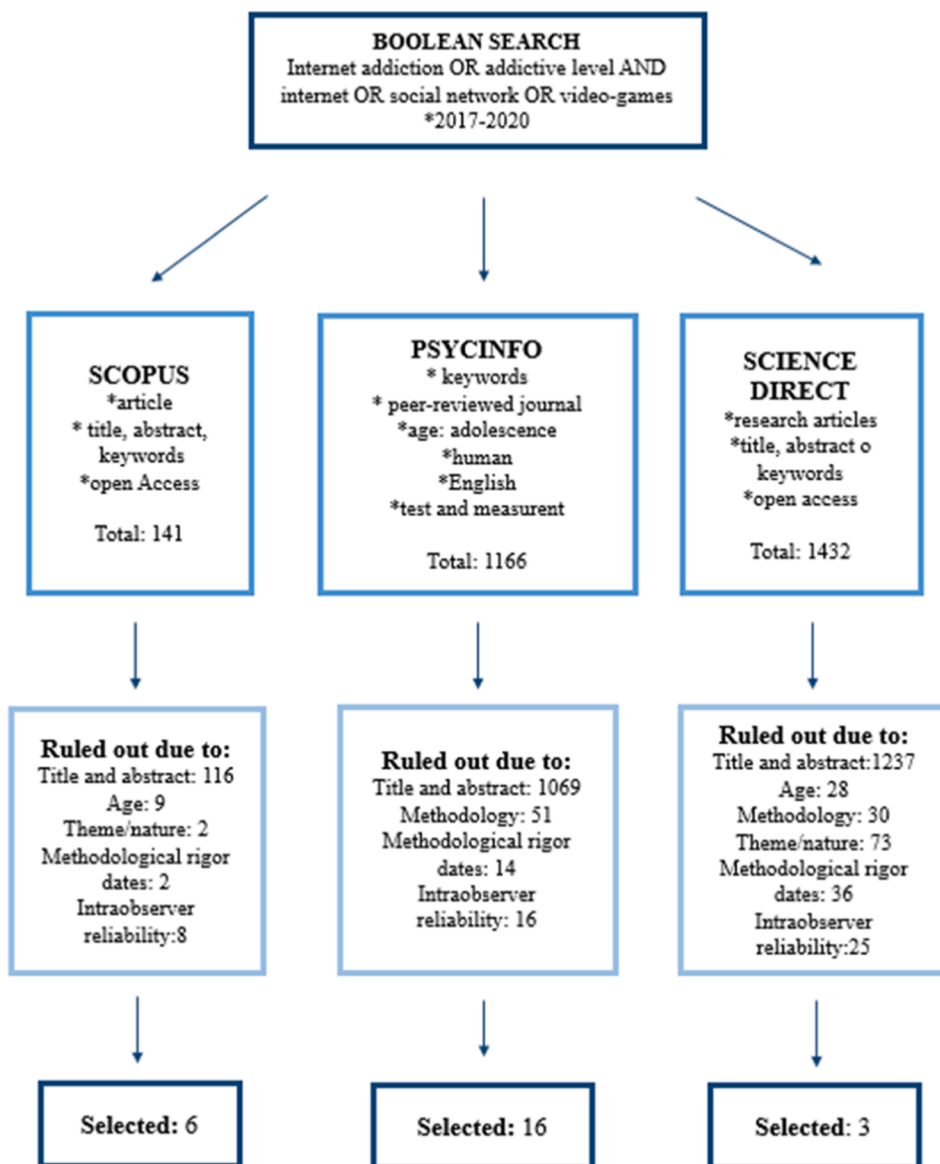


Fig. 1. Flow chart of the search process and selection of studies.

eligibility of the studies that comprise the sample.

The studies were coded manually and the title, abstract, and main text were read individually. All the articles yielded by our search were systematically reviewed and those that met the inclusion and exclusion criteria listed above were selected. A determining factor that significantly reduced the sample was the criterion of the scale of psychometric tests, since in many studies, they are not accompanied by clear references regarding the authorship of the instrument, or they were ad hoc questionnaires. The criterion of methodological rigor also led to the rejection of a large number of studies since unacceptable errors were detected in the measurement of the instruments, the most common being not providing the mean and standard deviation of the total scores correctly.

A statistical transformation to Fisher Z values (Martin-Andrés & Luna del Castillo, 2004) was performed using CMA statistical software. This program was used to perform publication bias tests (Egger's test) for statistical analysis of heterogeneity, meta-regression, and model comparisons to obtain forest plots, funnel plots, and Fisher Z meta-regression graphs.

### 3. Results

#### 3.1. Demographics

Newer literature on Internet addiction produced interesting results pertaining to recent years (2017–2020). In total, the present meta-analysis was composed of 20 studies, with  $k = 28$  samples from Europe, Asia, and international studies, with a total sample size of 21,878 adolescents, specifically 43.35% males, and 42.80% females (two studies did not provide data on the gender of their participants). Regarding the sample size, it is necessary to highlight the heterogeneity of sizes, with the smallest and largest being 31 and 2,785 participants. In terms of culture, social anthropology points to the need of addressing cultural diversity (Molano, 2007). In the present study, 72.87% of respondents were Asian (China, Korea, and Taiwan), 0.74% were Eurasian (Turkey), 17.82% were European (Italy, Spain, Croatia, Greece, and the UK), and 0.83% were participants in international studies. The participants' average age was 15.13 years, although some studies did not provide a specific average age, but rather a range of years. In such cases,

the arithmetic mean was computed.

#### 3.2. Statistical analysis

The objective of the present study was to determine the incidence of Internet addiction among adolescents (see Fig. 1). To do so, it was necessary to transform the measures of each study into Fisher Z-values (Martin-Andrés & Luna del Castillo, 2004). Fig. 2 presents the effect size, with a 95% confidence interval (3.164–4.045,  $p = 0.000$ ) for the various studies, with a mean of addiction ( $Z = 16.04$ ;  $SE = 0.225$ ;  $p = 0.000$ ). According to Moreau and Gamble (2020), the conversion of data is shown in the graph of the forest plot. In line with the measures of the various instruments that make up the sample (IAT, IAS, CIAS, PIUQ, AICA-S, AIDQ, IGD-20, and DGAS), the score of addiction in the participants (mean age = 15.17) was not very high. Subsequently, all the studies under investigation indicated a high significance in their scores. The highest rate is that of Peng et al. (2019) ( $Z = 8.778$ , median age = 13.53, China), and the lowest was that of Torres-Rodríguez et al. (2018) ( $Z = 5.552$ , median age = 14.97, Spain).

