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It will be pleasant to learn that from 1st January 2020, the Journal of Educational Research on Children, Parents and Teachers becomes a no fees journal outfit under the sponsorship of the African Educational Research and Development Foundation, which is based in South Africa.

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ARTICLES

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Level of test anxiety as a factor in test score characteristics in South West Universities in Nigeria

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Abstract

Scores generated from test instruments should be investigated for its accuracy and precision. Test scores without these validity and reliability are meaningless and cannot be used for accurate decision making. Investigating and providing evidences of score validity and reliability with respect to level of test anxiety are the main objective of this study. This study examined the levels of test anxiety on score validity and reliability using cognitive measures. Causal comparative research design was adopted, 400 participants were randomly selected from two Federal and two State Universities in South-West, Nigeria. Achievement tests in English Language MCQ and Test Anxiety Inventory (TAI) were used to collect data. Results indicated among others are that: the tests score reliability of cognitive tests with respect to level of test anxiety was not significant ($\chi^2(1) = 0.0040, p > 0.05$). Based on the findings of this study, it was concluded that examinees level of test anxiety yielded no effect in score reliability. Recommendations made among others were examinees should be kept at a low level of anxiety for accurate test scores to be yielded.

***Keywords**: Cognitive measures. Anxiety. Characteristics. Test. Test Score.*

Introduction

Test scores have two inherent characteristics called validity and reliability. The evidence of validity and reliability are requisites to ensuring the integrity and quality of test scores. These are important concepts in modern research, as they are used for enhancing the accuracy of the assessment and evaluation of a research work (Tavakol & Dennick, 2011). Test scores are generated from psychometric instruments such as tests, questionnaires, observer ratings among others, which are used in research, education, and administration. Psychometric instruments are used in educational and psychological research and practice to obtain information for theory building and decision making.

Examinees are subjected to variety of testing situations, such as school examinations and entrance examinations for promotion, admission and placement. However, it could be observed that many of these scores do not represent the ability of these students on certain construct of interest for such accurate decision making. If the test scores are not valid, they misrepresent students' true level of knowledge. Therefore Jimoh and Omorege (2012) posited that any action that undermines examinations poses a great threat to the validity and reliability of the examination results and its certification. It is imperative that those who use tests can evaluate whether the data they obtain so cleverly are any good in the first place (Cone & Foster, 1991).

The field of educational measurement appears to have reached a broad consensus that score validity should be a judgment of the degree to which arguments support the interpretations and uses of test scores (Kane, 2013). Anastasi and Urbina, (2012) advanced that the validity of a test concerns what the test measures, how well it does so and what can be inferred from the test scores. Whenever a test user wishes to make an inference from test scores, the validity of those inferences must be verified. All evidences provided strengthens the argument that the construct of interest is the construct the scores represent. A key point to understanding validity is the realization that it is not the test that is valid or invalid, but the test scores and the proposed inference the test user wishes to make that are valid or invalid. Score validity deals with the degree to which scores from a measurement measure the intended construct (Thompson, 2003). Score validity is about whether the inference one makes is appropriate, meaningful, and useful given the individual or sample with which one is dealing and the context in which the test user and individual/sample are working. That is, one cannot separate validity from the sample from which, or the context in which, the information was obtained (Zumbo, 2009). Hubley and Zumbo (2011) posited that validity is about the inferences, interpretations, actions, or decisions that are based on a test score and not the test itself. Violations of score validity severely impact the function and functioning of score interpretations.

Reliability is a measure of stability or consistency of test scores. Anastasi and Urbina (2012) posited reliability to be the consistency of scores obtained by the same person when re-examined with the same test on different occasions or with different sets of equivalent items, or under other variable examining conditions. An instrument (test) yield scores from testees on the number of times the test is administered, and the scores generated from the testees will have internal consistency to consider the scores reliable. Score reliability is of utmost importance in measurement because it is a necessary but not enough condition for score validity, any weakness in score reliability will impact the validity of an instrument used (Russel, 2008). In other words, poor score reliability often compromise the ability of the scores to measure the intended constructs. Thus, the validity of any scores are influenced directly by the reliability of the data and none of these things can be correctly interpreted without examining the reliability of one's data (Nilsson, Schmidt & Meek, 2002). Poor score reliability may compromise score validity. Lack of score reliability has a direct consequence on the uses of test scores. Ghiselli (1964) stated that unreliable scores are of little value when we wish to compare two or more individuals on the same test, to assign individuals to groups or classes, to predict other types of behaviour, to compare different traits of an individual, or to assess the effects of various systematic factors upon an individual's performance (Jönsson, Hahn & Olsson, 2015).

