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The Influence of Demographic Variables on Test Anxiety of Undergraduate Students

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Abstract:

The study was a cross-sectional research aimed at investigating the influence of demographic variables on test anxiety of undergraduate students. The population of study was university undergraduates drawn from the University of Education Winneba. A sample of 303 final year undergraduate students were drawn from the university using the table of random numbers. The study adopted the 10-item Test Anxiety Scale by Nist and Diehl (1990). Independent samples t-test, one-way ANOVA and Pearson correlation were used to test hypotheses 1, 2 and 3 respectively. Hypothesis one revealed that test anxiety level between male and female students differ significantly, with female students experiencing higher test anxiety than males. Hypothesis two revealed a significant difference between students' programmes and their test anxiety level with Business students showing significant test anxiety than Arts students. For hypothesis three, it was revealed that there is exist a weak positive statistically significant relationship between CGPA of students and their test anxiety level. It was concluded that test anxiety is a variable that most students would have to contend with in the process of tertiary education. However, differences abound in the reported levels of test anxiety when these students are grouped according to Gender, Programme of Study and CGPA. It was recommended that authorities of the University should devise alternative means for assessing students' academic achievement instead of the usual pen and pencil tests. The focus of the examination should be performance oriented instead of merely collection of facts (cognition).

Keywords: Gender, Programme, CGPA, test anxiety

1. Introduction

Test anxiety has become major drawback in the assessment of teaching and lesson process (Cassady, 2004; Nicaise, 1995; Zeidner, 1998). Nicaise (1995) proposed that test anxiety triggers negative feelings about an evaluation. In most cases, these negative feelings cause faster heart beat and increased perspiration from the sweat glands, leading to feelings of apprehension and inadequacy. Similarly, Zeidner (1998) confirmed that test anxiety activates negative phenomenological, physiological and behavioural responses from testees. It can be deduced from Zeidner's (1998) statement that test anxiety is strongly related to failure consequences. Rafiq, Ghazal and Farooqi (2007) and Cassady and Johnson (2002) acknowledged that intense test anxiety may impair students' performance and wellbeing in the long run.

Literature suggest that test anxiety levels vary in terms of gender, programme, and Cumulative Grade Point Average (Cassady & Johnson, 2002; Cizek & Burg, 2006). On gender differences, several researchers found female students experiencing higher levels of overall test anxiety than males (Chapell, Blanding, Takahashi, Silverstein, Newman, Gubi, & McCann 2005; Cassady & Johnson, 2002; Zeidner, 1998; Mehregan, Najjarian & Ahmadi, 2001). McDonald (2001) found gender difference on measures of test anxiety with female participants scoring higher than male participants at the total test anxiety level. A study by Wren and Benson (2004) among US sample of 261 children in Grades 3 through 6 on the Children's Test Anxiety Scale revealed that girls scored statistically significantly higher than boys. However, in Nigeria, Onyeizugbo (2010) reports that gender does not significantly influence the test anxiety of college students.

In terms of programme of study and test anxiety, significant differences were found among students pursuing different (Cizek & Burg, 2006; Kurbanoglu & Nefes, 2015; Nyroos & Wiklund-Hornqvist, 2011). For instance, Cizek and Burg (2006) found strong positive correlation between anxiety levels and achievement in reading, mathematics, natural science, and social science is negative and in the weak to moderate range. At the college and high school level, Nyroos and Wiklund-Hornqvist (2011) reported that students experience anxious moments when taking mathematics or physical science tests than English and social science tests. Though Kurbanoglu and Nefes (2015) confirmed that differences exist in test anxiety of students with respect to their programme of studies, there is a caveat to the degree at which different students would experience test anxiety. Again, Kurbanoglu and Nefes (2015) posit that levels of test anxiety are associated with students' interests in the subject regardless of whether or not the subject area is truly more difficult. For example, Ali and Mohsin (2013) report that students who enjoy science and find it interesting are more likely to have less anxiety when taking a science test than a student who is disinterested in that subject.

Salim (2000) raised the argument that students perform poor in public examinations in science and science related subjects as compared to other subjects. This is because most students become anxious when manipulating

numerical and scientific sort of questions. Dew, Galassi and Galassi (1984) agreed that in science subjects, numerical answers are more likely to be required hence can warrant phobic feelings among students who may have disinterest in the subject. Everson, Tobia, Hartman and Gourgey (1993) study report proposed that physical science students have highest level of test anxiety when compared with Mathematics, English and other humanities.

