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# The Spanish Version of the Video Game Functional Assessment-Revised

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**Abstract**

It is estimated that 16.8 million in Spain (41% female) are involved in gaming, and approximately 8.3% of Spanish gamers are problematic gamers (i.e., endorsing five or more of the nine criteria for Internet Gaming Disorder [IGD]). Given the high prevalence of IGD in Spain, this study evaluated construct validity and concurrent validity of the Spanish Version of the Video Game Functional Assessment—Revised (SP-VGFA-R), by examining the correlational coefficients with the nine-item Internet Gaming Disorder Scale-Short-Form (IGDS9-SF). A total of 434 adults 18 years of age or older participated in the study (15.1% female). Results showed that the SP-VGFA-R was positively and significantly associated with the IGDS9-SF (bivariate coefficients ranging from 0.411 to 0.610). Four distinct factors in the SP-VGFA-R were identified in confirmatory factor analysis, including (a) social attention, (b) tangible/intangible rewards, (c) escape/avoidance of demands or pain, and (d) sensory stimulation. Other findings showed that IGDS9-SF scores increased as (a) the escape/avoidance of demands or pain function increased and (b) two or more function scores increased. The SP-VGFA-R can be used in combination with the IGDS9-SF to assess Spanish gamers with IGD internationally, and to develop evidence-based behavioral interventions.

**Keywords:** video game functional assessment, internet gaming disorder, problematic gaming, Spanish gamers, psychometric evaluation

## Introduction

The prevalence of internet gaming disorder (IGD) internationally ranges from 0.7% to 27.5%, with higher prevalence among males than females in the vast majority of studies (1). A systematic review and meta-analysis were performed for studies (n = 53) conducted between 2009 and 2019 and showed worldwide prevalence estimates of 3.05% (2). However, it should be noted that the prevalence rates may differ depending on the screening instrument used and interpretation of those findings (3). In European countries, the rate of prevalence is largely based on categorical demographics (4), and some evidence suggests that IGD increased during the COVID-19 pandemic (5, 6). Despite IGD being problematic across several cultures, the current study focused on the Spanish culture, as the Spanish Video Game Association (2018) reported that in Spain, 16.8 million are involved in gaming (41% female), indicating that an estimated 35% of the total Spanish population has engaged in playing videogames (7, 8). Furthermore, an estimated 480 million people are native Spanish speakers (9, 10), and this language is spoken in 31 different countries. Among young adults (18-28 years), only a few studies have assessed prevalence and diagnosis of

IGD in Spain (11, 12). Given this, it is critical to understand what functionally maintains this behavior at such a relatively high rate, in attempts to treat this clinically.

Although there has been ongoing debate about whether problematic gaming is a genuine disorder, it has now received formal recognition in both the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5)(13) which included internet gaming disorder (IGD) in Section 3, and the World health Association's *International Classification of Diseases* (ICD-11) (14) which included 'gaming disorder' (GD). Subsequently, validated psychometric instruments like the Internet Gaming Disorder Test (15) were constructed and validated in several languages (e.g., Spanish (11), Chinese (16), Turkish (17), and Italian (18)). A study of Spanish adolescents was conducted by Buiza-Aguado et al. (7) and reported that in a sample of 708 students in large urban areas across low, medium and high socioeconomic status reported 72.8% were online gamers. Of this sample, 8.3% met five or more of the DSM-5's nine criteria for IGD. Other studies such as Lopez-Fernandez et al. (19) reported that 7.7% of equally sampled male and female Spanish adolescents gamers (n=1132) between the ages of 11 to 18 years were classified as pathological players. Moreover, Fumero et al. (20) found that among 946 Spanish adolescents aged 11 to 18 years (i) anxiety and time spent playing predicted IGD, (ii) social skills and family functioning indirectly predicted IGD, (iii) lower family functioning was related with IGD among females, and (iv) hostility and social skill deficits were associated with IGD among males.

Despite the known problems, variables, and consequences related to IGD in the Spanish population, few studies have examined methodologies to best treat this disorder, or reduce the duration and frequency of problematic gaming among those that meet criteria for IGD (21). Similar to other addictive behaviors, there are several behavioral interventions that may be applicable to the treatment of IGD. One such approach is by conducting a functional behavioral assessment to determine the antecedents that follow a type of behavior and the consequences related to maintaining the behavior (22). The Video Game Functional Assessment (VGFA-R) is a functional behavioral assessment instrument designed to assess the motivation to engage in video gaming that contributes to IGD, and comprises items relating to (i) social attention, (ii) tangible/intangible rewards, (iii) escape/avoidance of demands or pain, and (iv) sensory stimulation (23).

