HYPOTHESIZING COGNITIVE TEST ANXIETY AND ACADEMIC PERFORMANCE BY GENDER AND GRADE LEVELS OF COLLEGES OF EDUCATION STUDENTS IN GHANA

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ABSTRACT: *Psychologicalfactors such astest and examination anxiety and stress are important indicators of students' learning outcomes and academic performance. This surveylooked at cognitive test anxiety and examination scores of college of education students by gender and grade level differences. A total of 236 teacher trainees were selected via stratified and random sampling techniques for the survey. The cognitive test anxiety scale [CTAS] (α=0.91) by Cassady and Johnson (2002) was used to conduct the survey.Frequency count, percentage and independent samples t-test were computedwith the aid of Statistical Package for Social Sciences (SPSS) version 22. The study revealed high levels of examination anxiety among female students (p=0.004), but the cognitive test anxiety between level 100 and level 200 studentswas statistically insignificant (p $\geq$ .05). It is recommended that teachers, parents and educational administrators should support and boost the self-esteem of college of education students through cognitive, affective, motivational and behavioural strategies.*

KEYWORDS: Academic performance, test anxiety, cognitive test.

INTRODUCTION

Test anxiety describes the fear and panic of students about the ability of students to perform well in an examination. In the views of Mathews, Zeidner and Robert (2006), test anxiety refers to the negative effect, worry, physiological arousal, and behavioural concerns about failure or lack of competence in an examination task. Test anxiety affects between 25% and 40% of students (Cassady, 2010), which significantly interfere with their performance, emotional and behavioural well-being, school drop-out, school absenteeism and attitudes toward school (Huberty, 2009). Tests and examination trigger anxiety and psychological trauma among the students. Test anxiety is debilitative to students. It is one of the barriers to effective learning and academic performance in any educational institution is test anxiety. As a psychological factor, it may affect students' academic performance by preventing some learners from reaching their academic and educational potentials.

Oftentimes, tests and examinations are a source of anxiety for students because of a feeling of uncertainty and unfairness surrounding true achievements (Spielberger, cited in Rizwan& Nasir, 2010). Such feelings among students decrease their potential performance during tests and examinations. Test anxiety may result in an error towards measuring student's true academic achievement.

In Ghana, high qualifications have been regarded as the yardstick for recruitment, placement and advancement in organizations. High academic performance is also a parameter which is highly adopted in the selection of candidates for admission into secondary, colleges and tertiary institutions. Moreover, high premium is placed on academic performance in Ghanaian colleges of education due to the transition of Ghanaian colleges of education from the status of diploma to bachelor of education degree awarding for a beginning teacher certification. Due to this, high premium is placed on academic performance, as individuals do everything possible to obtain excellent results. This no doubt places students at varying levels of anxiety and tension in the process. Because of the importance attached to tests and their grades as predictive factors, anxiety has been raised in the minds of many students. Teacher trainees in colleges of education in the Upper East Region of Ghana are no exemption to this phenomenon.

Statement of the problem

Test anxiety is a serious problem among students in Ghanaian colleges of education, yet very little study has been carried out into it. It is predictive of poor examination scores of most teacher trainees in the Upper East Region of Ghana. Existing research on the phenomenon has been done in the western world (Speilberger, 2012; Kendra, 2012; Cassady, 2010; Huberty, 2009). A study reported that students in various levels of education, particularly in Ghanaian colleges of education are subjected to strict examination and other unfavourable conditions which create test anxiety among students (Atindanbila, Abasimi&Nyarko, 2014). This suggests that scholars in Ghana have done little on this important phenomenon that affects directly or indirectly students' academic performance. This implies that little attention is paid to this phenomenon in Ghana, particularly in colleges of education in the Upper East Region. The paucity of empirical data on the subject matter in Ghana is an empirical gap.

Purpose

The survey looked at cognitive test anxiety and examination scores ofColleges of Education students in the Upper East Region. Specifically, itexamineddifferences in cognitive test anxiety betweenmale and female students, as well as between level 100 and 200 students.