Examinee characteristics cannot be ignored when it comes to performance in the classroom. Examinees are of different behaviours as a result of the inherited traits in them that may also interplay in their performance. A trait can be thought of as a relatively stable characteristic that causes individuals to behave in certain ways. Potentially, test anxiety is one of those stable traits that may affect score validity and reliability. Test anxiety has been shown to be a relatively stable trait associated with test performance in many situations, including testing in schools (Kuku & Oladesu, 2019; Lang & Lang, 2010). Text- anxiety is a variable that could influence what one

does before, during and after the examination (Okubanjo, 2009). It may be undeniable that nearly everyone is affected by test anxiety which may affect the consistency of scores in an examination. It has been found that students consistently perceive examination as a source of increase in anxiety and a situation engulfed with uncertainty/unfairness in letting them demonstrate their true achievements (Zollar & Ben-chain, 1990). Anxiety is an undesirable emotional state which is associated with perturbation, dread and phobia which may alter score validity and reliability.

Research Hypotheses

1. There is no significant difference in the validity of English Multiple-choice test scores based on level of test anxiety.
2. There is no significant difference in the reliability of English Multiple-choice test scores based on level of test anxiety.

Methodology

Research design

The research design adopted for this study is causal comparative design in which the participants were exposed to the independent variable which was the levels of test anxiety which can either be low or high. The dependent variables involved cognitive test of English Language multiple choice achievement test scores.

Population of the study

The population of the study consists of students attending pre-degree classes in public universities in South-West, Nigeria. Students in this category are expected to sit for the Joint Admission Matriculation Board (JAMB) examination to confirm their admission into the degree programmes. The public universities with the pre-degree programme in South-West Nigeria are; Olabisi Onabanjo University (OOU), Ago-Iwoye in Ogun-State, Ladoke Akintola University (LAUTEC), Ogbomosho in Oyo-State, Federal University of Agriculture (FUNAAB), Abeokuta. in Ogun- State, Tai-Solarin University of Education (TASUED), Ijebu-Ode in Ogun-State, Obafemi-Awolowo University (OAU), Ile-Ife in Osun-State, Adekunle Ajasin University (AAUA), Akungba in Ondo-State, Ekiti-State University (EKSTU), Ado-Ekiti in Ekiti-State, Osun-State University (UNIOSUN), Osogbo in Osun-State, Federal University of Technology (FUTA), Akure in Ondo-State. In all the nine (9) universities that were in this category, each of them has a pre-degree students population that ranges between 140 and 5000.

Sample and sampling techniques

The sample for this study comprised of 400 pre-degree students in selected institutions. The institutions from the public Universities in South-west, Nigeria where there are pre-degree students and computer center for CBT were selected through stratified random sampling technique. Federal and State Universities was the basis for stratification. Two universities were randomly selected from the State and Federal Universities. The systematic random sampling technique was also used to select the participants for the study in each of the Universities. Students nominal roll of the Universities were collected, and the serial number of each student was used to pick the participants in the sample.

Research instrument

Self developed Achievement Test in English (ATE) was used to collect data via CBT, and, Test Anxiety Scale to assess the level of anxiety of each participant was adopted for the study. The English achievement test consist of two sections; section A and B. Section A was used to generate information pertaining to the participants in terms of name, age, gender, name of institution, etc. While section B were 50 items in English multiple choice based on the table of specification below (Table 2). The instruments were validated using table of specification, item analysis and pilot study. The reliability of the scores generated from the ATE using Cronbach Alpha was estimated at 0. 71. Sarason test anxiety scale was adopted. This scale includes 37 True/False items and its grades ranges between 0 - 37. The cut-off points are; 12 and below indicates low level of anxiety while 13 and above will indicate high level of anxiety in the participants (Sarason, 1980). The reliability was estimated to be 0.70 using Cronbach alpha.

