Validación en población clínica de la Problemática Internet Entertainment Use Scale for Adults (PIEUSAd)

Validation in clinical population of the Problematic Internet Entertainment Use Scale for Adults (PIEUSAd)

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Resumen

La adicción a las tecnologías ha sido debatida ampliamente tanto científica como clínicamente, siendo una condición a estudiar como potencial trastorno psiquiátrico. Algunas escalas españolas miden la adicción al internet, pero ninguna ha sido validada clínicamente. Los objetivos son describir la muestra clínica de pacientes en tratamiento por una adicción tecnológica, así como validar clínicamente la "Problematic Internet Entertainment Use Scale for Adults" (PIEUSAd). Una muestra clínica a pequeña escala (N=31; 71 % hombres, con una edad media de 33,31) fue seleccionada, se recogieron datos socio-demográficos, clínicos y de uso de tecnologías, así como la PIEUSAd y la "Compulsive Internet Use Scale" a través de una encuesta. El contexto fue un centro de salud pública de Barcelona (España). Los pacientes en tratamiento por una adicción tecnológica como primer diagnóstico eran usualmente hombres jóvenes que sufrían de una e-adicción genuina (sobre todo, adicción a internet, videojuegos o cibersexo); solo la mitad parecía sufrir una patología dual (normalmente otra adicción). Eran normalmente derivados por otros profesionales de la salud y la mayor parte no habían sido tratados psiquiátricamente con anterioridad. La PIEUSAd mostró gran variabilidad en sus puntuaciones, alta validez factorial y de constructo, y excelente fiabilidad (a=0,98). En conclusión, la heterogenei-

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dad de las características de los pacientes fue evidenciada. Además, la PIEUSAd ha sido validada clínicamente para poder hacer un mejor cribado en las adicciones tecnológicas, donde la "pérdida de control" y la "evasión" parecen ser los síntomas prevalentes en estos tipos de pacientes.

Palabras clave: Adicciones tecnológicas, adicción a internet, escala, cuestionario, validación clínica.

Summary

Addiction to technologies has been a widely debated scientific and clinically, being a condition for further study as potential psychiatric disorder. Some Spanish scales measure Internet addiction, but no one has been validated clinically. The aims were to describe a clinical sample of patients in treatment for a technology addiction, and to validate clinically the "Problematic Internet Entertainment Use Scale for Adults" (PIEUSAd). Little-scale clinical adult sample (N=31; 71 % men, and an age mean of 33.31) was selected, collecting socio-demographic and clinical data, technological usages, and the PIEUSAd and Compulsive Internet Use Scale in a survey. The setting was a public health center in Barcelona (Spain). The patients in treatment for a technological addiction as primary diagnosis were usually young males, which suffer from a genuine e-addiction (above all, internet addiction, gaming and cybersex); only the middle seems to have a dual pathology (usually another addiction). They are usually referred by other clinician and the majority don't have previous psychiatric care. The PIEUSAd showed large variability in item scored, and high factor and construct validity, and excellent reliability (a=0.98). In conclusion, the heterogeneity in the characteristics of patients is evidenced. Moreover, the PIEUSAd has been clinical validated to do a better screen in technological addictions, where "loss of control" and "evasion" seems to be the prevalent addictive symptoms in these types of patients.

Key words: Technological addictions, internet addiction, scale, questionnaire, clinical validation.

Addiction to Information and Communication Technologies (ICT) has been a widely debated field of scientific and clinical research for the last 25 years. Marks (1990) reported that certain behaviours can lead to addiction and generate a similar level of dependency to chemical addictions, while Young (1998a) developed diagnostic criteria for Internet addiction, taking as a reference the criteria for pathological gambling addiction. In the same period, Griffiths (2000, 2005) suggested that these emerging conditions were social in nature, defining them operationally as technology addictions with a series of addictive components (i.e., salience, mood modification, tolerance, withdrawal, conflict and relapse). To date, the only internationally acknowledged behavioural addiction is "Internet Gaming Disorder" (IGD), included as a condition for further clinic and scientific study in the DSM-5 (APA, 2013).

