



Cognitive Test Anxiety as a Predictor of Academic Achievement among Secondary School Students in Makurdi Metropolis, Benue State

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Abstract

For some students, the mention of tests, examinations or thinking about assessments or assignment deadline trigger off some feeling of uneasiness and nervousness which may affect performance if allowed to become too much. It is on predictive strength of cognitive test anxiety on academic achievement. One research question and one null hypothesis guided the study. Adapted and modified cognitive test anxiety scale and achievement test were used for data collection with reliability coefficient of 0.82 and 0.85 respectively. 375 copies of the instruments were administered to the respondents through research assistant. Data collected was analyzed using Regression Statistical analysis technique. The result showed that cognitive test anxiety predict academic achievement and based on the findings, it was recommended that students should thoroughly study in order to increase their confidence level and leave no room for self-doubt or self-defeating behaviour.

Keywords: Cognitive, Test, Anxiety, Academic Achievement.

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INTRODUCTION

Tests and examinations are standard evaluative and assessment tools for measuring a testee knowledge, aptitude, skills and abilities irrespective of age. Rana and Mahmood (2010) have observed that in this test conscious age, the lives of many are not only greatly influenced but are also determined by their test performance. And that some individuals have been prevented from reaching their academic potentials as a result of stress while students' perception of

examination as a source of increase in stress has limited their potential performance during test situation which has resulted in high test anxiety.

Test anxiety which is multidimensional has cognitive (worry), affective (emotional) components interference and lack of confidence (Stober, 2004). Test anxiety it is a physiological and psychological conditions in which someone experiences extreme stress, anxiety during, and/or before taking a test (Zeidner, 1998). Boslaugh (2013) refers to it as an evaluative performance or situational anxiety. Psychological symptoms that build up in students before a test as highlighted by Porto (2013) include restlessness, unusual body movements, difficulty in concentration, insomnia, fatigue, muscles contraction, abdominal pain and tremor. Some anxiety are normal and often help someone to stay mentally and physically alert (Parviz & Alemi, 2010) too much anxiety can result in emotional or physical distress, difficulty concentrating and emotional worry, which influence the academic performance and professional growth negatively (Coon & Mitterer, 2009; Ferreira, Almondes, Briga, Mata, Lemos & Maia, 2009).

Driscoll, Evans, Ramsey and Wheeler (2009), Dorinejad, Hakimi, Ashouri, Dehghani, Zeinal and Daghighi (2011) added showed that when test anxiety is higher, academic performance as lower. It then follows that a moderate level of test anxiety is essential for better academic performance.

Academic achievement is the extent to which a student, teacher or institution has achieved their educational goal (Wikipedia, 2016). It represents performance of outcomes that indicates the extent to which a person has accomplished specific goals that were the focus of activities. Academic achievement prepares students for future career and also allow them enter competitive fields. It can also affect students' opportunities for further education and future occupation. It then means that test scores have been shown to be a powerful predictor of future success as measured by education, occupation and income (Strenze, 2007; Jonsdottir, 2012). Cognitive test anxiety according to Dobson (2009) is a feeling of apprehension and discomfort by cognitive difficulties. Cognitive test anxiety also known as worry is composed of individual's cognitive reaction to situations where they are being evaluated in time prior to, during and after those tasks (Cassady & Johnson, 2002). They mention further that the cognitive component directly influence performance of students in test and examination. Of great important to this study is the relationship between cognitive test anxiety and academic performance.

Research on the relationship between test anxiety and academic achievement repeatedly demonstrated that the cognitive domain of test anxiety has a substantial and meaningful impact on test performance (Morris, Davis & Hutchuchings, 1981). Cognitive test anxiety evidence from traditional correlated studies and meta-analyses, path-analyses have confirmed that cognitive test anxiety has the strongest connection with performance. A research study by Cassady and Johnson (2002) to investigate the effect of cognitive test anxiety on students' academic achievement found out that it exerts a significant stable and negative impact. Another study by Cassady (2005) to examine the effect of cognitive test anxiety on students' memory comprehension and understanding of expository test passage in situations without externally imposed evaluative pressure revealed from the result gathered through structural equation modelling that significant impact of cognitive test anxiety on performance exist in conditions with and without external evaluative pressure and the impacts are stronger in those conditions with external evaluative pressure. This means that test anxiety interferes with learning through deficiencies in encoding, organization and storage in addition to the classic interpretation of retrieval failures.