Table 1

Table of Specification for a 50-Item Test in English

Content	Cognitive			Total Items
	Knowledge	Comprehension	Application	
Comprehension.	2	7	1	10
Sentence interpretations.	1	4	-	5
Opposite in meaning (Antonyms).	3	2	-	5
Nearest in meaning (Synonyms).	2	3	-	5
Sentence completion.	2	8	5	15
Oral forms.	3	3	4	10
Total Items	**13**	**27**	**10**	**50**

Method of data collection

The two instruments were administered via CBT. ATE test was administered in the four universities selected for the study by the researcher with the assistance of four proctors and four computer technologists. TAI was first administered to the participants and immediately after English MCQ achievement test was administered to the participants using CBT mode. Data was generated electronically and immediately. Scores generated were factor analysed and co-related.

Methods of data analysis

Descriptive and inferential statistics were used to find the group effects on the score validity and reliability. Thus for validity, construct evidence in form of factor analysis was established for each group. Also, the equivalence of the factors generated by the two groups were examined using Turker's Exact Test. The difference in performances between the groups was established through analysis of variance model. Reliability was determined through the internal consistency using Cronbach Alpha. Differences in group level effect was also determined by comparing the Alpha value through t-test of correlated values at 0.05 level of significance.

Results

Hypothesis 1: There is no significant difference in the validity of cognitive test scores based on level of test anxiety.

To test this hypothesis, the examinees responses to English language MCQ achievement test were divided into two clusters respectively: cluster one, examinees having low test anxiety and cluster two, examinees having high test anxiety. These examinees were placed into the groups based on the scores on the test anxiety scale (Sarason, 1980). In all, 132 examinees were in the low-test anxiety group while the high-test anxiety group had 220 examinees. The responses of these two groups were respectively subjected to factor analysis to examine the factorial validity of the test. In order to know the number of factors or traits underlying the test in the two groups, parallel analysis (PA) was conducted for the examinees response to the test items in the two groups respectively.

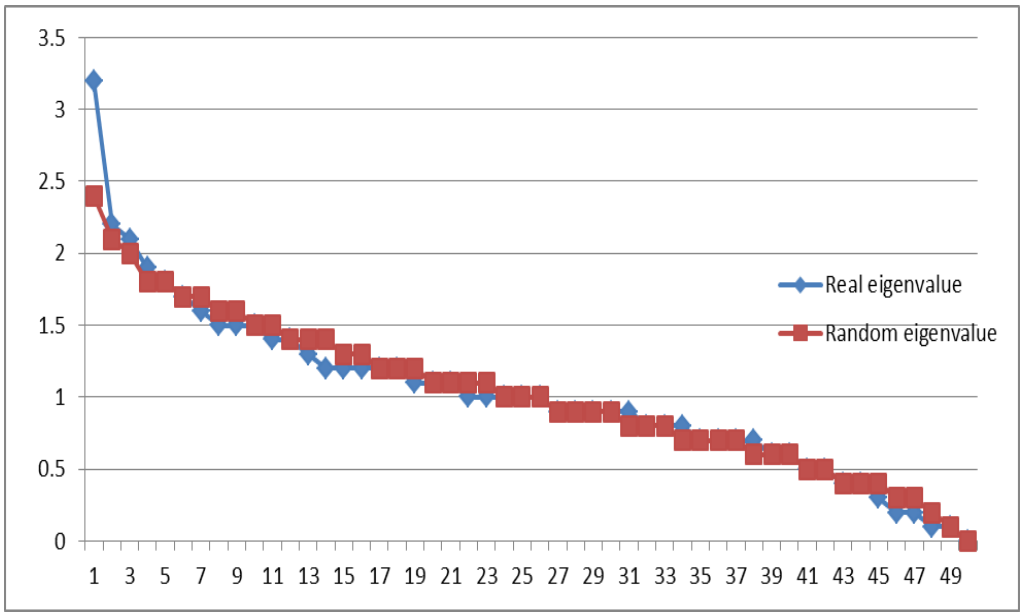

Figure 1: Number of factors of the English test based on low test anxiety

Figure 1 presents the result of parallel analysis showing the number of factors underlying the English test among examinees with low test anxiety. The figure shows that there are four factors that were extracted to underlie the English test among examinees with low test anxiety. This is because there were four eigenvalues that were observed above the point at which the random eigenvalue intercepted the real eigenvalues.