Social attention involves seeking a response from others by drawing the attention to an individual's behavior via positive or negatively maintained behavior (24). The escape/avoidance function is divided into two related functions, including escape (termination of the demand made on the individual) and avoidance (temporary removal of the demand). The tangible/intangible rewards function is the desire for an item or commodity within a game, such as earning in-game items like improved equipment or cosmetic items (25, 26). Finally, the sensory stimulation function is maintained by two aspects, including visual characteristics (e.g., lights and graphics that are aesthetically pleasing) and auditory characteristics (e.g., music, sound effects). The sensory stimulation function can lead to a gamer becoming so intensely immersed in the videogame, that they become disconnected from other aspects of their environment and life (27-29). Theoretical support for the VGFA-R is now well established in the literature (23, 24, 29-32).

There has also been recommendations to assess the functions that reinforce video gaming among gamers that meet criteria for IGD (32). Although prior research has shown that identifying severity level [4, 10] is necessary when developing interventions, understanding the reinforcing functions that maintain the detrimental behavior is essential in the development of actual treatment interventions [18]. Since there is a large Spanish population world-wide, the IGD has been cross-culturally validated [4, 11, 12, 13], and identifying the function that maintains/reinforces a

behavior is vital in implementing treatment interventions (23), the VGFA-R must also be validated among these populations to conduct functional assessments that lead to the development of effective interventions. Since the Spanish Version of the Video Game Functional Assessment – Revised (SP-VGFA-R) has already been validated in English, it is possible to make comparisons between samples from other cultures. Consequently, the purpose of the present study was to psychometrically evaluate the SP-VGFA-R, as well as establish concurrent validity with one of the most used instruments assessing IGD, namely the nine-item Internet Gaming Disorder-Short Form (IGDS9-SF).

## Methods

### *Participants*

Initially, a total of 434 gamers participated in the study. Potential participants were recruited at the Universitat Autonoma de Barcelona Universita or were contacted online via approved Spanish social networking sites (33), or through emails within social networks. Inclusion criterion was similar to that of Buono et al (24). Participants (i) were required to be 18 years or older, (ii) were required to play at least one hour of videogames per week, (iii) had to speak and read Spanish, and (iv) had to access the survey via mobile phone, tablet, or computer. Exclusion criteria included (i) being under the age of 18 years, (ii) having no access to the internet via laptop/desktop computer, (iii) submitting incomplete data (e.g., exiting the survey prior to completion, providing demographics but no answers to outcome measures). Of the 434 initial gamers, 66 were eliminated because they were either underage (n=18) or provided incomplete data (n=48) resulting in a final sample size of 368 gamers. Of these, 284 identified as male (77.20%), 84 identified as female (22.80%). The mean age of the total sample was 25.1 years. (53.9%), whereas the remainder

ENTER TABLE 1 HERE

### *Materials*

The 24-item Video Game Functional Assessment – Revised (VGFA-R) assesses four functions (six questions per function) that reinforce/maintain video gaming: (i) social attention, (ii) tangible/intangible rewards, (iii) escape/avoidance of demands or pain, and (iv) sensory stimulation (23). Individuals are presented with an item (e.g., *"I choose to play videogames when I am upset or depressed"*) and then select their response based on a seven-item scale (never, almost never, seldom, half the time, usually, almost always, always). Items associate with each function are summed and the function with the highest rating is the function that maintains video gaming (note: participants may have more than one function that maintains gaming). The psychometric properties of the Spanish VGFA-R are presented in the Results section.

The Spanish version of the nine-item Internet Gaming Disorder Test Short Form (IGDS9-SF) was used to assess the risk of IGD and is based on the nine DSM-5 criteria for IGD (11, 15). Factor analysis from the original scale development study identified six components comprising salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Individuals are presented with an item (e.g., Do you feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure; ¿Sientes la necesidad de pasar cada vez más tiempo jugando para lograr satisfacción o placer?) and select one of five responses indicating their level of agreement/disagreement with the statement (1=never, 2=rarely, 3=sometimes, 4=often, 5=very often). The total score is obtained (ranging from 9 to 45) and higher scores indicate higher

level of IGD symptom-severity. The Spanish IGDS9-SF showed very good overall internal consistency using Cronbach's Alpha (α = .857).