As indicated by King, Ollendick, Prins (2000), McHroy and Brunting (2002), Onem (2011), Saeidi and Khaliliaqdam (2013), Karata, Alci and Aydin (2013), there is a very strong connection between cognitive test anxiety and academic achievement. High level of test

anxiety is associated with such components as assignment, worry (cognitive) components during stressful activities that subsequently lead to interruption in the performance of the students and reduction of efficiency. According to Iranfar, Khoshnoudi, Rezaei, Ahmadi, Koshay, Rashiditabar, Kashani (2013) in their research study to investigate the relationship between test anxiety and academic performance of students is vital statistics course. In the study conducted by Steinmayr, Crede and Wirthwein (2016) on subjective well-being, test anxiety, academic achievement: testing for reciprocal effects found out that worry (cognitive, component) negatively predicted changes in students' GPA.

Duty, Christian, Ioftus and Zappi (2016) conducted a study in which cognitive component of test anxiety was correlated with academic performance among nursing students. The result indicated modest but statistically significant lower examination grade T-scores in students with high compared with low level of cognitive test anxiety (CTA). High level of CTA were associated with reduced academic performance. Further literature by Cassady (2005), Cassady, Mohammed and Mathieu (2004) and Olatoye (2007) showed that cognitive test anxiety causes poor performance in cognitive task and that the CTA level is dependent on the type of test or examination administered. Oludipe (2009) explored how test anxiety affects students' performance level in the science, he concluded that low test anxious students performed better than high test anxious students in both numerical and non-numerical tasks.

In their study on the relationship between test anxiety and academic achievement, Rana and Mahmood noted that cognitive factors (worry) are pivotal in generating anxiety more than affective (emotionality factor). The research finding on the effect of students' test anxiety and teacher evaluation practices on students carried out by Hancock (2000) showed that students with high test anxiety level performed poorly and were less motivated to learn which result to low performance. Literature on students' sex and cognitive test anxiety scores reported that female students consistently showed high cognitive test anxiety in most cognitive test situations (Olatoye & Afiwape, 2003; Falaye, 2010). As reported by Cassady and Johnson (2002), and Farooqi, Ghani and Spielberger (2012), there was gender differences in test anxiety but the differences were not related to performance on examination. In the same vein, report by Olatoye (2007) showed no significant difference in cognitive test anxiety level of male and female students.

It is evident from the work reviewed that cognitive test anxiety has connection with academic achievement owing to the fact that test may create irrelevant thought, decreased attention and concentration which may lead to academic failure. For example, if before or during a test, a student's level of anxiety is above the optimum level, he may fail to demonstrate his true abilities. Under such circumstances fear of the actual test may disrupt preparation and cause great amount of distress during the test that is more than likely to impair his performance. In other words, students who suffer test anxiety are more likely to experience negative cognitive while in evaluative situation.

How to improve students' performance in English and Mathematics has always been of the problems confronting teachers, parents, education stakeholders and the entire public West African Examination Council (WAEC) and Nigerian Examination Council (NECO) continue to register high increases of incidence of students poor performance in various subjects especially in English Language and Mathematics, the situation is the same in internal examinations. The persistent failure has prevented many of the students from getting admission into tertiary institution since credit pass in these subjects have been made compulsory for admission. In Nigeria, new curricula are being mapped out, more inclusive education is being proposed and more serious move toward educational, science and technological advancement are being put in place yet students' performances are not meeting the expected demand. This unwholesome situation does not augur well with a nation such as

Nigeria that is hoping to attain sustainable educational development by 2030. Despite the efforts made by government, individuals, education stakeholder to improve the students' performance, their performance still remain poor. These prompted this study to investigate the cognitive test anxiety as a predictor of academic performance of secondary school students in Makurdi Metropolis Benue State.

Purpose of the Study

Specifically this study investigated cognitive test anxiety as a predictor of academic performance in English Language and Mathematics among secondary school students in Makurdi metropolis.

Research Question

Only one research question was generated and answered to sharpen the focus of the study:

- To what extent does cognitive test anxiety predict the academic performance in English Language and Mathematics among secondary school students in Makurdi metropolis?

