Foundation University Journal of Psychology
Vol 6, No.2 (July, 2022)

FUJP Open Access Journal

Research Article DOI 10.33897/fujp.v6i2.470

Construction and Validation of Internet Gaming Disorder Scale for Children and Adolescents

Shaista Zahid[1], Mohsin Atta[1], Najma Iqbal Malik[1]

1. University of Sargodha
For Correspondence: Najma Iqbal Malik. Email:najmamalik@gmail.com

Abstract

Objective. The present study was designed to construct a reliable and valid measure of internet gaming disorder for children and adolescents.

Method. The age of the sample, of 300 children and adolescents, ranged from 11-20 years (M = 1.50, SD = .50) Scale was based on an empirical keying approach. Two studies were designed to accomplish the objectives. In study 1, with the help of experts, literature, and feedback from the student the items for the internet gaming disorder scale were formed. The number of items was curtained to fourteen items out of fifty items after the EFA was performed. Principal axis factoring with varimax rotation was used to produce the factorial structure ofthe internet gaming disorder scale (IGDS).

Result. Three distinct factors emerged namely, Escape (8 items), giving up activities (3 items), and inability to reduce playing (3 items) respectively. Confirmatory factor analysis in Study-II showed the structural validity of all scales (for example the dimensional structure). Pilot research was performed to assess the overall psychometric properties of the IGDS and its factors. Reliability coefficients were found .70, .71, .70 for Escape, Giving Up Activities, and Inability Reduce Playing respectively, whereas overall reliability was .70. Convergent and discriminant validities were ensured through the correlation of IGDS and its subscale with loneliness, life satisfaction, procrastination, and Internet gaming disorder scale-short-form.

Keywords. *Internet gaming disorder scale, escape, giving up activities, inability to reduce playing.*

Introduction

The Internet gaming disorder (IGD) is also conceived as an online gaming disorder. It is described as consecutive and regular use of the internet to participate in games, often causing other gamers to have clinically relevant disabilities or distress (DSM-5, 2013). Over the last decade, experts have become increasingly worried about gaming addiction worldwide. In this modern era, it has become the need of the time that this issue should be accepted as an independent disorder in the clinical field, as suggested by the American Psychiatric Association (2000). For gaming addiction treatment, unification and consensus is the need of time. The clinical diagnosis of IGD, according to the APA, requires a behavioural pattern that involves constant and repeated gaming using the internet to participate in games, which may lead to severe distressor impairment. It is shown by five or more symptoms out of the main criterion which should be found, within 12 months. More specifically, the nine proposed IGD criteria include: 1) internet games concern; 2) signs of withdrawal due to the removal of internet-based gaming; 3) tolerance is developed, which results in spendingmore time in playing internet-based games 4) repeated, unsuccessful efforts to control the desire;5) lacking interest in past favourite activities; 6) continuous extreme use of internet-based games despite knowledge about its problems; 7) deceptive attitude regarding the amount of time spent on internet gaming; 8) playing games to regulate negative moods; and 9) due to severe involvement in internet-based games losing a relationship, job, or career (Rehbein et al., 2015).

Consequences of IGD

A considerable concern that the excessive and pathological use of computers and video games will adversely affect the psychosocial well-being of players.This concern is focused on the premise that excessive (internet) gaming displaces behaviours that help sustain and strengthen healthy relationships. (for example, Colwell & Kato, 2003; Kraut et al., 1998). In addition, violent video games can decrease empathetic feelings (Gao, Pan, Li, Weng, Yao, & Chen, 2017). It also can encourage the growth of aggressive problem-solving abilities (Anderson & Bushman, 2001). Minimizing empathy and problem-solving skills for aggression may prevent healthy friendships or romantic relationships from being sustained. Thus, reducing the psychosocial well-being of players (Colwell & Payne, 2000) While theoretically possible, the idea that pathological gaming reduces the psychosocial well-being of players has no empirical support.

Prevalence

It is noted in the current literature that quite a pertinent literature has investigated the epidemiology and basis of IGD across different populations, ranging from 8 years-old children to (Han, et al., 2009) older adults aged 40 years and above (Festl, Scharkow, & Quandt, 2013). For example, research has shown that IGD prevalence in younger age groups (16-21 years) is higher than in older age groups (34-40 years) (Mentzoni al., 2011).

IGD as Behavioral Addiction

The neuropsychological function of IGD has been analyzed by many neurobiological and neuro-cognitive research studies (Dong et al., 2011; Zahra, Kiani, & Shahbaz, 2019). While certain clinical reports and suggested criteria of IGD diagnosis share similarities with that of substance addiction (Ko et al., 2012; Zahra, Kiani, & Shahbaz, 2019;), so far no research study has reached a decisive conclusion that IGD and substance use disorder have a commonality of functional mechanism to a certain degree. As substantial research has been carried out to address the neurobiological function of substance use disorder for the last ten years (Volkow et al., 2010), analysis of IGD's neurobiological functional mechanisms may uncover their similarity to those of substance use disorder (Montag et al., 2015). The interconnection of the addictive behaviour cycle is such that the joyful activities are trailed after by intoxication (increased dopamine). An increase in the dopamine level leads to addictive behaviour (Young & Abreu, 2010).

