

## Internet gaming disorder in adolescence: Psychological characteristics of a clinical sample

ALEXANDRA TORRES-RODRÍGUEZ<sup>1\*</sup>, MARK D. GRIFFITHS<sup>2</sup>, XAVIER CARBONELL<sup>1</sup> and URSULA OBERST<sup>1</sup>

<sup>1</sup>Department of Psychology, FPCEE Blanquerna, Universitat Ramon Llull, Barcelona, Spain

<sup>2</sup>International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK

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*Background and aims:* Internet gaming disorder (IGD) has become a topic of increasing research interest since its inclusion in Section 3 of the DSM-5. Given the lack of clinical studies concerning IGD, exploring the characteristics of clinical samples with IGD will help to delineate the gaming disorder construct and inform future treatment studies. *Methods:* Data collection consisted of clinical interviews comprising 31 male adolescents diagnosed with IGD. Alongside the clinical interviews, the participants were administered a battery of psychometric tests assessing the following: IGD, personality traits, comorbid symptomatology, emotional intelligence (EI), and family environment characteristics. *Results:* The results showed that the adolescents with IGD and their relatives reported a high number of hours per week and high presence of stressful life events in the majority of the sample. High scores on scales assessing depression, anxiety, and somatic disorders were found. However, the findings indicate the presence of several other comorbid disorders meaning that some of the adolescent sample with IGD had different clinical profiles. Several personality traits were found to be highly associated with IGD including introversion, inhibition, submissiveness, self-devaluation, interpersonal sensibility, obsessive–compulsive tendencies, phobic anxiety, and hostility, as well as paranoid and borderline personality traits. Other negative characteristics found in the present sample included a high level of social problems, low EI, and dysfunctional family relationships. *Discussion and conclusions:* The findings suggest a more global pattern of key psychological characteristics associated with Internet gaming disorder in adolescence. This may help in understanding the complexity of this proposed disorder and it may also help in designing more specialized interventions for adolescents with IGD. The findings have important implications for clinical practice and interventions.

**Keywords:** Internet gaming disorder, adolescent gaming, video game addiction, gaming addiction, problematic gaming

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### INTRODUCTION

Playing video games is a very popular form of entertainment among children and adolescents as well as among young adults. The video game sector estimates a global growth of 8.5% among the countries with the biggest revenues: China, USA, Japan, South Korea, Germany, United Kingdom, France, Spain, Canada, and Italy (Newzoo Games, 2016). Despite the benefits that video games have (e.g., entertainment and socialization), clinical and empirical studies have consistently demonstrated that the excessive use of video games may lead to negative consequences in various areas of psychological functioning and can result in an addiction among a small minority of gamers (Ferguson, Coulson, & Barnett, 2011; Kowert, Festl, & Quandt, 2014; Kuss & Griffiths, 2012a; Petry et al., 2014; Torres-Rodríguez, Griffiths, & Carbonell, 2018; Williams, Yee, & Caplan, 2008; World Health Organization [WHO], 2014). Adolescence is typically viewed as a life stage where vulnerability to addiction is more pronounced, and is not different for video

game addiction (Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013; López-Fernandez, Honrubia-Serrano, Baguley, & Griffiths, 2014; Wan & Chiou, 2006). More specifically, because of cognitive, social, hormonal, and neurobiological immaturities, adolescence is a period of increased risk of experiencing psychological disorders including addictive behaviors (Arnett, 1999; Masten & Garnezy, 1985; Steinhausen & Metzke, 2001).

Video game addiction in the form of “Internet gaming disorder” (IGD) was included in Section 3 of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association [APA], 2013). In addition, the beta draft of the 11th revision of International Classification of Diseases (ICD-11; WHO, 2016) includes “gaming disorder.” The ICD-11 defines this

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\* Corresponding author: Alexandra Torres-Rodríguez; Department of Psychology, FPCEE Blanquerna, Universitat Ramon Llull, 34 Cister Street, Barcelona 08022, Spain; Phone: +34 93 253 30 00; Fax: +34 93 253 30 32; E-mail: alexandrart@blanquerna.url.edu

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disorder as a recurrent gaming behavior pattern that includes both online and offline gaming. Gaming disorder manifests as an impaired control over gaming and an increasing priority over other life interests and daily activities, leading to recurrent gaming despite increasing negative consequences. The inclusion of gaming disorder by established medical and psychiatric bodies has led to much debate as to whether its inclusion is premature (Aarseth et al., 2016; Griffiths, van Rooij, et al., 2016; Király, Griffiths, & Demetrovics, 2015; Kuss, Griffiths, & Pontes, 2017).

A recent meta-analysis estimates the prevalence of IGD between 0.7% and 15.6% extracted from studies using naturalistic populations (Feng, Ramo, Chan, & Bourgeois, 2017). Other prevalence estimate rates of IGD have been reported as 3.1% (Ferguson et al., 2011), 3% (Rehbein, Pysch, Kleimann, Mediasci, & Mößle, 2010), and 3.7% (Kuss et al., 2013). The present study comprised Spanish teenagers and the prevalence rate of IGD among Spanish adolescents has been estimated to be between 6.2% (Muñoz-Miralles et al., 2016) and 7.7% (López-Fernández et al., 2014).