Second, the heterogeneity of the sample was analyzed according to the Cochrane Handbook for Systematic Reviews of Interventions by Higgins and Green (2011) (Cohen, 1988; DerSimonian & Laird, 2015) (see Table 2). The Q statistic by Der Simonian and Laird (1986) ( $Q = 2493.26$ ,  $df = 27$ ,  $p < 0.000$ ) indicated high variability, rejecting the homogeneity hypothesis. For this reason, it is necessary to pay attention to the  $I^2$  statistic = 98.91%, which explains the percentage of variability resulting from heterogeneity. According to Higgins, Thompson, Deeks, and Altman (2003), heterogeneity is very high. Consistent with this finding, it is necessary to follow the random-effects model (Bonett & Price, 2015; Martín-Andrés & Luna del Castillo, 2004). Although the inclusion criteria include methodological rigor and the reliability of data as essential elements, it is necessary to perform Egger's test with 99% reliability to study the bias effect (Botella & Gambará 2002; Botella & Sánchez, 2015). The Egger's test shows the absence of publication bias, with a 99% confidence interval ( $p$ -value 1-tailed = 0.02;  $p$ -value 2-tailed = 0.4) (Eggers et al. 1997) (see Table 3). Subsequently, the value of the standard error is not high (3.17), which implies proximity to the regression line, reaffirming the non-existence of publication bias (Martín-Andrés and Luna del Castillo, 2004).

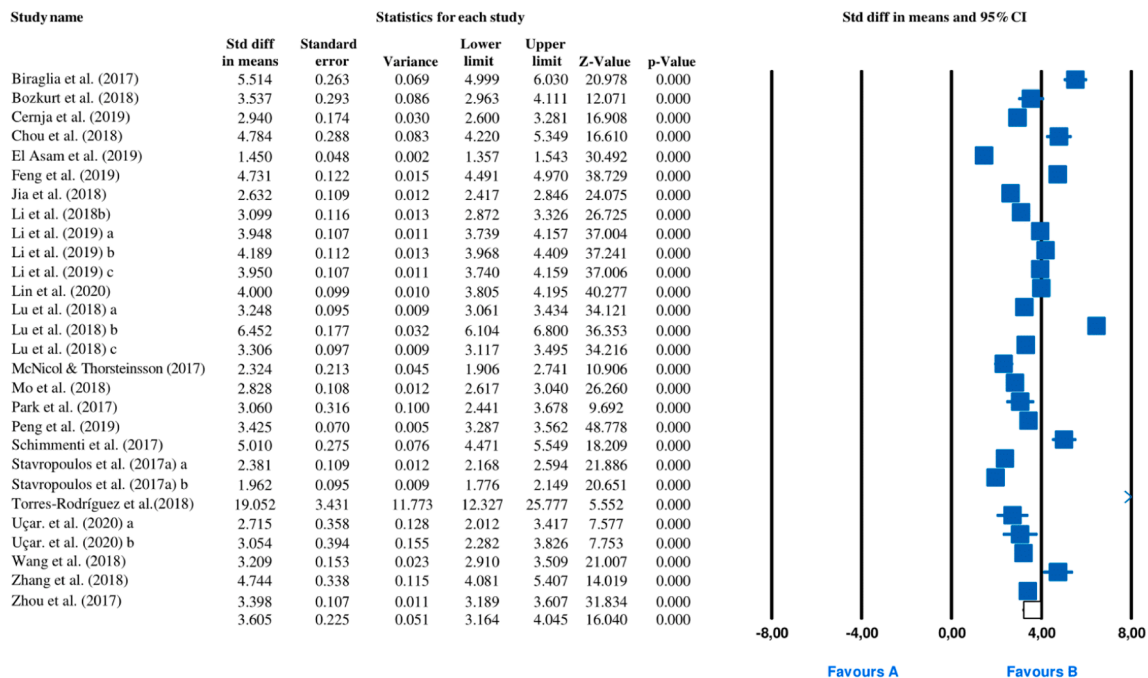


Fig. 2. Forest plot.

**Table 2**  
Heterogeneity statistics.

Model		Fixed	Random
Effect size and 95% interval	Point estimate	2.98	3.60
	Standard error	0.02	0.22
	Variance	0.00	0.05
	Lower limit	2.94	<b>3.16</b>
	Upper limit	3.03	<b>4.04</b>
Test of null (2-tailed)	Z-value	134.53	16.04
	P-value	0.00	0.00
	Q-value	2493.26	
Heterogeneity	Df(Q)	27	
	P-value	<b>0.00</b>	
	I-squared	<b>98.91</b>	
	Tau squared	1.33	
Tau-squared	Standard Error	0.53	
	Variance	0.28	
	Tau	1.15	

**Table 3**  
Egger's test.

Intercept	9.98
Standard error	<b>3.17</b>
95% lower limit (2-tailed)	3.45
95% upper limit (2-tailed)	16.51
T-value	3.14
DF	26
P-value (1-tailed)	<b>0.02</b>
P-value (2-tailed)	<b>0.04</b>
Confidence Interval	<b>99%</b>

The variability evidenced in the Q and I<sup>2</sup> statistics (see Table 2) indicates the existence of extreme data, but the tight CI (2.94–3.03) should limit such heterogeneity. These data are consistent with the funnel plot graph (Fig. 3), which reaffirms the variability observed previously, reiterating the diversity of studies (Sterne et al., 2011), as shown by Egger's test. Thus, most of the results are very close to each other at the peak of the cone, except for one study that clearly escapes the norm, that of Torres-Rodriguez et al. (2018). This study provides extreme data, however, due to the methodological quality of the research and the internal coherence of its data, it was retained in the meta-analysis. It is important to note that the transformation to Fisher Z values despite being accepted in the methodology of the meta-analysis (Martin-Andrés & Luna del Castillo, 2004) is not indicative of inconveniences. The x > 0.5 values can be distorted since they are far from the mean values compared to the normal curve.

### 3.3. Moderator variables and meta-regression analysis

Recent literature emphasizes the existence of moderating factors, which is why it is necessary to study the role of the variables of gender, instrument, type of addiction, geographic region, and age. The realization of a meta-regression (Jak & Cheung, 2019) and a comparison of models could explain such a high variability of results (Botella & Sánchez, 2015).

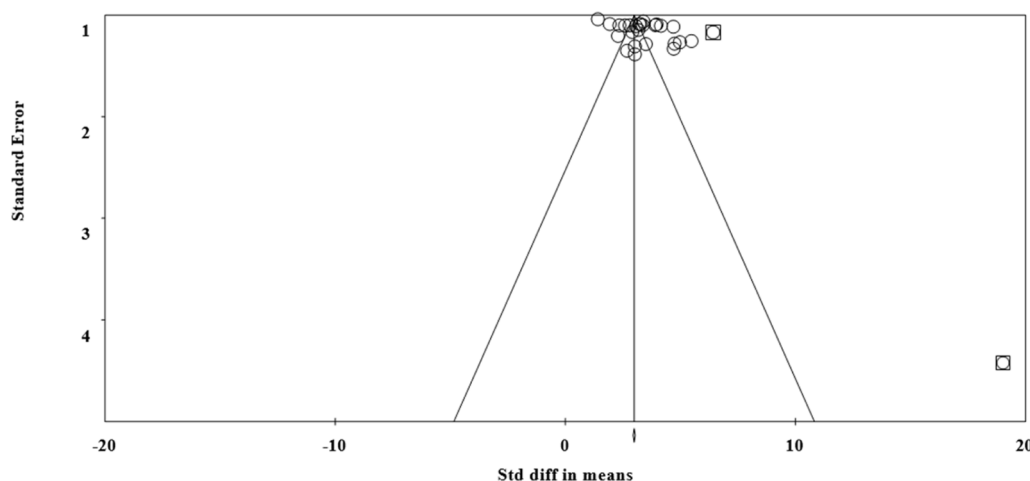
For the present study, six moderating variables were selected: male, female, measurement instrument, type of addiction, geographic region, and average age. The meta-regression (see Table 4) generated seven models, of which only three were relevant: Model 4 (measurement instrument), Model 6 (geographic region), and Model 7 (average age).