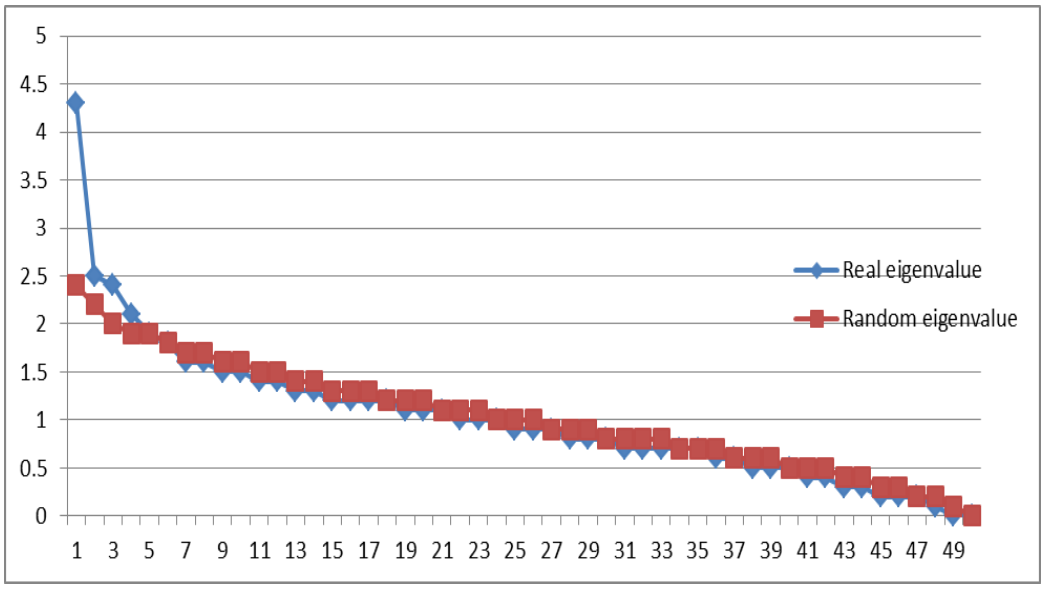

Figure 2: Numbers of factors of the English test based on high test anxiety

Figure 2 shows that there are four factors. The figure shows that there are four factors that were extracted to underlie the English test among examinees with high test anxiety. This is because there are four eigenvalues that were observed above the point at which the random eigenvalue intercepted the real eigenvalues. In order to compare the factors observed to underlie the English test between the examinees with low- and high-test anxiety level groups. To compare the factorial validity of the test, Principal axis factor analysis was conducted respectively on the test scores for samples for the two groups based on the number of factors predicted by the parallel analysis (PA). The resulting rotated loading matrix was assessed to determine the number of variables that load on each factor to evaluation how well the factors were defined. Thereafter, the well-defined factors were then compared through Tucker's congruence test if they have same number of factors that underlie them.

Table 2:
Comparing of Factor loading of English test in low test anxiety examinees and English test in high test anxiety examinees

Table 2 presents the comparison factor loadings of English test in low test anxiety examinees and English test in high test anxiety examinees after rotation. The results showed that in the low test anxiety sample, three factors (factor 1, factor 2 and factor 4) out of the four factors predicted have three or more loadings greater than or equal to 0.32, the condition set for adjudging a factor well defined (Tabachnick & Fidell, 2013). The table further shows that in the high-level test anxiety sample, three factors (factor 1, factor 3, and factor 4) out the four extracted factors are well defined. These results showed that the English test in low and high level of test anxiety examinees have three well defined factors that underlie them respectively. These results suggest that both groups examinees measure three dominant traits respectively irrespective of their level of test anxiety. However, the extent of equivalence of the extracted factors was assessed using Tucker's test of factor congruence.