Psychosocial Well-Being as an Epidemiology

The impact of well-being on pathological gaming indicates that socially inept, low self-esteem, alienated and/or generally unhappy adolescents with their lives are more likely to experience symptoms of pathological gaming behaviour. People with low self-esteem or unsatisfactory personal relationships will usually use video gaming to escape from reality, find fellowship, or gain a sense of accomplishment that they cannot gain in a real life. (e.g., Leung, 2004; Williams et al., 2008). In this regard, multiplayer online games are considered to be especially appropriate as a replacement for social interaction in real life since they allow large-scale social interaction within the Internet's anonymity (Morahan-Martin & Schumacher, 2000; Peters & Malesky, 2008).

Time Spent on Internet Gaming and Academic Achievement

Several studies have shown that addicted adolescents, with particular regard to the relationship between addictive tendencies and school outcomes, have lower school grades than their non-addicted peers (Hauge & Gentile, 2003) Previous study findings have mixed the relationship between the amount of time spent playing video games and academic success. Some studies of the video gaming effect have shown that the amount of time spent playing video games is inversely related to scholastic achievement (Charlton, 2002; Van-Schie & Wiegma, 1997). No substantial correlation between video gameplay and academic success has been identified in other research (Sharif & Sargent, 2007).

Correlates of IGD

The correlates of IGD given below are used for the validity of the scale.

Satisfaction With Life

Life satisfaction with life applies to a general cognitive evaluation of the subjective well-being of a person (Diener et al., 1985). Studies have found that game addiction is connected to less satisfaction with everyday life (Ko et al., 2012; Lemmens et al., 2011; Shapira et al., 2003). It also seems that compulsive use of online games stems from the motivation to mitigate real-life dissatisfaction (Chiou & Wan, 2006). Such research indicates that we should anticipate a negative relationship between IGD and satisfaction with life.

Loneliness

Loneliness has been characterized as an uncomfortable experience that results from major deficiencies in an individual's social relationship network (Peplau, 1982). The association between loneliness and addiction to online games has been repeatedly verified by cross-sectional research (Qin et al., 2007). Loneliness is both a cause and a consequence of online pathological gaming, suggesting a mutual relationship (Kim et al., 2009; Lemmens et al., 2011). Such studies indicate that pathological gaming does nothing to facilitate the creation or Real-life contact maintenance while playing online games can briefly provide an escape from the negative feelings related to social deficiencies. The resulting displacement of social contact in the real world is likely to lead to the deterioration of established relationships, thereby growing isolation. A positive relation between IGD and loneliness is expected irrespective of the causal order between these constructs. In any formative phase of human life, the feeling of isolation can be discovered, and it may have more effects on puberty and young adulthood than every other age group.

Procrastination and IGD

Procrastination was found to be correlated positively with task aversion, delay sensitivity, low self-efficacy, and self-regulation failure (Bui, 2007; Hajloo, 2014; Steel, 2007). A delay in critical work and inability to self-regulate to maintain performance can result in characteristic procrastination. Procrastination appears to be one of the most negative effects of internet addiction (Sirois, 2014). Literature shows that the internet appears to be a huge distracting factor for students, shifting their focus away from studies to trivial activities.

The purpose of the study is to construct and validate a new scale of internet gaming disorder for adolescents and children in the Pakistani population. The present scale on internet gaming disorder would be in Urdu language and used for both children and adolescents for both clinical and non-clinical populations. This is an emerging pathological behaviour in Pakistan. The interest in this behaviour even rose with the suicides of two Pakistani youngsters who committed suicide when they were forbidden to play or when they missed the mission (Khan, 2020).

The previous scale on IGD develops in those cultures which are different from Pakistani culture, so this scale measures the gaming behavior for the Pakistani population and beyond. The purpose is to develop a criterion-based scale on the population of adolescents and children is therefore based on the notion that previously develop scales were constructed for the concerned population instead it can be applied in vast cultures previously no such tool was constructed for the concerned population.. The aggression due to online gaming addiction pave way for the development of the IGDQ scale.

Method

The present study tends to develop an indigenous scale that measures the symptoms of internet gaming disorder in children and adolescents. An empirical keying approach was used for the test construction. Exploratory factor analysis (EFA) was used to determine the factor structure of the newly developed scale. The process of scale development was completed in two studies. Study-I involved the instrument purpose and construction method whereas psychometric properties of the scale through confirmatory factor analysis would be completed in Study II. Furr (2011) also described it as a process completed in five steps: (1) Describe the construct measured and the Context, (2) Select response format, (3) Assemble the initial item pool, (4) Select and revise items and (5) Evaluate the psychometric properties (see relevant section). A brief description of the two studies is given below:

Study 1: Instrument Purpose and Construct Measured. ***1. Describe the Construct Measured and The Context.*** The construct was identified with the help of experts from the psychology, education, and sociology department to know the experience and identify the psychological, economical, educational, and social aspects due to excessive gaming. Two focus group discussions were conducted. The first one included adolescents to know the experience and symptoms faced by the individuals who involve in excessive online gaming. A second focus group discussion was conducted that included a psychologist, educationist, sociologist and two parents of those adolescents and children who involve in excessive online gaming to know the psychological, social educational and physical changes that occurin an individual due to excessive online gaming.

2. Response Scale Format. The response format is based on five-point Likert scale ranging from (not at all =0, rarely=1, to some extent =2, very =3, very much=4).Five to nine points are suited for most occasions and in any case (Streiner et al., 2015; Krosnick & Presser, 2010) and are the most frequently used (Furr, 2011).

After that, the collected data was given to the experts consisting of clinical psychologists, assistant professors, and lecturers of the department of psychology through the help of that gathered data comprised of opinion was utilized in the development of construct. After that scale was constructed and experts thoroughly viewed the scale and finished the construct.