Research hypotheses

H_1: *There will be no statistically significant differencein cognitive test anxiety andexamination scores of male and female college of education students in Upper East Region of Ghana.*

H_2: *There will be no statistically significant difference in cognitive test anxiety and examination scores of level 100 and 200 college of education students in the Upper East Region of Ghana.*

Significance of the study

Theoretically, this research would contribute to the on-going debate about cognitive test anxiety and performance in examination task to fill the gap in contemporary literature. The study would provide counsellors and psychologists additional information on good study habits and other learning skills that are acquired by students. This information could be used in counselling both tutors and trainees on strategies to reduce test anxiety among students as they prepare for examinations.

THEORETICAL FRAMEWORK

The Theory of Arousal by Hebb (1972)posits that human beings pursue an ideal level of stimulation such that too little of it brings about monotony while too much of it leads to anxiety. This theory assumes that both little and much levels of anxietyyield minimum performance while a moderate level results in maximum performance. Two models, Cognitive Interference Model (CIM) and the Skill-Deficit Model (SDM) further illuminate discussion of Hebb's theory.

Cassady (2004) indicated that each person has a certain amount of working memory capacity that he or she could utilise when situations demand cognitive processing. Students who are highly anxious havedivided attention between task demands and personal concerns compared to those who have lower anxiety. Specifically, test anxious students are preoccupied by interfering thoughts and have problems encoding the learned material.

The Skill-Deficit Model by Hill and Wigfield's (1984) sheds light on what triggers test anxiety. This model suggests that students who have reduced performance attribute such performance to inadequate preparation in study skills or having poor test-taking skills. Culler and Holahan (1980) as cited in Denizli (2004) in a study on the effects of study skills on test anxiety and academic performance, found a negative relationship between the mean grade point average (GPA) and test anxiety scores.
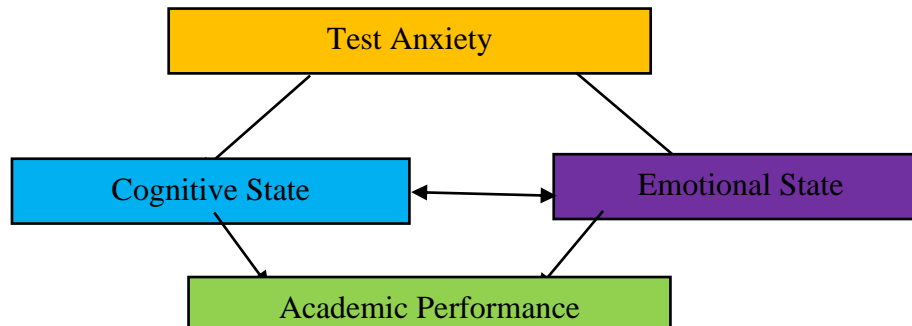
Conceptual framework

Figure 1: Relationship between cognitive test anxiety and academic performance

Source: *Adapted from Munch and Broder (1999)*

In Figure 1, the dependent variable is trainees' academic performance while test anxiety constitutes the independent variables. Any form of anxiety is a reaction to anticipation about something stressful but test anxiety is when a student excessively worries about doing well on a test. Test anxiety induces two states in students during examination which can either hinder or facilitate students' academic performance. These two states are cognitive state of the student which generates several thoughts in the mind of the student, either positively or negatively. If the thoughts are positive, then it may result in enhanced academic performance. Conversely, if the thoughts are negative then it may hinder academic performance. The second state induced by test anxiety is emotionality. This is the physiological reaction experienced by students during examination. Similar to that of the cognitive state, if the reactions are positive it may lead to better examination or test scores, but if the reactions are negative, it may lead to poor result. Essentially, test anxiety also has both biological and mental aspects which are related to the emotional and cognitive states of test anxiety. These worry reactions contributed to the performance decrements on cognitive intellectual tasks (Cassady& Johnson, 2002).