***Procedure***

The translation of the VGFA-R was carried out using standardized international protocols (34). Participants included undergraduates at Universitat Autonoma de Barcelona Universita, and were contacted via online social networks and answered an online questionnaire (SP-VGFA-R) with informed consent. An independent samples *t*-test was performed and showed no significant differences between the datasets (undergraduates recruited at the Universitat Autonoma de Barcelona Universita and participants recruited online). Therefore, they were combined to create one dataset. Participants that agreed to take part in the study were instructed to click on the link at the bottom of the recruitment email. The link relocated the study participants to the study materials within *Qualtrics.* The SP-VGFA-R was completed first by study participants, followed by demographic information (e.g., participants were asked about their preferred gaming platforms), and then the Spanish IGDS9-SF. The materials were administered in this manner because to provide a break between answering questions that had some similarity in phrasing. Once participants completed all of the study materials, a debriefing statement was provided.

***Ethics***

Approval from the second author's institutional review board (IRB) was requested and obtained prior to recruiting participants or the study. The study procedures were carried out in accordance with the Declaration of Helsinki. All participants were informed about the study, and all provided informed consent.

***Data Analysis***

Values of the SP-VGFA-R within each function are summed for their total score. If the total highest score is equal to another function (e.g., attention and tangible), the highest motivating function is then maintained by automatic reinforcement, because of the two functions interplaying with each other. This is common practice for functional assessment (35). However, for the current dataset, no participants had equal maintaining functions.

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 27. There were three analyses used for the study, comprising a principal components analysis (PCA), a correlational analysis, and a multinomial logistic regression analysis. A PCA was used to compute scores for the factors underlying the VGFA-R. The four-factor solution was preferred because of prior theoretical support (36), and internal consistency for the entire scale was examined using Cronbach's alpha and resulted in good overall consistency, α = .938. Each subscale had the following Cronbach's alpha scores: Social Attention (α = .874), Escape/avoidance (α = .875), Tangible/intangible (α = .827), and Sensory stimulation (α = .747). The comparison between a new scale and an established scale is a method to evaluate concurrent validity. This is accomplished by examining the correlation coefficient between the items of the two scales (37). The correlational analysis was performed to examine the relationship between the Spanish version of the VGFA-R and the IGDT-SF and to determine concurrent validity.

A multinomial logistic regression analysis was performed to determine how scores on the IGDS9-SF (i.e., risk of Internet Gaming Disorder) predicted each function of the VGFA-R (social attention, tangible/intangible rewards, escape/avoidance of demands or pain, sensory stimulation). This analysis was used because the four levels of the VGFA-R (outcome variable) have no

magnitude as found in ordinal, interval, and ratio scales of measurement (38), and there are more than two levels found in traditional binomial logistic regressions. All assumptions were met prior to running the analysis. Multicollinearity did not appear to be an issue given that all significant correlational coefficients (< .07) were below the typical cutoff value of (≥) .80 (39). Participant data were removed and placed into the two or more functions category if they had more than one function that maintained a behavior, as defined by a functioning being within 3 points (≤) of the highest scored function.

**Results**

Descriptive information is shown in Table 1. A frequency distribution analysis showed that 14.6% played videogames for 24 hours or more per week, and 10.6% played videogames for 18 to 23 hours per week and preferred gaming consoles (29.5%) or mobile game devices (16.6%). Concurrent validity of the Spanish Version of the VGFA-R was established by examining the correlation coefficients to the Spanish version of the IGDS9-SF (total score). As presented in Table 2, the correlation analysis showed significant, positive correlations between the two scales (bivariate coefficients ranging from .411 - .610).

ENTER TABLE 2 HERE

***Spanish VGFA-R Construct Validity***

A four-factor confirmatory analysis was utilized to examine the factorability of 24 items of the VGFA-R. The data were screened for univariate outliers, and the minimum amount of data for factor analysis was satisfied. Initially, factorability of the 24-item VGFA-R was examined using several well-recognized criteria. All 24 items correlated at a minimum of .30 with at least one other item. Kaiser-Meyer-Olkin measure of sampling adequacy was .920, above the recommended value of .60 (40). Bartlett's test of sphericity was significant ($\chi^2 = (276) = 4497.617$, $p < .001$). Diagonals of the anti-image correlation matrix exceeded .3, supporting inclusion of each item in the factor analysis (41). Communalities ranged between .435 and .764, confirming all other items shared some common variance. Therefore, factor analysis was conducted with all 24 items. Principal components analysis with promax rotation was utilized because the primary purpose was to identify and compute scores for the correlated factors underlying the VGFA-R. The first factor explained 37.84% of the variance, the second factor explained 7.92% of the variance, the third factor explained 7.06% of the variance, and the fourth factor explained 5.26% of the variance. A promax rotation provided the best-defined factor structure. The summary of the confirmatory factor analysis is presented in Table 3.