The congruence coefficient is the cosine of the angle between two vectors and can be interpreted as a standardized measure of proportionality of elements in both vectors. It is evaluated as:

$$\phi(x,y) = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2 \sum y_i^2}}$$ ---------- equ 1

Where x_i and y_i are loadings of variable i on factor x and y, respectively, i = 1, ……,n usually the two vectors are columns of a pattern matrix. So, how large should the coefficient be before you declare the factors highly similar? Lorenzo-Seva and Ten-Berge (2006) suggested "a value in the range .85–.94 corresponds to a fair similarity, while a value higher than .95 implies that the two factors or components compared can be considered equal."

For comparison of the factors, Tucker's congruence test was conducted on the factors of the test in the two samples. The result is presented as follows:

Table 3:
Comparison by size factor loading of English test in low test anxiety examinees and English test in high test anxiety examinees groups

Table 3 shows that Factor 1 of English test in low test anxiety examinees group corresponds to Factor 2 of English test in high test anxiety examinees group, Factor 2 of English test in low test anxiety examinees group corresponds to Factor 1 of English test in high test anxiety examinees group, and Factor 3 of English test in low test anxiety examinees group corresponds to Factor 3 of English test in low test anxiety examinees group. Thus, the comparison of the factors that underlie the English test in low test anxiety examinees and English test in high test anxiety examinees were done along the earlier stated pairs.

Using the Tucker's formula, the various indices of the formula are presented in Table 4

Table 4:
Indices for calculating the congruence of the factors of English test in low test anxiety examinees and English test in high test anxiety examinees groups

	N	Sum
ProductF1_low_F2_high	50	0.38
ProductF2_low_F1_high	50	0.30
ProductF3_low_F3_high	50	0.81
sqfactorloadingF1_low	50	3.57
sqfactorloadingF2_low	50	1.97
sqfactorloadingF3_low	50	1.69
sqfactorloadingF1_high	50	2.78
sqfactorloadingF2_high	50	1.97
sqfactorloadingF3_high	50	1.95

Congruence of Factor 1 low and Factor2 high test anxiety group = $\frac{0.38}{\sqrt{(3.57)(1.97)}}$ = 0.054

Congruence of Factor 2 low and Factor1 high test anxiety group = $\frac{0.30}{\sqrt{(1.97)(2.78)}}$ = 0.055

Congruence of Factor 3 low and Factor3 high test anxiety group = $\frac{0.81}{\sqrt{(1.69)(1.95)}}$ = 0.24579

The results showed that extracted factors in examinees sample have congruence coefficient of 0.054, 0.055 and 0.246 respectively. The results suggest that the extracted factors or traits found to underlie the English test in the low- and high-test anxiety groups of examinees are not equivalent. This implies that English test could not measure equivalently the same trait among examinees with low- and high-test anxiety status. This showed that the validity of the English test among examinees having low anxiety differed significantly from the test sore validity recorded from the English test among examinees having high test anxiety. To determine between which levels of test anxiety of English was more valid, exploratory factor analysis with covariate (type of university of examinees) was conducted. To achieve this, the examinees having low and high level of test anxiety were divided into two groups (i. examinees from state and ii. examinees from federal university). The results are presented in Figure 2