The first model, in which no moderating variable is introduced, does not help understand the variance in any percentage, as do the second (male), third (female), and fifth (type of addiction) models. However, Model 4 (measurement instrument) justified a variance of 31% (R<sup>2</sup> = 0.31), with a significance of p < 0.001. This is similar to Model 6 (geographic region), which indicates a 47% variance (R<sup>2</sup> = 0.47) with a significance of p < 0.001, and Model 7 (average age), which explains a 24% variance (R<sup>2</sup> = 0.24), with a significance of p < 0.001. The meta-regression allowed a detailed understanding of the role of the measurement instrument (see Table 5) and geographic region (see Table 6). The meta-regression of Model 4 (measurement instrument) shows that there are significant differences when using psychometric tests. From this set, it was analyzed how the Chinese Internet Addiction Scale (CIAS), which focuses on Internet addiction, together with the Internet Gaming Disorder Test (IGD-20), which focuses on online gaming addiction, led to scores that reported significant differences (CIAS = 1.92; Z = 1.75; p = 0.07) and (IGD-20 = 16.72; Z = 4.53, p = 0.00) with respect to the rest of the instruments.

These results are striking since one would expect differences between the already recognized pathology of IGD and generic addiction to Internet use. The meta-regression of Model 6 (geographic region)

**Table 4**  
Model comparison: Random effects (MM), Z-distribution, Fisher's Z.

Model name	Tau Sq.	R <sup>2</sup>	Q	df	P-Value
Model 1	1.47	0.00	2450.19	25	0.00
Model 2 MALE	1.47	0.00	2450.19	25	0.00
Model 3 FEMALE	1.47	0.00	2450.19	25	0.00
Model 4 INSTRUMENT	1.32	<b>0.31</b>	2450.19	25	<b>0.00</b>
Model 5 ADDICTION	1.47	0.00	2450.19	25	0.00
Model 6 GEOGRAPHICAL AREA	1.47	<b>0.47</b>	2450.19	25	<b>0.00</b>
Model 7 AGE	1.47	<b>0.24</b>	2450.19	25	<b>0.00</b>



**Fig. 3.** Funnel plot of standard error by standard difference in means.

**Table 5**

Meta-regression: Model 4 – Measurement instrument.

Covariate	Coefficient	Standard Error	95% Lower	95% Upper	Z-value	2-sided p-value	Q	df	P
Intercept	2.32	0.98	0.39	4.24	2.37	0.01	28.47	8	0.0004
CIAS	<b>1.92</b>	<b>1.09</b>	<b>-0.22</b>	<b>4.08</b>	<b>1.75</b>	<b>0.07</b>			
DGAS	0.72	1.42	-2.07	3.59	0.51	0.60			
IA	0.77	1.37	-1.92	3.47	0.56	0.57			
IADQ	1.08	1.19	-1.25	3.43	0.91	0.36			
IAS	0.81	1.21	-1.57	3.19	0.67	0.51			
IAT	1.38	1.01	-0.60	3.37	1.37	0.17			
IGD-20	<b>16.72</b>	<b>3.69</b>	<b>9.48</b>	<b>23.97</b>	<b>4.53</b>	<b>0.00</b>			
PIUQ	-0.87	1.37	-3.56	1.81	-0.64	0.52			
AICA-S	It has not been possible to contemplate it because its sample (N = 163) is not adequately representative.								

**Table 6**

Meta-regression: Model 6 – Geographic region.

Covariate	Coefficient	Standard Error	95% Lower	95% Upper	Z-value	2-sided p-value	Q	df	P
Intercept	3.93	0.24	3.46	4.40	16.33	0.00	5.4	3	0.14
Asian papers	-0.79	0.52	-1.83	0.23	-1.51	0.13			
European papers	-0.60	0.43	-1.46	0.25	-1.38	0.16			
International papers	<b>-1.61</b>	<b>0.94</b>	<b>-3.46</b>	<b>0.24</b>	<b>-1.71</b>	<b>0.08</b>			

yielded data on cultural differences, underscoring the “international paper” variable. In the study by McNicol and Thorsteinsson (2017), which presents a relatively small sample (n = 163), addiction was measured using the AICA-S test, which had very little effect and was rejected in the meta-regression test, and its scores were within the confidence limits with high significance. The only feature that differentiates it from its counterparts relates to the origin of its participants, with 51.0% in North America (the USA or Canada) and 39.9% in Australia or New Zealand. Therefore, it is crucial to study the phenomenon of Internet addiction in greater detail in these nations via independent studies in the future. In sum, the heterogeneity that the Q and I<sup>2</sup> statistics and the funnel plot presented could be understood both by the measurement instrument used and by the cultural diversity.

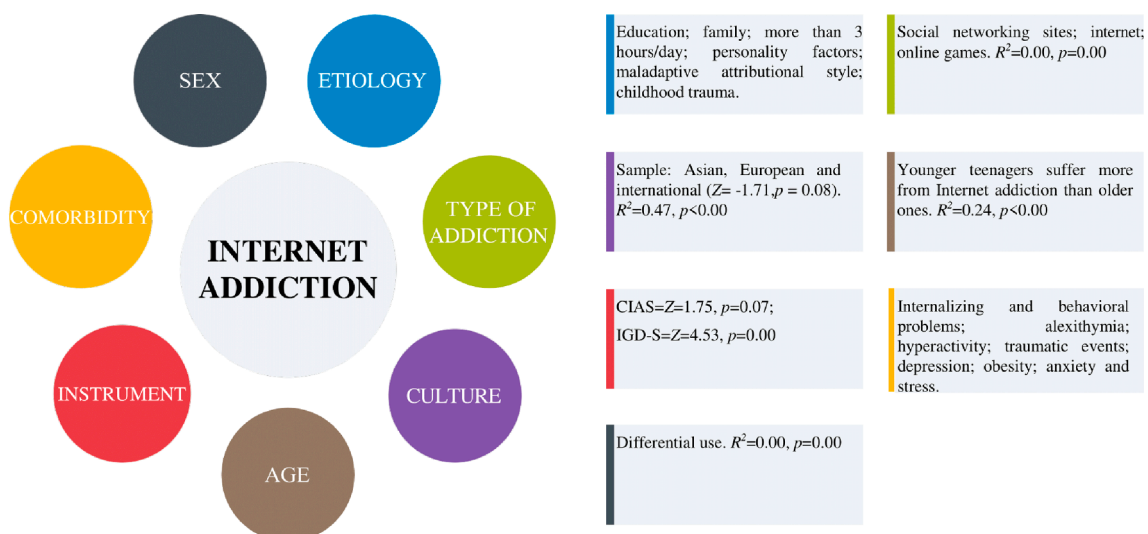
**4. Discussion**

The results of the comparison of models and meta-regression should be considered from the perspective of the systematic manual review. In this sense, it is necessary to obtain explicit relevant data that was not able to be quantified through statistics in the present study (see Fig. 4).