3. Item Pool Generation. The data collected from the experts and adolescents was not only comprised of their opinion and experiences they also took consideration of the collected data by experts and utilized it when they were developing the construct the generated items were then viewed by the assistant professors and then finalized fifty items based on the IGD symptoms.

The process of generating items was the technical step on which the whole construct was based. So, the statements that were generated were reviewed again and again to ensure that the behaviour properly addressed the symptoms of online gaming disorder mentioned in the given criteria of DSM 5. Some expert's opinion was taken after item generation when those statements were accepted by the expert then the items were taken to the third step.

4. Select and Revise Items. This step involves the procedure of item formulation which included previous scales, literature, theories and its description in the DSM 5 criteria. Previous scales on IGD help in the development of new scales. That scale helped in item formulation. Therefore, the DSM criteria, research and literature were described by the adolescents, parents and expert psychologists who were concerned with the domain of IGD and evaluating it. So, the items were revised and then select with the help of previous scales used.

5. Empirical Item Evaluation. In this step screening of items was performed to view the verbatim are according to the symptoms of the disorder in the true sense. Item was avoided with double meaning and ambiguity and developed in indigenous language as constructed for the Pakistani population.

Sample

The sample of study I comprised of adolescents and children therefore the sample was selected purposively so it could be representative of the population (N = 300). The sample was based on students including girls (n = 100) and boys (n = 200) based on convenient sampling. The inclusion criterion for the study was adolescents and children who play online games and they were students. Permission was taken from the heads of school colleges and university heads from the city of Sargodha Punjab province. Thereafter questionnaire was distributed to collect the data. The sample size consists of 300 adolescents and children including boys and girls. For the present study, a purposive sampling technique was used to approach adolescents and children.

Instruments

The instruments that are given below were used in the present study.

Satisfaction With Life Scale. To measure the life satisfaction of participants "satisfaction with life scale" by Diener et al. (1985) was used. The scale is a psychometrically sound measure of LS as the Cronbach alpha is .87 and test-retest reliability is .82. the scale is to be responded to on a 7-point Likert scale where 0= strongly agree (SA) and 7= strongly disagree (SD). The scale includes five items where a high score indicates a high level of satisfaction with life and a low score indicates a low level of satisfaction. There is no reverse item on this scale. The translated version of this scale was used which was in the Urdu language.

Procrastination Scale. To measure procrastination in participants procrastination scale by Lay (1968) was used. The scale is a psychometrically sound measure of procrastination as the Cronbach alpha is .82. The scale is to be responded to on a five-point Likert scale where 1=extremely uncharacteristic (EU) and 5= extremely characteristic (EC). The scale includes 20 items where a high score indicates high procrastination and a low scoindicates low procrastination.
This scale has 10 reverse coded items.

UCLA Loneliness Scale. To measure loneliness in participants "The UCLA loneliness scale" by Russel et al (1978) was used. The scale is a psychometrically sound measure of loneliness as the Cronbach alpha is .96 and test-retest reliability is .94.

The scale is to be responded on a four-point Likert scale where 1 = never and 4 = often. This scale used 20 items where a high score indicates a high level of loneliness and a low score on the scale indicates a low level of loneliness. This scale has no reverse item scores.

Internet Gaming Disorder Scale-short-Form (IGD-SF-9). To measure gaming disorder in participants "IGD-SF-9" by Pontes and Griffiths (2014) was used. The scale is a psychometrically sounded measure of gaming disorder as the Cronbach alpha is .87. the scale is to be responded on a five-point Likert scale where 0 = strongly agree and 4 = strongly disagree. This scale includes 9 items where a high score indicates a high level of gaming disorder and a low score indicates a low level of gaming disorder. This scale has no reverse coded items.

Procedure

A list of experts was made, and they were requested for a committee approach to finalize the items which were empirically based on the symptoms of IGD. They were further asked to correct or discard the irrelevant items from the construct.

The starting point was the permission that was taken from the supervisor for the collection of data from different schools and colleges in Sargodha Punjab province. An informal talk was held with the principal of colleges and universityheads to take permission. After taking the permission questionnaire was distributed among participants to collect the data. The questionnaire comprised of 4 different scales to assure convergent and divergent validity. Participants were approached in their school and colleges, a brief description of the study was given to them and about filling out the form and before all of these informed consents was taken out from them. The sample was consisting of 300 comprised of 150 children and 150 adolescents. The age of adolescents ranges from (12-to 18) and children (from 9-11) according to the psychosocial stages of development defined by (Erickson, 1968). Moreover, important demographic information was also taken from respondents through a form. The time required for the completion of a questionnaire was ten minutes. All the participants were assured that their information will be kept confidential. In the end, participants were thanked for their corporation and time.

For the item generation of the construct, two focus groups were conducted one from the adolescents (2 male and 2 female undergraduate students) and their parents (2 male and 1 female) and the second from experts and psychologists having knowledge of internet gaming disorder symptoms and their consequences. Second focus group was composed of 2 PhD assistan professors from sociology department (1 male & 1 female), four PhD from psychology department (2 male assiatant professor & 2 female associate professors) in University of Sargodha The generated themes (symptoms) that were proposed through interviews were also taken from the gamers so the intended phenomenon can be clearly defined the themes (symptoms) that were generated were mainly addressed by the gamers and experts were "inability to reduce playing despite problems" often participants reports that they do not have control on the urge to play the game despite having problems. On the other hand, "deceiving family members about the time of games being played by the" most of the students reported that they do lie about the time of gaming and deceive about their other tasks done. One of the themes (symptom) that was addressed by the participants was violence or aggressive behaviour that arises due to excessive gaming because they usually play games in which they have to play an aggressive role and character in gaming.