The clinical importance of the IGD has increased over the past few years, and studies in the gaming literature have involved the evaluation of assessment tools (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Pontes, Király, Demetrovics, & Griffiths, 2014; Pontes & Griffiths, 2014), diagnostic issues (King & Delfabbro, 2014; Király et al., 2015; Ko et al., 2014; Petry et al., 2014), risks (Kuss et al., 2013; Rehbein et al., 2010; Tejeiro, Gómez-Vallecillo, Pelegrina, Wallace, & Emberley, 2012; Wood, Gupta, Derevensky, & Griffiths, 2004), treatment models (Griffiths, Kuss, & Pontes, 2016; King, Delfabbro, & Griffiths, 2010; King, Delfabbro, Griffiths, & Gradisar, 2012; Torres-Rodríguez et al., 2018; Young, 2009), experimental treatment studies (Du, Jiang, & Vance, 2010; Han, Kim, Lee, & Renshaw, 2015; King et al., 2017; Lindenberg, Halasy, & Schoenmaekers, 2017; Wölfling, Beutel, Dreier, & Müller, 2014; Yao et al., 2017; Young, 2013), and case studies (Griffiths, 2010; King et al., 2012; Schwartz, 2013; Torres-Rodríguez & Carbonell, 2015; Torres-Rodríguez, Griffiths, Carbonell, Farriols-Hernando, & Torres-Jiménez, 2017; Voss et al., 2015).

Despite increasing research, there are few studies that have examined the clinical characteristics of individuals with IGD or among individuals who seek treatment for video game addiction (Martín-Fernández, Matalí, García-Sánchez, Pardo, & Castellano-Tejedor, 2016). Many studies reporting associated psychological problems and risk factors stem from non-clinical samples in schools and online gamer communities (e.g., Feng et al., 2017; Gentile et al., 2011; Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000). These IGD studies have reported psychological problems including affective instability, low self-esteem, insecure personality, shyness, loneliness, limited leisure activities, family deficits, maladaptive coping styles, lower social competence, and lower school performance (e.g., Gentile et al., 2011; Kim, Namkoong, Ku, & Kim, 2008; King & Delfabbro, 2016; Kuss et al., 2013; Lemmens, Valkenburg, & Peter, 2011; Liebert, Lo, Ph, Wang, & Fang, 2005; Rehbein et al., 2010; Schneider, King, & Delfabbro, 2017; Tejeiro et al., 2012). Other disorders associated with

symptoms of IGD include anxiety disorders, depression, suicidal ideation, behavioral disorders, social phobia, autism spectrum disorder (ASD), attention-deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder, and personality disorders (e.g., Andreassen et al., 2016; Chan & Rabinowitz, 2006; Ferguson et al., 2011; Gentile et al., 2011; Han, Lee, Shi, & Renshaw, 2014; Kelleci & Inal, 2010; Kim et al., 2006; Ko et al., 2006; Shapira et al., 2000).

Given the lack of clinical studies concerning IGD, exploring the characteristics of clinical samples with IGD is much required, because several authors have highlighted the importance of individual profiles of social and psychological attributes as predictors of game usage pattern and game preferences (e.g., Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010; Homer, Hayward, Frye, & Plass, 2012). Furthermore, analyzing the psychological characteristics of adolescent clinical samples will help to delineate the gaming disorder construct and inform future treatment studies. More specifically, delineating the clinical characteristics of IGD participants will help in designing more specialized psychological treatments for IGD. This is because the etiology of IGD can be diverse (Torres-Rodríguez et al., 2018) with some treatment studies focusing on gaming as the primary problem and others focusing on the related symptoms (Ferguson et al., 2011) such as lower social competence, emotional intelligence (EI), and symptoms of other comorbid disorders. There is both an empirical and clinical need for an in-depth clinical examination of characteristics associated with IGD. Consequently, the primary aim of this study was to examine the psychological characteristics of treatment-seeking adolescents with gaming disorder recruited via public mental health centers.

## METHODS

### *Participants*

The initial sample comprised 55 adolescents who voluntarily sought treatment at two public mental health centers in the Barcelona metropolitan area. These individuals represent the complete clinical sample of those seeking treatment and self-declared IGD problems at both centers during the 18-month period when the study was carried out. Out of these, 12 were considered as lost (because they did not return to the treatment center after the first visit) and 12 more were excluded for not meeting the inclusion criteria of this study (four did not meet the inclusion criteria 1 and 2 below; one was younger than 12 years; two presented with a severe mental disorder where the primary disorder needed treating as opposed to the IGD, and five declined to participate in the study). The inclusion criteria were (a) endorsing at least five or more of the nine IGD criteria according to DSM-5 (APA, 2013), (b) scoring 71 or more on IGD-20 Test (Pontes et al., 2014) adapted to Spanish population (Fuster, Carbonell, Pontes, & Griffiths, 2016), (c) being aged 12–18 years, (d) not having a severe mental disorder or intellectual disability, and (e) understanding the Spanish language. Thus, the final sample consisted of 31 male adolescents diagnosed with IGD.

## Procedure

Data collection comprised clinical interviews and the administration of several diagnostic instruments to each participant (listed below). Baseline assessments were taken from the 31 participants when they first entered treatment. The clinical interviews were conducted by clinical psychologists, who also applied the diagnostic tests.

## Materials

Demographic data were recorded through a demographic questionnaire and the initial clinical interview. The following scales were used:

*Internet Gaming Disorder Test (IGD-20 Test; Pontes et al., 2014)*. To assess IGD symptoms, the Spanish version of the 20-item IGD-20 Test was used (Fuster et al., 2016). It assesses the symptoms of IGD across six subscales (salience, mood modification, tolerance, withdrawal symptoms, relapse, and conflict). All subscales comprise three items, except conflict, which has five. Answers are scored on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The minimum and maximum scores are 20 and 100 and, following Pontes et al. (2014), participants who scored 71 or more were classified as having IGD. To compare the results among subscales, the sum scores of each subscale were divided by the number of items of the subscale.