Hypothesis

One hypothesis was formulated to guide the study:

- Cognitive test anxiety does not significantly predict the academic performance in English Language and Mathematics among secondary school students in Makurdi Metropolis.

THEORETICAL FRAMEWORK

This study is hinged on the Attentional Control theory developed by Eysenck and Calvos (1992). It focuses on anxiety and cognitive performance with the assumption that the effects of anxiety on attentional control (individual's capacity to choose what they pay attention to and what they ignore) are key to understanding the relationship between anxiety on performance. According to this theory, anxiety impairs efficient functioning of students' attentional system and increases the extent to which processing efficiency depends on attentional control. In this respect, anxiety may reduce a students' attentional focus to the examination task and instead makes a student focus his or her attention to other stimuli such as thought of worry or other distracting aspect which are not relevant to the task. Thus, the assumption is that worry (cognitive) component decreases school performance.

METHODOLOGY

The study investigated cognitive test anxiety as predictor of academic achievement among secondary school students in Makurdi Metropolis of Benue State. To guide the study one research question and one null hypothesis were stated. A total of 375 (142 males and 233 females) out of 3,754 senior secondary school students in 20 senior secondary schools in Makurdi Metropolis were used for the study (Source: Benue State Ministry of Education, Statistics Unit 2015).

Adapted and Modified Cognitive Test Anxiety Scale developed. Cassady & Johnson (2002), and Achievement tests were used for data collection. The cognitive test anxiety had sections A and B. Section A consisted of the respondent's personal data such as school, age sex while section B had 4 response categories as Very Typical (VT), Some What Typical (ST) Quite Typical (QT), Not All Typical (NT) that were assigned 4,3,2,1 respectively. The instrument was pilot-tested on 30 students who were not part of the study. This enabled the research to generate the data for computing the internal consistency of the instrument using Cronbach Alpha method which yielded a reliability coefficient index of 0.82.

The achievement test was a 40 item objective test in English Language and Mathematics drawn from the past SSCE papers and were found to have high validity and reliability of 0.85 using Cronbach Alpha method. The researcher and three research assistants administered the copies of the instruments to the 375 respondents with the approval of school heads in various schools. All the copies were retrieved. Regression Statistical Analysis was used to test the null hypothesis at 0.05 level of significance.

RESULTS

The mean scores and standard deviation of the respondents in the study variables across sex is presented in Tables 1.

Table 1: Descriptive statistic of the subjects by sex

SN	Variable	Sex	N	mean	SD
1.	Cognitive test anxiety	Male	142	51.296	11.836
		Female	233	54.386	11.792
		Total	375	53.216	11.888
2.	Performance in English Language	Male	142	19.880	3.457
		Female	233	21.223	3.596
		Total	375	20.715	3.599
3.	Performance in Mathematics	Male	142	19.486	2.931
		Female	233	16.176	3.200
		Total	375	17.429	3.489

The information in Table 1 gives a descriptive statistic of the study variables. From the table, the mean score for the male as regards to cognitive test anxiety is 51.296 which is less than 54.386 obtained for the female and the overall cognitive test anxiety of the students is 53.216. The information in the table further shows that the mean score for the male as regards to performance in English Language is 19.880 which is less than 21.223 obtained for the female while the mean score for the male as regards to performance in Mathematics is 19.486 which is greater than 16.176 obtained for the female and the overall performance of the students in English Language and Mathematics are 20.715 and 17.429 respectively. These shows that on the average, the females have more cognitive test anxiety than the males and females also performed better than the males in English Language while the males had better academic performance in Mathematics than the females.

Hypothesis

Cognitive test anxiety does not significantly predict academic achievement among secondary school students in Makurdi Metropolis. The independent (predictor) variable is cognitive test anxiety while the dependent (criterion) variable is students' academic achievement (English Language and Mathematics). The statistical analysis technique used to test this hypothesis

was Linear Regression analysis tested at .05 level of significance. The inter-correlation coefficient among the variables is shown in Table 2.

TABLE 2: Inter-correlation between cognitive test anxiety variable and students' academic achievement (N=375)

Variables	Cognitive test anxiety	Performance in English Language	Performance in Mathematics	p-level
Cognitive test anxiety	1.000	-.057	-.273*	
Performance in English Language	-.057	1.000		.137
Performance in Mathematics	-.273*		1.000	.000

*Significant at .05 level.