ENTER TABLE 3 HERE

***Comparison of Spanish IGDS9-SF and Spanish VGFA-R***

A multinomial logistic regression analysis was performed to determine how scores on the IGDS9-SF predicted each function of the VGFA-R (social attention, tangible/intangible rewards, escape/avoidance of demands or pain, sensory stimulation). The social attention function served as the comparison group and findings showed that the IGDS9-SF score increased as the escape/avoidance of demands or pain function increased ($\beta = .112$, $\chi^2_{(1)} = 13.08$, $p < .0001$), and two or more functions scores increased ($\beta = .057$, $\chi^2_{(1)} = 5.029$, $p = .025$). Results also showed that age was a significant predictor of escape/avoidance of demands or pain function ($\beta = .079$, $\chi^2_{(1)} =$

7.71, $p = .006$), tangible/intangible rewards ($\beta = .073$, $\chi^2_{(1)} = 9.16$, $p = .002$), sensory stimulation ($\beta = .129$, $\chi^2_{(1)} = 15.832$, $p < .001$), and two or more functions ($\beta = .057$, $\chi^2_{(1)} = 6.201$, $p = .013$).

## Discussion

The goal of the present study was to establish construct validity of the Spanish version of the VGFA-R, and to establish concurrent validity by examining the correlational coefficients with the Spanish IGDS9-SF. Prior research has shown high reliability and validity of the VGFA-R (23), and this translated well within the Spanish population used in the present study. The scale showed positive correlations (bivariate coefficients ranging from .411 to .610). The initial English validation of the VGFA-R showed that the sensory stimulation function did not load well among participants. However, the Spanish version showed that four distinct functions were identified from the confirmatory factor analysis, including (i) social attention, (ii) tangible/intangible rewards, (iii) escape/avoidance of demands or pain, and (iv) sensory stimulation.

Findings also showed that IGDS9-SF scores increased as the escape/avoidance of demands or pain function increased and two or more function scores increased when social attention was used as the comparison group, reinforcing the findings of previous research (29). Prior research has shown that some gamers spend a significant investment in terms of time and energy towards gaming because it allows the opportunity to escape their real-life problems (42, 43). Additionally, much of the research has focused on the occurrence of different gamer profiles (44), or the development of diagnostic materials to identify the relationships between IGD and other psychopathologies (45, 46).

Tullet-Prado et al. (44) indicated that identifying gamer profiles would be of "high clinical value" because latent class analyses showed four IGD classes comprising (i) IGD aversive, (ii) normative, (iii) moderate IGD risk, and (iv) high IGD risk, and recommended that social engagement and participation should be particularly targeted by IGD immunization and treatment protocols. However, identifying gamer profiles is not sufficient in conducting functional assessments. Moreover, as indicated in the Results section, the tangible/intangible rewards and sensory stimulation functions had no difference compared to social attention when examining how IGD predicted these functions. This indicates that the identification of severity alone may not be adequate in identifying the function that maintains the behavior, or enough information to develop treatment interventions.

Given the empirical support demonstrating the SP-VGFA-R is an appropriate tool to assess behavioral functions that reinforce video gaming, clinicians internationally can use this functional assessment to treat IGD among the Spanish populations. Furthermore, Spanish-speaking researchers can now use the IGDS9-SF to identify the severity of IGD and the VGFA-R to further develop behavioral interventions to target the function that maintains the gaming behavior. More specifically, for gamers that show IGD severity levels that are consistent with problematic gaming, the functional behavioral assessment instrument will help determine the antecedents that follow a type of behavior and the consequences related to maintaining the behavior (47, 48). However, cultural influences must also be considered when identifying if the severity level of IGD is considered an issue.