*Millon Adolescent Clinical Inventory (MACI; Millon, 1994)*. The MACI is a widely used, validated, and standardized instrument to assess adolescent personality patterns (12 subscales), expressed concerns (8 subscales), and clinical syndromes (7 subscales), in addition to four validity (modifying) scales. This study used the Spanish version of MACI and comprised of 160 items. Possible answers were either “true” or “false.” The standardized base rate (BR) scores were used in this study, and BR scores of 0 and 115 were selected to represent the minimum and maximum possibilities on each scale. This allowed comparisons between scales and different age ranges using the same data classification on four interpretative clinical benchmarks as follows: no significant difficulties (scores below 60), possible presence of traits (scores between 60 and 74), probable presence of psychopathology (scores between 75 and 85), and presence of a specific personality trait or clinical syndrome (scores over 85). This study followed the scoring guidelines described in the Spanish manual (Millon, 2004).

*Symptom Checklist-90-R (SCL-90-R; Derogatis, 1996)*. The Spanish version of the original SCL-90-R was used to assess psychological distress and symptoms of different mental disorders (Derogatis, 2002). The 90-item SCL-90-R is a widely used and well-validated self-report scale using a 5-point Likert scale (ranging from 0 = *no problem* to 4 = *very serious*) with minimum and maximum global scores of 0 and 360. The SCL-90-R comprises nine symptom scales (somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic-anxiety, paranoid ideation, and psychoticism), as well as the following three global indexes: The Global Severity Index (GSI) is considered to be the most sensitive single quantitative indicator concerning individual’s psychological distress status (on a scale from 0 to 4). It is obtained by

dividing the total score by the total number of items (90). The Positive Symptom Total (PST) is the sum of all items with a score equal or above 1 and thus conveys the breadth or array of symptoms that the individual is now experiencing. It can be used as an indicator of whether respondent is attempting to misrepresent his or her status. Finally, the Positive Symptom Distress Index (PSDI) assesses the intensity of the symptoms by multiplying GSI with the total number of items (90) and dividing the product by PST. This study followed the scoring guidelines described in the Spanish manual (Derogatis, 2002).

To assess the behavioral and emotional functioning of the patients, two scales from the Achenbach System of Empirically Based Assessment were used. They were the Youth Self-Report for Ages 11–18 Years (YSR/11-18) and the Child Behavior Checklist for Ages 6–18 Years (CBCL/6-18; Achenbach & Rescorla, 2001). The YSR/11-18 is a 112-item self-report scale completed by the adolescents, and the CBCL/6-18 is the version for their parents. The first part of both instruments assesses the psychosocial competencies of adolescents across four subscales (7 items) and the second part assesses behavioral and emotional symptoms across eight subscales (113 items; Table 5). For the scoring, Assessment Data Manager v.910 School-Age Module for CBCL/6-18, Teacher’s Report Form for Ages 6-18 (TRF/6-18), and YSR/11-18 was used. Both questionnaires have been validated for the Spanish population, obtaining high validity and internal consistency. For example, the internalizing and externalizing problem scales have been reported as both having a Cronbach’s  $\alpha$  of .80 (Lemos, Fidalgo, Calvo, & Menéndez, 1992).

*Trait Meta-Mood Scale (TMMS-24; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995)*. The TMMS-24 is a 24-item instrument and uses a 5-point Likert scale to assess perceived EI. The Spanish version of the TMMS-24 was used (Fernandez-Berrocal, Extremera, & Ramos, 2004). The TMMS-24 is widely used in adolescents and adults and comprises three subscales: (a) attention to emotion (participants’ self-perception of the degree to which they pay attention to their own moods and emotions), (b) clarity (participants’ self-perception of the degree to which they understand their own emotions), and (c) repair of emotion (participants’ self-perception of the degree to which they are able to modify their own emotions). The Spanish TMMS-24 has psychometric characteristics similar to the original version with an internal consistency (Cronbach’s  $\alpha$ ) of .90, .90, and .86 for attention, clarity, and repair, respectively. For this study, the benchmarks for males described in the Spanish version are used (Fernandez-Berrocal et al., 2004).

*Family Environment Scale (FES; Moos & Moos, 1994)*. The 90-item FES assesses social and environmental characteristics of families across 10 subscales with nine items each in the Spanish version (Seisdedos, Victoria de la Cruz, & Cordero, 1989). The self-report items are answered as being either “true” or “false” and can be answered by adolescents or adults. The minimum and maximum direct scores are 0 to 9 for the 10 subscales with total scores ranging from 0 to 100 with scores  $\leq 50$  being the cut-off point for clinical significance. The original version showed adequate validity and high internal consistency (Cronbach’s  $\alpha$  of .89).



### Data analysis

All analyses were conducted with SPSS software version 24. Descriptive analyses were calculated using frequencies and percentages for categorical variables and means and standard deviations (*SDs*) for continuous variables. In order to analyze if IGD symptoms were associated with other indices of mental health, Spearman's correlations were calculated between IGD scores and MACI subscales, SCL-90 global indices, and TMMS-24 attention and clarity subscales. Additionally, in order to compare adolescents' perceptions with those of their parents, Spearman's correlations between the results of the YSR/11-18 and the CBCL/6-18 questionnaires were calculated.