Study II Psychometric Properties of the Newly Constructed Instrument. Study II comprised two steps to ensure the psychometric properties of the scale. Step one consists of exploratory factor analysis (EFA). The response format is based on a five-point Likert scale that ranges from (not at all = 0, rarely = 1, to some extent = 2, very = 3, very much = 4). The demographics that were included to assess some credentials of adolescents were gender, age class family system, number of siblings, birth order, and institute fwhich here they study. The sample size for the EFA was 200 adolescents and boys and girls. The permission was taken from the headsschools and colleges. To fillof , the form informed consent was taken and ensured that the information will be kept confidential.

After the data collection, the factorial structure was extracted by using principal axis factoring analysis through varimax rotation. The total factors extracted were three in total, which included escape named factor I, second-factor named as giving up activities and the third factor was named as the inability to reduce playing game.

The initial eigenvalues displayed 20.40% variance was of the first factor, 13.88% variance was of the second factor and the third factor explained 11.48% variance. In step two confirmatory factor analysis (CFA) was done to ensure the reliability and validity of the questionnaire.The demographics that were included to assess some credentials of adolescents were gender, age class family system, number of siblings, birth order, and institute from whichthey study. The sample size for the CFA was 300 adolescents and boys and girls. (see Table 1). Again, the permission was taken from the heaschoolsschool and colleges of students. To fill, the form informed consent was taken and it was ensured that the information will be kept confidential.

To ensure the convergent and divergent validity of the scale different scales were used satisfaction with life scale, procrastination scale, UCLA loneliness scale, IGSF-9.

Reliability of Construct

The reliability of the scale ensures how consistent its vignettes are and although a scale is developed carefully and minutely there also requires that a scale should ensure its reliability. Reliability of a scale must be ensured whicelps further researchers to be carried out in future. To ensure the reliability of scale Cronbach alpha method is used to ensure its reliability.

Cronbach alpha reliability of the total scale was .70 and the reliability coefficients of subscales extracted from item analysis were .70 (escape), .70 (giving up activities), and .71 (inability to reduce playing).

Validity of Scales

The worth of a scale is seen when it proves to be worthy. If the scale is not proving reliable, it does not matter to that extent but if the scale is not proving its worth, no matter how much effort and care it is developed it is of no worth. Therefore, a scale basic element is to prove validity. Validity and reliability do not ensure that the test is valid or accurate, but validity is the most important thing and ensures the accuracy of the scale. In the procedure of the scale construction ensuring validity is the first step to enhancingand provingthe worth of the scale to be developed.

After the data collection for CFA, the factorial structure was extracted by using principal axis factoring analysis through varimax rotation to ensure the maximum dispersion of loadings within factors.

Moreover, varimax rotation in contrast to quartimax rotation attempts to load a smaller number of variables high on every factor thus clarifying the factors more simply and clearly interpretable (Field, 2013). Three factors namely *escape, giving up activities, and inability to reduce playing game* were extracted through EFA. The initial Eigenvalues displayed 20.40%, 13.88%, and 11.48% variances respectively for three factors. That also confirmed the factorial validity of the scale. The factor loadings werehigher than .40 and the model fit indicates as described above were ranging from acceptable to high.

Results

Table 1

Demographic Variable of the Sample of Main Study (*N* = 300)

Demographic variables	Male		Female		Total	
	f	(%)	*f*	(%)	*f*	(%)
Gender	200	66	100	33	200	
Age						
children	100	50	50	50	150	50
Adolescents	100	50	50	50	150	50
Class						
High school	100	50	100	100	200	66
College	100	50	0	0	100	33
Family system						
Nuclear	124	62	51	51	175	58
Joint	76	38	49	49	125	41
Gaming duration						
1 hour or above a day	54	27	41	41	95	31
2 hour or more a day	88	44	59	59	147	49
4 hour a week	31	15	0	0	31	10
7 hours in week	27	13	0	0	27	9
Gaming starting period						
1 year or below	4	2	27	27	31	10
Year or above	196		73	73	269	89
Institute		98				
Government	100		100	100	200	66
Private	100	50	0	0	100	33

Table 1 shows the frequency and percentage of all adolescents and children in the terms ofdemographic variables utilized in this present study.

Table 2

Exploratory Factor Analysis and Confirmatory Factor Analysis for Internet Gaming Disorder Scale