Recent literature points out that Internet addiction or problematic

use is a disorder with a high rate of comorbidity (Lozano-Blasco & Cortés-Pascual, 2020 [details removed for peer review]; Stanković et al., 2021; Tas, 2019; Yang et al., 2020; Zhai et al., 2020), which coincides with the findings of the present study. In this regard, the sample of studies considered refers to how Internet addiction is presented along with obesity (Bozkurt et al., 2018), anxiety, depression, and stress (El Asam et al., 2019; Feng et al., 2019; Li et al., 2019; McNicol & Thorsteinsson, 2017; Torres-Rodriguez et al., 2018; Uçar et al., 2020), internalizing problems (Torres-Rodriguez et al., 2018), behavior (El Asam et al., 2019), alexithymia (Schimmenti et al., 2017), hyperactivity (El Asam et al., 2019), and traumatic events or childhood trauma (Park et al., 2017; Schimmenti et al., 2017).

However, the sample has a complex etiology. In general, we can differentiate features between individual and environmental variables that predispose adolescents to addiction to new technologies. In terms of individual variables, teenagers addicted to the Internet have a maladaptive attributional style marked by rumination and scarce “self-care,” aspects that are carried over to adulthood (McNicol & Thorsteinsson, 2017). Similarly, people who present “emotional and cognitive Internet preoccupation” (Černja et al., 2019) and who feel constantly judged (Biraglia et al., 2017) are at greater risk of suffering



**Fig. 4.** SCAMPER template of discussion.

from addiction. Therefore, it is pertinent to consider the existence of a series of variables intrinsic to the individual personality that can lead adolescents to suffer from addiction. These variables include introversion, inhibition, submissiveness, self-evaluation, lack of interpersonal sensitivity, obsessive-compulsive tendencies, phobic anxiety, hostility, paranoia, borderline personality, hostility, and low self-esteem (Peng et al., 2019; Stavropoulos et al., 2017; Torres-Rodríguez et al., 2018; Zhou et al., 2017). However, friendliness and responsibility act as protectors (Zhou et al., 2017). Furthermore, low emotional intelligence—understood as the difficulty in recognizing emotions and regulating them—is a precipitating variable for Internet addiction (Mo et al., 2018; Peng et al., 2019; Schimmenti et al., 2017; Wang et al., 2018).

Some studies indicate that Internet addiction is not a cause, but a consequence of other pathologies. In this sense, adolescents with childhood trauma may use the Internet as a form of escape, and its use can become addictive (Park et al., 2017; Schimmenti et al., 2017). Likewise, deep loneliness can lead to an increase in addiction (Zhang et al., 2018). In this way, the Internet fulfills the desire for relationships. Consistently, people with depression are more likely to overuse the Internet for comfort (Zhang et al., 2018). Subsequently, adolescents who exhibit psychological security (Jia et al., 2018), self-control, responsibility to complete school tasks (Černja et al., 2019), and good orientation (Biraglia et al., 2017)—which are protective factors originating in individuality—show lower rates of addiction.

In terms of environmental factors, an adolescent's relationship with family, school, and activities carried out together over time seem to play an important role. Dysfunctional families with internal conflicts, bad communication, a lack of social support, and boredom lead to the risk of developing an addiction to new technologies. (Peng et al., 2019; Schimmenti et al., 2017; Wang et al., 2018; Zhou et al., 2017). As for the socioeconomic factors, a disparity has been noted. Chou et al. (2018) explained how a mother's low socioeconomic level increases Internet addiction, while Jia et al. (2018) showed that the higher the mother's education level and the better her socioeconomic status, the higher the rate of addiction, which is consistent with other studies in the same sample, such as those of Feng et al. (2019) and Wang et al. (2018). Perhaps the factor of quality time spent with children could be a key element in the understanding of Internet addiction from a socioeconomic perspective. Addiction has also been explained by boredom (Chou et al., 2018) and the absence of social support (Černja et al., 2019; Mo et al., 2018). In terms of adolescent education, a good relationship with teachers (Jia et al., 2018) and a close connection with one's school (Peng et al., 2019), the absence of stress and cyberbullying, along with academic success and physical activity (El Asam et al., 2019; Lin et al., 2020), are protective elements. Similarly, the use of multiplayer platforms and spending more than three hours a day playing online games or using social networks precipitate addiction (Bozkurt et al., 2018; Stavropoulos et al., 2017), while spending time on homework or searching the Internet for information does not explain the addiction to any degree (Bozkurt et al., 2018).

The role of gender in Internet addiction is a major area of research. The results of the present meta-regression show how gender does not explain Internet addiction at any percentage, which is in line with several previous studies (Chang & Man Law, 2008; Kuss et al., 2013; Müller et al., 2014; Marino et al., 2018). In general, the univocal finding is that gender does not explain addiction (Biraglia et al., 2017; Černja et al., 2019; Chou et al., 2018; McNicol & Thorsteinsson, 2017; Schimmenti et al., 2017; Zhang et al., 2018). However, the results of the systematic reviews show that gender plays a secondary role in addiction. Biraglia et al. (2017) explained that gender alone is not relevant, but, together with self-evaluation, it moderates Internet addiction, with men being the most affected. Černja et al. (2019) reasoned how there are differences in the components of Internet addiction that are explained by gender, with men being influenced by "social problems" while women "neglect work and lack self-control." Additionally, gender loses strength with an increase in age (Li & Peng, 2019). Schimmenti et al. (2017)

demonstrated that the differential use of the Internet among both genders is what determines the differences in addiction; in women, it appears to be mediated by their affectivity, alexithymia being a key element, while men seem to seek escape from traumatic events. In other words, Internet addiction may respond to different needs in men and women in such a way that it is worth asking the following questions: What role does Internet addiction play in men? What role does it play in women? Does Internet addiction address different needs according to gender?

In a world that is interconnected and globalized by Internet access (Pacheco, 2020; Howard Ross, 2010), it is notable how geographic regions explain 47% of the variability. Specifically, the present meta-regression shows cultural differences in the international sample (configured by the population of the USA, Canada, Australia, and New Zealand) with respect to the Asian and European populations. These results should be interpreted with caution because, as explained in the previous section, the study by McNicol and Thorsteinsson (2017) had a small sample, so much so that the meta-regression rejected its measurement instrument (AICA-S) as a variable.

It is important to point that although the statistical findings are within the confidence limit, there is a differentiating element in this study. Either because of the measurement instrument or because of culture, it is necessary to conduct further studies on Internet addiction in native English-speaking countries to shed light on this issue. Beyond this outcome, it is necessary to further reflect on recent literature on culture as a moderator of addiction. On the one hand, these findings are in accordance with the meta-analysis of Lozano-Blasco and Cortés-Pascual (2020) [details removed for peer review] on the problematic use of the Internet and depression, which indicates no significant differences between Asia and Europe. The meta-analysis by Winkler et al. (2013) indicates how there are significant cultural differences, especially in Asian nations. Meta-analyses of China demonstrate internal cultural differences between East China (higher economic growth and higher use of the Internet) and West China (lower economic development and limited use of the Internet) (Lei, Cheong, et al., 2018; Lei, Li, et al., 2018). Winkler et al. (2013) argued that the differences may emerge due to the search for individuality in the online world as opposed to a traditional society marked by collectivist values. Similarly, the meta-analysis by Durkee et al. (2012) points to differences among European nations with Israel showing the highest rate of Internet addiction and Italy the lowest. Finally, the meta-analysis of Cheng and Li (2014) should be examined from a more globalized perspective; they explained how the prevalence of Internet addiction varies among regions, being the highest in the Middle East and the lowest in Northern and Western Europe. They argued that Internet addiction negatively correlates with life satisfaction and the quality of environmental conditions.

