RESEARCH ARTICLE

VALIDATION OF THE GAMING ADDICTION SCALE (GAS) ON NIGERIAN ADOLESCENTS

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ABSTRACT

A cross-sectional survey design utilizing an ex-post factor design was adopted to validate the Gaming Addiction Scale (GAS) using Nigerian secondary school adolescents. A purposive sampling technique was used to select the 338 (*mean a*ge and SD13.60 ±1.867) participants made up of 149 males and 189 females from several randomly selected secondary schools in a Local Government Area of Edo State, Nigeria. Participants responded to Gaming Addiction Scale (GAS) and Internet Gaming Disorder Test(IGD-20).Observed internal consistency of GAS showed a Cronbach's alpha coefficient of .75, a Spearman-Brown coefficient of .71 and Guttman Split-Half coefficient of .71. All but one of the items in the scale reported acceptable goodness-of-fit measures revealing corrected item-total correlations range of .192 to .523.Significant positive correlation was also observed between GAS and IGD-20 revealing concurrent validity score of (r = .459, *P*= .000).Determined new norms for GAS were scores51.81 for male and 47.98for female. GAS is gender sensitive and has acceptable psychometric properties for Nigerian population.

INTRODUCTION

Gaming addiction is still one of the most researched social psychological concepts associated with playing computer and videogames (Lemmens, Valkenburg and Peter, 2009). APA's DSM-5 has not recognized gaming addiction as a disorder, but the World Health Organization added "gaming disorder" to the 2018 version of its medical reference book. Lemmen *et al*., (2009) report that although the term addiction is not used by clinical psychologists, game addiction is the most prevalent term among researchers to describe excessive, obsessive, compulsive, and generally problematic use of videogames. Griffiths (2005) concluded that computer and videogame overuse can lead to a behavioral addiction. Savolainen, Kaakinen, Sirola and Oksanen (2018)report that addictive behaviors of the youth are a particular cause for significant negative outcomes, as they may develop into long lasting habits and have detrimental effects on individuals' physical health (Balogh, Mayes and Potenza, 2013), social relationships (Yao and Zhong, 2014) and financial status (Canale, Griffiths, Vieno, Siciliano and Molinaro, 2016). Addictive behavior according to Mendelson and Mello (1986) refers to behavior that is excessive, compulsive, uncontrollable and psychologically or physically destructive. In accordance with Mendelson and Mello's (1986) behavioral definition, Lemmen *et al*. (2009) defined gameaddiction as excessive and compulsive use of computer or videogames that results in social and/or emotional problems; despite these problems, the gamer is unable to control this excessive use.

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In order to aid research in the area of gaming addiction a measurement for the concept was developed. Inspired by earlier theories and research on game addiction, Lemmens *et al*. (2009) went on to develop and validate a scale to measure computer and videogame addiction. They created 21 items to measure seven underlying criteria (i.e., salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems) (Lemmens *et al*., 2009). The dimensional structure of the scale was investigated in two independent samples of adolescent gamers (N D 352 and N D 369) and in both samples, a second-order factor model described their data best(Lemmens *et al*., 2009). The 21-item scale, as well as a shortened 7-item version, showed high reliabilities with both versions showing good concurrent validity across samples, as indicated by the consistent correlations with usage, loneliness, life satisfaction, social competence and aggression (Lemmens *et al*., 2009). The 21-item game addiction scale had a Cronbach's alpha of .94 in the first sample (M = 1.59, SD = .62) and .92 in the second sample (M = 1.64, SD = .57) (Lemmens *et al*., 2009).The 7-item game addiction scale had a Cronbach's alpha of .86 in the first sample (M = 1.52, SD = .64) and .81 in the second sample (M = 1.54, SD D .61).To examine the concurrent validity, Lemmen *et al.* correlated respondents' mean scores on both versions of the game addiction scale with time spent on games, loneliness, life satisfaction, aggression, and social competence. Both the 21-item and the 7-itemversions of the scale showed strong correlations with time spent on games, and significant moderate correlations with the psychosocial variables in the expected directions; the correlations were highly comparable across both samples (Lemmens *et al*., 2009). In addition, the correlations of the 7-item version did not significantly differ from those of the 21-item version, indicating that the 7- item

version of the game addiction scale was just as valid as the longer version (Lemmens *et al.*, 2009). Their data indicated that the percentage of addicted adolescent Dutch gamers is approximately 2%, but it could be as high as 9%, depending on the method of determining when someone is addicted (Lemmens *et al.*, 2009). The aim of this study is to revalidate the gaming addiction scale using a Nigerian sample. Gaming has been on the rise over the last couple of decades in Nigeria, involving a lot of youth negatively. Internet gaming addiction in Nigeria has been the focus of several studies (Adiele and Olatokun, 2014; Ofole and Babatunde, 2015; Onyemaka, Igbokwe, Adekeye, and Agbu (2017) to mention a few. The growing interest is apparent. For instance Onyema *et al.* (2017) concluded that videogame addiction has a significant effect on the academic performance of male undergraduate students in Nigeria.Local authorities are including gaming as a source of revenue generated internally; the sustenance of which depends on the chances that the players get and remain addicted. Measuring gaming addiction in Nigeria should be carried out using an instrument that has been validated in Nigeria with published psychometric properties.