Although research into foreign language anxiety is abundant, few investigations have directly focused on test anxiety (Chastain, 1975; Phillips, 2002; Liu & Jackson, 2008). Among these few studies is Chastain's (1975). Chastain found that test anxiety was negatively and moderately correlated with course grades in beginner-level, French audio lingual classes, whereas test anxiety was positively and very weakly correlated in beginner level, regular French classes ($r = 0.18$) and test anxiety was positively and weakly correlated in beginner-level, regular German and Spanish classes. In another study by Horwitz, Horwitz, and Cope (1986), test anxiety had a negative and very weak relationship with final grades in the case of introductory-level, foreign language students. Phillips (1992) found significant relationship between language anxiety and students' oral test performance. Phillips measured the correlation between language anxiety and oral test performance and found that there was a moderate negative relationship between them. Liu and Jackson (2008) investigated the unwillingness to communicate and anxiety of Chinese learners of English as a foreign language. Their results revealed that most of their participants were willing to participate in interpersonal conversations, but they did not like the risk of using/speaking English in class.

Finally, the relationship between test anxiety and academic achievement (CGPA) cannot be overlooked. Studies have demonstrated negative correlations between test anxiety and GPA, with reported correlations ranging from $- .15$ to $- .24$ (Chapell et al., 2005; Greenberger et al. 2008). Using Test Anxiety Instrument (TAI), Chapell et al., (2005) looked into the relationship between the level of test anxiety and GPA. They found a negative correlation between test anxiety and GPA. As test anxiety increased, GPA of undergraduates decreased. Test anxiety can be considered a major cause of students' low academic achievement and negative attitudes in science education (Kurbanoglu & Nefes, 2015).

Test anxiety poses significant challenge on students' true ability on a given test. The effects of test anxiety extend beyond the four corners of the school. It affects many people in various life stages and careers beyond school, whenever their abilities, achievements, or interest are assessed (Lufi, Okasha, & Cohen, 2004). In the viewpoint of Sarason and Stoops (1978), anxiety has adverse and negative effects in the processes of assessment. Though many researchers attempted to look at the overall effects of test anxiety on students' output, there is paucity of knowledge on demographic triggers of test anxiety among undergraduate students. Hence, this study attempts to explore the extent to which test anxiety is influenced by the demographic variables of undergraduate university students.

1.1. Objectives

- To investigate gender differences in test anxiety of undergraduate students.
- To ascertain whether the undergraduate students would report differently when they are classified according to programme of study.
- To examine whether significant relationship exist between students' Cumulative Grade Point Average (CGPA) and their test anxiety level.

1.2. Hypotheses

- H_0 : There is no statistically significant difference between gender and test anxiety among students.
- H_1 : There is a statistically significant difference between gender and test anxiety among students.
- H_0 : There is no statistically significant difference between students' programme and their test anxiety level.
- H_1 : There is a statistically significant difference students' programme and their test anxiety level.
- H_0 : There is no statistically significant relationship between students' Cumulative Grade Point Average (CGPA) and their test anxiety level.
- H_1 : There is a statistically significant relationship between students' Cumulative Grade Point Average (CGPA) and their test anxiety level.

2. Methodology

The study adopted a cross-sectional research design of data collection. The researcher measured the variable of interest as they had occurred and there was no conscious attempt to manipulate any of the variables that were measured in the study. The population of study was university undergraduates drawn from the University of Education Winneba. A sample of 303 final year undergraduates was drawn from this population and they formed the participants in this study using the table of random numbers technique. The instrument of data collection was the 10-item Nist and Diehl (1990) Test Anxiety Scale. It is in the Likert format, with responses ranging from 'Never' (1) – 'Always' (5). An alpha reliability of .85 was established for this study. The researchers personally collected the data. Prior arrangements were made with the departments concerned as well as course lecturers and invigilators, and intact classes were used for this purpose. Verbal consent was sought from participants and they were assured of confidentiality and anonymity. The measure was administered and collected back the same day, since the approximate time of response to the questionnaire was 5 minutes. Hypothesis 1 was analyzed with a t-test for independent samples whilst hypotheses 2 was analysed using one-way ANOVA. Hypothesis 3 was tested using Pearson correlation.