The results of the present meta-regression indicated that age plays a relevant role because it explains 24% of Internet addiction, which is in line with previous studies (Capetillo-Ventura & Juárez-Treviño, 2015; Kuss et al., 2013; Li, Li, Wang, Zhao, Bao, & Wen, 2013; Li et al., 2010; Liu et al., 2017; Müller et al., 2014; Poli & Agrimi, 2012; Yang et al., 2017; Zhi et al., 2013) and previous meta-analyses (Marino et al., 2018). However, it is necessary to conduct a systematic review of the present sample of studies to understand the role played by age as a variable.

Biraglia et al. (2017) argued that younger adolescents with poorer self-concepts are more likely to suffer from Internet addiction. In this sense, Li and Peng (2019) described how age loses significance with increasing age, while McNicol and Thorsteinsson (2017) maintained that increasing age changes the predictors of Internet addiction. El Asam et al. (2019) explained how the younger the age, the greater the obsession (an element of problematic Internet use, or PIU), while the older the age, the greater the neglect (an element of PIU). There is some agreement that younger people are more affected (Biraglia et al., 2017; Li & Peng, 2019; McNicol & Thorsteinsson, 2017; Mo et al., 2018; Stavropoulos et al., 2017) by Internet addiction. In this case, evolutionary development seems to be a protective element.

However, it should not be overlooked that there are studies on the Chinese population that indicate the opposite—the older the person, the more addicted he/she becomes (Feng et al., 2019; Wang et al., 2018; Zhang et al., 2018; Zhou et al., 2017). Finally, it should be borne in mind that adolescence itself is a vulnerable stage for developing addictions (Hurd et al., 2014; Luengo Kanacri et al., 2014) and that the development of addictions may affect adolescents' cognitive development in the future (Yan et al., 2020; Luengo Kanacri et al., 2014; Wei et al., 2020).

The differences found in meta-regression according to the measurement instrument can be explained by the disparate components that make up the pathology of Internet addiction. The relevance of this outcome should not be overlooked, as it indicates differences when evaluating addiction. These findings are consistent with previous meta-analyses on Internet addiction, such as the work of Lei et al. (2018) and Lei et al. (2018). In the absence of a clear and unifying criterion, such as the one established in the IGD in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013), numerous terms have proliferated in an attempt to respond to this new reality, such as “excessive internet use,” PIU, Internet addiction disorder (IAD) (El Asam et al., 2019), and Internet addiction (IA) (Müller et al., 2016) among others. Similarly, numerous measurement instruments have emerged that have helped analyze and raise awareness on the problem (Caci et al., 2017; Pontes et al., 2015; Ryan et al., 2014).

Several authors, including Akin (2012), Smahel et al. (2012), Tonioni et al. (2012), Müller et al. (2016), and Lin et al. (2018), consider it necessary to take into account that other online activities, apart from games, can generate addiction. Internet addiction was introduced by Young (1998), who emphasized the imperative need to address the growing concerns regarding psychological, social, and professional repercussions of online activities. Chou et al. (2018) pointed out important differences between activities performed on the Internet. Moreover, they explained how “online gaming” is marked by gender, while “online chatting,” “online watching,” and “online studying” are marked by age. McNicol and Thorsteinsson (2017) explained how a “discussion forum” is a predictor of Internet addiction in adolescents, while in the adult stage, it is determined by “video gaming,” “sexual activity,” and “email and avoidant coping.” Meanwhile, Mo et al. (2018) and Schimmenti et al. (2017) identified differential use depending on gender, which raises the question of whether Internet addiction is being measured well. It is perhaps time to unify criteria to achieve both an early diagnosis that allows for intervention and educational projects for developing Information Communication Technology (ICT) skills that provide tools to students and teachers for prevention.

In sum, Internet addiction is explained by the following factors: *age*, with younger adolescents being the most vulnerable; *assessment instrument(s)* (defining Internet addiction, elaborating on its symptoms, and introducing it as a pathology); and finally, *geographic region*, with the need to explain the elements underlying cultural variability.

Although the present study reveals important findings, it has several limitations. First, there was a lack of study participants living in Africa, Oceania, North America, Latin America, and Southeast Asia. Second, most studies on Internet addiction have been conducted with an adult population, not adolescents. Therefore, longitudinal studies that analyze the development of Internet addiction in both adolescence and adulthood must be undertaken in the future. Third, the lack of clear diagnostic criteria makes research on Internet addiction more complex since multiple measurement instruments may be involved, all of which try to respond to a complex situation in a way that improves the population's quality of life. Although the instruments in the present sample comply exhaustively with psychometric criteria, it is necessary for future studies to carefully analyze Internet addiction in countries with Anglo-Saxon influences (adapting the criteria of inclusion and exclusion as well as BooleanAction search terms). Likewise, it is necessary to employ a psychometric-oriented methodology that would enable an in-depth analysis of the predictive value of various evaluative tools. However, the most practical implication of future research would be reaching a

consensus on the following concerns: What is Internet addiction? What symptoms does it have? How can we measure it?

It is congruent to determine how age and geographic region serve as determinant variables of measuring Internet addiction. However, the scientific community should not ignore the disparities across measurement instruments. The education and healthcare sectors need international institutions such as WHO and APA to define what Internet addiction is, what symptoms it produces, how it is diagnosed, and how it can be treated. The lack of these definitions has generated multiple measurement instruments with a disparity of evaluative criteria, which has led to inconsistent findings. As such, a consensus among the scientific community to draw up a common line of action needs to be reached.

## 5. Conclusion

Internet addiction is a rapidly growing challenge faced across the world. The results of the present study indicate that the majority of the study sample did not have a severe addiction to new technologies. However, this finding does not detract from recognizing the fact that the etiology of this pathology is extremely complex, involving individual, educational, social, and cultural factors. Moreover, a high degree of comorbidity with other disorders makes it more difficult to intervene in adolescents. The primary outcome of this study was the absence of agreement between the definitions and measurement instruments of Internet addiction. This is not a generalist conclusion that encourages further research but evidence of a real need for an agreement regarding a clear diagnosis of this problem. The apparent desire of the scientific and educational community to respond to this situation is evident, but there is a need for regulated coordination that allows for the construction of a coherent explanatory model for Internet addiction by considering the aspect of human diversity.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgments

This publication has been co-financed by the European Regional Development Fund through the Interreg V-A programme Spain-France-Andorra-Poctefa (Retsaso project EFA341/19). The aim of Poctefa is to strengthen the economic and social integration of the Spain-France-Andorra border area. Its support is concentrated on the creation of a cross-border network of actors in health and social intervention through a collaborative work platform and a cross-border training offer. Funding was also received for the purchase of CMA software from: S57\_20R “Educa viva - Educación y Procesos Psicológicos” of “Departamento de Ciencia, Universidad y Sociedad del Conocimiento”.

