Assessment of the Influence of Statistical Anxiety on Academic Performance of Post Graduate Students in Tertiary Institutions in Rivers State

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Abstract: *The study assessed the influence of statistical anxiety on academic performance of postgraduate students in tertiary institutions in Rivers State. The study adopted judgmental research design. The population of this study consisted of 309 postgraduate students of Faculties of Education of Universities in Rivers State (University of Port Harcourt =104, Rivers State University =97, and Ignatius Ajuru University of Education =108). The census sampling technique was adopted; hence the total population was used for the study. A self-structured rating scale titled: "Assessment of the Influence of Statistical Anxiety on Academic Performance of Postgraduate Students Rating Scale" was used in generating data for the study. The reliability of the instrument was established using the Cronbach Alpha method and a reliability index of 0.74 was obtained. The research questions were answered using mean and standard deviation, while the null hypotheses were tested at the 0.05 level of significance using One-way Analysis of Variance. It was found that there is no significant difference in the mean rating of students in the three tertiary institutions in Rivers State on the extent to which interpretational anxiety, situational anxiety and dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State. It was therefore, recommended among others that the teaching of statistics and its interpretation at the postgraduate level should not be made difficult to ensure proper and effective understanding and improvement in the academic performance of students.*

Key Words: *Statistical Anxiety, Academic Performance, Post Graduate Students, Rivers State.*

Introduction

The proliferation of various courses offered in Universities has made evident the proliferation of studies on student results in those courses. Alternative delivery methods in those courses have introduced an important variable for understanding student success in statistical courses offered in tertiary institutions (Onwuegbuzie & Wilson, 2013). Students' attitudes and anxiety are other variables that have been found to explain students' performance in statistics. Statistical education in Nigeria begins in the third year of primary school, when students are introduced to the concepts of averages and other statistical topics through the use of tables and charts. They learn from descriptive statistics that covers graphical representation to the application of statistical reasoning. When they move to the tertiary level of

education, almost all social and pure science specializations include at least one statistics course for the students to gain basic knowledge of statistics. Statistics is considered to be an important practice for university students, especially postgraduate students, who are involved in research, and thus making statistics a compulsory course for students in various tertiary institutions. For obvious fact, postgraduate students in the Nigeria Universities have to complete a fundamental statistics course as a condition of graduation at the postgraduate level. In comparison to other fields of study, statistics education has advanced to the status of a new knowledge discipline (Emmioglu & Capa-Aydin, 2012).

In all higher educational institutions, statistics is offered as prerequisite for other courses. Students are required to take statistics courses in order to prepare them for the upcoming courses like final year project, seminar and the likes. This is due to the fact that statistics is used in research studies, and specifically in their research. However, statistical knowledge, should be made a viable programme and not be restricted to postgraduate students alone; the general public should be aware of statistical concepts that are used in everyday life. Students ought to have statistical education in order to be able to extract information from the data that they receive for analysis. Probability and global economic fluctuations, as well as other statistical concepts, are most likely at the heart of all current information. In our daily lives, we are exposed to a wide range of situations in which statistical data is used to make decisions. This has consequences for students' statistics result, which is important at master's or doctorate level. Unfortunately, most students have statistics anxiety.

Anxiety is one of the most influential elements among students. Anxiety associated with statistics can be of great concern to anyone who teaches research methods and statistics, especially those who teach at the undergraduate level. When students study towards a B.Sc. in Psychology for example, a large proportion of their first and second year courses may be made up of studying modules that contain statistics. What teachers need to understand is that some students can find this difficult from the start and it is not because they cannot do the work or do not want to participate, rather it is because they have a genuine worry or fear of working with statistics (Onwuegbuzie, DaRos, & Ryan, 2017).

There are different strategies that academics can put into place before, and at the beginning of a module which includes a large proportion of statistics or mathematics. Teachers could provide students with a statistics anxiety questionnaire to measure the level of anxiety before the module and this would then inform the academic of the general level of anxiety. Teaching materials could then be adapted accordingly to ensure that students are comfortable in the learning of mathematics and statistics. One of the main strategies put in place is to offer support to students, through tutorial sessions, direct statistical support or even an online chat system, so that students can ask questions. While the importance and use of statistics increase, researchers constantly find student difficulties in statistics courses. It has been hypothesized that most of the difficulties with statistics are due to non-intellectual factors such as misconceptions, perceptions, and anxiety. Statistical anxiety is defined as the feelings of anxiety encountered when taking a statistics course or doing statistical analyses; that is, gathering, processing, and interpreting (Cruise, Cash, & Bolton, 2015).