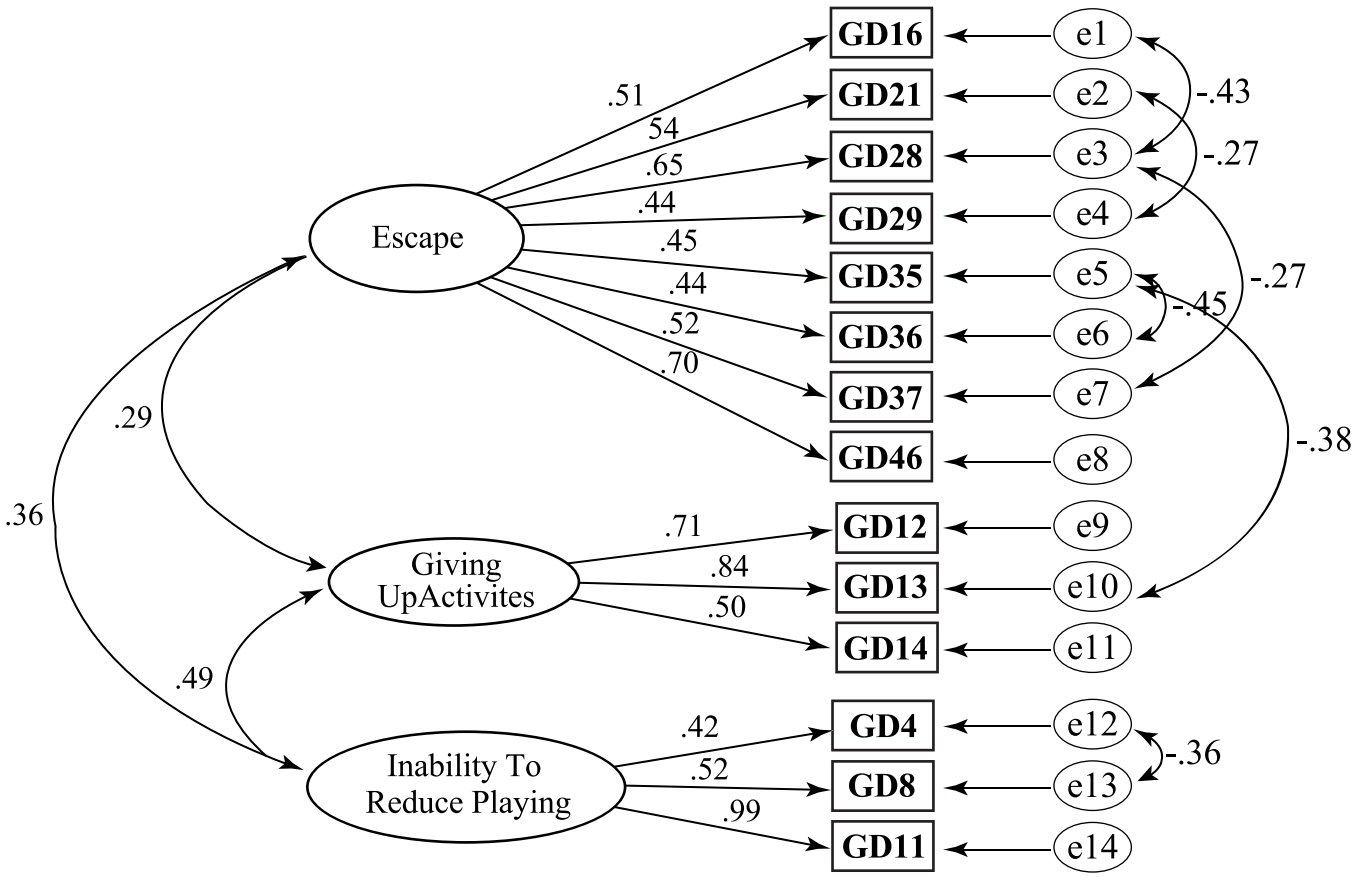
	EFA		CFA	
	Factor 1 (Escape=08)			
16	.40		.51	
21	.44		.54	
28	.47		.65	
29	.38		.44	
35	.55		.45	
36	.45		.44	
37	.42		.52	
46	.66		.70	
	Factor 2 Giving up other activities (Items=03)			
12	.63		.71	
13	.89		.84	
14	.51		.50	
	Factor3 Inability reduce playing (Items=03)			
04	.71		.42	
08	.68		.62	
11	.64		.99	
Cum variance %	20.40	34.29	45.77	100.46

To see the dimensionality of the internet gaming disorder scale exploratory factor analysis was done. The Kaiser measure Olkin measure of sampling adequacy was .610 which is above .6 which indicates its acceptability It also enhanced the appropriateness of factor analysis. Secondly,the significant Bartlett's test of Sphericity (χ^2 (78) = 1026.2, p = .000) confirmed that the correlation matrix significantly differed from an identity matrix the values of commonalities were above .3 which indicates that some common variance was shared by every other item, therefore, it can be concluded that 14 items should include in factor analysis.

Principal component analysis with varimax rotation was used as an extraction method to extract the factor structure of the internet gaming disorder scale. The initial Eigenvalues displayed 20.40% variance was of the first factor, 13.88% variance was of the second factor and the third factor explained 11.48% variance.

Figure 1

CFA of the Three Retained Factors



This Figure 1 portrays the confirmatory factor analysis of the internet gaming disorder scale for adolescents and children. Model fit indicates as described above are ranging from acceptable to high. Moreover, the fit indicates are acceptable to good i.e CMIN/df = 3.71, GFI = .88, AGFI = .85, NFI = .81, TLI = .80, CFI = .85, RMSEA = .09, PCLOSE = 00, SRMR = .072

Discussion

The present study was an empirical effort to construct a reliable and valid instrument to measure the internet gaming disorder scale for adolescents and children. Although much has been done to examine internet gaming disorder and its impact on adolescents to the psychological health. But little assessment had been made by the researchers and psychologists for the development of standardized instruments to measure internet gaming disorder in the Pakistani population and culture. It is broadly recognized that adolescence and childhood are among the most critical age periods of an individual where certain changes occur that exert a lifelong impact on personality. Having through a review of literature it was found that there are only a few measurements available to measure internet gaming disorder but none of the available instruments was measuring internet gaming disorder-specific for the Pakistani population as thereof adolescents toward internet games. Particularly in Pakistan, there was no such scale available that was developed within indigenous and cultural contexts. Another sole purpose of the current study was to find out whether a model with a smaller number of items can have a data definition that is comparable or even better.For the development of short-scale models, the maximum load item for each criterion was selected to create fourteen items.Keeping in view the worth of the variable concerned researcher planned the current study to develop an indigenous and culture effective tool in the Urdu language to measure internet gaming disorder among adolescents and children. The current study is a significant advance toward this path as it has built up a measure of internet gaming disorderand its psychometric accuracy in terms of validity, reliability, and factorial structure.