In Spain, which is among the countries with the highest use of technologies and in the top-30 nations according to the ICT Development Index (IDI; 27/166, International Telecommunication Union, 2014), these behavioural addictions have posed certain difficulties to the research community. They have been primarily treated as "e-addictions" or Internet addiction, characterized by the excessive or abusive use of the Internet as a means of accessing the object of the "habit", according to González, Merino and Cano (2009), who report clinical cases involving online gaming, cybersex, online betting and social networks.

One of the most active areas in this field of study is the development of measurement scales for detecting potential technology addictions (i.e., to Internet, mobile phone and video games) in the general population. Such scales can be used to filter samples to support the evaluation pro-

cess for possible e-addictions; validated measurement scales are therefore a necessary tool for health and education professionals in the detection of addictive problems in the use of ICTs. In Spain, and Spanish-speaking countries, few of the main screening tools of Internet addiction have been adapted, such as the most widely used scale: the Internet Addiction Test (IAT; Young, 1998b; adapted by Delgado *et al.*, 2012). This adapted version has enabled the scale to be used both in Spain (Puerta-Cortés & Carbonell, 2013) and in Latin American countries (e.g., like in Colombia; Puerta-Cortés & Carbonell, 2014). However, other Spaniard researchers have created their own Internet addiction scales: the Internet Over-Use Scale (IOS; Jenaro, Flores, Gómez-Vela, González-Gil & Caballo, 2007), the "Cuestionario de Experiencias Relacionadas con Internet" (CERM; Beranuy Fargues, Chamarro Lusar, Graner Jordania, & Carbonell Sánchez, 2009) or the Problematic Internet Entertainment Use Scale for Adolescents (PIEUSA; López-Fernández, Freixa-Blanxart, & Honrubia-Serrano, 2013) are available. The latter provides the possibility to apply it to different online entertainments, in concrete: videogames and social networking in children from 11 to 18 years old. For the present study, this scale was adapted to adults doing basically three changes: (i) substituting "video games and/or social networks" for "Internet entertainments", to provide the opportunity to ask for the main online activity related problem independently of the scales, and (ii) reducing the number of items from 30 to 20 maintaining the underlying addictive symptomatology, and (iii) amplifying the Likert-response scale from 7 to 10 for analytical interpretative purposes.

As far as we are aware, however, to date none of these original Internet-related problem scales or adaptations has been validated in a clinical sample in Spain, almost any Internet addiction scale has been clinically validated elsewhere; that is, none has been tested with patients and with the assistance of clinicians as part of the research team, as IGD is claiming to consider it a future psychiatric disorder (APA, 2013). There are only two exceptions: the Taiwanese "Chen Internet Addiction Scale" (CIAS), clinically validated for adolescents (Ko, Yen, Chen, Chen, & Yen, 2005) and adults (Ko, Yen, Chen, Yang, Lin & Yen,

2009) by the team of the Kaohsiung Municipal Hsiao-Kang Hospital in Chinese; and the French adaptation of the IAT (Khazaal *et al.* 2008), used to evaluate Internet addiction by the Swiss team of the Geneva Addiction Outpatient Clinic of the Geneva University Hospital (Thorens *et al.*, 2014). Moreover, the scientific and clinical community in the field of technological addictions don't have enough evidence about the characteristics of clinical patients that ask for treatment.

The aims of this study are: (i) describe a clinical sample of Spanish patients in treatment for technology addiction as primary diagnosis, and (ii) to validate clinically the adaptation of the Problematic Internet Entertainment Use Scale for Adults (PIEUSAd), because patients treated for these behavioural e-addictions usually were more than 18 years old.

METHOD

This is a descriptive and psychometric exploratory study with a survey research design.

