DEVELOPMENT AND VALIDATION OF AN INSTRUMENT TO MEASURE ACHIEVEMENT MOTIVATION OF UNDERGRADUATES STUDENTS IN UNIVERSITIES IN CROSS RIVER STATE, NIGERIA

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Abstract
This study describes the processes involved in the development and validation of an instrument to measure a culture-fair achievement motivation among undergraduate students in universities in Cross River State. Specifically, face and content validity was carried out by five experts in Measurement and Evaluation. Construct validity was carried out using exploratory factor analysis while reliability of the instrument was carried out using Cronbach alpha coefficient. The exploratory factor analysis revealed three factors. The items loading on achievement motivation scale revealed factor loading of ≥.05. Reliability process revealed that AMS is reliable as the coefficient ranges from .70 - .79 for the three subscales. Convergent validity was carried out using bivariate correlation and the result showed that all the sub scales are highly correlated. The instrument was recommended for use by researchers and experts in measurement and evaluation
Keywords: Content validity, construct validity, reliability, statistical anxiety scale, factor analysis

Introduction

Individuals have different things that get them motivated. Factors that motivate individuals are different. It could be internal factors or external factors. Internal factors are factors within the individual that cause them to behave in a particular way. One could say that these are endogenous factors within the ambience of the individual that stirs him/her into striving for a particular thing. External factors are factors outside the individual. They are factors within the environment that propels the individual into acting a way distinguishable from others. These could be peer influence, social climate among others. In the academic environment, students are motivated by so many things and one of such is achievement in academics.

Achievement motivation is the tendency to strive for success other than failure. Achievement motivation, also referred to as the need for achievement (and abbreviated n Achievement), is an important determinant of aspiration, effort, and persistence when an individual expects that his performance will be evaluated in relation to some standard of excellence. Such behavior is called achievement-oriented. McClelland (2010) believes that the

need for achievement is a distinct human motive that can be distinguished from other needs. One characteristic of achievement motivated people is that they seem to be more concerned with personal achievement than with the rewards of success. More so , McClelland and Atkinson (1996) noted that achievement motivation theory was based on a personality characteristic that manifested as a dispositional need to improve and perform well according to a certain standard of excellence . Alkison (1966) further noted that for one to achieve success, there are three factors that underlie that achievement. Firstly, the individual must have a need for success. That is, there must be a tenacious penchant for that success. Secondly, the individual must be able to carry put an estimate of what it will cost such a task to complete and finally, the incentive value of such effort must be comprehended. These are the factors that guide an individuals' choice of a particular factor. More so, the tendency to avoid failure is guided by three factors. Firstly, the individual must have a need to avoid failure. That is, there must be a tenacious penchant for that failure avoidance. Secondly, the individual must be able to carry put an estimate of what it will cost such a task not to be carried out and finally , the cost and consequences of not been able to achieve such task.

Students in schools may not be able to perform very well in their academic given different task that they are exposed to. The child must be determined in order to ensure that success is maintained. On this note, so many researchers have attempted to study achievement motivation in many research works. Different instruments have been used. Some are adopted while others are adapted. Most of these instrument that are adopted for use in most area are culturally bias. This is because the nature of students that these instruments were designed to measure is quite different from the students that these instruments are used on.

Objectives

The objective of this study is to develop and validate a self-administered questionnaire that will measure achievement motivation and to develop subscales useful for subsequent assessment.

Method

The method for developing and validating this instrument is described using the following processes.

Draft of the achievement motivation scale (AMS)

Validity procedure

Translational validity – content validity

                   Face validity

Construct validity   Factor analysis

Convergent validity   bivariate correlation

Discriminant validity   bivariate correlation

Reliability procedure   Cronbach alpha

Content validity according to Devon, Block, Moyles-Wright, Ernst, Hayden, and Lazarra (2007) was undertaken to ascertain whether the content of the questionnaire was appropriate and relevant to the study purpose. Content validity indicates the extent to which the content (items in the scale) reflect a complete range of the attributes under study and is usually undertaken by test

experts. To estimate the content validity of the AMS, the researchers clearly defined the conceptual framework of achievement motivation scale by undertaking a thorough literature review and seeking experts' opinion. Once the conceptual framework was established, two purposely chosen experts in the areas of test measurement and statistics and three psychologist were asked to review the initial draft of 50 - item of AMS to ensure it was consistent with the conceptual framework. Each expert read and corrected the draft and the items that were consistently indicated as ambiguous, non-reflective of the construct were removed. A total of 30 items were used for the research exercise.