To investigate the factor structure of the IGD Scale, principal axis factoring with varimax rotation of the 14 items uncovered that three elements had an eigenvalue > 1 and the scree plot demonstrated inflection at five components. Along with these lines, as per the Kaiser model of factor extraction, we retain three factors (total explained variance was 45.7%), fourteen items with factor loadings of ≥.40 (see Table 4) were retained and each of these items loaded on its respective factor. “Escape,” “Giving up activities,” and “inability to reduce playing” was decided to be the name of the factors.

Although the explained variance of the Internet Gaming Disorder Scale is moderate, it is acceptable given the high factor loadings, communalities >.30. CFA was also done on the internet gaming disorder scale toconfirm the scale’s factorial structure.

The CFA's results showed that all the indicators were corresponding with their respective latent factors and that the superordinate latent factor of the IGD converged with the three latent factors. The three-factor structure obtained by EFA was therefore complied with by CFA, which demonstrates a good model with 14 items suitable for the data.

The first-factor Escape (8 items) resulted in the EFA & replicated in the CFA is very reliable & it tends to measure the Escape of an individual from negative moods, such as guilt hopelessness, and also depersonalization from the self and others and to avoid the situations that cause the problem and indulged in pathological gaming. First, a specific psychiatric disorder may likely be a cause to develop the IGD scale. Second, that the resulting IGD problems and adverse effects either later evolve into a psychiatric condition, or third, that both of the problems share underlying genetic, psychological mechanisms, socio-demographic or, making people prone to both pathologies(Dong et al., 2011). These behavioural addictions can cause a very serious effect, often affecting the affected person's family and social interactions or their academic duties or work(Baer et al., 2011). Due to these problems, a comorbid situation can occur which causes problems that accumulate and linger as the behaviour persists (e.g. depression, social phobia, anxiety) (Griffiths & Meredith, 2009).

The second factor is “Giving up Other Activities” (3 items), which demonstrates individual behaviour of giving up activities during gameplay and important tasks despite causing problems. The individual postpones or delays the task or activities due to gaming and becomes irresponsible toward his or her duties as the symptoms described in DSM-5. The consequences of these behavioural addictions could be severe, often affecting the person's family and social interactions along with academic or job responsibilities (Baer et al., 2011).

These issues often contribute to comorbid psychological & health-related problems that accumulate and stay behind as the behaviour persists (e.g. depression, anxiety, social phobia) (Griffiths & Meredith,2009).

The third factor "Inability to Reduce Playing" (3 items) is the personal behaviour of unsuccessful attempts of playing the game the individual has no control over the urge to play the game as the individual involves in pathological addiction to gameplay according to the symptom given by the DSM -5. It seems to affect the occurrence of the issue concerning self-control (Ng & Hastings, 2005). Video games encompass a high concentration potential, and certain individuals lose control over their urges due to these characteristics. The outcome of the present study showed that for the Pakistan community, the newly developed scale of internet gaming disorder for children and adolescents was internally consistent and accurate. Three IGD Scale factors were significantly positively related to each other. This study also identifies the high prevalence of IGD in adolescents & children.

Construct validity of this newly developed scale was increased by the findings of IGDQ and its all domains (escape, giving up other activities, and inability to reduce playing) that were significantly correlated with loneliness. The association between isolation and addiction to online games has been repeatedly verified by cross-sectional research (Qin et al., 2007),but the fact that they had a non-significant link with academic procrastination, except for the inability to minimize play, indicates an essential connection with procrastination. To be more specific, IGD and its other sub-domains showed a positive correlation with IGDSF-9. This smaller, 14-item IGD scale was closely associated with the 9-item dichotomous IGDSF scale and proved to be accurate, having Cronbach's alpha value as .71. Working with these scales of all versions the studies yielded good results.

The prevalence of IGDQ in adolescents and children address through percentage (see table 6) respective to their family system, age, and gender. The results show that males have a higher prevalence of IGDQ as compared females. Previous research also supports the findings that the prevalence of IGD is high in the younger age group (16–21 years old) as compared to the older age groups (34–40 years old) (Mentzoni et al., 2011).

It also seems that compulsive use of online games originates from the impulse to lessen the frustration that occurs due to different real-life problems (Chiou & Wan, 2006). Different studies suggested a negative association between IGD & satisfaction with life. But this study predicted a positive correlation between the IGDQ and satisfaction with life; it might be due to the reason that adolescents and young players often feel satisfaction and player while indulging in online gaming and escaping from negative moods or thoughts. As documented in some research examining healthy populations with Internet or video games addiction, the psychological symptoms associated with IGD may be related to loss of control throughout the problem and/or previous and primary variables of mental disorder (Berner et al., 2014; & Su, 2007).

Conclusions

Overall, as suggested by the DSM-5, the conclusion of the current study provides empirical evidence for the definition of IGDQ (APA, 2013). While the present study also supports the reliability of further study of the phenomenon. Moreover, the findings of the current study suggested that the IGDQ is a shorter standardized and psychometrically sound measure of gaming disorder, following the new structure as defined by the DSM-5 (APA, 2013). Three factors were retained based on symptoms which were escape, giving up other activities, and inability or reduced playing.