## References

- Akin, A. (2012). The relationships between Internet addiction, subjective vitality, and subjective happiness. *Cyberpsychology, Behaviour, and Social Networking*, 15(8), 404–410. <https://doi.org/10.1089/cyber.2011.0609>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington.
- Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions*, 4(3), 119–123.
- Blaszczynski, A. (2006). Internet use: In search of an addiction. *International Journal of Mental Health and Addiction*, 4(1), 7–9.
- Biraglia, A., Brizi, A., Salvati, V., Metastasio, R., & Mannetti, L. (2017). Assessment and locomotion motivational concerns in Internet Addiction Disorder. *Computers in Human Behavior*, 76, 463–468. <https://doi.org/10.1016/j.chb.2017.08.002>
- Bonett, D. G., & Price, R. M. (2015). Varying coefficient meta-analysis methods for odds ratios and risk ratios. *Psychological Methods*, 20(3), 394–406. <https://doi.org/10.1037/met0000032>

- Bozkurt, H., Özer, S., Şahin, S., & Sönmezgöz, E. (2018). Internet use patterns and Internet addiction in children and adolescents with obesity. *Pediatric Obesity, 13*(5), 301–306. <https://doi.org/10.1111/jippo.12216>
- Botella, J., & Gamba, H. (2002). Qué es el meta-análisis. *Rógar*.
- Botella, J., & Sánchez, J. (2015). Meta-análisis en ciencias sociales y de la salud. *Síntesis*.
- Caci, B., Cardaci, M., Scrima, F., & Tabacchi, M. E. (2017). The dimensions of Facebook addiction as measured by Facebook Addiction Questionnaire and their relationships with individual differences. *Cyberpsychology, Behavior, and Social Networking, 20*(4), 251e258. <https://doi.org/10.1089/cyber.2016.0073>
- Capetillo-Ventura, N., & Juárez-Treviño, M. (2015). Internet addiction in university medical students. *Medicina Universitaria, 17*(67), 88–93. <https://doi.org/10.1016/j.rmu.2015.02.003>
- Cash, H., Rae, C. D., Steel, A. H., & Winkler, A. (2012). Internet addiction: A brief summary of research and practice. *Current Psychiatry Reviews, 8*(4), 292–298.
- Černja, I., Vejmelka, L., & Rajter, M. (2019). Internet addiction test: Croatian preliminary study. *BMC Psychiatry, 19*(1), 1–11. <https://doi.org/10.1186/s12888-019-2366-2>
- Chang, M. K., & Man Law, S. P. (2008). Factor structure for Young's internet addiction test: A confirmatory study. *Computers in Human Behavior, 24*(6), 2597–2619. <https://doi.org/10.1016/j.chb.2008.03.001>
- Cheng, C., & Li, A. Y. (2014). Internet addiction prevalence and quality of (real) life: A Meta-Analysis of 31 Nations Across Seven World Regions. *Cyberpsychology, Behavior, and Social Networking, 17*(12), 755–760. <https://doi.org/10.1089/cyber.2014.0317>
- Chou, W. J., Chang, Y. P., & Yen, C. F. (2018). Boredom proneness and its correlation with Internet addiction and Internet activities in adolescents with attention-deficit/hyperactivity disorder. *Kaohsiung Journal of Medical Sciences, 34*(8), 467–474. <https://doi.org/10.1016/j.kjms.2018.01.016>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge. In press.
- DerSimonian, D., & Laird, N. (2015). Meta-analysis in clinical trials revisited. *Contemporary Clinical Trials, 45*, 139–145. <https://doi.org/10.1016/j.cct.2015.09.002>
- Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., et al. (2012). Prevalence of pathological internet use among adolescents in Europe: Demographic and social factors. *Addiction, 107*(12), 2210–2222. <https://doi.org/10.1111/j.1360-0443.2012.03946.x>
- El Asam, A., Samara, M., & Terry, P. (2019). Problematic internet use and mental health among British children and adolescents. *Addictive Behaviors, 90*(March 2018), 428–436. <https://doi.org/10.1016/j.addbeh.2018.09.007>
- Feng, Y., Ma, Y., & Zhong, Q. (2019). The relationship between adolescents' stress and Internet addiction: A mediated-moderation model. *Frontiers in Psychology, 10* (October), 1–8. <https://doi.org/10.3389/fpsyg.2019.02248>
- Friese, M., & Frankenbach, J. (2020). p-hacking and publication bias interact to distort meta-analytic effect. *Psychological Methods, 25*(4), 456–471.
- Higgins, J. P. T., & Green, S. (2011). *Cochrane handbook for systematic reviews of interventions version 5.1.0*. The Cochrane Collaboration. [www.cochrane-handbook.org](http://www.cochrane-handbook.org).
- Higgins, J. P. T., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ, 327*, 557–560. <https://doi.org/10.1136/bmj.327.7414.557>
- Howard Howard Ross, Marc. (2010). CULTURA Y POLÍTICA COMPARADA: Culture in Comparative Political Analysis. *Revista Uruguaya de Ciencia Política, 19*(1), 7–44. Recuperado en 02 de enero de 2021, de [http://www.scielo.edu.uy/scielo.php?script=sci\\_arttext&pid=S1688-499X2010000100001&lng=es&tlng=es](http://www.scielo.edu.uy/scielo.php?script=sci_arttext&pid=S1688-499X2010000100001&lng=es&tlng=es).
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings*. Thousand Oaks, CA: Sage. <https://doi.org/10.4135/9781483398105>
- Hurd, Y. L., Michaelides, M., Miller, M. L., & Jutras-Aswad, D. (2014). Trajectory of adolescent cannabis use on addiction vulnerability. *Neuropharmacology, 76*, 416–424. <https://doi.org/10.1016/j.neuropharm.2013.07.028>
- Jak, S., & Cheung, M. W. L. (2019). Meta-analytic structural equation modeling with moderating effects on SEM parameters. *Psychological Methods, 25*(4), 430–455. <https://doi.org/10.1037/met0000245>
- Jia, J., Li, D., Li, X., Zhou, Y., Wang, Y., Sun, W., et al. (2018). Peer victimization and adolescent Internet addiction: The mediating role of psychological security and the moderating role of teacher-student relationships. *Computers in Human Behavior, 85*, 116–124. <https://doi.org/10.1016/j.chb.2018.03.042>
- Kirmayer, L. J., Raikhel, E., & Rahimi, S. (2013). Cultures of the Internet: Identity, community and mental health. *Transcultural Psychiatry, 50*(2), 165–191.
- Kuss, D. J., Griffiths, M. D., & Binder, J. F. (2013). Internet addiction in students: Prevalence and risk factors. *Computers in Human Behavior, 29*, 959–966. <https://doi.org/10.1016/j.chb.2012.12.024>
- Lei, H., Cheong, C. M., Li, S., & Lu, M. (2018). The relationship between coping style and Internet addiction among mainland Chinese students: A meta-analysis. *Psychiatry Research, 270*(October), 831–841. <https://doi.org/10.1016/j.psychres.2018.10.079>
- Lei, H., Li, S., Chiu, M. M., & Lu, M. H. (2018). Social support and Internet addiction among mainland Chinese teenagers and young adults: A meta-analysis. *Computers in Human Behavior, 85*, 200–209. <https://doi.org/10.1016/j.chb.2018.03.041>