### *Cultural effects and behavioral decision making*

Previous research has shown that there are cultural influences on judgment and decision-making (49), and this might deem what is socially acceptable in terms of videogame playing. For example, in some cultures, what constitutes excessive gaming may be viewed differently, and even if the IGDS9-SF identifies severe IGD, this might not be an issue culturally, as problematic

dimensions are seemed to be shaped by culture-specific expressions. For example, in some cultures, what constitutes excessive gaming may be viewed differently, and even if the IGDS9-SF identifies more severe IGD, this might not be an issue culturally, as problematic dimensions appear to be shaped by culture-specific expressions (Chinese and North American definitions and cultures for addictions are shaped by strong achievement motivation and experience of loneliness, whereas European cultures are less so) [45]. The relationship between values and decision-making styles are higher and numerous in younger adolescents (50). Furthermore, studies have shown slight cultural differences when examining British versus Spanish gamers (19). This was slightly lower than what was reported in Lopez-Fernandez et al. (19), which showed that 7.7% of gamers in Spain could be classified as pathological players. Irrespective of the exact prevalence of IGD, having a complimentary functional assessment can result in the development in effective treatment interventions to alleviate IGD. Additionally, functional assessments should be developed in several languages and validated among different cultural populations. This will assist clinicians and treatment providers in identifying the correct function, and then interventions can be developed that target each function. However, the invariance of English to Spanish or inclusion of other cultures should be taken into account, as this may limit the findings of the present study.

***Limitations and future research***

The present study is not without its limitations. One limitation is that both psychometric instruments used involved self-report responses (indirect assessment), rather than using direct behavioral assessment. There are limitations to both direct and indirect assessments (e.g., interfering in the natural environment versus participants incorrectly marking their responses or exaggerating or underestimating their responses to each item), and the sample utilized was not representative of all Spanish gamers given its cross-sectional design, its use of university students as the target population, and the method of data collection (i.e., convenience sampling). Future research should consider more representative methodologies to enhance true sampling across different international Spanish populations, although this would be difficult and costly in terms of both time and money. Future research should utilize both the Spanish IGDS9-SF and Spanish VGFA-R to gather information concerning the antecedent stimuli and consequences that are functional to the problem behavior (23, 51). Conducting videogame playing functional assessments will help clinicians identify why the problem behavior occurs, and further understanding of this concept will allow for the development of evidence-based treatments and interventions. Furthermore, validating the VGFA-R into other cultural populations would allow clinicians to conduct functional assessments and can be used with the IGDS9-SF to identify gamers with severe IGD. Finally, future studies should use an approach to where the IGD scales and the VGFA-R are administered in different orders for participants within the same study. Having one scale administered prior to the other one may influence or prime the participant in their responses to the other scale.

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Table 1. Demographic Information of Gamers ($N$=304)

| | N | *% of population* |
|---|---|---|
| Platform(s) used | | |
| Computer games | 195 | 53.0 |
| Gaming consoles | 105 | 28.5 |
| Mobile games | 61 | 16.6 |
| Tablet/iPad | 5 | 1.4 |
| Hours played/week | | |
| 0–5 | 58 | 15.8 |
| 6–11 | 101 | 27.4 |
| 12–17 | 102 | 27.7 |
| 18–23 | 42 | 11.4 |
| 24+ | 65 | 17.7 |

Table 2. Principal Component Analysis of the Total Variance of the Spanish Version of the Video Game Functional Assessment—Revised

*Total variance explained*

| | *Extraction sums of squared loadings* | | | *Rotation sums of squared loadings*[a] |
|---|---|---|---|---|
| *Component* | *Total* | *% of variance* | *Cumulative %* | *Total* |
| 1 | 9.083 | 37.844 | 37.844 | 6.592 |
| 2 | 1.902 | 7.925 | 45.769 | 6.481 |
| 3 | 1.694 | 7.058 | 52.828 | 6.520 |
| 4 | 1.262 | 5.258 | 58.086 | 5.180 |

Extraction method: principal component analysis.

[a]When components are correlated, sums of squared loadings cannot be added to obtain total variance.

Table 3. Correlation Matrix of Spanish Video Game Functional Assessment—Revised and Spanish Internet Gaming Disorder Scale-Short Form

| | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|
| SP-VGFA-R attention (1) | — | — | — | — | — |
| SP-VGFA-R escape (2) | 0.534[a] | — | — | — | — |
| SP-VGFA-R tangible (3) | 0.558[a] | 0.575[a] | — | — | — |
| SP-VGFA-R sensory (4) | 0.587[a] | 0.577[a] | 0.610[a] | — | — |
| Total Spanish IGDS9-SF (5) | 0.411[a] | 0.635[a] | 0.467[a] | 0.474[a] | — |

[a]Coefficients are significant at <0.001.

IGDS9-SF, nine-item Internet Gaming Disorder Scale-Short-Form; SP-VGFA-R, Spanish video game functional assessment—revised.