### Ethics

The study was approved by the ethics committees of the mental health centers that participated in the studies and the research team's university ethics committee. The participants and their legal guardians signed consent forms. In presenting the cases, information that could identify the participants was anonymized. The study procedures were carried out in accordance with the Declaration of Helsinki.

## RESULTS

### Sociodemographic data

The sociodemographic data of all 31 participants are described in Table 1. The participants were all males aged between 12 and 18 years (mean = 14.97 years, *SD* = 1.74). All participants were Spanish and all except two were students. None of the participants reported any serious physical health problem. Only one participant was then receiving antidepressant medication. However, 19.4% of the sample had a history of previous psychological treatment and a high number of stressful life events. The most

Table 1. Sociodemographic data of the participants

	<i>n</i> (%)
Family housing situation	
Living with parents	4 (12.9%)
Living with parents and siblings	11 (35.5%)
Shared parental custody	16 (51.6%)
Schooling status	
Attending school	29 (93.5%)
Not attending school	2 (6.5%)
Life events	
Victim of bullying at school	12 (38.7%)
Own or family illness	7 (22.6%)
Mental disorder in family	7 (22.6%)
Divorce of parents	16 (51.6%)
Substance abuse in family	5 (16.1%)
Domestic violence/neglect/physical abuse	9 (29%)
Death of family member	5 (16.1%)
Economic problems	8 (25.8%)

common stressful life events in the sample were the divorce of the parents and having been bullied at school, as reported by 51.6% and 38.7% of the sample, respectively. The adolescents reported an average of 47.51 hr of playing video games per week, whereas their relatives reported their children as playing an average of 49.45 hr per week. The most popular games were the "Multiplayer Online Battle Arena" (MOBA) games and the "Massively Multiplayer Online Role-Playing Games" (MMORPGs), played by 64.5% and 51.6%, respectively.

### Internet gaming disorder

To assess the IGD symptoms, the IGD-20 Test was used. The sum scores of all the participants exceeded the cut-off point of 71 and were considered as disordered gamers (because they met inclusion criteria 1 and 2). The participants scored uniformly on all subscales (Table 2).

### Millon Adolescent Clinical Inventory (MACI)

The base rate (BR) scores of the subscales and total scale are reported in Table 3. All 31 participants obtained raw scores of 0 on the Reliability (W) scale and scores between 203 and 536 on the Disclosure (X) scale. Many of the personality patterns and expressed concern scales showed an average above the cut-off point of 60 in the following scales: introversion, inhibition, identity diffusion, and peer insecurity, indicating the presence of possible pathological at the domain level. Although most participants did not show alterations in the clinical scales, there were some adolescents with pathological traits in almost all subscales. Clear pathological patterns among participants were identified. There was a significant positive correlation between IGD scores and "anxious feelings" scores ( $\rho = .367, p < .05$ ), and a significant negative correlation between IGD scores and "oppositional" scores ( $\rho = -.416, p < .05$ ) and "self-de-meaning" scores ( $\rho = -.371, p < .05$ ).

### Symptom Checklist-90-R

Table 4 shows the number of participants with non-clinical, borderline, and clinical ranges in each symptom scale of SCL-90 and the global indices (GSI, PST, and PSDI).

Table 2. Descriptive statistics [means, *SDs*, minimum and maximum scores of the IGD-20 subscales, and sum score (*N* = 31)]

	Mean $\pm$ <i>SD</i>	Min	Max
Saliency	4.12 $\pm$ 0.56	3	5
Mood modification	4.17 $\pm$ 0.53	3	5
Tolerance	3.89 $\pm$ 0.75	2	5
Withdrawal symptoms	3.47 $\pm$ 0.60	2	5
Conflict	3.71 $\pm$ 0.40	1	5
Relapse	4.13 $\pm$ 0.67	1	5
IGD sum score	78.0 $\pm$ 5.79	71	90

Note. *SD*: standard deviation; IGD: Internet gaming disorder.

Table 3. Descriptive overview of MACI scores [means, SDs, SEM, and number and percentage of participants in different benchmark ranges (N = 31)]