According to Zeidner (2011), statistical anxiety is extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal when exposed to statistics content, problems, instructional situations, or evaluative contexts, and it is commonly claimed to debilitate performance in a wide variety of academic situations by interfering with the manipulation of statistics data and solution of statistics problems. **Statistical anxiety** describes the apprehension that an individual experiences in

instructional situations, in evaluative contexts related to statistics, or when working on statistical tasks. It is thus said to be an enduring, habitual type of anxiety (Onwuegbuzie & Daley, 2019).

Statistics fear is a barrier that stops students from learning and comprehending statistics. It has been reported that majority of university students, particularly those studying medicine and social sciences, have difficulty enrolling in statistics courses. Students who have difficulty with these statistics will do everything they can to avoid taking this course or to postpone it to the following semester. Students frequently attempt to avoid taking a statistics course, but they are forced to do so when they are required to complete a final year research project for their degree.

According to a study conducted by Garfield and Ahlgren (2018), postgraduate students who have high levels of anxiety in statistics have a negative relationship with their performance. They highlighted that at least 80% of postgraduate students demonstrate a decline in academic performance in their statistics courses. The fact that certain students have difficulty with challenging statistics courses has been noticed. This has been observed to be due to the students' perceptions of the course as well as their intrapersonal characteristics related with the course. Postgraduate students who have negative perceptions are more likely to have low levels of confidence and high levels of anxiety than other students.

Anxiety, fear, and insecurity, when dealing with statistics, are the main concerns for statisticians in this study. They also include feelings of anxiety in the classroom, when taking exams, and even when deciding on the most appropriate statistical method to use, such as when assigning and analysing research data, among others. Anxiety is associated with feelings of unease as well as taking decisive action. In addition, someone suffering from anxiety has a low tolerance for discomfort and does easy acts with little thought. For example, students may attempt to put off studying statistics because they are concerned that it will have an adverse effect on their academic performance. They will put off their assignments out of fear of failing, which can sometimes result in a positive relationship between statistical anxiety and academic performance. This is supported by the findings of Elmore, Lew and Bay (2013) that 14% to 19% of undergraduate students admitted delaying their assignments due to statistical anxiety.

A study found that students who have high aspirations for success, particularly in mathematics and statistics, have lower levels of anxiety than their peers (Gal & Ginsburg, 2014). This is because they recognize the importance of understanding mathematics and statistics. Students' low self-confidence can result from a high level of anxiety, which can ultimately lead to a decline in their academic performance. Many students display a lot of fear when statistics class activities are carried out. Non-statistics students face a number of difficulties, one of which is the difficulty in understanding statistics theory, which is abstract and technical for students to grasp. Further, students face difficulty with the use of mathematical symbols in statistical notes. Students' lack of confidence and concern with statistics has been exacerbated by their lack of exposure to mathematics symbols and notations from the start of their studies. Any new concepts or phrases that are introduced to pupils can be supported by a similar argument. As a result, students struggle to connect statistical theory to past knowledge and experience.

The antecedents of statistical anxiety are classified as interpretational, situational and dispositional anxiety. Interpretation anxiety is experienced when trying to explain statistical results. **In interpretation bias, the tendency to interpret ambiguous situations in a positive or negative fashion, has been implicated in the maintenance of social anxiety.** Onwuegbuzie and Daley (2019) investigated **off-line interpretations of ambiguous social and non-social situations separately for positive and negative bias using a sample of 102 participants who presented a continuum of social anxiety ranging from low to high anxiety. A modest correlation was found between positive and negative social**

interpretation bias suggesting that negative and positive interpretation bias does not lie on opposite ends of a single continuum. Negative interpretation bias for social situations was positively related to social anxiety, but not to general negative affect. In contrast, positive social interpretation bias was negatively related to general negative affect, and to a lesser extent, to social anxiety. Onwuegbuzie and Daley (2019) further found that most postgraduate students experienced statistical anxiety (61.8 %) and interpretation anxiety (40%).

