



Introduction

Recently the American Psychiatric Association (APA) has introduced **Internet Gaming Disorder** in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V, 2013) in the Conditions for Further Study.

- ✓The disorder is going to be classified as a **non-substance addictive behavior**.
- ✓Nine criteria were proposed to assess internet gaming disorder.
- ✓For a diagnosis 5 or more criteria must be present in a 12-month period.

Aim

Since video-games are the most popular and over-used leisure activities among adolescents, we aimed to develop a brief scale to assess pathological video-gaming among adolescents (**Video-gaming Behavior Scale for Adolescents, VBSA**) referring to the DSM-V and applying Item Response Theory (IRT).

Method

Participants

1681 adolescents attending junior high school and high school (57% males, mean age= 15.6 years, *SD* =1.8).

Scale development

A set of 45 items (5 for each DSM-V criterion) was developed. In a pilot study, items were evaluated at both qualitative and quantitative levels. As a result, some items were removed and other items were adapted obtaining a set of 34 items (Table 1).

Table 1. *Synthesis of the steps in the development of the Video-gaming Behavior Scale for Adolescents (VBSA).*

DSM-V Criteria	Initial Step: 45 items	Second step: 34 items	Final Step: 9 items
Pre-occupation	5	4	1
Withdrawal	5	4	1
Tolerance	5	4	1
Inability to control	5	3	1
Loss of interest for other activities	5	4	1
Continue despite problems	5	4	1
Lying	5	4	1
Escape	5	4	1
Risk/lose relationships/opportunities	5	3	1

We investigated the unidimensionality of the 34-item version evaluating the presence of local dependence (LD). None of the LD statistics were greater than 10, attesting the unidimensionality of the scale.

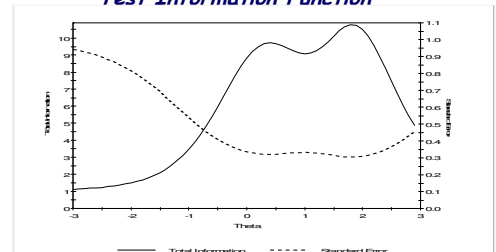
IRT Item selection and calibration (IRTPRO software)

We tested the fit of the unidimensional two parameter model (a = discrimination, b = severity). We selected 9 item with both adequate discrimination and severity parameters and high representativeness of each criterion (Table 1). Then, we performed a new calibration with the chosen 9 items (Table 2).

Table 2. *Item discrimination (a) and category threshold (b) estimates with standard errors.*

Item	DSM-V Criteria	a	b ₁	b ₂
1	Pre-occupation	2.24 (0.12)	0.23 (0.04)	1.89 (0.08)
2	Withdrawal	1.97 (0.11)	0.02 (0.04)	1.78 (0.07)
3	Tolerance	2.71 (0.16)	0.32 (0.04)	1.89 (0.07)
4	Inability to control	2.53 (0.16)	0.72 (0.04)	2.07 (0.08)
5	Loss of interest for other activities	2.32 (0.13)	-0.11 (0.04)	1.74 (0.08)
6	Continue despite problems	1.66 (0.16)	0.04 (0.04)	1.74 (0.07)
7	Lying	1.50 (0.09)	0.48 (0.05)	2.12 (0.10)
8	Escape	1.13 (0.07)	-0.67 (0.06)	1.51 (0.09)
9	Risk/lose relationships/opportunities	1.72 (0.13)	1.59 (0.08)	2.97 (0.18)

Test Information Function



The 9-item VBSA scale accurately measures from low to high severity levels of gaming disorder.

Validity

Table 3. *Validity measures*

	GAS	Gaming Versatility	Time spent in gaming
VBSA	.75**	.39**	.40**

** $p < .001$

Correlations of the Video-Gaming Behavior Scale for adolescents (VBSA) score with the Game Addiction Scale (GAS, Lemmens et al., 2009) and other gaming related constructs were high and in expected direction.

Discussion & Conclusion

The VBSA is an efficient tool to assess the DSM-V gaming disorder criteria in adolescents.