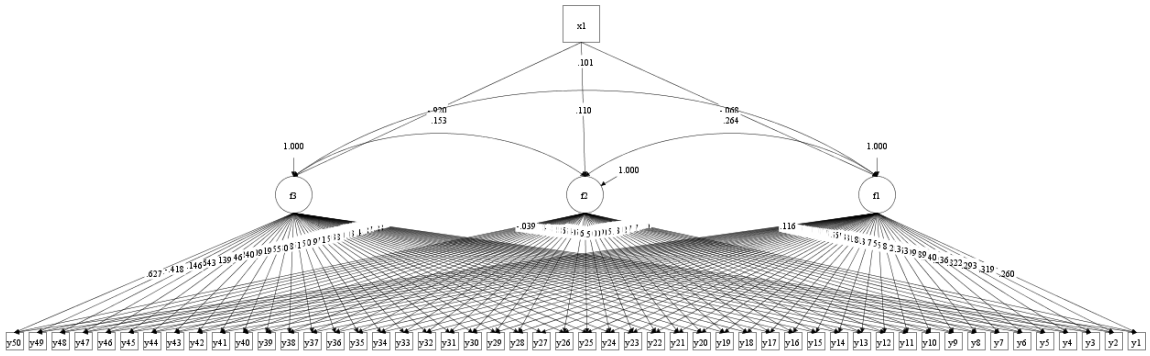

Figure 3: Exploratory Factor Analysis with covariate (university type: federal and state) of English multiple-choice test among examinees having low test anxiety

χ^2 (1125) = 1196.296, P= 0.0686); RMSEA= 0.020 (90% CI = 0.000 – 0.029, probability of RMSEA ≤ 0.05 = 1.000), CFI= 0.95, TLI=0.94

Figure 3 shows Exploratory Factor Analysis with covariate (university type: federal and state) of English multiple-choice test among examinees having low test anxiety. The model tests the null hypothesis that the extracted three factors underlying the English MCQ test among low test anxiety examinees were consistent in samples of federal and state universities. The figure shows that adding respondents' university (labelled X in Figure 3) to the 3-factor model does not distort the model (χ^2 (1125) = 1196.296, P = 0.0686); RMSEA= 0.020 (90% CI = 0.000 – 0.029, probability of RMSEA ≤ 0.05 = 1.000), CFI= 0.95, TLI=0.94). Therefore, the consistency of factors underlying the English test among students of state and federal universities was assessed. The results are presented in Table 5:

Table 5:
Model result of Exploratory Factor Analysis with covariate (university type: federal and state) of English MCQ test among examinees having low test anxiety

Two-Tailed

Factor	Covariate		Estimate	S.E.	Est./S.E.	P-value
F1		ON				
	X1		-0.068	0.236	-0.288	0.774
F2		ON				
	X1		0.11	0.248	0.445	0.656
F3		ON				
	X1		-0.92	0.207	-4.448	0.000

Table 6 shows that Factor 1 and factor 2 underlying the English test were consistent among Federal and State universities' students (-0.068, p > 0.05; 0.11, p > 0.05 respectively). The results also show that factor 3 was inconsistent among students of federal and state universities. The results showed that most of the traits measured by the English MCQ test among examinees having low test anxiety in the federal university sample were consistent with the traits measured by the test in the state university sample.

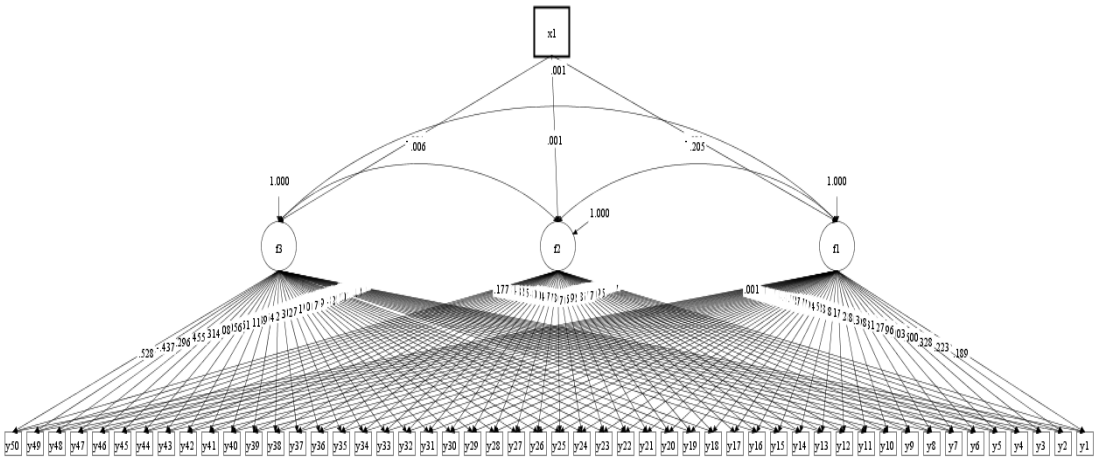

Figure 4: Exploratory Factor Analysis with covariate (university type: federal and state) of English MCQ test among examinees having high test anxiety