Situational antecedents of statistical anxiety are fundamental factors that come from statistics courses themselves and implies teacher and teaching-related factors as established by Brookover, Paterson and Thomas (2012). Common situational indices are statistics teachers, lack of feedback from statistics instructors, the nature of statistics courses, pace of statistics instruction, statistical notation/terminology, complexity of statistics textbooks and the likes. Fenster (2012) asserted that because of the objective, logical, and hierarchical nature of statistics courses, grading distributions are less lenient, which causes more student anxiety than other courses. On this premise, it is pertinent to state that many postgraduate students in Rivers State cannot establish a link between newly acquired statistical knowledge and their existing knowledge, which in turn initiates more statistics anxiety. Statistics teaching methods are also important in statistical anxiety, because statistics might be considered as a language and follows the modem language teaching techniques, teaching by appraising students to do rather than study, because in statistics, concepts should be learned by 'statisticking', not by memorizing. Onwuegbuzie (2017) found that both the lack of positive feedback and lack of encouragement from the statistics instructors led to a negative student perception about the course and thus increased situational statistical anxiety. Moreover, they found that students perceived statistics courses as fast-paced courses, which contributed to their statistics anxiety. Additionally, they found that students who were naive to statistical symbols and formulas showed more anxiety.

Dispositional antecedents of statistics anxiety are personality characteristics. In general, students who rely on a deterministic view of statistics will find that variation in data is unexpected and uncomfortable. Gal and Ginsburg (2014) suggested that a statistics course should not block the demand for further statistics instruction but should facilitate statistical thinking. Also, Onwuegbuzie (2017) posited that dispositional anxiety involves a complex array of emotional reactions that could debilitate statistics achievement. Self-perception of mathematical ability is said to be a significant predictor of situational anxiety both at the beginning and at the end of a course. Students perceived statistical courses as having very little value in practice. Benson (2019) established that statistical anxiety is not different between graduate and undergraduate students. But found that postgraduate students experienced higher levels of statistical anxiety, even though undergraduates experienced higher levels of general anxiety. Thus, Benson concluded that one's academic success in mathematics courses, was a predictor of statistics anxiety.

Statement of Problem
While the importance of statistics is rapidly increasing in today's societies, researchers are constantly looking for solutions to students' difficulties in statistics courses. These student difficulties are mainly due to non-intellectual factors such as misconceptions, perceptions, and anxiety. Statistical anxiety is a multi-dimensional construct that includes interpretational anxiety, situational anxiety and dispositional anxiety. Many postgraduate students find it very difficult to formally or informally assess their mathematical capacity because of statistical anxiety. Not all postgraduate students understand the signs of statistical anxiety and its effects on them. In the fight against examination malpractice, it appears that no one is exonerated. As exposed in the preceding section, education stakeholders, postgraduate students, as well as

the national economy could rightly be apportioned blames for the preponderance of this menace. Several factors have been found that affect statistical anxiety. These factors cluster around statistics course/instructor related factors, personality related factors (i.e., attitudes toward statistics, learning styles, and self-concept), and factors related to students' gender, age, study major, ethnicity, and others. The basic concepts of mathematics or statistics that were studied as a result of this make it difficult to recall them. When students fail to grasp the concept of statistics, it has a negative impact on their overall performance. This study's goal is basically to assess the influence of statistical anxiety on academic performance of postgraduate students in tertiary institutions in Rivers State.

Purpose of the Study

The purpose of this study is to assess the influence of statistical anxiety on academic performance of postgraduate students in Rivers State. In specific terms, the objectives of the study are to:

1   Find out the extent to which interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State.

2   Examine the extent to which dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State.

3   Determine the extent to which situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State

Research Questions

The following research questions guided the study:

1   To what extent does interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

2   To what extent does dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

3   To what extent does situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 significant level.

1. There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which interpretational anxiety influence their academic performance in Rivers State.

2. There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which dispositional anxiety influence their academic performance in Rivers State.

3. There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which situational anxiety influence their academic performance in Rivers State.

Methodology

The study adopted judgmental research design. The population of this study consisted of 309 postgraduate students in the Faculties of Education of Universities in Rivers State (University of Port Harcourt =104, Rivers State University = 97, and Ignatius Ajuru University of Education =108). Since the population was small, the census sampling technique was adopted; hence the total population was used for the study. A self-structured rating scale titled: "Assessment of the Influence of Statistical Anxiety on Academic Performance of Postgraduate Students Rating Scale" was employed for data collection. The reliability of the instrument was established using the Cronbach Alpha method and a reliability index of 0.74 was gotten. The data obtained was analysed, and mean and standard deviation were used to answer the research questions, while One-way Analysis of Variance was used to test the null hypotheses at 0.05 level of significance.