Scales of MACI	Mean ± SD	SEM	0–59 <sup>a</sup>	60–74 <sup>a</sup>	75–84 <sup>a</sup>	85–120 <sup>a</sup>
<b>Personality Patterns Scales</b>						
Introversion (1)	64.58 ± 20.43	3.66	15 (48.4%)	9 (29.0%)	2 (6.5%)	5 (16.1%)
Inhibition (2A)	60.87 ± 19.95	3.58	16 (51.6%)	6 (19.4%)	5 (16.1%)	4 (12.9%)
Doleful (2B)	49.74 ± 16.25	2.91	20 (64.5%)	11 (35.5%)	0 (0%)	0 (0%)
Submissiveness (3)	58.26 ± 27.38	4.91	15 (48.4%)	8 (25.8%)	3 (9.7%)	5 (16.1%)
Dramatizing (4)	39.71 ± 28.27	5.07	25 (80.6%)	2 (6.5%)	2 (6.5%)	2 (6.5%)
Egoistic (5)	43.65 ± 26.55	4.76	23 (74.2%)	4 (12.9%)	0 (0%)	4 (12.9%)
Unruly (6A)	45.97 ± 20.55	3.69	22 (71.0%)	7 (22.5%)	1 (3.2%)	1 (3.2%)
Forceful (6B)	49.58 ± 21.76	3.90	24 (77.4%)	2 (6.5%)	1 (3.2%)	4 (12.9%)
Conforming (7)	54.81 ± 28.28	5.08	18 (58.1%)	7 (22.5%)	0 (0%)	6 (19.4%)
Oppositional (8A)	52.32 ± 19.42	3.488	20 (64.5%)	8 (25.8%)	3 (9.7%)	2 (6.5%)
Self-demeaning (8B)	50.68 ± 19.64	3.52	21 (67.7%)	6 (19.4%)	3 (9.7%)	1 (3.2%)
Borderline tendency (9)	55.77 ± 17.31	3.11	17 (54.8%)	11 (35.5%)	1 (3.2%)	2 (6.5%)
<b>Expressed Concern Scales</b>						
Identity diffusion (A)	63.42 ± 19.07	3.42	11 (35.5%)	14 (45.1%)	2 (6.5%)	4 (12.9%)
Self-devaluation (B)	56.52 ± 20.65	3.71	17 (54.8%)	9 (29.0%)	2 (6.5%)	3 (9.7%)
Body disapproval (C)	52.74 ± 21.09	3.78	20 (64.5%)	5 (16.1%)	5 (16.1%)	1 (3.2%)
Sexual discomfort (D)	29.06 ± 7.03	1.26	23 (74.2%)	2 (6.5%)	5 (16.1%)	1 (3.2%)
Peer insecurity (E)	62.16 ± 26.67	4.79	12 (38.7%)	9 (29.0%)	4 (12.9%)	6 (19.4%)
Social insensitivity (F)	44.61 ± 25.10	4.50	23 (74.2%)	5 (16.1%)	1 (3.2%)	2 (6.5%)
Family discord (G)	55.35 ± 25.48	4.57	16 (51.6%)	11 (35.5%)	0 (0%)	4 (12.9%)
Childhood abuse (H)	52.71 ± 20.12	3.61	19 (61.3%)	9 (29.0%)	2 (6.5%)	1 (3.2%)
<b>Clinical Syndrome Scales</b>						
Eating dysfunctions (AA)	48.42 ± 22.15	3.97	20 (64.5%)	9 (29.0%)	0 (0%)	2 (6.5%)
Substance abuse (BB)	45.87 ± 18.04	3.24	25 (80.6%)	5 (16.1%)	1 (3.2%)	0 (0%)
Delinquent predisposition (CC)	39.26 ± 19.34	0.99	27 (87.1%)	3 (9.7%)	1 (3.2%)	0 (0%)
Impulsive propensity (DD)	46.90 ± 22.39	4.02	23 (74.2%)	4 (12.9%)	1 (3.2%)	3 (9.7%)
Anxious feelings (EE)	58.77 ± 20.22	3.63	17 (54.8%)	8 (25.8%)	3 (9.7%)	3 (9.7%)
Depressive affect (FF)	56.87 ± 17.82	3.20	16 (51.6%)	13 (41.9%)	0 (0%)	2 (6.5%)
Suicidal tendency (GG)	51.48 ± 14.95	2.68	23 (74.2%)	7 (22.6%)	0 (0%)	1 (3.2%)

Note. SD: standard deviation; MACI: Millon Adolescent Clinical Inventory; SEM: standard error of measurement.

<sup>a</sup>Scores 0–59 = no significant difficulties; 60–74 = possible presence of traits at the domain level; 75–85 = likely psychopathology is present; >85 = presence of personality pattern likely at an impairing level.

Table 4. Descriptive overview of SCL-90 scores overview of SCL-90 scores [means, SDs, and number and percentage of participants in different benchmark range (N = 31)]

	Descriptive data			Interpretative benchmarks		
	Mean ± SD	Min	Max	Non-clinical	Borderline	Clinical
Somatization	0.78 ± 0.90	0	4.0	9 (29.0%)	7 (22.6%)	15 (48.4%)
Obsessive–compulsive	1.32 ± 0.67	0.20	2.70	3 (16.1%)	5 (16.1%)	23 (74.2%)
Interpersonal sensitivity	1.29 ± 0.98	0	3.54	6 (19.4%)	2 (6.4%)	23 (74.2%)
Depression	1.24 ± 0.94	0.15	3.54	8 (25.8%)	3 (9.7%)	20 (64.5%)
Anxiety	0.82 ± 0.63	0	3.67	8 (25.8%)	4 (12.9%)	19 (61.3%)
Hostility	1.33 ± 1.04	0	3.67	5 (16.1%)	5 (16.1%)	21 (67.8%)
Phobic anxiety	0.67 ± 0.77	0	2.86	7 (22.6%)	2 (6.5%)	22 (70.9%)
Paranoid ideation	1.08 ± 0.85	0	3.83	6 (19.4%)	2 (6.5%)	23 (74.2%)
Psychoticism	0.67 ± 0.67	0	2.60	13 (41.9%)	8 (25.8%)	10 (32.3%)
Global Severity Index	1.02 ± 0.63	0.21	2.79	2 (6.5%)	4 (12.9%)	25 (80.6%)
Positive symptom total	43.7 ± 18.13	13	79.0	1 (3.2%)	3 (9.7%)	27 (87.1%)
Positive Symptom Distress Index	2.0 ± 0.62	1	3.35	7 (22.6%)	9 (29.0%)	15 (48.4%)

Note. The classification of non-clinical (0–45), borderline (50–65), and clinical (70–99) was done using the male adolescents’ non-psychiatric *t*-scores. SCL-90: Symptom Checklist-90-R; SD: standard deviation.