χ^2 (1125) = 1266.559, P = 0.0020); RMSEA= 0.025 (90% CI = 0.016 - 0.032, probability of RMSEA ≤ 0.05 = 1.000), CFI= 0.98, TLI=0.96

Figure 4 shows Exploratory Factor Analysis with covariate (university type: federal and state) of English multiple-choice test among examinees having high test anxiety. The model tests the null hypothesis that the extracted three factors underlying the English multiple-choice test among examinees having high test anxiety were consistent in samples of federal and state universities. The figure shows that adding respondents' university (labelled X1 in Fig 4) to the 3-factor model did not distort the model (χ^2 (1125) = 1266.559, P = 0.0020); RMSEA= 0.025 (90% CI = 0.016 - 0.032, probability of RMSEA ≤ 0.05 = 1.000), CFI= 0.98, TLI=0.96). Therefore, the consistency of factors underlying the English test among students of state and federal universities was assessed. The results are presented in Table 6.

Table 6: ***Model result of Exploratory Factor Analysis with covariate (university type: federal and state) of English multiple-choice test among examinees having high test anxiety***

Factor	Covariate	Estimate	S.E.	Est./S.E.	Two-Tailed P-value
F1	ON				
	X1	-0.531	0.194	-2.73	0.006
F2	ON				
	X1	0.001	0.189	0.005	0.996
F3	ON				
	X1	-0.804	0.17	-4.722	0.000

Table 6 shows the consistency of the factors underlying the English multiple-choice item among students of federal and state universities whose level of test anxiety were high. The table shows that Factor 1 and factor 3 underlying the English test were inconsistent among federal and state universities' students (-0.531, $p < 0.05$; -0.804, $p < 0.05$ respectively). The table also shows that factor 2 was consistent among students of federal and state universities (0.001, $p > 0.05$). The results showed that only one of the traits measured by the English multiple-choice test among examinees having high test anxiety in the federal university sample were consistent with the traits measured by the test in the state university sample. Therefore, the hypothesis that there is no significant difference in the validity of cognitive test scores based on level of test anxiety was rejected. Hence, there was significant difference in the validity of cognitive test scores based on level of test anxiety with the cognitive test scores from examinees with the low level of test anxiety being more valid that its counterparts with high level of test anxiety.

Hypothesis 2: There is no significant difference in the reliability of cognitive test scores based on test anxiety.

To test this hypothesis, the reliability estimates of the cognitive tests in examinees groups with low- and high-test anxiety were compared using independent alpha formula. The equality of alpha across two populations, are tested using the null hypotheses: $H0$: α dif = 0, where α dif = $\alpha_1 - \alpha_2$, and α_1 and α_2 are the alpha coefficients for a test score in Populations 1 and 2, respectively. The test statistics is given as:

$$Z = \frac{\alpha_{diff}}{\phi_{diff}} = \frac{\alpha_1 - \alpha_2}{\sqrt{\phi_1{}^2 + \phi_2{}^2}} \quad \text{---------- eqn 1}$$

where $\hat{\phi}_1$ and $\hat{\phi}_2$ are the standard errors for the estimates $\alpha\hat{}1$ and $\alpha\hat{}2$. For this two-tailed alternative, the p value of the test is obtained as twice the area under the standard normal curve to the left of |z|. And the standard error is given by the relation

$$\phi = \frac{SD_r}{\sqrt{(\frac{1}{2} * k * (k-1))}} \text{----------eqn2}$$

Where SD_r is the standard deviation of item inter-correlations and k is the number of items. The independent alpha formula is implemented in the cocron statistical package. Thus, cocron package was used for the comparison of the reliability estimates obtained from two independent groups (group of examinees having low anxiety and the group having high test anxiety). The results are presented as follow:

Table 7: ***Comparison of reliability coefficients estimate of the English language test scores among examinees having low test anxiety and those having high test anxiety***