3. Results

Table 1 presents cross-tabulation of respondents' demographic variables, which include Gender, Programme of study and Cumulative Grade Point Average (CGPA). These variables were used to test for the three hypotheses that undergird the study.

Gender	Programme				CGPA					Total	%
	Arts	Bus.	Educ.	Sci.	3.5-4.0	3.0-3.49	2.5-2.99	1.0-1.99	< 1.0		
Male	75	71	45	28	29	91	89	4	6	219	72.3
Female	20	22	35	7	6	36	26	5	11	84	27.7
Total	95	93	80	35	35	127	115	9	17	303	100

Table 1: Crosstab of Gender, Programme and CGPA of Undergraduate Students

As shown in Table 1, a total of 219 (72.3%) respondents were males and 84 (27.7%) were females. In terms of Programme of Study, Arts students were 95, Business students were 93, Education students were 80 and Science students were 35. Regarding students' CGPA, 35 students reported CGPA of 3.50-4.00, and a total of 127 students reported CGPA of 3.00-3.49. Also, 115 students reported CGPA of 2.50-2.99. Furthermore, 9 students reported CGPA of 1.00-1.99 and 17 students reported CGPA of less than 1.00.

3.1. Hypothesis One (1)

Hypothesis 1 investigated gender differences in test anxiety of undergraduate students. The gender of the students was compared with their self-reported test anxiety response. The statistical tool deployed to test this hypothesis was independent sample t-test. The result is presented in Table 2.

Gender	Freq.	Mean	Std. dev.	df	t-value	Sig
Male	219	18.66	5.00	301	-3.110	.002
Female	84	20.74	5.74			

Table 2: Independent Sample T-Test Results of the Different Between Gender and Test Anxiety
*P< 0.05 (2-Tailed Significant Results)

Table 2 presents the results of the independent samples t-test performed on the test anxiety of two independent groups made up of female and male students selected at random. Comparing the mean of test anxiety scores between male and female students shows that there is a significant difference between males and females considering the level of test anxiety. As it is shown in Table 1, the mean of test anxiety score for female students (M=20.74, SD=5.735) was higher than the mean of test anxiety score for male students (M=18.66, SD=5.0). The independent sample t-test performed revealed that there was a statistically significant difference in the mean of test anxiety between male and female respondents [$t(301) = -3.110, p = 0.002$]. Justifying that, whatever difference that exists in the mean of the values of test anxiety was not due to chance. Consequently, the null hypothesis that "There is no statistically significant difference between gender and test anxiety among students." is rejected. Thus, test anxiety between male and female students differ, with female students experiencing higher test anxiety level.

3.2. Hypothesis Two (2)

In testing the hypothesis, the independent variable programme was measured against test anxiety (self-reported). The result of the one-way analysis of variance is presented in Table 3.

		Sum of Squares	df	Mean Square	F	Sig.
Test anxiety	Between Groups	342.396	3	114.132	4.213	.006*
	Within Groups	8099.967	299	27.090		
	Total	8442.363	302			

Table 3: One-Way ANOVA Result on the Differences among Students' Test Anxiety and Programme.
*P< 0.05 (2-Tail Significant Results)

The results show a statistically significant difference at the 0.05 probability alpha level in test anxiety for the four programme groupings [$F(3, 299) = 4.213, p = .006$]. Based on the results, the null hypothesis that "there is no statistically significant difference between students' programme and their test anxiety level" is therefore rejected. This means that there is a significant difference between students' programmes and their test anxiety level. To locate where the differences exist in the distribution, a Post-hoc test using the Tukey HSD was conducted. The result is presented in Table 4.

(I) Programme	(J) Programme	Mean Difference (I-J)	Std. Error	Sig.
Arts	Business	-2.428*	.759	.008
	Education	-.446	.790	.942
	Science	.065	1.029	1.000
Business	Arts	2.428*	.759	.008
	Education	1.981	.794	.062
	Science	2.492	1.032	.077
Education	Arts	.446	.790	.942
	Business	-1.981	.794	.062
	Science	.511	1.055	.963
Science	Arts	-.065	1.029	1.000
	Business	-2.492	1.032	.077
	Education	-.511	1.055	.963

Table 4: Post-Hoc Test on Students' Programme and Level of Test Anxiety
*Mean Difference Is Significant at 0.05 Levels (2-Tailed)

Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Arts students ($M = 18.38$, $SD = 5.133$) was significantly different from Business students ($M = 20.81$, $SD = 5.537$). There was no statistically significant mean difference in the test anxiety score of the other students' programmes as indicated in the Post-hoc test.