The clinical characteristics at the beginning of treatment (baseline) indicated that most of the participants had comorbid psychological problems and symptoms of psychopathology

within the clinical range. There is also some variabilities in the clinical profiles in the sample. The primary symptom dimensions with clinical scores were common among the sample,

including comorbid symptoms related to obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, and paranoid ideation dimensions. Overall, 80.6% ( $n=25$ ) of the sample had significantly high psychological distress with a range of different comorbid symptoms. The IGD scores significantly correlated with scores on “interpersonal sensitivity” ( $\rho = .442, p < .05$ ), “hostility” ( $\rho = .363, p < .05$ ), “GSI” ( $\rho = .360, p < .05$ ), and “PSDI” ( $\rho = .473, p < .01$ ).

*Youth self-report for ages 11–18 years (YSR/11-18) and the child behavior checklist for ages 6–18 years (CBCL/6-18)*

The YSR/11-18 and CBCL/6-18 were used to compare the perceptions from the participants (YSR/11-18) with those of their families (CBCL/6-18). Table 5 shows the means, SDs, SEM, as well as the number and percentage of participants falling into the non-clinical, borderline, and

clinical categories. Regarding the competence scales, there was a lack of presence of activities and social relationships and a high percentage of participants showing clinically significant scores. Similarly, the total competence scale mean was classified within the clinical range ( $23.93 \pm 7.01$ ). The clinical scores presented by the participants differed across the syndrome scales. Being “withdrawn/depressed” had the highest clinical mean, followed by the “anxious/depressed” scale. The scores on the symptom scales denoted clinical status in all total scales: internalizing problems ( $69.65 \pm 9.29$ ), externalizing problems ( $61.77 \pm 8.32$ ), and total problems ( $68.10 \pm 6.89$ ). The IGD score correlated significantly with the following CBCL/6-18 scales: “anxious/depressed” ( $\rho = .356, p < .05$ ), “withdrawn/depressed” ( $\rho = .371, p < .05$ ), and “internalizing problems” ( $\rho = .407, p < .05$ ). Regarding the YSR/11-18, there was a significant negative correlation on the activity competence scale ( $\rho = -.572, p < .01$ ).

Table 5. Descriptive overview of YSR/11-18 and CBCL/6-18 scores [means, SDs, SEM, and number and percentage of participants in different benchmark range ( $N=31$ )]

		Mean ± SD	SEM	Correlations	Non-clinical	Borderline	Clinical
Competence scales					<b>65–36</b>	<b>35–31</b>	<b>30–20</b>
Activities	YSR	30.0 ± 6.11	1.09	n.s.	6 (19.4%)	9 (29.0%)	16 (51.6%)
	CBCL	27.38 ± 7.15	1.28		4 (12.8%)	5 (16.2%)	22 (71.0%)
Social	YSR	34.7 ± 14.65	2.63	0.699***	6 (19.4%)	8 (25.8%)	15 (48.4%)
	CBCL	31.41 ± 8.10	1.46		8 (25.8%)	6 (19.4%)	17 (54.8%)
School <sup>a</sup>	YSR <sup>b</sup>	–	–	–	–	–	–
	CBCL	37.06 ± 7.26	1.35	–	18 (59.5%)	4 (12.9%)	7 (27.6%)
Total competence scales <sup>a</sup>	YSR	27.96 ± 9.16	1.70	0.504**	<b>80–41</b>	<b>40–37</b>	<b>36–10</b>
	CBCL	23.93 ± 7.01	1.30		0 (0%)	4 (13.8%)	25 (86.2%)
Syndrome scales					<b>50–65</b>	<b>66–69</b>	<b>70–100</b>
I – Anxious/depressed	YSR	61.26 ± 8.63	1.55	0.627***	21 (67.7%)	3 (9.7%)	7 (22.6%)
	CBCL	66.1 ± 10.06	1.80		16 (51.6%)	3 (9.7%)	12 (38.7%)
II – Withdrawn/depressed	YSR	64.65 ± 9.93	1.78	0.522**	19 (61.3%)	4 (12.9%)	8 (25.8%)
	CBCL	78.13 ± 2.57	2.57		4 (12.9%)	6 (19.4%)	21 (67.7%)
III – Somatic complaints	YSR	58.52 ± 8.74	1.57	0.521**	24 (77.4%)	3 (9.7%)	4 (12.9%)
	CBCL	63.52 ± 9.89	1.77		19 (61.3%)	1 (3.2%)	11 (35.5%)
IV – Social problems	YSR	61.45 ± 8.87	1.59	n.s.	19 (61.3%)	5 (16.2%)	7 (22.6%)
	CBCL	64.0 ± 9.15	1.64		15 (48.4%)	9 (29.0%)	7 (27.6%)
V – Thought problems	YSR	56.26 ± 5.74	1.03	n.s.	29 (93.5%)	1 (3.2%)	1 (3.2%)
	CBCL	64.95 ± 7.35	1.32		16 (51.6%)	5 (16.2%)	10 (67.8%)
VI – attention problems	YSR	65.1 ± 10.12	1.80	n.s.	17 (54.8%)	6 (19.4%)	8 (25.8%)
	CBCL	65.87 ± 8.37	1.50		20 (64.5%)	5 (16.2%)	6 (19.4%)
VII – rule-breaking behavior	YSR	56.55 ± 5.75	1.03	0.692***	27 (87.1%)	3 (9.7%)	0 (0%)
	CBCL	59.55 ± 5.40	0.97		27 (87.1%)	4 (12.9%)	0 (0%)
VIII – aggressive behavior	YSR	60.32 ± 10.42	1.87	0.665***	24 (77.4%)	2 (6.5%)	5 (16.2%)
	CBCL	64.03 ± 9.21	1.65		18 (58.1%)	3 (9.7%)	10 (67.8%)
Total scales					<b>50–59</b>	<b>60–63</b>	<b>64–100</b>
Internalizing problems	YSR	61.94 ± 9.88	1.77	0.607***	11 (35.5%)	4 (12.9%)	16 (51.6%)
	CBCL	69.65 ± 9.29	1.67		5 (16.2%)	1 (3.2%)	25 (80.6%)
Externalizing problems	YSR	57.77 ± 8.27	1.48	0.627***	20 (64.5%)	5 (16.2%)	6 (19.4%)
	CBCL	61.77 ± 8.32	1.49		9 (29.0%)	8 (25.8%)	14 (45.2%)
Total problems	YSR	62.16 ± 6.28	1.12	0.430*	11 (35.5%)	9 (29.0%)	11 (35.5%)
	CBCL	68.10 ± 6.89	1.23		3 (9.7%)	3 (9.7%)	25 (80.6%)