Limitations of the Study

Although the results on the psychometric properties of the internet gaming condition were generally solid, some possible limitations are worth noting. First of all, the data was self-reported that is vulnerable to different established biases (for example desire for social approval, biases in memory retrieval, and so on). Second, the participants were selected from the Punjab province Sargodha division, the existing results should not be applied directly to the general population. Thirdly, only Pakistani adolescents and children were included in the sample of this study, the present results may Therefore, adolescents from other ethnic backgrounds and adult samples should not be generalized. There was another major factor affecting the results was the COVID-19 due to which it was difficult to take a large sample. Maladaptive behaviour might increase due to this pandemic situation because free time during COVID- 19 adolescents showed more tendencies toward online gaming.

Suggestions

Hopefully, this study will be helpful in carrying out more IGD studies both in Pakistan and worldwide as well. Future research may also get benefit from this study; it can be replicated more broadly, i.e., working on it at a national level, to advance the accurate estimate of this disorder. This can only be made after broad support has been given for the proposed cutoff score for the IGDS9-Short form. The sample size should be increased as it was not taken much in this study due to COVID -19. In the context of Pakistani cultural history, the Internet gaming disorder questionnaire is the first to measure IGD and further research on IGD will ideally emerge for this purpose.More studies on IGD should be carried out to collect evidence of the clinical validity of this phenomenon, considering the severity and adverse effects arising from IGD in a minority of game players. Players who live separate, i.e., with no partner or roommate or family member, could under-diagnosed this problem the reason is they do not obtain the social supervision that is needed for its criteria. Studies that will be conducted in future mustaddress home, family, or other social metrics which would help provide additional information about the social dimensions of such IGD parameters.

Implications

This short fourteen item scale is a valid and reliable questionnaire that will measure IGD. This questionnaire yields good diagnostic accuracy which is why; IGDQ can be used for research and diagnosis for both genders' gamers specifically in adolescents and children. By developing an instrument that is suitable for all types of gamers, it can be hoped that IGDQ psychometrically a robust scale that will be helping future research which is intended to report important questions related to the IGD, such as Its causes and implications among different age groups and its effects with and without proper treatment. A serious problem around the world has been its term, disordered participation in video games, and this phenomenon needs more specialized scientific attention. Therefore, in estimation, validation and a general understanding of IGD, this research is a big step forward.

Declaration

Funding. This research received no specific grant from any funding agency in the public, commercial or profit-sector.

Conflict of interest. The authors are well informed and declared no competing interests.

Acknowledgement. Authors are very thankful to all the participants who have participated in the study.

Availability of data and materials. The datasets used and/or analyzed during the current study are available from the corresponding authors on reasonable request.

Ethics approval and consent to participate. Formal permission was acquried from institutional Ethical board to conduct research.

Competing interest. The authors declare to have no competing interests.

References

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorder (5th ed.).* https://doi:10.2307/1132206.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorder (5th ed.).* https://doi:10.2307/1132206.

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*(5), 353-359.

Field, A. (2013). *Discovering Statistics using IBM SPSS statistics* (4th ed.). SAGE Publications Ltd.

Baer, S., Bogusz, E., & Green, D. A. (2011). Stuck on screens: Patterns of computer and gaming station use in youth seen in a psychiatric clinic. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 20*(2), 86.

Berner, J. E., Santander, J., Contreras, A. M., & Gómez, T. (2014). Description of internet addiction among Chilean medical students: a cross-sectional study. *Academic Psychiatry, 38*(1), 11-14.

Bui, N. H. (2007). Effect of evaluation threat on procrastination behavior. *The Journal of social psychology, 147*(3), 197-209.

Cao, F., & Su, L. (2007). Internet addiction among Chinese adolescents: prevalence and psychological features. Child: Care, *Health and Development, 33*(3), 275-281.

Charlton, J. P. (2002). A factor-analytic investigation of computer 'addiction' and engagemen. *British Journal of Psychology, 93*(3), 329-344.

Chiou, W. B., & Wan, C. S. (2006). Psychological motives and online games addiction: A test of flow theory and humanistic needs theory for Taiwanese adolescents. *Cyber Psychology & Behavior, 9*(3), 317-324.

Colwell, J., & Kato, M. (2003). Investigation of the relationship between social isolation, self-esteem, aggression and computer game play in Japanese adolescents. *Asian Journal of Social Psychology, 6*(2), 149-158.

Colwell, J., & Payne, J. (2000). Negative correlates of computer game play in adolescents. *British Journal of Psychology, 91*(3), 295-310.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75.

Dong, G., Lu, Q., Zhou, H., & Zhao, X. (2011). Precursor or sequela: Pathological disorders in people with internet addiction disorder. *PLOS One, 6*(2). https://doi.org/10.1371/journal.pone.0014703.

Festl, R., Scharkow, M., & Quandt, T. (2013). Problematic computer game use among adolescents, younger and older adults. *Addiction, 108*(3), 592-599.

Furr, R. M. (2011). Scale Construction and Psychometrics for Social and Personality Psychology. New Delhi, IN: Sage Publications. https://doi.org/10.4135/9781446287866.

Gao, X., Pan, W., Li, C., Weng, L., Yao, M., & Chen, A. (2017). Long-time exposure to violent video games does not show desensitization on empathy for pain: an fMRI study. *Frontiers in psychology, 8,* 650.

Griffiths, M. D., & Meredith, A. (2009). Videogame addiction and its treatment. *Journal of Contemporary Psychotherapy, 39*(4), 247-253.