The current instrument does not have a norm or norms for the results of measuring and assessment. An objective of this study is to generate norms for both genders representing adolescence. The current instrument was validated in 2009 using a Dutch sample of adolescents. After 11 years, a lot has changed about the general experience of the adolescent. The interesting spike in gaming activity in Nigeria climaxed over the last decade. Validation of an instrument that expresses the experience of the adolescent at this time is necessary. The reliabilities and validities derived from the study carried out then would no doubt be unreliable in measuring the adolescent gaming experience in the current age and in a very diverse cultural environment. The results of this study will contribute significantly to improve the scale for a Nigerian sample. There is no known indigenous gaming addiction scale developed by Nigeria researchers, hence the need to validate an existing scale with a local population sample. The socio-cultural diversity gap between 2009 Dutch adolescents and 2020 Nigerian adolescents is quite wide. There is a need to validate this measurement in Nigeria, in order to achieve socio-cultural fairness.

Objective

The aim of this study is to validate the addiction level of Gaming Addiction Scale developed by Lemmen*et al.* (2009) with a Nigerian adolescent sample in order to derive acceptable psychometric properties for the scale for Nigerian population.

METHODS

Population Sample and Sampling Techniques: A total of 338 participants which consisted 149 males (44.1%) and 189 females (55.9%) while age range of the students was 10-19 years, with mean ± standard deviation of 13.60 ±1.867 years. A minority (5.3%) of the students were 10 years old, while 0.3% was 19 years old. The 14 year olds (18.6%) were the highest population. The students were conveniently selected from several secondary schools in a local government area of Edo State, Nigeria.

The sex and age distribution are shown in Table 1

Table 1: Sex and age distribution of participants

Variable	Frequency (n=338)	Percentage
Sex		
Male	149	44.1
Female	189	55.9
Age		
10	18	5.3
11	31	9.2
12	52	15.4
13	58	17.2
14	63	18.6
15	59	17.5
16	40	11.8
17	15	4.4
18	1	0.3
19	1	0.3

Research Setting: The data was collected in the classrooms of the students during their break time, after regular classes were completed in the morning which made it convenient to secure the numbers and check fatigue.

Inclusion Criteria: In-school adolescents between the age range of 10-19 years of age who can read and write functionally.

Measurement: Two scales were used in this study.

The Game Addiction Scale (GAS): First is the Game Addiction Scale (Lemmens *et al.*, 2011) is a 21-item scale developed for adolescents was used to screen for internet game addiction. Each item of the GAS is preceded by a statement "during the last six months, how often…and is scored on a 5-point likert scale (1=never, 2=rarely, 3=sometimes, 4=often, 5=very often). Lemmens *et al*, suggested two scoring formats to assess the presence of game addiction: A monothetic format (all items scoring above 3) and a polythetic format (at least half of the items scoring 3 or above). The Polythetic format was used in this study. Previous psychometric properties reported high reliabilities with Cronbach alpha=0.82 to 0.87.

The Internet Gaming Disorder Test (IGD-20): The Game Addiction Scale was administered alongside the Internet Gaming Disorder Test(IGD-20) which is a 20 item scale examining gaming activities over a 12month period. All four items are rated on a 5-point Likert scale: 1= never to 5=very often. Answers given as 4 (often) or 5(very often) should be seen as an endorsement of that criterion (Pontes, Király, Demetrovics, and Griffiths, 2014). Both instruments (GAS and IGD-20) were administered to the secondary school students from several secondary schools randomlyselected from Oredo Local Government area in Benin City, Edo State.

Procedure/Data Collection: The researchers presented a research proposal, which included ethical approval to conduct the study, and obtained permission from the schools authorities to administer the scales to the students. The study and the right of the student to withdraw from the study at any time were explained to the students and informed consent was obtained. The researchers then administered the scales to the students. There was no time restriction.

Data Analysis: All data (socio-demographic and clinical characteristics) of the students were entered into SPSS version 25.

RESULTS

Statistical Analysis: Descriptive statistics including mean and standard deviation were used to determine the new norms for the instrument. To determine the internal consistency/reliability of GAS, Cronbach's standardized α, Spearman-Brown coefficient and Guttman Split-Half coefficient was calculated and obtained.

The result of this analysis shows that GAS is reliable for the Nigerian population. All items in the scale resulted in acceptable goodness-of-fit measures.

Measure of Validity of GAS: To measure the validity of GAS, concurrent validity technique was employed to show how well GAS compares to other well established related test. Using the Pearson's r, correlations between GAS and IGD-20were investigated.