Face validity was carried out to evaluates the appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language. This was carried out by those experts and was done simultaneously

2.2 Construct validity

Construct validity refers to the degree to which the items in an instrument relate to the relevant theoretical construct (Nashrin and Trisha, 2009). Construct validity is a quantitative value rather than a qualitative distinction between 'valid' and 'invalid'. It refers to the degree to which the intended independent variable (construct) relates to the proxy independent variable (indicator) (Hunter & Schmidt 1990). To establish the construct validity of AMS, factor analysis was used . The sample was collected using a purposive sampling technique . When the scale development studies carried out for the determination of appropriate sampling size were evaluated, it was seen that Comrey and Lee (1992) rated 100 as weak, 200 as average, 300 as good, 500 as very good and 1000 as excellent. In their scale development studies, Guilford (1954) stated that least sampling size should be 200, while Aleamoni (1976) gave 400 as minimum. . After the evaluation of related literature, "Achievement Motivation Scale" development study was realized in second semester of 2016–2017 academic session with the participation of 426 students selected from two universities in Cross Rivers State

Results

Factor Structure of Achievement Motivation Scale (AMS)

In order to determine the structure of the scale factor, varimax rotation method was used and principal components factor analysis method was applied to scores obtained from answersgiven by 529 students to the scale. The suitability of the data for factor analysis can be tested by Kaiser-Mayer-Olkin (KMO) coefficient and Barlett Sphericity Test (Ugulu 2011). If KMO is higher than 0.60 and Bartlett Test is meaningful, then data is suitable for factor analysis (Kline 1994; Buyukozturk 2003).

Kaiser-Mayer-Olkin value was found to be 0.637 and acceptable in principal components factor analysis. Another indicator of the strength of the relationship among variables is Bartlett's test of sphericity. Bartlett's test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. The fact that chi-square obtained in this test is meaningful shows that data come from multivariate normal distribution. In this study, the observed significance level was $p < 0.005$. It is concluded that the strength of the relationship among variables was strong (George and Mallery 2001).

Factor analysis on Achievement motivation scale derived four factors with eigenvalues exceeding 1.0. These factors altogether explained 70.34% of variance of results. Scree plot shows that three factors were in sharp descent and then started to level off. Two items were deleted because their Eigen values were less than 1 (Yavuz 2005).

Varimax rotation was used. Thus, the factor analysis resulted in three independent factors with factor loadings greater than 0.4. Table 1 presents factor loadings and factor structures of the items. These three factors accounted for 70.34% of total variance and were named according to the common characteristics of the items loaded on the same factor. Eigenvalues of the factors are 1.412, 1.310, 1.201and respectively.

It was found that the total variance explained was 70.34%. The proportion of explained variance by the prime factor in valid scales should be at least 20% (Reckase 1979). Because our Factor 1 accounted for 38.21% of total variance, these results are considered satisfactory. This suggests the presence of one major factor and thus reinforces the prior evidence concerning the internal consistency of the AMS

Description of AMS Dimensions
Factor 1 can be named academic determinism while factor 2 was named academic laziness and the third factor was named academic optimism

Factor 1 consisted of 15items that focus on academic determination of the students, thus, this factor was named academic determinism. Factor 2 included 8 items which focus on items such as related to poor attitude to learning and this dimension was named as "academic laziness". While factor 3 that focuses on the individual's resolution to make it in academics was titled, ''academic optimism''

Table 1: Factor structures and loadings of the 30 items in AMS

Items	F1	F2	F3
FACTOR 1 (Academic Determinism)			
I study to ensure that I achieve something in life	.742		
I spend a lot of time studying to pass very well	.714		
I want to be a professional in my area of studies	.699		
I am basically out to be the best in life	.696		
I avoid all occasions that will make me fail	.653		
I work so hard to be the best in my class	.659		
I cannot postpone my studies for anything	.630		
I enjoy spending enough to study to achieve the best.	589		
I compete with the best students in my class	.589		
I will ensure that a get good grades till graduation	.584		
I feel I can succeed in my academics	.568		
I put all things behind to ensure that I pass well	.511		
I don't leave school task undone before going to bed.	501		