Participants

The sample is composed of 31 consecutive patients who sought treatment for some form of social addiction at the "Asociación AIS-PRO JUVENTUD: Atención e Investigación de Socioadicciones" (AIS) between January and September 2014 (both months inclusive). Of the total sample, 22 patients were men (71 %) and 9 were women (29 %), with an overall average (*M*) age of 33.31 years and a standard deviation (*SD*) of 14.07.

Instruments

The questionnaire was divided into three sections: (a) socio-demographic and clinical data (as Thorens *et al.*, 2014) and details of technology use (López-Fernández *et al.*, 2013), (b) adaptations of the PIEUSAd scale, for measuring problematic Internet usage, and (c) the Spanish adaptation of the Compulsive Internet Use Scale (CIUS; Meerkerk, Van, Vermulst & Garretsen, 2009) to support the convergent construct validity.

PIEUSAd is a scale comprising 20 items related to the use of online forms of entertainment, which are Likert-scored from 1–10 (being 1 "to-

tally disagree" y 10 "totally agree"); this gives a total score range of 20–200, with higher scores indicating more problematic Internet usage. The previous version (PIEUSA; López-Fernández *et al.*, 2013) was validated in an adolescent Spanish population and presented excellent reliability (Cronbach alpha coefficient: 0.92) and acceptable factorial validity (one-dimensionality with an explained variance of 31 %).

The CIUS is a 14-item, 5-point Likert scale (from 0 "never" to 4 "very frequently") with high internal consistency (Cronbach alpha: 0.89) and good factorial, criterion and concurrent validity. The Spanish adaptation of the CIUS, done with permission of his main author, used the translation and back-translation method. It was included in the study to support the construct validity of the PIEUSAd.

Procedure

Consent for the study was given by the management of this clinical centre and all necessary research permits were provided by those who collaborated in the study in 2014. Written informed consent was received from all patients. The questionnaire was administered at the centre under the supervision of clinical experts in behavioural addictions, with specific training and extensive experience in these types of disorders. A cross-sectional assessment was conducted before treatment, as part of a broader evaluation conducted in a single session lasting approximately 90 minutes.

Data analysis

A descriptive analysis was carried out to assess the socio-demographic and clinical variables, usage types and PIEUSAd results. For the categorical variables, frequencies and percentages were calculated; for the continuous variables, M and SD. The bivariate analysis consisted of correlation tests (Pearson's chi-squared test, Pearson's correlation, Student's t-test for independent groups or, alternatively, the Mann-Whitney U test). The psychometric analyses were performed by calculating the factorial validity [Exploratory Factor Analysis (EFA)] with the Principal Component technique (PC) and construct validity, convergent variant (Pearson's correlation), and the internal consistency (Cronbach alpha). Statistical analysis was performed in IBM SPSS v. 21, with a significance level set at 0.05.

RESULTS

Descriptive study of clinical status and use of technologies

Of the 31 patients, 21 (67.7 %) sought advice from our clinic on a genuine technology addiction, that is one in which the Internet was a necessary component (e.g. cybersex); the remainder sought advice on behavioural addictions in which technology was not a necessary component (Internet was simply one of a number of possible means of satisfying the addiction; e.g., compulsive buying). The sample characteristics can be seen in Table 1.

Table 1

**Socio-demographic, clinic and ICT usages by patients with technological addictions (N=31)
(percentage and frequency, or mean and standard deviation)**

Sub-sample	Spain (n=31)	
Variables	**% (n)**	**M(SD)**
Socio-demographic		
Gender		
Male	71(22)	
Female	29(9)	
Age		29(33.31)
Civil status		
Single	38.7(12)	
With couple/Married	32.2(10)	