Table 1: Correlation Coefficients Items of GAS

S/N	Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	Did you think about playing a game all day?	.428	.820
2	Did you spend much free time on games?	.484	.818
3	Have you felt addicted to a game?	.517	.815
4	Did you spend increasing amounts of time on games?	.437	.820
5	Did you play longer than intended?	.489	.817
6	Were you unable to stop once you started playing?	.343	.824
7	Did you play games to forget about real life?	.350	.824
8	Have you played games to release anger or stress?	.384	.822
9	Have you played games to feel better?	.417	.820
10	Have others unsuccessfully tried to reduce your game use?	.357	.823
11	Were you unable to reduce your game time?	.192	.831
12	Have you failed when trying to reduce game time.?	.432	.820
13	Have you felt bad when you were unable to play?	.519	.815
14	Have you become angry when unable to play?	.523	.815
15	Have you become stressed when unable to play?	.456	.819
16	Did you have fights with others (e.g. family, friends) over your time spent on games?	.399	.821
17	Have you neglected others (e.g. family, friends) because you were playing games?	.371	.823
18	Have you lied about time spent on games	.425	.820
19	Have you neglected other important activities (e.g. school, work, sports) to play games?	.298	.826
20	Has your time on games caused sleep deprivation?	.385	.822
21	Did you feel bad after playing for a long period.	.059	.836

Table 2. Pearson's correlation of GAS and IGD-20

	VARIABLE
	Internet Gaming Disorder Test(IGD-20)
Gaming Addiction Scale (GAS)	.829**

** Significant at p =.000

Table 3. Calculated New Norm for GAS Using Nigerian Samples

Variable	Gender	N	SSEIT Norm
GAS	Male	149	51.81
	Female	189	47.98
	Total	338	49.67

Using Pearson's Correlation Analysis, GAS was correlated with IGD-20 in order to determine the concurrent validity of GAS. The items total correlations were also obtained to test the relationship between each item and the composite/total item score. Concurrent validity was fair and significant (r=0.459,P<0.001), and reliability of the GAS was good (Cronbach alpha: 0.83).

Measure of Reliability of Gaming Addiction Scale: In other to determine the reliability and verify the internal consistency of the items on Nigerian population, Cronbach's alpha (or alpha coefficient), Spearman-Brown coefficient and Guttman Split-Half coefficient were used. As summarized in Table 1, the internal consistency, measured by Cronbach's coefficient was (α = .75), with a Spearman-Brown coefficient of .71 and Guttman Split-Half coefficient of .71. The corrected item total correlations ranged from .192 (P<.05) to .523 (P<.05). One of the items failed to have a significant item-total correlation coefficient. This item was deleted from the new version; hence this validated version for Nigerian population is a 20-item scale.

As summarized in Table 2, GAS correlated positively and significantly with IGD-20 (Rxy = .459, P<.001 = .000) Cronbach alpha = .829. This result shows that GAS is valid for Nigerian population.

Calculation of Norms of GAS: The cutoff value of the GAS for both male and female Nigerian adolescents is summarized in Table 3. By implication, any score below the cutoff is considered to be low Gaming Addiction. This cut off result shows a significant difference in the score of the male (≥ 51.81) when compared by that of the female participants (≥ 47.98).

The scale is gender sensitive; therefore it has different norms for male and female adolescents as indicated above. Males that score greater than 51.81 are game addicted. Females that score greater than 47.98 are game addicted. The general norm for adolescents in Nigeria is 49.67 and so adolescents who score greater than this norm are game addicted.

DISCUSSION

The focus of this study is to obtain a psychometric property for the Gaming Addiction Scale (GAS) for the Nigerian adolescent population. The GAS in the Nigerian version reported a high Cronbach alpha similar to that which was obtained by the developer (Lemmen *et al*., 1998). The implication of this finding shows a good inter-relatedness of the items of the GAS, uni-dimensionality and homogeneity of the construct (Cortina, 1993; Bland and Altman 1997) among the Nigerian population. The alpha scores are also not too high as the alpha values did not exceed the maximum value of 0.90 (Streiner 2003; DeVellis 2003).The high alpha score in our study shows that GAS has a strong reliability value. One of the items was however eliminated as it failed to have a significant item-total correlation coefficient. Finally, the obtained norm scores for the Nigerian sample is a novel addition to the scale as the developer and previous users of GAS did not indicate a norm for the scale. The norm derived from this study is suggestive of the fact that GASis gender sensitive.

Conclusions and Recommendations

Based on the findings the 21-item of the GAS showed good internal reliability and a valid measure of Gaming Addiction.
With one item eliminated, the Nigerian validated Gaming Addiction Scale is now a 20-item scale. The scale is gender sensitive posing different cutoff scores for both male and female participants. Accordingly, it is concluded that GAS has acceptable psychometric properties for Nigerian population as it fits well to the Nigerian socio-cultural setting as a measure of Gaming Addiction. Further validation studies using a larger sample, as well as other geopolitical regions of Nigeria are recommended.

Ethical Consideration

This study carried out investigations that involved human elements hence ethics of research for human subjects were observed in compliance with the Helsinki Declaration. The research intention and proposed procedures was subjected to scrutiny by the Internal Research Ethic Committee (IREC) of Redeemer's University Nigeria. Respondents' informed consent was sought and obtained before the instruments were administered.

Conflict of Interest: The authors declare that there is no conflict of interest.

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