Results

Research Question 1: To what extent does interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

Table 1: Descriptive statistic on the extent interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State.

S/No.	Items	UNIPORT [$n_1 = 104$]		RSU [$n_2 = 97$]		IAUE [$n_3 = 108$]		Aggregate	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	Rmk
1	**Interpretation bias has a robust association with statistical anxiety in students.**	3.33	0.92	2.90	1.15	3.27	1.12	2.94	HE
2	**Postgraduate students likely interpret statistical ambiguity in a negative way when it matches the domain of their anxiety.**	2.92	1.11	3.32	0.89	3.18	0.95	2.97	HE
3	**The association between anxiety and interpretation bias seems to be stronger among postgraduate students**	3.67	0.94	3.74	0.95	3.89	1.11	3.55	VHE
4	**Negative interpretational bias causes emotional vulnerability among postgraduate students.**	3.25	0.83	2.67	1.13	3.25	0.94	2.98	HE
5	**Reduction of interpretational bias mitigates proneness to statistical anxiety.**	3.51	0.80	3.81	0.90	3.75	1.21	3.56	VHE
	Grand Score/Remark	**3.34**	**0.92**	**3.29**	**1.00**	**3.47**	**1.07**	**3.20**	**HE**

Source: Survey Data, 2022.

The information in Table 1 presents that students from University of Port Harcourt have a grand mean of 3.34 and standard deviation of 0.92, students from Rivers State University have a grand mean of 3.29 and standard deviation of 1.00, and students from Ignatius Ajuru University of Education have a grand mean of 3.47 and standard deviation of 1.07 on their rating on the extent interpretational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The students of the

three tertiary institutions in Rivers State have total means that lie between 2.50 –3.49, and standard deviations that lie between 0.90 – 2.00 implying that interpretational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent.

Research Question 2: To what extent does dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

Table 2: Descriptive statistic on the extent dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State.

S/No.	Items	UNIPORT [n₁ = 104]		RSU [n₂ = 97]		IAUE [n₃ = 108]		Aggregate	
		$\overline{x}$	SD	$\overline{x}$	SD	$\overline{x}$	SD	$\overline{x}$	Rmk
6	**It is a performance on an academic task that taps into a very basic propensity and causes anxiety among students.**	3.58	0.88	3.55	0.94	3.71	0.96	3.81	VHE
7	**Dispositional anxiety opposes a propensity to take risks within any academic domain.**	2.98	1.06	3.17	1.05	3.16	1.07	2.98	HE
8	**It negates self-reported risk-aversion mapped onto several different academic domains.**	3.15	1.02	3.12	1.10	3.09	1.10	2.97	HE
9	**It is characterized by feelings that are detached from students' statistical knowledge.**	3.19	1.09	3.11	0.95	3.14	0.93	3.17	HE
	Grand Score/Remark	**2.58**	**1.01**	**3.24**	**1.01**	**3.28**	**1.02**	**3.23**	**HE**

Source: Survey Data, 2022.

The information in Table 2 above presents that students from University of Port Harcourt have a grand mean of 2.58 and standard deviation of 1.01, students from Rivers State University have a grand mean of 3.24 and standard deviation of 1.01, and students from Ignatius Ajuru University of Education have a grand mean of 3.28 and standard deviation of 1.02 on their rating on the extent dispositional anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The students of the three tertiary institutions in Rivers State have total mean that lie between 2.50 –3.49, and standard deviations that lie between 0.90 – 2.00 implying that dispositional anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent.

Research Question 3: To what extent does situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State?

Table 3: Descriptive statistic on the extent situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State.

S/No.	Items	UNIPORT [n₁ = 104]		RSU [n₂ = 97]		IAUE [n₃ = 108]		Aggregate	
		$\overline{x}$	SD	$\overline{x}$	SD	$\overline{x}$	SD	$\overline{x}$	Rmk
10	**Situational anxiety propel postgraduate students to listen to what they feel comfortable sharing about statistics, but not to press too hard.**	3.52	0.85	3.50	0.90	3.56	0.88	3.52	VHE
11	**It ensures the validation of the emotions students are sharing even if you cannot relate them in statistics.**	2.81	1.22	3.10	1.05	3.02	1.27	2.98	HE
12	**It forms beads of sweat on students' forehead and gives room for doubting their self-worth.**	3.10	1.20	3.02	1.18	2.78	1.10	2.97	HE
13	**Statistics teachers talk so fast and that gets postgraduate students easily frightened. .**	3.13	1.04	3.22	0.96	3.17	0.76	3.17	HE
14	**It recreates irritation and weariness among postgraduate students.**	3.54	0.83	3.55	0.98	3.62	1.23	3.57	VHE
	Grand Score/Remark	**3.22**	**1.03**	**3.28**	**1.01**	**3.23**	**1.05**	**3.24**	**HE**

Source: Survey Data, 2022.