Separated/Divorced	25.8(8)	
Other	3.2(1)	
Educative level		
Primary education	19.4(6)	
Secondary education	38.7(12)	
Higher education	38.7(12)	
Other (i.e., piano player)	3.2(1)	
Clinic and health		
Motive of consultancy		
Internet addiction	19.4(6)	
Online (video) gaming addiction		25.8(8)
Cybersex addiction	19.4(6)	
Online gambling	3.2(1)	
Shopping addiction	22.6(7)	
Other addictions (i.e. sex)	9.7(3)	
Comorbidity		
Anyone	51.6(16)	
Other behavioural addiction (e.g., sex)	9.7(3)	
Other drug addiction (e.g., alcohol)	19.4(6)	
Anxiety disorder	9.7(3)	
Mood disorder	3.2(1)	
Personality disorder	6.5(2)	
Referred by		
Family	29(9)	
Themselves	19.4(6)	
Other clinical and health professional/s	48.4(15)	
Other social professional	3.2(1)	
Treatment time (number of months in AIS)		4.61(6.52)
Previous psychiatric care		
None	77.4(24)	
Institution	6.5(2)	
Private practice	16.1(5)	
ICT usage		
Technologies		
Fixed computer	48.4(15)	
Laptop	64.5(20)	
Mobile phone/Smartphone	90.3(28)	
Tablet	35.5(11)	
Casual games		
Yes	19.4(6)	
First shooter games (FSG)		
Yes	29(9)	
Role games (MMORPGs)		
Yes	25.8(8)	
Social networks (i.e, Facebook)		
Yes	41.9(13)	
Online series		
Yes	29(9)	

Online press			
Yes		22.6(7)	
Online shopping			
Yes		16.1(5)	
Online porn			
Yes		6.5(2)	
Online surfing			
Yes		35.5(11)	

Comparative analysis of patients with a genuine addiction and patients with non-genuine addictions revealed few differences, with the exception of gender ($X^2_{(1)}$=4.831, p<,05; ?=.471 $p<.01$), with men more likely to present genuine Internet addiction (81.8 %) and women non-genuine Internet addictions (66.7 %); age, with sufferers of genuine addictions younger on average (M=29.24; DT=12.88 versus M=44; DT=11.75; U: Z=-2.62, $p<.01$); and compulsion to use the Internet, with genuine addicts scoring more highly on the CIUS (M= 22.25; DT=15.94 versus M=9.11; DT=8.17; U: Z=-2.195, $p<.05$).

Descriptive study of the PIEUSAd

The PIEUSAd results for the clinical sample gave a M of 63.64 (DT=52.96), with a range of 172 (between 20 and 192). Table 2 contains descriptions of the items in the PIEUSAd.

Table 2
Item analysis and internal consistency in PIEUSAd for Spanish adults under treatment for a technological addiction (N=28) (statement and its symptom, mean (M), standard deviation (SD), median, M of the scale if item is deleted, Variance (V) of scale if the item is deleted, corrected item-total correlation, and Cronbach alpha if item is deleted)

Item n.	PIEUSAd item statement (Spanish adaptation for adults)	M	SD	M if it. del.	V if . it del.	It.- total r	α if it. del.
1	When I am not connected to Internet, I usually think about my online activities.	2.61	2.44	61.04	2599.22	.80	.98
2	When I am connected to Internet I spend more time than I had planned.	4.39	3.10	59.25	2553.68	.77	.98
3	When I finish my online activities, I look forward to plan my next session online.	3.04	3.10	60.61	2501.21	.95	.98
4	I need more time online to derive enjoyment than I did at first, in other words, more and more to obtain a similar level of satisfaction.	2.64	2.90	61.00	2542.67	.87	.98
5	When I am connected to Internet, I can forget my duties (e.g., household chores, homework, etc.).	3.71	3.28	59.93	2522.59	.82	.98
6	When I connect with Internet I look for change my mood: to become more tense, trying to answer quickly and be more active… or be more quiet, including relaxed.	3.00	2.83	60.64	2570.02	.79	.98
7	I have tried to control de use that I do with Internet to not exceed, but it's difficult to achieve it.	3.11	3.30	60.54	2489.22	.92	.98
8	When I have to finish an online session, I became unease.	2.36	2.16	61.29	2614.95	.84	.98
9	Frequently, when I have been a lot of time connected and I am feeling bad, I have difficulties to leave the session.	2.75	2.82	60.89	2539.66	.90	.98