Many students experience some level of stress in an examination. Theoretically, test anxiety refers to the negative effect, worry, physiological arousal, concerns about failure or lack of competence on an examination (Mathews, Zeidner, & Robert, 2006). Some students often perceivethreat from teachers during examination tasks, and about cancelation of written examinations, among others (Meetei, 2012). Test anxiety operationally refers to disturbing, distracting emotions, preoccupied feelings or fear of evaluation situations that students experience during test and examination situations. A student experiences test anxiety when he/she excessively worries about doing well on a test.

Test or examination anxiety experiences may be linked to attitude of teachers, and phobia for particular subjects like mathematics and science subjects (Speilberger, 2012). Test anxiety level could be high, moderate or low. High test anxiety refers to students who score seventy two (72) and above. Moderate test anxiety refers to students whose scores range from sixty

two to seventy one (62-71) on the cognitive test anxiety scale. Low test anxiety refers to those students whose scores range from twenty seven to sixty one (27-61) on the cognitive test anxiety scale. The ranges of the various levels of test anxiety that is (27-61 low test anxiety), (62-71 moderate test anxiety) and (72 and above) are the standard score ranges of the scale (Cassady& Johnson 2002). Test anxiety tend to make students tensed, apprehensive, nervous and emotionally aroused (Speilberger, 2012), and decrements on cognitive or intellectual tasks (Kendra, 2012). People with low self-esteem, poor reading, failing grades, disruptive classroom behaviour, negative attitudes toward school, and nervousness often experience high test anxiety. Barrow, Dunn and Lloyd's (2013) provide empirical evidence that supported self-efficacy, test anxiety, and overall academic success.

With regard to gender difference, several researchers (Erbe, 2007; McDonald, 2001; Putwain, 2007; Stober, 2004; Wren & Benson, 2004; Yerin, 2003) showed divergent views on gender differences in test anxiety. For instance, Capell et al. (2005) cited in Atindanbila, Abasimi, Nyarko and Atambila (2014) found that gender significantly influenced test anxiety. Contrary to several studies reporting higher test anxiety in females than males, other research findings show no gender difference (Erbe, 2007; Fiore, 2003). Test anxiety was found to be negatively associated with academic achievement for females (Zeidner&Safir, 2001).

In terms of the influence of cognitive test anxiety on the academic performance of students of different levels or grades, Markman, Rhoades, Stanly, Whitton and Ragan (2010) argued that test anxiety peaks at higher educational levels during both study time and testing. A number of studies reported that student's academic level impacted on their test anxiety level (Ferdous, 2012; Guress, 2010; Sansgiry, Kavita& Sail, 2006; Waterworth, 2003; Yousefi, 2009). Notwithstanding, Fulya (2008) found an insignificant relationship. A research by Liu (2006) showed that students with advanced English proficiency tended to be less anxious. Elkhafaifi (2005) also found that advanced students had lower language anxiety levels than beginning or intermediate students. Casado and Dereshiwsky (2001) found that students' level of language anxiety seemed to increase slightly rather than decrease.

METHODOLOGY

The research design

Thestudy adopted the cross-sectional survey design. The rationale for the adoption of a cross-sectional survey design was that it relies on large-scale data from a representative sample of a population with the aim of describing the nature of existing conditions (Cohen, Manion&Morrisson, 2011).

Population, sample and sampling techniques

The target population was one thousand five hundred and sixty-seven (1,567) level hundred (100) and level two hundred (200) teacher trainees of two (2) Colleges of Education in the Upper East Region of Ghana. The accessible population of the 1,567 levels 100 and 200 teacher trainees of the two colleges were used because they were the only category of students on campus and were preparing to write the end of first semester examinations. The third years were already in off-campus for teaching practice. A combination of stratified and simple random sampling techniques was used to sample 236 (15%) trainee teachers. The

respondents were stratified into categories based on school, grade and gender. A total of 161 male and 75 female students were randomly sampledfrom the two college of educationusing the lottery approach. In college 'A', one hundred and one (101) teacher trainees comprising thirty-four (34) male and nineteen (19) female level 100 students as well as forty-two (42) male and sixteen (16) female level 200 students were sampled for the study. In college 'B', a total of one hundred and twenty-five (125) teacher trainees comprising forty-three (43) male and twenty-two(65) female level 100 students as well as forty-two (42) male and eighteen (18) female level 200 students were sampled for the study. The sample was deemed representative of the target population based on the recommendations of Gay and Airasian (2003) that a sample size of 10% to 20% is representative in descriptive research.