The information in Table 3 above presents that students from University of Port Harcourt have a grand mean of 3.22 and standard deviation of 1.03, students from Rivers State University have a grand mean of 3.28 and standard deviation of 1.01, and students from Ignatius Ajuru University of Education have a grand mean of 3.23 and standard deviation of 1.05 on their rating on the extent situational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The postgraduate students in the three tertiary institutions in Rivers State have total means that lie between 2.50 –3.49, and standard deviations that lie between 0.90 – 2.00 implying that situational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent.

Test of Hypotheses
Test of Hypothesis 1: There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which interpretational anxiety influence their academic performance in Rivers State.

Table 4: One-way Analysis of Variance (ANOVA) on the extent to which Interpretational Anxiety influence Academic Performance of Postgraduate Students in Tertiary Institutions in Rivers State

Sources of Variation	Sum of Squares	Df	Mean Square	F	Sig	Decision
Between Groups	.453	2	.633	85.662	.011	H_o
Within Groups	81.114	307	4.519			Not rejected
Total	81.567	309				

N = 309; F(2, 0.633) = 85.662; p = 0.011 < 0.05

Table 4 presents the sum of squares of 0.453, with 2 degrees of freedom, and a mean square of 0.633 for between groups. Within groups has the sum of squares of 81.114, degrees of freedom of 307, and a mean square of 4.519, while the total has 81.567 sum of squares and 309 degrees of freedom. The computed F is 86.662 which is not statistically significant at .05. Thus, the null hypothesis that "there is no significant difference in the mean ratings of students in the three tertiary institutions on the extent to which interpretational anxiety influence academic performance of postgraduate students in Rivers State" is accepted: F(2, 0.633) = 85.662, p = 0.011 < 0.05. In other words, students in the three tertiary institutions accepted that interpretational anxiety influence academic performance of postgraduate students in Rivers State to a high extent.

Test of Hypothesis 2: There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which dispositional anxiety influence their academic performance in Rivers State.

Table 5: One-way Analysis of Variance (ANOVA) on the Extent to which Dispositional Anxiety Influences Academic Performance of Postgraduate Students in Tertiary Institutions in Rivers State

Sources of Variation	Sum of Squares	df	Mean Square	F	Sig	Decision
Between Groups	1.480	2	.509	49.633	.013	H_o
Within Groups	36.370	307	1.661			Not Rejected
Total	37.850	309				

N = 309; F(2, 0.509) = 49.633; p = 0.013 < 0.05

Table 5 presents the sum of squares of 1.480, with 2 degrees of freedom, and a mean square of 0.509 for between groups. Within groups has the sum of squares of 36.370, degrees of freedom of 307, and a mean square of 1.661, while the total has 37.850 sum of squares and 309 degrees of freedom. The computed F is 49.633 which is not statistically significant at .05. Thus the null hypothesis that "there is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which dispositional anxiety influence their academic performance in Rivers State" is accepted: F(2, 0.509) = 49.633; p = 0.013 < 0.05. Thus, postgraduate students in the three tertiary institutions consented that dispositional anxiety influence academic performance of postgraduate students in three tertiary institutions in Rivers State to a High Extent.

Test of Hypothesis 3: There is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which situational anxiety influence their academic performance in Rivers State.

Table 6: One-way Analysis of Variance (ANOVA) on the Extent to which Situational Anxiety Influences Academic Performance of Postgraduate Students in Tertiary Institutions in Rivers State

Sources of Variation	Sum of Squares	df	Mean Square	F	Sig	Decision
Between Groups	1.380	2	.821	59.204	.017	H_o
Within Groups	66.193	307	2.841			Not rejected
Total	67.573	309				

N = 309; F(2, 0.821) = 59.204; p = 0.017 < 0.05

Table 6 presents the sum of squares of 1.380, with 2 degrees of freedom, and a mean square of 0.821 for between groups. Within groups has the sum of squares of 66.193, degrees of freedom of 307, and a mean square of 2.841, while the total has 67.573 sum of squares and 309 degrees of freedom. The computed F is 59.204 which is statistically significant at .05. Thus the null hypothesis that "there is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which situational anxiety influence their academic performance in Rivers State" is accepted: F(2, 0.821) = 59.204, p = 0.017 < 0.05. In other words, students in the three tertiary institutions agreed that situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent.