The above table shows the correlation between cognitive test anxiety and students' academic in English Language and Mathematics. The correlation value of $-.057$ obtained for performance in English Language indicated that a weak negative correlation exists between cognitive test anxiety and students' academic in English Language and the correlation value of $-.273$ obtained for performance in Mathematics indicated that a weak negative correlation exists between cognitive test anxiety and students' academic in Mathematics. This is because the correlation values of $-.057$ and $-.273$ obtained for English Language and Mathematics respectively are far away from 1. The closer the value is to 1, the stronger the relationship. Similarly, cognitive test anxiety and students performance in English Language are not statistically significant ($p=.137$) while cognitive test anxiety and students performance in Mathematics are statistically significant ($p=.000$). This indicates that the higher the level of cognitive test anxiety the lower the students' academic performance in both English Language and Mathematics and vice versa.

Therefore, based on the correlation values of $-.057$ and $-.273$ which indicates a weak negative correlation between the variables, the null hypothesis which stated that cognitive test anxiety does not significantly predict academic achievement among secondary school students in Makurdi Metropolis is hereby upheld as regards English Language but is rejected as regards Mathematics.

The composite contributions of cognitive test anxiety to academic performance of the students in English Language and Mathematics were check as stated in Table 3.

TABLE 3: Regression analysis of the prediction of students' academic performance in English Language and Mathematics with cognitive test anxiety

Variables	Source of variance	Sum of square	df	Mean square	F-ratio	p-level
English Language	Regression	15.527	1	15.527	1.199	.274
	Residual	4828.943	373	12.946		
	Total	4844.469	374			
Mathematics	Regression	338.182	1	338.182	29.922*	.000
	Residual	4215.696	373	11.302		
	Total	4553.877	374			

*Significant at .05 level.

($R=.057$, $R\text{ square}=.003$ for English Language; $R=.273$, $R\text{ square}=.074$ for Mathematics)

The result in Table 3 shows that the analysis of variance was used in measuring the fitness of the regression model. From the above table, the F-statistic values obtained for performance in

English Language and Mathematics are 1.199 and 29.922 respectively while the p-values obtained for English Language and Mathematics are .274 and .000 respectively. This indicates that the regression model does not fit the data for English Language but the regression model fit the data as regards to Mathematics because the p-value for English language is greater than .05 while that of Mathematics is less than .05.

The table further shows the R-values of .057 and .273 representing the regression coefficient between cognitive test anxiety and students' academic performance in English Language and Mathematics respectively. The R-squares values of .003 and .074 represent the total variability of the students' academic performance in English Language and Mathematics respectively as explained by cognitive test anxiety. A multiple R-squares of .003 and .074 imply that cognitive test anxiety account for .30 percent (.30%) and 7.4 percent (7.4%) of the variance in the academic performance in English Language and Mathematics respectively among secondary school students in Makurdi Metropolis. To find out the relative contributions of cognitive test anxiety to academic performance in English Language and Mathematics among secondary school students in Makurdi Metropolis, a test of regression weight was carried out. The result is presented in Table 4.

TABLE 4: Test of regression weights for contributions of each of cognitive test anxiety on students' academic performance in English Language and Mathematics

	Variables	B	Standard error	Beta wts.	t-ratio	p-level
English Language	Constant	21.627	.853		25.344	.000
	Cognitive test anxiety	-.017	.016	-.057	-1.095	.274
Mathematics	Constant	21.686	.797		27.199	.000
	Cognitive test anxiety	-.080	.015	-.273	-5.470*	.000

The result in Table 4 shows the effect of cognitive test anxiety over the students' academic performance in English Language and Mathematics. Analysis of the coefficient table shows that when cognitive test anxiety is constant, we have a t-statistic values of $t=25.344$ with a value of $p=.000$ and $t=27.199$ with a value of $p=.000$ for performance in English Language and Mathematics respectively, these are statistically significant because $p<.05$. On the other hand, cognitive test anxiety has a t-statistic values of $t=-1.095$ with a value of $p=.274$ and $t=-5.470$ with a value of $p=.000$ as regards to performance in English Language and Mathematics respectively. These indicate that cognitive test anxiety and performance in English Language are not statistically significant because $p=.274$ which is greater than .05 while cognitive test anxiety and performance in Mathematics are statistically significant because $p=.000$ which is less than .05. The result further shows that the Beta values obtained for English Language and Mathematics are $-.057$ and $-.273$ respectively.