3.3. Hypothesis Three (3)

To examine whether significant relationship exist between students' Cumulative Grade Point Average (CGPA) and their test anxiety levels, Pearson correlation test was conducted on the data and the result is presented in Table 5.

		CGPA	Test Anxiety
CGPA	Correlation	1	
	Sig (2-tailed)		
	N	0	
Test Anxiety	Correlation	.184*	1
	Sig (2-tailed)	.001	
	N	303	0

Table 5: Results of Pearson's Correlation Coefficient between CGPA and Test Anxiety
* $P < 0.05$ (2-Tail Significant Results)

Table 5 shows that the relationship between students test anxiety and CGPA is .184 which is small (Cohen, 1988). This implies that there is exist a weak positive statistically significant relationship between CGPA of students and their test anxiety level at $p < .05$. Consequently, the null hypothesis that 'there is no statistically significant relationship between students' CGPA and their test anxiety level' is therefore rejected.

4. Discussions

The findings from the analysis show that 32.7% of students in the sample suffer from test anxiety. The mean of test anxiety score among female students was meaningfully higher than the mean of test anxiety score among male students. Females reported significantly higher levels of test anxiety than males. The difference in the socialization patterns of males and females has been the primary explanation for this difference. More pressure is placed on females to succeed in school than males. This leads to the increase in test anxiety levels because girls essentially are afraid to fail; each testing situation is seen as another possible chance of failure. Another possible explanation is that "males are more defensive about admitting anxiety because it might be seen as threatening to their masculinity; they are trained to cope with anxiety by denying it or by finding ways to overcome it. Furthermore, another explanation for the differences in test anxiety on the basis of students' gender is that males and females though may have the same levels of test worry, but females have higher levels of emotionality. The finding confirms Chapell et al. (2005), Cassady and Johnson, (2002); Mehregan et al. (2001) and McDonald, (2001) where gender differences have also been reported on measures of test anxiety with female participants scoring higher at the total anxiety level. This finding contradicts Onyeizugbo (2010) study which reveals no gender differences in the test anxiety of Nigerian college students.

Also, the results reveal that the mean of test anxiety score for Arts students was significantly different from that of Business students. Averagely the two programmes are preferred mostly by females in most school settings. This is mostly due to career options available and the thought of their readable nature. But students quickly come to the realization that the demands of the two programmes (content structure and calculations) are mostly demanding and as such are not well-prepared during examination. Coupled with the fear of failing, this leads to the increase in test anxiety levels. The results failed to support the assertion of Chapell et al., (2005) that there is a negative correlation between test anxiety and GPA. As test anxiety increased, GPA of undergraduates decreased.

Looking at the relationship between CGPA and test anxiety, the analysis shows that there is meaningful relationship between test anxiety levels among the categories of students CGPA. One possible explanation for this could be ascribed to emotional state of students with higher CGPA. Such students are mostly anxious to maintain their level, knowing the

possibility of graduating with less regarded honours. Hence are under undue pressure to maintain or better in upcoming test/examinations this perhaps led to the increase in their test anxiety levels. This finding contradicts with studies that found a negative correlation between test anxiety and academic achievement (CGPA) (Chapell et al., 2005; Greenberger et al., 2008).

5. Conclusion and Recommendations

Test anxiety is a painful discomfort that most students would have to contend with in the process of tertiary education. Test anxiety can cause students to cheat in examinations or misconducts themselves when performance is being evaluated. Differences exist in the reported levels of test anxiety when undergraduate students are grouped according to Gender, Programme of Study and CGPA. Female students experience much higher level of test anxiety than their male counterparts. Business students experience higher level of test anxiety as compared to Arts students. It was further concluded that high performing students normally experience much higher level of test anxiety. In view of the findings, it was recommended the university's counselling centre should be strengthened to run a guidance seminar on effective coping skills to test anxiety for all students prior to their first ever quiz and end of term examinations. The students should be given adequate time to plan for their examinations rather than last minute rush revision that may not allow them to satisfactorily prepare for their examinations. Also, the authorities of the University should devise alternative means for assessing students' academic achievement instead of the usual pen and pencil tests. The focus of the examination should be performance oriented instead of mere recall or recognition of facts.

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