Discussion of Findings

The study assessed the influence of statistical anxiety on academic performance of postgraduate students in tertiary institutions in Rivers State. The research question one (1) ascertained the extent that interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State. The information in Table 1 presents that students from University of Port Harcourt have a grand mean of 3.34 and standard deviation of 0.92, Rivers State University have a grand mean of 3.29 and standard deviation of 1.00, and Ajuru University of Education have a grand mean of 3.47 and standard deviation of 1.07 on their rating of the extent interpretational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State. The students of the three tertiary institutions in Rivers State have total means that lie between 2.50 –3.49, and standard deviations that lie between 0.90 – 2.00 implying that interpretational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent. The test of hypothesis one (1) presented the sum of squares of 0.453, with 2 degrees of freedom, and a mean square of 0.633 for between groups. Within groups has the sum of squares of 81.114, degrees of freedom of 307, and a mean square of 4.519, while the total has 81.567 sum of squares and 309 degrees of freedom. The computed F is 86.662 which is not statistically significant at .05. Thus, the null hypothesis that "there is no significant difference in the mean ratings of students in the three tertiary institutions on the extent to which interpretational anxiety influence academic performance of postgraduate students in Rivers State" is accepted: F(2, 0.633) = 85.662, p = 0.011 < .05. In other words, students in the three tertiary institutions accepted that interpretational anxiety influences academic performance of postgraduate students in Rivers State to a high extent.

This finding is supported by Onwuegbuzie and Daley (2019) who established that interpretation anxiety is experienced when trying to explain statistical results. **In interpretation bias, the tendency to interpret ambiguous situations in a positive or negative fashion, has been implicated in the maintenance of social anxiety.** Onwuegbuzie and Daley (2019) investigated **off-line interpretations of ambiguous social and non-social situations separately for positive and negative bias using a sample of 102 participants who presented a continuum of social anxiety ranging from low to high anxiety. A**

modest correlation was found between positive and negative social interpretation biases suggesting that negative and positive interpretation bias do not lie on opposite ends of a single continuum. Negative interpretation bias for social situations was positively related to social anxiety, but not to general negative affect. In contrast, positive social interpretation bias was negatively related to general negative affect, and to a lesser extent, to social anxiety. Further, Onwuegbuzie and Daley (2019) found that most postgraduate students experienced statistical anxiety (61.8 %) and interpretation anxiety (40%).

The research question two (2) ascertained the extent that dispositional anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The information in table 2 presented that students from University of Port Harcourt, have a grand mean of 2.58 and standard deviation of 1.01, Rivers State University have a grand mean of 3.24 and standard deviation of 1.01, and Ajuru University of Education have a grand mean of 3.28 and standard deviation of 1.02 on their rating of the extent dispositional anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The students of the three tertiary institutions in Rivers State have total mean that lies between 2.50 –3.49, and standard deviation that lies between 0.90 – 2.00 implying that dispositional anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent. The test of hypothesis two (2) presented the sum of squares of 1.480, with 2 degrees of freedom, and a mean square of 0.509 for between groups. Within groups has the sum of squares of 36.370, degrees of freedom of 307, and a mean square of 1.661, while the total has 37.850 sum of squares and 309 degrees of freedom. The computed F is 49.633 which is not statistically significant at .05. Thus, the null hypothesis that "there is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which dispositional anxiety influence their academic performance in Rivers State" is accepted: $F(2, 0.509) = 49.633$; $p = 0.013 < 0.05$. Thus, postgraduate students in the three tertiary institutions consented that dispositional anxiety influence academic performance of postgraduate students in three tertiary institutions in Rivers State to a high extent.