					95% confidence interval	
	Alpha	χ^2	df	p-value	lower bound	upper bound
LOW	0.729	0.0040	1	0.9497	0.67	0.79
HIGH	0.726				0.67	0.78

Table 8 shows that the reliability estimates of test scores of English among examinees having low test anxiety (α_{low} = 0.73) was approximately the same as the reliability of the test scores of the group of examinees having high test anxiety (α_{high} = 0.73). Dependent alpha formula showed no significant in the reliability estimates of the tests' scores in the two identified groups based on level of test anxiety ($\chi^2(1) = 0.0040, p > 0.05$). Therefore, the hypothesis which stated that there is no significant difference in the reliability of cognitive test scores based on test anxiety was not rejected. Hence, there was no significant difference in the reliability of cognitive (English language) test scores based on test anxiety.

Discussion of findings

Hypothesis one stated that there is no significant difference in the validity of cognitive test scores based on level of test anxiety was rejected.

The cognitive test scores validity among the group of examinees having low- and high-test anxieties were compared. This was done for English language achievement test and it was found that the test scores validity of the English test among examinees having low test anxiety was significantly different from the test scores validity of the English test in the sample of examinees having high level of test anxiety. It was further found that the test scores of English test in the sample of examinees having low test anxiety was more valid than the test scores of the English test in sample of examinees having high level of test anxiety.

The findings suggest that English language test scores validity in samples of examinees having low level of test anxiety differs significantly from the test scores validity of the test in the sample of examinees with high test anxiety. This finding is consistent with a study that used 187 purposely selected sample of undergraduate students confirmed a result that students with high academic achievement tend to experience low level of test anxiety and vice versa (Khalid & Hassan, 2009). The study is also supported by a study carried out by Oludipe (2009), whose findings revealed that test anxiety contributes the major influence on student's under-achievement and low performances at different levels of their educational life. The study was equally in line with Gaudry and Spielberger (1971) with a study conducted and reports revealed that high test anxiety is considered as one of the main factors for low performance of students at university level.

The implication of the findings is that test scores validity of cognitive test varies significantly with respect to examinees level of test anxiety. However, validity of test scores of cognitive tests is at its best among examinees with low level of test anxiety.

Hypothesis two which stated there is no significant difference in the reliability of cognitive test scores based on test anxiety was not rejected.
Series of analysis were advanced based on the comparison of the reliability estimate of test scores of English language achievement test among the group of examinees having low level of test anxiety and groups of examinees having high level of test anxiety. Result showed that the reliability coefficient of English Language test scores based on low level and high-level test anxiety were the same. The findings in this study was consistent with Vogel and Collins (2009), in their findings, it was reported that high and low levels of test anxiety did not affect performance in the study carried them. These findings suggest that reliability of English achievement tests do not vary irrespective of the level of test anxiety of examinees responding to the test questions. It therefore implies that reliability of cognitive test scores remains unchanged irrespective of the level of test anxiety of students responding to the tests.

Conclusion

The general goal of all test users is to ensure a better and enhanced test score validity and reliability. Scores should be able to measure objectively the intended construct it was meant for and consistently too. Therefore, based on the findings of this study, the cognitive tests level of test anxiety effect on score validity and reliability, the English Language achievement tests scores produces a better test scores validity in the samples of examinees with low level of test anxiety than in the samples of examinees with high level of test anxiety. Therefore, it was concluded that examinees should be at a low level of test anxiety before tests is administered to them for a higher validity. However, the level of test anxiety with respect to cognitive tests has no effect on score reliability.

Recommendations

Low level of test anxiety has been considered the best for test scores validity and reliability. Examiners and test administrators should make sure that the procedure for test administration should be such that it will lower the level of test anxiety in the examinees before, during and after the test administration. Issuing of threats by some examiners before, during and after examination should be prohibited.

Examiners should prepare the minds of examinees ahead of time before test takes place. The usefulness of prognostic test cannot be undermined. Conducive environment for test administration is highly recommended. Trained proctors who are skilled in examination ethics and procedure are recommended. Good test items that have undergone refinement analysis will reduce the level of text anxiety because it would have taken care of level item difficulty, content validity and other factors that may increase the level of test anxiety.

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