10	When, for any reason, I have to stop connection before I want to, I get irritable, nervous, in a bad mood, tired… is short, I feel bad.	2.93	2.79	60.71	2548.95	.88	.98
11	Being connected to Internet has helped me to forget my daily problems for a while and just enjoy myself.	4.61	3.54	59.04	2492.48	.85	.98
12	I have arrived to modify my usual patterns (e.g., hours of sleep, meals, etc.) by continuing using Internet.	3.57	3.31	60.07	2497.33	.90	.98
13	I have hidden the truth or the time using Internet.	3.00	3.50	60.64	2517.8	.78	.98
14	I have tried everything possible to get more time of connection or obtain online novelties, do more online contacts, etc.	3.29	3.32	60.36	2498.46	.89	.98
15	When I am in Internet it is usual for me to ask people around me to let me online a little longer.	3.18	2.83	60.46	2537.0	.91	.98
16	I get completely absorbed when I am online and I lose the notion of time.	4.04	3.07	59.61	2536.32	.84	.98
17	I have substitute my personal face-to-face contacts by online contacts.	2.54	2.94	61.11	2534.62	.88	.98
18	My friends, family… get annoyed because for being connected to Internet I have reduced my time with them.	3.00	2.98	60.64	2553.57	.80	.98
19	If for any reason I need to reduce my online activity or stop it, my levels of frustration and irritability will increase.	2.82	3.03	60.82	2517.49	.91	.98
20	If after a reduction or stopping my online activity I could return to it, immediately I return to usual patterns, including, if I could, I use Internet more usually to recover them quickly.	3.07	3.10	60.57	2499.89	.95	.98

Note: "Instructions: Please answer each of the following questions about Internet used in the past year. In each question you are asked to consider your answers from 1 to 10 in this way: "1" = Totally disagree, and "10" = Totally agree."

The results were examined for a possible distinction between genuine e-addicts and patients with non-genuine e-addictions. Those with genuine e-addictions obtained higher average PIEUSAd scores than the non-genuine addicts (*M*=77.05, *SD*= 58.45 versus: *M*=35.33, *SD*=21.24); however, the difference was not significant (*U*: 48.05, *Z*=-1.822, *p*=068). The sample was therefore treated globally for the psychometric analysis.

Psychometric study of the PIEUSAd

To validate the adapted PIEUSAd for the clinical sample (n=28), EFA was performed with the PCA extraction method, as the original scale indicated a one-dimensional structure (López-Fernán-dez *et al.*, 2013). The Kaiser-Meyer-Olkin (KMO) measure (0.53) confirmed the sampling adequacy, and Bartlett's test of sphericity ($X^2_{(190)}$=1067.73; *p*<.001) showed that the correlation between items was sufficient to apply the PC method. Factor extraction generated one factor with eigenvalues greater than 1, with factor loadings above 0.6. The combination accounted for 77.21 % of the total variance of the factor "problematic Internet usage in adults". Internal consistency was high, with a Cronbach alpha of 0.98, indicating excellent reliability of the PIEUSAd in the clinical population (see Table 2).

The CIUS was similarly analysed. The sampling adequacy was confirmed (KMO=0.88), and

Bartlett's test ($X^2_{(91)}$=447.49; $p<.001$) enough correlation between items to apply the PC method. Factor extraction generated one factor solution with eigenvalues greater than 1 (factor loadings above 0.5). The total variance of the factor "compulsive Internet usage in adults" was 71.12 %; with a Cronbach alpha of 0.97, an excellent internal consistency of the CIUS in this clinical population. Construct validity was confirmed by the association between both scales that measure a similar construct (see Figure 1). The correlation between the total scores for the PIEUSAd and the CIUS was positive and statistically significant, with a high effect size (r=0.89, $p<.001$, r^2=0.78). In other words, the greater the problematic use of the Internet for entertainment, as measured by the PIEUSAd, the greater the compulsive Internet usage, according to the CIUS.