In line with this finding, situational antecedents of statistical anxiety are fundamental factors that come from statistics courses themselves and implies teacher and teaching-related factors as established by Brookover, Paterson and Thomas (2012). Common situational indices are statistics teachers, lack of feedback from statistics instructors, the nature of statistics courses, pace of statistics instruction, statistical notation/terminology, complexity of statistics textbooks and the likes. Fenster (2012) asserted that because of the objective, logical, and hierarchical nature of statistics courses, grading distributions are less lenient, which causes more student anxiety than other courses. On this premise, it is pertinent to state that many postgraduate students in Rivers State cannot establish a link between newly acquired statistical knowledge and their existing knowledge, which in turn initiates more statistics anxiety. Statistics teaching methods are also important in statistical anxiety, because statistics might be considered as a language and follows the modem language teaching techniques, teaching by appraising students to do rather than study, because in statistics, concepts should be learned by 'statisticking', not by memorizing". Onwuegbuzie (2017) found that both the lack of positive feedback and lack of encouragement from the statistics instructors led to a negative student perception about the course and thus increased situational statistical anxiety. Moreover, they found that students perceived statistics courses as fast-paced courses, which contributed to their statistics anxiety. Additionally, they found that students who were naive to statistical symbols and formulas showed more anxiety.

The research question three (3) ascertained the extent that situational anxiety influences academic performance of postgraduate students in tertiary institutions in Rivers State. The information in table 3 presented that students from University of Port Harcourt have a grand mean of 3.22 and standard deviation of 1.03, Rivers State University have a grand mean of 3.28 and standard deviation of 1.01, and Ajuru University of Education have a grand mean of 3.23 and standard deviation of 1.05 on their rating of the extent situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State. The postgraduate students in the three tertiary institutions in Rivers State have total mean that lies between 2.50 –3.49, and standard deviation that lies between 0.90 – 2.00 implying that situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent. The test of hypothesis three (3) presented the sum of squares of 1.380, with 2 degrees of freedom, and a mean square of 0.821 for between groups. Within groups has the sum of squares of 66.193, degrees of freedom of 307, and a mean square of 2.841, while the total has 67.573 sum of squares and 309 degrees of freedom. The computed F is 59.204 which is not statistically significant at .05. Thus, the null hypothesis that "there is no significant difference in the mean ratings of postgraduate students in the three tertiary institutions on the extent to which situational anxiety influence their academic performance in Rivers State" is accepted: $F(2, 0.821) = 59.204$, $p = 0.017 < .05$. In other words, students in the three tertiary institutions agreed that situational anxiety influence academic performance of postgraduate students in tertiary institutions in Rivers State to a high extent.

Gal and Ginsburg (2014) suggested that a statistics course should not block the demand for further statistics instruction but should facilitate statistical thinking. Dispositional antecedents of statistical anxiety, according to Gal and Ginsburg (2014), are personality characteristics. In general, students who rely on a deterministic view of statistics will find that variation in data is unexpected and uncomfortable. After discussing the effects of non-cognitive factors in statistics learning. Also, Onwuegbuzie (2017) posited that dispositional anxiety involves a complex array of emotional reactions that could debilitate statistics achievement. Self-perception of mathematical ability is said to be a significant predictor of situational anxiety both at the beginning and at the end of a course. Students perceived statistical courses as having very little value in practice. Benson (2019) established that statistical anxiety is not different between graduate and undergraduate students, but found that postgraduate students experienced higher levels of statistical anxiety, even though undergraduates experienced higher levels of general anxiety. Thus, one's academic success in mathematics courses, was a predictor of statistics anxiety.

Conclusion
From the findings of this study, the level of statistical anxiety among postgraduate students in tertiary institutions in Rivers State is alarming. In addition, factors such as gender, age, and programme, all play a role in achieving success. Statisticians should, however, demonstrate their knowledge of statistics, particularly pedagogical content knowledge, in their teaching, hence students should be encouraged to focus on clear-headed statistical participation rather than their own well-being. Conclusively, there is no significant difference in the mean ratings of postgraduate students in tertiary institutions on the extent to which interpretational, situational and dispositional anxiety influence academic performance of students in Rivers State.

Recommendations
Based on the findings of the study, the following recommendations are made;

1. The teaching of statistics and its interpretation at the postgraduate level should not be made difficult to ensure proper and effective understanding and then negate interpretational anxiety.

2. Students should be encouraged to focus on clear-headed statistical participation rather than their own well-being as to ensure they are void of situational anxiety.

3. Researchers should investigate statistical anxiety using a good number of variables and methodologies, including assessments, readiness, efficacy, and motivation as to avoid the challenges that will be posed by dispositional anxiety.

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