Note. The bold values pretends to classify the scores in ranges “non-clinical,” “borderline,” and “clinical” scores. SD: standard deviation; YSR: Youth Self-Report; CBCL: Child Behavior Checklist; SEM: standard error of measurement.

<sup>a</sup>Missing score of two individuals who are not attending to school ( $n = 2, 6.5%$ ). <sup>b</sup>System missing.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p > .001$ .

Table 6. Descriptive statistics of the TMMS-24 [means, SDs, SEM, and number and percentage of participants laying in the different classification ranges (N= 31)]

	Mean ± SD	SEM	n (%)		
			Low (≤21)	Adequate (22–32)	Excessive (≥33) <sup>a</sup>
Attention to feelings	18.48 ± 7.14	1.28	21 (67.7%)	8 (25.8%)	2 (6.5%)
Clarity of feelings	21.74 ± 6.0	1.07	Low (≤25) 25 (80.6%)	Adequate (26–35) 5 (16.1%)	Excellent (≥36) 1 (3.2%)
Mood repair	21.48 ± 5.03	0.90	19 (61.3%)	12 (38.7%)	0 (0%)

Note. SD: standard deviation; TMMS-24: Trait Meta-Mood Scale; SEM: standard error of measurement.

<sup>a</sup>Only in the attention dimension, scores equal or above 33 are considered as excessive, not excellent as in the other two dimensions.

Emotional intelligence

Table 6 presents the information related to EI assessed with the TMMS-24. A high percentage of participants presented scores in the lower range thus showing deficits in EI. The overall means also were lower than scores classified in adequate range. However, there was no significant correlation between the IGD-20 scores and the scores of the TMMS-24 dimensions.

Family Environment Scale (FES)

The results regarding the Family Environment scale are presented in Table 7. Cohesion and expressivity scores were low reflecting poor family cohesion in 24 participants (77.4%) and poor familiar expressivity in 20 participants (64.5%). The conflict scale score must be interpreted considering that scores ≤50 mean conflict presence. In this sample, 11 individuals (35.5%) and 9 individuals (29%) showed a moderate and remarkable conflict presence in the family, respectively. Regarding the subscales of personal growth indices, independence, achievement orientation, intellectual-cultural orientation, and moral-religious emphasis all showed low scores meaning a poor presence of these attributes in the participants' families. The organization and control scales showed a tendency for low organization in 17 families and a tendency of high control in 20 families (≤5). The results in Table 7 show a tendency of negative family

relationship, absence of family growth characteristics, and control-disorganized families. Consequently and considering the scores outlined above, a negative family relationship and environment was common in the present sample.

DISCUSSION

This is the first study to examine the psychological characteristics of a clinical sample of adolescents with Internet gaming disorder recruited through two public mental-health centers. The weekly gameplay (47.51 hr) appears to be high in this sample compared to the findings of other studies where 30 hr per week was reported among disordered players (e.g., Fuster et al., 2016; Pontes et al., 2014). In addition, it appears that younger gamers play more hours than older gamers (Fuster et al., 2016). The adolescents in this study preferred MMOPRG and MOBA games. This is in accordance with other studies where those who played MMORPGs and MOBA games reported poor well-being and mental health and reported more hours played than other gamer groups (Fuster et al., 2016; Smyth, 2007).

The findings of this study demonstrated that the participants obtained uniform scores among IGD-20 subscales (i.e., salience, mood modification, tolerance, withdrawal, relapse, and conflict symptoms). In the disorder gamer profile founded by Pontes et al. (2014), symptoms, such

Table 7. Family environment characteristics through FES scores (means, SDs, SEM, and number and percentage of participants in different benchmark ranges)

	Mean ± SD	SEM	Low presence (1–4)	Average presence (5–6)	High presence (7–9)
Family Relationship Index					
Cohesion	3.03 ± 2.49	0.44	24 (77.4%)	4 (12.9%)	3 (9.7%)
Expressivity	4.06 ± 2.04	0.36	20 (64.5%)	7 (22.6%)	4 (12.9%)
Conflict	5.13 ± 1.80	0.32	11 (35.5%)	11 (35.5%)	9 (29.0%)
Personal Growth Index					
Independence	4.48 ± 1.87	0.33	13 (41.9%)	14 (45.2%)	4 (12.9%)
Achievement	4.81 ± 1.88	0.33	17 (54.8%)	7 (22.6%)	7 (22.6%)
Intellectual-cultural	2.81 ± 1.55	0.28	26 (83.9%)	5 (16.1%)	0 (0%)
Active-recreational	2.84 ± 1.26	0.22	29 (93.5%)	2 (6.5%)	0 (0%)
Moral-religious	2.32 ± 1.37	0.24	29 (93.5%)	2 (6.5%)	0 (0%)
System Maintenance Index					
Organization	4.68 ± 2.05	0.36	17 (54.8%)	6 (19.4%)	3 (9.7%)
Control	5.55 ± 1.84	0.33	13 (41.9%)	11 (35.5%)	9 (29.1%)

Note. SD: standard deviation; SEM: standard error of measurement; FES: Family Environment Scale.

as conflict, were critical in determining the pathological use of online video game playing (King, Delfabbro, Zwaans, & Kaptis, 2013).