DISCUSSION AND CONCLUSION

The PIEUSAd scale was applied to a clinical sample of patients with genuine and non-genuine social additions involving the use of ICTs. The descriptive findings appear to suggest that e-addicts are usually a heterogeneous group in terms of socio-demographic variables, half of whom have a dual condition and use Internet for the purposes of entertainment; that said, if we consider the differences observed between genuine and non-genuine e-addicts, we find a large proportion of young males who are compulsive Internet users. Although the two sub-groups were not clearly differentiated, the p-value was at a limit that suggests a larger sample size may in fact have revealed a difference. It would be interesting in future research to separate the groups and to identify the specificity
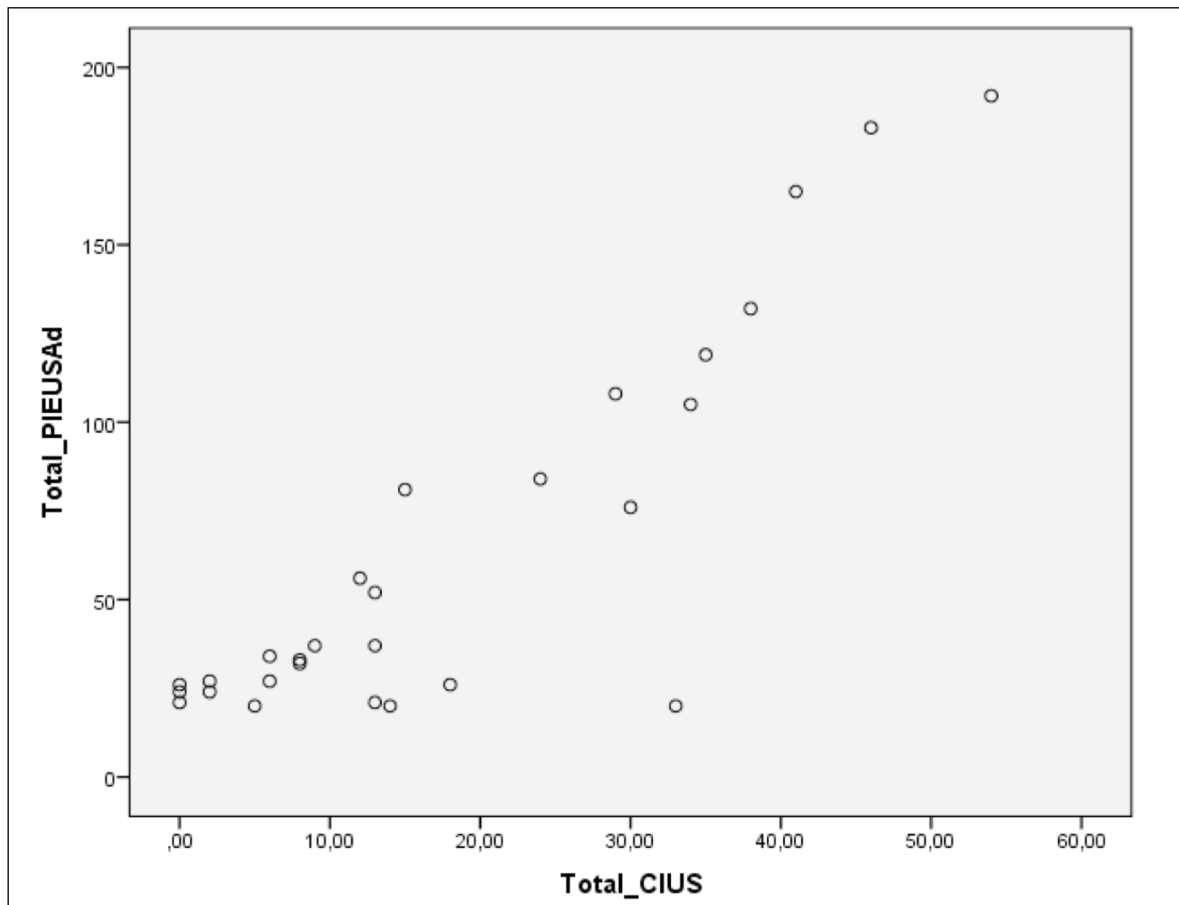