Hajloo, N. (2014). Relationships between self-efficacy, self-esteem and procrastination in undergraduate psychology students. *Iranian Journal of Psychiatry and Behavioral Sciences, 8*(3), 42.

Hauge, M. R., & Gentile, D. A. (2003, April). *Video game addiction among adolescents: Associations with academic performance and aggression.* Presented at Society for Research in Child Development Conference, Tampa, FL.

Khan, J.A. (2020, June .23). SAMAA - Lahore teen suspected of dying by suicide over online game: SAMAA news. https://www.samaa.tv/news/pakistan/2020/06/lahore-teen-dies-by-suicide-after-told-to-pause-pubg.

Kim, J., LaRose, R., & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: The relationship between Internet use and psychological well-being. *Cyber Psychology & Behavior, 12*(4), 451-455.

Ko, C. H., Yen, C. F., Yen, C. N., Yen, J. Y., Chen, C. C., & Chen, S. H. (2012). Screening for Internet addiction: an empirical study on cut-off points for the Chen Internet Addiction Scale. *The Kaohsiung Journal of Medical Sciences, 21*(12), 545-551.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*(9), 1017.

Krosnick, J. A., Presser, S., Fealing, K. H., Ruggles, S., & Vannette, D. L. (2015). The future of survey research: Challenges and opportunities. *The National Science Foundation Advisory Committee for the Social, Behavioral and Economic Sciences Subcommittee on Advancing SBE Survey Research,* 1-15.

Lay, C. H. (1986). At last, my research article on procrastination. *Journal of research in personality, 20*(4), 474-495.

Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). The effects of pathological gaming on aggressive behavior. *Journal of Youth and Adolescence, 40*(1), 38-47.

Leung, L. (2004). Net-generation attributes and seductive properties of the internet as predictors of online activities and internet addiction. *Cyber Psychology & Behavior, 7*(3), 333-348.

Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J & Pallesen, S. (2011). Problematic video game use: estimated prevalence and associations with mental and physical health. Cyberpsychology, *Behavior, and Social Networking, 14*(10), 591-596.

Montag, C., Bey, K., Sha, P., Li, M., Chen, Y. F., Liu, W. Y., ... & Reuter, M. (2015). Is it meaningful to distinguish between generalized and specific Internet addiction? Evidence from a cross-cultural study from Germany, Sweden, Taiwan and China. *Asia-Pacific Psychiatry, 7*(1), 20-26.

Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior, 16*(1), 13-29.

Ng, B. D., & Hastings, P. (2005). Addiction to the internet and online gaming. *Cyberpsychology & Behavior, 8*(2), 110-113.

Peplau, L. A. (1982). Perspective on *loneliness. Lonelinss: A Sourcebook of Current Theory, Research and Therapy.*

Peters, C. S., & Malesky Jr, L. A. (2008). Problematic usage among highly- engaged players of massively multiplayer online role playing games. *Cyber Psychology & Behavior, 11*(4), 481-484.

Pontes, H. M., & Griffiths, M. D. (2016). Portuguese validation of the internet gaming disorder scale–short-form. *Cyberpsychology, Behavior, and Social Networking, 19*(4), 288-293.

Qin, H., Rao, P. L., & Zhong, H. Q. (2007). A study on factors of leading to online game addiction. *Chinese Journal of Clinical Psychology.*

Rehbein, F., Kliem, S., Baier, D., Mößle, T., & Petry, N. M. (2015). Prevalence of Internet Rehbein, F., Kliem, S., Baier, D., Mößle, T., & Petry, N. M. (2015). Prevalence of Internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction, 110*(5), 842-851.

Shapira, N. A., Lessig, M. C., Goldsmith, T. D., Szabo, S. T., Lazoritz, M., Gold, M. S., & Stein, D. J. (2003). Problematic internet use: proposed classification and diagnostic criteria. *Depression and anxiety, 17*(4), 207-216.

Sharif, I., & Sargent, J. D. (2007). Association between television, movie, and video game exposure and school performance. *Pediatrics, 118*(4), 1061-1070.

Sirois, F. M. (2014). Absorbed in the moment? An investigation of procrastination, absorption and cognitive failures. *Personality and Individual Differences, 71*, 30-34.

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin, 133*(1), 65.

Streiner, D. L., Norman, G. R., & Cairney, J. (2015). Health Measurement Scales: A Practical guide to their development and use (5th ed.). Oxford, UK: Oxford University Press. https://doi.org/10.1093/med/9780199685219.001.0001.

Van-Schie, E. G., & Wiegman, O. (1997). Children and videogames: Leisure activities, aggression, social integration, and school performance. *Journal of Applied Social Psychology, 27*(13), 1175-1194.

Volkow, N. D., Wang, G. J., Fowler, J. S., Tomasi, D., Telang, F., & Baler, R. (2010). Addiction: decreased reward sensitivity and increased expectation sensitivity conspire to overwhelm the brain's control circuit. *Bioessays, 32*(9), 748-755.

Williams, D., Yee, N., & Caplan, S. (2008). Who plays, how much, and why? A behavioral player census of a virtual world. *Journal of Computer Mediated Communication, 13*(4), 993-1018.

Young, K. S., & De Abreu, C. N. (Eds.). (2010). Internet addiction: *A handbook and guide to evaluation and treatment.* John Wiley & Sons.Zahra, S., Kiani, S., & Shahbaz, K. (2019). Internet gaming disorder: an emerging addiction among Pakistani university students. NUST Journal of Social Sciences and Humanities, 5(1), 87-104.