Multiple negative environmental factors were found among disordered gamers in this study. The majority of the sample had undergone stressful life events in concordance with other studies in the field (Leung, 2007; Yan, Li, & Sui, 2014). Other negative characteristics found in the present sample included a high level of social problems and negative family patterns, such as conflicted functioning and poor family relationships, and findings that are also in accordance with previous research (e.g., Yan et al., 2014). Moreover, Bonnaire and Phan (2017) found a strong influence of family conflict and a poorer family relationship on the occurrence of IGD in adolescents. In addition, a very high number of adolescents reported school failure, poor social environment, and shortage of engaging in alternative activities to playing video games. These findings confirm other studies showing correlations between IGD in adolescence and risk factors reported in this study (Beutel, Hoch, Wölfling, & Mueller, 2011; Ferguson et al., 2011)

In relation to other psychological characteristics, several personality traits were found to be highly associated with IGD including introversion, inhibition, submissiveness, self-devaluation, interpersonal sensibility, obsessive-compulsive tendencies, phobic anxiety, and hostility, as well as paranoid and borderline personality traits. Similar findings have been reported in several studies using non-clinical samples (Griffiths, van Rooij, et al., 2016; Zadra et al., 2016), as well as associations between IGD and boredom inclination, sensation-seeking, and schizoid traits. As previous research has demonstrated, it is essential to include EI as an indicator of psychological distress (Beranuy, Oberst, Carbonell, & Chamarro, 2009) when examining psychological characteristics of those with IGD. Furthermore, having good EI is a good mental health predictor (Martins, Ramalho, & Morin, 2010), whereas poor EI is likely to act as a predictor of addiction-related behaviors (Engelberg & Sjöberg, 2004; Parker, Taylor, Eastabrook, Schell, & Wood, 2008), particularly in the adolescents (Parker, Summerfeldt, Taylor, Kloosterman, & Keefer, 2013). As previous research has demonstrated, the EI findings in this study showed a tendency toward being clinically significant and can be viewed as a lack of skills in this area of psychological functioning.

In both the global scores and subscale scores of the SCL-90, YSR/11-18, and CBCL/6-18, the sample in this study had high clinical scores indicating multiple clinical symptoms and underlying mental distress. Previous research has demonstrated an association between high levels of distress and online addictions (Mentzoni et al., 2011; Yan et al., 2014). Ng and Wiemer-Hastings (2005) found that gamers with a psychosocial vulnerability were susceptible to pathological involvement with online games. In all the participants, other comorbidities besides IGD were diagnosed by clinicians. This has been reported by other studies highlighting the high rates of comorbid psychiatric disorders (Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013; Ferguson et al., 2011; Müller, Beutel, Egloff, & Wölfling, 2014).

While many of the gamers in the present sample had high scores on scales assessing depression, anxiety, and somatic disorders, the presence of several other comorbid disorders meant there were different clinical profiles of adolescents with IGD in the sample. The relationship between IGD and other problems has been reported in previous studies, concerning IGD and its relationship with depression, anxiety, ADHD, ASD, obsessive-compulsive symptoms, and behavioral disorders (Andreassen et al., 2016; Brunborg, Mentzoni, & Frøyland, 2014; Carli et al., 2013; Ceyhan & Ceyhan, 2008; King, Delfabbro, & King, 2016; Kuss & Griffiths, 2012b; Müller et al., 2015; van Rooij et al., 2014).

## CONCLUSIONS

As far as the authors are aware, this is the first study to examine the psychological characteristics among a clinical sample of adolescents with IGD. Furthermore, this study analyzed several psychological characteristics as regards the sociodemographic data, IGD symptoms, personality traits, comorbid disorders, EI, and the family functioning. Consequently, the findings presented here have important implications for clinical practice and interventions. By studying all the psychological patterns simultaneously, the findings point toward a more global pattern of key psychological characteristics associated with Internet gaming disorder in the adolescence. This may help in understanding the complexity of this proposed disorder given the many different psychological characteristics and vulnerabilities, and it may also help in designing more complex and global interventions for adolescents with IGD. The findings suggest an integrative approach for specialized treatments including the treatment of comorbid disorders, as well as interventions that address low self-esteem, poor social skills, low EI, and family dysfunction (among others) in order to address the disorder more holistically.

Despite its novelty, this study is not without limitations. These should be kept in mind when interpreting the findings. First, most of the data collected were self-report in nature. However, all scales used were previously validated, psychometrically robust, and had good internal consistency. Furthermore, MACI inventories add validity to scales in dealing with the common problems of self-reported tests such as reliability, disclosure, social desirability, and debasement. Second, the sample size was modest limiting the results obtained. However, for a clinical sample, the sample size was much bigger than other case studies reported in the prior literature. Third, being a clinical sample, the generalization of the findings to other populations is limited although the major criticism of the existing data is that it tends to come from non-clinical samples. Finally, there was no control group to compare the results. However, on the whole, the findings of this study provide a valuable contribution the IGD literature.

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