Figura 1
Dispersion graph between the PIEUSAd and the CIUS (r=0.89, p<.001)

of e-addicts not only in terms of their general Internet use but also in terms of their predominant online activity, as this is where the heterogeneity appears to emerge (Griffiths & Pontes, 2014; Laconi, Tricard, & Chabrol, 2015).

The PIEUSAd scores are relatively moderate, similar to those found in the general adolescent population (López-Fernández et al., 2013) but with a greater variability that is suggestive of problematic behaviour. This said, the scores per item are below 5 with the exception of items 2 and 28 (loss of control) and item 11 (evasion), which correspond to items 2, 16 and 15, respectively, of the previous version (PIEUSA, López-Fernández, Honrubia-Serrano, Gibson & Griffiths, 2014). In addition, the psychometric parameters of the new version for adult patients gave greater reliability and validity than found in earlier studies (López-Fernández et al., 2013, 2014).

The findings of this study validate our measurement instrument for the analysis of behavioural addictions in healthcare settings. This scale, which is the only one to have been validated in a clinical population in Spain, can help to detect problematic Internet usage in the Spanish adult population, for both clinical and research purposes (Carvajal, Centeno, Watson, Martínez & Sanz Rubiales, 2011). PIEUSAd allows us to detect possible generic addictions to online entertainment, possibly in combination with scales to measure problematic usage of specific online activities (for example, for cybersex, the Spanish version of "Internet Sex Screening Test" [ISST; Ballester Arnal, Gil Llario, Gómez Martínez & Gil Julià, 2010)], as a clinical battery of tests to detect this type of Internet addiction.

Nevertheless, the limitations of this study must also be acknowledged. The 28-patient sample is small, although this is commonly the minimum feasible sample size for patients with specific conditions that are difficult to research. The preliminary findings suggest that the scores are not as high as would be expected for this type of scale (i.e. IAT), seeming more appropriate for detecting problems in the general population. Thorens et al. (2014) offer a number of explanations for this; for example, many of their patients were very young and had been encouraged to visit the centre by their families. This pattern was also observed in our study, particularly in the case of genuine e-addicts, although it could be due to age, to a lack of self-awareness regarding the problem, or to a discrepancy between the family's tolerance of problematic Internet usage and the patient's perception of this use. Analysis of problematic Internet usage is also undermined by a general lack of conceptual clarity, so for future studies it would be ideal to have at least 30 cases of genuine e-addiction to each of the online activities, whereas for the moment we have treated each of the technology addictions equally, whether they are simply an Internet addiction, an addiction to a specific online activity, or concurrent with comorbid conditions. Analysis of the accuracy with which participants are classified would also help to measure the sensitivity and specificity of our scale, which is something we hope to achieve with a larger sample – if possible from the general population – using methods such as those reported by Ko et al. (2005, 2009).

Finally, the heterogeneity of technology addictions is also a relevant factor, since in future work PIEUSAd can be associated with each of the online activities to explore possible differences between a patient addicted to online gaming and a patient addicted to cybersex, even in the different categories of "gamers" (e.g., MOBA, MMORPG or FSP) or "cybersex addicts" (e.g., watching pornography, engaging in sex chats or searching online sexual contacts). In sum, we have offered clinical evidence of technological addictions, which is useful for other clinicians, researchers in technological (behavioural) addictions and the APA for the future diagnostic of IGD, and other Internet-related addictive problematics.

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CONFLICT OF INTERESTS

All authors declare no conflict of interest.

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