I don't allow any body have higher grade than me   .475
I ensure that I put all things behind me to pass well   .434
Factor 2 (Academic Laziness)
I don't seek for help even if I have need for help   .755
I work independently from others in my class   .615
I hardly stay in the class to learn   .540
I don't mind staying without reading   .536
I may not cover my course outline before a semester ends   .446
I miss my lectures at any time of the day   .286
I get satisfied if I leave some school works undone   .105
Factor 3 (**Academic Optimism**)
I am more ambitious when I receive good grades   .179
Nothing concerns me with failure   .155
I get annoyed when I don't do well in my academics   .143
I ensure that I ask questions for proper understanding in my
academics   .140
I study only with peers that can help me succeed   .131
I work hard when I discover that I am not doing well   .127

Convergent Validity and Reliability of SAQ

Convergent validity is a construct validity component that measures the extent to which constructs that are theoretically related are related in reality. To test for the convergence of these sub scale, the correlation for each of the sub scale was carried out with intent to determine the extent of their relationship. Series of reliability analyses were performed for each factor. Table 2 summarises the correlation among the variables to determine their convergence

Table 2: Convergence validity of the three sub –scales of the instrument

Variable	AMS 1	AMS 2	AMS 3
AMS 1	1.00	0.71	0.83
AMS 2	0.71	1.00	0.69
AMS 3	0.83	0.69	1.00

The reliability of the instrument was further carried out using Cronbach alpha method.. Once the validity procedures were completed, the final version of the AMS was examined to assess its reliability. Reliability refers to the ability of a questionnaire to consistently measure an attribute and how well the items fit together, conceptually (DeVon. 2007). Although reliability is necessary, is not sufficient to validate an instrument, because an instrument may be reliable but

not valid (DeVon, 2007). Liu (2003) stated that limit value for scale reliability could be taken as 0.70. The result is presented in table 3

Table 3: Summarizes of number of the items, means, standard deviations and reliability coefficient of each factor.

Variables	N	X	S.D.	α
SA 1	15	21.61	3.36	.70
SA 2	8	29.38	3.68	.72
SA 3	7	22.32	3.17	.79

Cronbach Alpha coefficient for the whole scale was determined as 0.72.

Discussion

A 30 items measuring achievement motivation was developed using the Likert type format (4-Strongly agree, 1-Stronglydisagree) was used .. The (AMS) was also subjected to: (1) factor analysis for exploring factor structures and (2) series of reliability analyses for investigating reliability of each factors emerged. The construct validity of the (SAQ) was examined using factor analysis with varimax rotation. Our sample of 529 students, according to Tabachnick and Fidell (2001), is sufficiently large to allow meaningful factor analysis to scrutinizethe construct validity of the (AMS). Three factors were found from the result of analysis which were academic determinism, academic and academic optimism. As a result of the factor analysis,. It was decided to exclude any item that did not have a factor loading of 0.40. All the items of the instrument combined accounted for 70.38% of the total variability in students' (AMS) scores. Because this study was preliminary, future studies with larger sample size might show an increased accounted variance. Overall, these results support the convergent validity of the (AMS).

Bivariate correlation was used to establish the convergent validity of the three sub scale and was found that the coefficient of the subscales as relating to one another were highly correlated as a prove that there is convergence among the variables. Cronbach's alpha reliability coefficients were also used to examine the three subscales structures dimensions. Analyses showed that all of the coefficients were high enough to be considered adequate, namely, all items lead to a higher alpha coefficient for the overall scale reliability. The results of reliability for the scales ranged from 0.70 to 0.79. The highest alpha coefficients were 0.79, 0.72 and0.79. As a result, it can be said that reliability coefficients of the scales exceed the value of 0.60, which is considered acceptable for research purposes (Nunnally1967).

Conclusion

Based on the result it can confidently be said that the AMS is a valid and reliable research tool which can be generalised to a wider population of undergraduate students.

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