- Li, G., Hou, G., Yang, D., Jian, H., & Wang, W. (2019). Relationship between anxiety, depression, sex, obesity, and internet addiction in Chinese adolescents: A short-term longitudinal study. *Addictive Behaviors, 90*(November 2018), 421–427. <https://doi.org/10.1016/j.addbeh.2018.12.009>
- Li, D., Li, X., Wang, Y., Zhao, L., Bao, Z., & Wen, F. (2013). School connectedness and problematic Internet use in adolescents: A moderated mediation model of deviant peer affiliation and self-control. *Journal of Abnormal Child Psychology, 41*. <https://doi.org/10.1007/s10802-013-9761-9>
- Li, J., Li, D., Jia, J., Li, X., Wang, Y., & Li, Y. (2018). Family functioning and internet addiction among adolescent males and females: A moderated mediation analysis. *Children and Youth Services Review, 91*(June), 289–297. <https://doi.org/10.1016/j.childyouth.2018.06.032>
- Li, L., & Peng, W. (2019). Transitioning through social media: International students' SNS use, perceived social support, and acculturative stress. *Computers in Human Behavior, 98*(November 2018), 69–79. <https://doi.org/10.1016/j.chb.2019.03.011>
- Li, D., Zhang, W., Li, X., Zhen, S., & Wang, Y. (2010). Stressful life events and problematic Internet use by adolescent females and males: A mediated moderation model. *Computers in Human Behavior, 26*, 1199e1207. <https://doi.org/10.1016/j.chb.2010.03.031>
- Lin, L., Liu, J., Cao, X., Wen, S., Xu, J., Xue, Z., & Lu, J. (2020). Internet addiction mediates the association between cyber victimization and psychological and physical symptoms: Moderation by physical exercise. *BMC Psychiatry, 20*(1), 1–8. <https://doi.org/10.1186/s12888-020-02548-6>
- Lin, M. P., Wu, J. Y., You, J., Hu, W. H., & Yen, C. F. (2018). Prevalence of internet addiction and its risk and protective factors in a representative sample of senior high school students in Taiwan. *Journal of Adolescence, 62*, 38–46. <https://doi.org/10.1016/j.adolescence.2017.11.004>
- Liu, F., Zhang, J., Zhou, N., Li, X., & Fang, X. (2017). The relationship between family functions and college students' internet addiction: The mediating effect of coping styles. *Chin. J. Special Educ., 24*(2), 90–96. <https://doi.org/10.1016/j.addbeh.2016.08.009>
- Lozano-Blasco, R., & Cortés-Pascual, A. (2020). Problematic Internet uses and depression in adolescents: A meta-analysis. [Usos problemáticos de Internet y depresión en adolescentes: Meta-análisis]. *Comunicar, 63*, 109–120. <https://doi.org/10.3916/C63-2020-10>
- Lu, L., Xu, D. D., Liu, H. Z., Zhang, L., Ng, C. H., Ungvari, G. S., et al. (2018). Internet addiction in Tibetan and Han Chinese middle school students: Prevalence, demographics and quality of life. *Psychiatry Research, 268*(July), 131–136. <https://doi.org/10.1016/j.psychres.2018.07.005>
- Luego Kanacri, B. P., Pastorelli, C., Eisenberg, N., Zuffianò, A., Castellani, V., & Caprara, G. V. (2014). Trajectories of prosocial behavior from adolescence to early adulthood: Associations with personality change. *Journal of Adolescence, 37*, 701–713. <https://doi.org/10.1016/j.adolescence.2014.03.013>
- Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018). A comprehensive meta-analysis on problematic Facebook use. *Computers in Human Behavior, 83*, 262–277. <https://doi.org/10.1016/j.chb.2018.02.009>
- Martin-Andrés, A., & Luna del Castillo, J. (2004). *Bioestadística para las Ciencias de la Salud*. Ediciones Norma Capital.
- McNicol, M. L., & Thorsteinsson, E. B. (2017). Internet addiction, psychological distress, and coping responses among adolescents and adults. *Cyberpsychology, Behavior, and Social Networking, 20*(5), 296–304. <https://doi.org/10.1089/cyber.2016.0669>
- Molano, O. L. (2007). Identidad cultural un concepto que evoluciona. *Revista Opera, 7*, 69–84.
- Mo, P. K. H., Chan, V. W. Y., Chan, S. W., & Lau, J. T. F. (2018). The role of social support on emotion dysregulation and Internet addiction among Chinese adolescents: A structural equation model. *Addictive Behaviors, 82*(January), 86–93. <https://doi.org/10.1016/j.addbeh.2018.01.027>
- Moreau, D., & Gamble, B. (2020). Conducting a meta-analysis in the age of open science: tools, tips, and practical recommendations. *Psychological Methods, 12*. <https://doi.org/10.31234/osf.io/t5dwg>
- Müller, K. W., Beutel, M. E., & Wölfling, K. (2014). A contribution to the clinical characterization of Internet addiction in a sample of treatment seekers: Validity of assessment, severity of psychopathology and type of co-morbidity. *Comprehensive Psychiatry, 55*, 770–777. <https://doi.org/10.1016/j.comppsy.2014.01.010>
- Müller, K. W., Dreier, M., Beutel, M. E., Duven, E., Giral, S., & Wölfling, K. (2016). A hidden type of internet addiction? Intense and addictive use of social networking sites in adolescents. *Computers in Human Behavior, 55*, 172–177. <https://doi.org/10.1016/j.chb.2015.09.007>
- Pacheco, E. M. (2020). Culture learning theory and globalization: Reconceptualizing culture shock for modern cHoward Ross-cultural sojourners. *New Ideas in Psychology, 58*(April), 100801. <https://doi.org/10.1016/j.newideapsych.2020.100801>
- Park, S., Lee, Y., & Jun, J. Y. (2017). Differences in the relationship between traumatic experiences, self-esteem, negative cognition, and Internet addiction symptoms among North Korean adolescent defectors and South Korean adolescents: A preliminary study. *Psychiatry Research, 257*(August 2016), 381–385. <https://doi.org/10.1016/j.psychres.2017.07.078>
- Peng, W., Li, D., Li, D., Jia, J., Wang, Y., & Sun, W. (2019). School disconnectedness and adolescent internet addiction: Mediation by self-esteem and moderation by emotional intelligence. *Computers in Human Behavior, 98*(March), 111–121. <https://doi.org/10.1016/j.chb.2019.04.011>
- Pies, R. (2009). Should DSM-V designate "internet addiction" a mental disorder? *Psychiatry, 6*(2), 31–37.
- Poli, R., & Agrimi, E. (2012). Internet addiction disorder: Prevalence in an Italian student population. *Nordic Journal of Psychiatry, 66*(1), 55–59. <https://doi.org/10.3109/08039488.2011.605169>
- Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015). Clinical psychology of internet addiction: A review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience and Neuroeconomics, 4*, 11e23. <https://doi.org/10.2147/NAN.S60982>
- PRISMA Statement website. PRISMA translations policy [consultado 13 Sep 2019]. Recuperado de: <http://www.prisma-statement.org/>.
- Reinarman, C. (2005). Addiction as accomplishment: The discursive construction of disease. *Addiction Research & Theory, 13*(4), 307–320.
- Ryan, T., Chester, A., Reece, J., & Xenos, S. (2014). The uses and abuses of Facebook: A review of Facebook addiction. *Journal of Behavioral Addictions, 3*, 133e148. <https://doi.org/10.1556/JBA.3.2014.016>