Instrumentation

The Cognitive Test Anxiety Scale (CTAS) by Cassady and Johnson (2002) was used to collect data for the study. The cognitive Test Anxiety Scale (CTAS) had a reliability coefficient of 0.91. The instrument was pilot tested on twenty (20) levels 100 and 200 students from Tumu College of Education in the Upper West Region of Ghana.

Data analysis and presentation

The data were analysed using frequency count and percentage as well as independent samples t-test computed at a significance level (p-value) of $p \leq 0.05$ (2-tailed) at a Confidence Interval (C.I) of 95% with a margin of error of ± 5. Independent samples t-test was computed to compare the significant differences in means of the influence of cognitive test anxiety on the academic performance of students by gender and grade level differences.

RESULTS

Demographic Information

Table 1: Demographic characteristics of respondents (n = 236)

Variable	Freq	%
Sex		
Male	161	68
Female	75	32
Level/Grade		
100	118	50
200	118	50

It is observed in Table 1 that more male (n = 161, 68%) than female (n = 75, 32%) teacher trainees, but of equal proportion of the respondents from level 100 (n=118, 50%) and level 200 (n=118, 50%) were used for the study in both colleges of education. This result suggests that there were relatively equal proportions of students in different grade levels, but with more male than female students in colleges of education in the Upper East Region of Ghana. This conjecture led to the formulation of two hypotheses that, "*There is no statistically*

significant deference between the influence of cognitive test anxiety on the academic performance of male and female students colleges of Education in Upper East Region” (hypothesis 1). Secondly, *“There is no statistically significant difference between the influence of cognitive test anxiety on the academic performance of level 100 and 200 students in colleges of Education in the Upper East Region”* (hypothesis 2).These assumptions were statistically subjected to independent samples test (t-test) at a significance level of p<0.05. The t-test results are shown in Tables 2 and 3.

Table 2: Independent samples t-test of cognitive test anxiety (CTA) and academic performance by gender differences of teacher trainees (n = 236)

Gender	Sample (N)	Mean	Std. Deviation	t	df	p-value
Male	161	72.58	5.81	-2.898	234	0.004
Female	75	74.96	5.85			

*Test variables - Dependent variable (*cognitive test anxiety*) and independent variable (*gender*).

** df (234) - degrees of freedom

*** t-test is significant at the .05 level (2-tailed).

The result in Table 2 shows statistically significant gender differences in cognitive test anxiety and academic performance of the teacher trainees. A comparison of the mean differences indicate a higher mean score for female teacher trainees (M= 74.96, N= 75, SD= 5.85) as compared with their male counterparts (M= 72.58, N= 161, SD= 72.58). The t-test is statistically significant; [t (234) = -2.898, p = 0.004, 2-tailed] The study reveals that female students experienced higher cognitive test anxiety than their male counterparts. This finding suggests that gender has a significant effect on the level of anxiety among teacher trainees in Colleges of Education in the Upper East Region of Ghana. The finding validates the views of several researchers (Chapel et al., 2005 cited in Atindanbila et al., 2014;Unruh & Lowe, 2010; Putwain, 2007; Erbe, 2007; Stober, 2004; Wren & Benson (2004; Yerin, 2003; college students have also reported higher mean test anxiety scores than males (Erbe, 2007; McDonald) who found that female student experienced higher test anxiety than male students. The gender differences in test anxiety level may be attributed to different social roles assigned to males and females and increased emotional vulnerability of women to these differences in their roles. Besides, Maccoby and Jacklin cited in Lowe and Lee (2008) argued that young women are socialized to express emotions whereas men learn to minimize emotional experiences. Juxtaposing the result to that of hypothesis one, it could be anticipated that female students would have low academic performance than the males due to high cognitive test anxiety. However, the finding contradicts the views of other researchers (Fiore, 2003; McDonald, 2001) who found no difference in test anxiety on account of gender. Similarly, the finding is inconsistent with that of Zeidner and andSafir (2001) who found a statistically significant negative correlation between test anxiety and academic achievement.