The unstandardized coefficient measures the extent to which the independent variable can predict the dependent variable. From the table, cognitive test anxiety (independent variable) is predicted to decrease students' academic performance in English Language (dependent variable) by .017% while cognitive test anxiety (independent variable) is predicted to decrease students' academic performance in Mathematics (dependent variable) by .080%. That shows that for any additional unit of cognitive test anxiety in learning, the students' academic performance in English Language is predicted to decrease by .017% while for any additional unit of cognitive test anxiety in learning, the students' academic performance in Mathematics is predicted to decrease by .080%. Based on the obtained results, the null hypothesis that cognitive test anxiety does not significantly predict academic

achievement among secondary school students in Makurdi Metropolis is upheld as regards to students' academic performance in English Language but is rejected as regards to Mathematics. It was finally concluded that cognitive test anxiety has a negative effect on students' academic achievement.

DISCUSSION

The result finding indicated that cognitive test anxiety had a negative impact on students' academic achievement. Cognitive (worry) component of test anxiety is the factor most consistently found to be associated with decline in performance because it involves negative thought, self-criticism or concern about the negative consequences of failure that occurs during test situation. Worry negatively predict changes in academic achievement (Eysenck, Derakshan, Santos & Calvo, 2007). This study is consistent with the findings of King Ollendick, Prins (2008), McHroy and Brunting (2002) Onem (2011), Saeidi and Khaliliaqdam (2013), Karata, Alci and Ayolin (2013) who stated that there is a strong connection between cognitive test anxiety and academic achievement.

The finding also revealed sex differences in cognitive test anxiety with the females having higher test anxiety than the males. Males and females experience similar level of test worry but females have higher level of the emotionality component which produces higher general test anxiety (Cakici, 2016). Males typically score lower on measurement of test anxiety than females (Lashkaripour, 2006; Najjarian & Ahmadi, 2001). Huberty (2008) emphasized that adolescents have high biological and personality disposition to high level of general anxiety that make them more susceptible to the effect of being evaluated. Another plausible explanation is that the males are more defensive about admitting anxiety because it will be seen as threatening to the masculinity; they are trained to cope with it by denying it or by finding ways to overcome it (Mousavi, Haghshenas & Alishahi, 2008).

The finding further showed that the males performed better in Mathematics while female in English Language. It is widely believed that girls and boys show different aptitude in key cognitive skills with girls being better at language and boys at technical subjects like Science and Math. Steinmayr and Spinath (2008), and Voyer and Voyer (2014) observed that males outperform females on test of mental rotation while the females outperform males on word fluency (Weiss, Ragland, Brensinger, Deiseichammer & Delazer, 2006). It then implies that the impact of high stakes situation is more pronounced for boys than for girls. Girls' show a greater preference for person oriented activities (empathisizing) and boys a preference for systems and machines (Shibley-Hyde, 2005). Gender socialization or stereotype has caused girls to lose interest in Math and lack of confidence in Mathematical ability. This situation has put the girls in a greater disadvantage because the most accurate predictor of performance on tests in Math is the number of math courses taken. Spelke (2005) found out that gender differences in Math and Science ability have a genetic basis in cognitive systems that emerge in early childhood. Also women have greater anxiety during a Math test which taxed with working memory and lead them to underperform on the test.

CONCLUSION

This paper has examined cognitive test anxiety as a predictor of academic achievement and on the basis of the result of the analysis of data collected on the variable it was concluded that cognitive test anxiety of student predict the level of their performance in cognitive activities in school. Thus, the higher cognitive text anxiety, the lower the academic performance of students.

Recommendations

Based on the findings, the following recommendations were made:

- Systematic relaxation and desensitization techniques, which relax all the muscles and helps the individual imagine the anxiety producing situation can be used by psychologist for several weeks to help the students;
- Cognitive restricting technique should be used under to replace the negative, irrational messages about test with positive ones;
- Girls should be taught strategies to manage anxiety. This will help close gender gap in Math achievement;
- The students should thoroughly study in order to increase their confidence level and leave no room for self-doubt or self-defeating behaviour.

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