- Schimmenti, A., Passanisi, A., Caretti, V., La Marca, L., Granieri, A., Iacolino, C., Gervasi, A. M., Maganuco, N. R., & Billieux, J. (2017). Traumatic experiences, alexithymia, and Internet addiction symptoms among late adolescents: A moderated mediation analysis. *Addictive Behaviors*, *64*, 314–320. <https://doi.org/10.1016/j.addbeh.2015.11.002>
- Smahel, D., Brown, B. B., & Blinka, L. (2012). Associations between online friendship and Internet addiction among adolescents and emerging adults. *Developmental Psychology*, *48*(2), 381–388. <https://doi.org/10.1037/a0027025>
- Stanković, M., Nešić, M., Čičević, S., & Shi, Z. (2021). Association of smartphone use with depression, anxiety, stress, sleep quality, and internet addiction. Empirical evidence from a smartphone application. *Personality and Individual Differences*, *168*. <https://doi.org/bibliotecauoc.idm.oclc.org/10.1016/j.paid.2020.110342>
- Stavropoulos, V., Kuss, D. J., Griffiths, M. D., Wilson, P., & Motti-Stefanidi, F. (2017). MMORPG gaming and hostility predict Internet addiction symptoms in adolescents: An empirical multilevel longitudinal study. *Addictive Behaviors*, *64*, 294–300. <https://doi.org/10.1016/j.addbeh.2015.09.001>
- Sterne, J. A. C., Sutton, A. J., Ioannidis, J. P. A., Terrin, N., Jones, D. R., Lau, J., et al. (2011). Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. *BMJ*, *343*(Jul22 1). <https://doi.org/10.1136/bmj.d4002>. d4002–d4002.
- Tas, I. (2019). Association between depression, anxiety, stress, social support, resilience and Internet addiction: A structural equation modelling. *Malaysian Online Journal of Educational Technology*, *7*(3), 1–10. <https://doi.org/10.17220/mojet.2019.03.001>
- Tonioni, F., D'Alessandris, L., Lai, C., Martinelli, D., Corvino, S., Vasale, M., Fanella, F., Aceto, P., & Bria, P. (2012). Internet addiction: Hours spent online, behaviors and psychological symptoms. *General Hospital Psychiatry*, *34*(1), 80–87. <https://doi.org/10.1016/j.genhosppsych.2011.09.013>
- Torres-Rodríguez, A., Griffiths, M. D., Carbonell, X., & Oberst, U. (2018). Internet gaming disorder in adolescence: Psychological characteristics of a clinical sample. *Journal of Behavioral Addictions*, *7*(3), 707–718. <https://doi.org/10.1556/2006.7.2018.75>
- Uçar, H. N., Çetin, F. H., Ersoy, S. A., Güler, H. A., Kılınc, K., & Türkoğlu, S. (2020). Risky cyber behaviors in adolescents with depression: A case control study. *Journal of Affective Disorders*, *270*(July 2019), 51–58. <https://doi.org/10.1016/j.jad.2020.03.046>
- Wang, W., Li, D., Li, X., Wang, Y., Sun, W., Zhao, L., & Qiu, L. (2018). Parent-adolescent relationship and adolescent internet addiction: A moderated mediation model. *Addictive Behaviors*, *84*(December 2017), 171–177. <https://doi.org/10.1016/j.addbeh.2018.04.015>
- Widyanto, L., & Griffiths, M. (2007). Internet addiction: Does it really exist? (Revisited). In J. Gackenbach (Ed.), *Psychology and the Internet: Intrapersonal, interpersonal, and transpersonal implications* (pp. 141–163). Academic Press.
- Wei, L., Han, X., Yu, X., Sun, Y., Ding, M., Du, Y., Jiang, W., Zhou, Y., & Wang, H. (2020). Brain controllability and morphometry similarity of internet gaming addiction. *Methods*. <https://doi.org/bibliotecauoc.idm.oclc.org/10.1016/j.ymeth.2020.08.005>
- Winkler, A., Dörsing, B., Rief, W., Shen, Y., & Glombiewski, J. A. (2013). Treatment of internet addiction: A meta-analysis. *Clinical Psychology Review*, *33*(2), 317–329. <https://doi.org/10.1016/j.cpr.2012.12.005>
- Yan, H., Lu, X., Li, K., Wo, W., Jun, C., & Mu-Ni, X. (2020). Abnormal brain activity in adolescents with Internet addiction who attempt suicide: An assessment using functional magnetic resonance imaging. *Neural Regeneration Research*, *15*(8), 1554–1559. <https://doi.org/bibliotecauoc.idm.oclc.org/10.4103/1673-5374.274346>
- Yang, L., Cao, H., Ma, X., Geng, Y., Xu, J., & Fu, Y. (2017). The relationship between childhood trauma and internet addiction among college students: The mediating effect of coping styles. *Psychology*, *5*(1), 19–25. <https://doi.org/10.3389/fpsyg.2019.02248>
- Yang, X., Wu, X., Qi, J., & Zhou, X. (2020). Posttraumatic stress symptoms, adversity belief, and internet addiction in adolescents who experienced a major earthquake. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. <https://doi.org/biblioteca-uoc.idm.oclc.org/10.1007/s12144-020-00816-y>
- Young, K. S. (1998). *Caught in the net*. New York, NY: Wiley.
- Young, K. (2009). Internet addiction: Diagnosis and treatment considerations. *Journal of Contemporary Psychotherapy*, *39*(4), 241–246.
- Zhai, B., Li, D., Li, X., Liu, Y., Zhang, J., Sun, W., et al. (2020). Perceived school climate and problematic internet use among adolescents: Mediating roles of school belonging and depressive symptoms. *Addictive Behaviors*, *110*. <https://doi.org/biblioteca-uoc.idm.oclc.org/10.1016/j.addbeh.2020.10650>
- Zhang, S., Tian, Y., Sui, Y., Zhang, D., Shi, J., Wang, P., et al. (2018). Relationships between social support, loneliness, and internet addiction in Chinese postsecondary students: A longitudinal cHoward Ross-lagged analysis. *Frontiers in Psychology*, *9* (SEP), 1–13. <https://doi.org/10.3389/fpsyg.2018.01707>
- Zhi, X., Wang, C., Wang, C., & Hao, W. (2013). Coping style, social support and parenting style in adolescents with internet addiction. *Chinese Journal of School Health*, *34*(4), 426–429. <https://doi.org/10.3389/fpsyg.2014.01256>
- Zhou, Y., Li, D., Jia, J., Li, X., Zhao, L., Sun, W., & Wang, Y. (2017). Interparental conflict and adolescent internet addiction: The mediating role of emotional insecurity and the moderating role of big five personality traits. *Computers in Human Behavior*, *73*, 470–478. <https://doi.org/10.1016/j.chb.2017.04.012>