Table 3: Independent samples t-test of cognitive test anxiety (CTA) and academic performance by grade level differences of teacher trainees (n = 236)

Grade level	Sample (N)	Mean	Std. Deviation	t	Df	p-value
Level 100	118	73.97	5.82	1.463	234	0.145
Level 200	118	72.83	5.97			

*Test variables - Dependent variable (*cognitive test anxiety*) and independent variable (*grade level*).

** df (234) - degrees of freedom

*** t-test is significant at the .05 level (2-tailed).

The data in Table 3 shows no statistically significant difference in the cognitive test anxiety between level 100 and level 200 students [t (234) = 1.463, p=.145, 2-tailed] at 0.05 alpha level of a confidence interval (C.I) of 95% even though the mean differences indicate that level 100 students experienced higher cognitive test anxiety (M=73.97, SD=5.82) as compared with their counterparts in level 200 (M=72.83, SD=5.97). There is ample evidence to conclude that grade level is not a critical factor that determined cognitive test anxiety level of students in colleges of education in Upper East Region of Ghana. This result is consistent with the research findings of Fulya (2008) who did not find any significant difference in test anxiety according to grade level. The possible explanation for this result may be that students used in this study displayed a similar attitude irrespective of their academic levels and departments towards test anxiety. However, the finding is inconsistent with the submission of other researchers (Ferdous 2012; Mansor et al., 2009; Sansgiry et al., 2006) who discovered higher test anxiety level among lower grade students than higher grade students. On the other hand, Markman et al. (2010) and Elkhafaifi (2005) observed that test anxiety peaks at higher or advanced educational levels than beginning or intermediate levels.

FINDINGS

The main findings of this study show that female students ranked higher in cognitive test anxiety (M=74.96, SD=5.85) than their male counterparts (M=72.58, SD=5.81).Even though there was no statistically significant difference between the level of cognitive test anxiety based on level, the level 100 students had higher cognitive test anxiety mean score (M=73.97, SD=5.82) than their counterparts in level 200 (M=72.83, SD=5.97). But the results from the independent sample t-test showed that there was no statistically significant difference between the influence of cognitive test anxiety on level 100 and 200 students' academic performance (t(226)=1.463,p=0.145).

CONCLUSIONS

Based on the findings of the study, it is concluded that female students ranked higher in cognitive test anxiety than their male counterparts. This may be attributed to different gender and social roles assign to males and females. Also, there is enough evidence to conclude that level or grade of students is not a critical factor that influenced cognitive test anxiety of students in Colleges of Education in the Upper East Region. The finding indicated that level 100 students had higher level of test anxiety than level 200 hundred students, but this finding was not statistically significant. This may be attributed to same attitude of students in different levels such as not studying and wait till last minute to cram volumes of materials to be learned.

RECOMMENDATIONS

In view of the above findings, the study makes the following recommendations:

1. Counsellors in the colleges of education in the Upper East region should deal with test anxiety and other problems that students face during their academic life. They should provide interventions to remedy test anxiety and other related problems that students may encounter.

2. Counsellors in the colleges of education in the Upper East region should also focus on grooming students in study habits and skills to stabilize their emotional response to potentially difficult situations like tests.

3. It is further suggested that students should be fully informed by the institutional administrators and departments about the nature of courses, duration of the semester, and level of commitment necessary for the successful completion of the course.

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