Antecedents of statistics anxiety in a higher education system

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Abstract

As more empirical data existed in higher education environment, along with it were simple to complex tools such as statistical concepts and analyses that enabled the translations of the data to bring about a better educational system. A rising challenge therefore in universities reflected a scenario on data integration, institutional metrics and higher education analytics not in the pedestal of productive interpretation and utilization. Contributory to the ability of making sense with empirical data necessary for a proactive and successful delivery of education would be the element of good statistics background. This study contended that learning statistics and its rudiments were perceived as complicated and difficult as compared to some other courses offered at university level. Further, this investigation contested the existence of statics anxiety among postgraduate students in an in-site university setting. The data from randomly selected 136 postgraduate students (Kampala International University, Uganda) referring to dispositional (procrastination and perfectionism) and environmental antecedents (gender) and statistics anxiety were scientifically elicited, processed and analyzed utilizing the quantitative-post positivist's research paradigm model. The findings revealed (1) a positive but insignificant relationship between academic procrastination and statistics anxiety; (2) a significant negative relationship between perfectionism and statistics anxiety; and (3) differences in statistics anxiety between the female and male students existed. Notably from the results then, academic procrastination did not significantly affect the students' statistics anxiety; the students with higher levels of perfectionism tended to have lower levels of statistics anxiety while the levels of statistics anxiety among the female students were slightly higher than that of the male students.

Keywords: Antecedents, academic procrastination, gender, perfectionism, statistics anxiety

1. Introduction

In Uganda, academic achievement is generally not underestimated as it is used to evaluate both the learner, the teacher and the education system. Postgraduate education is taken as a serious pursuit and underscored most especially its research element in the aspects of research methodology, methods and techniques including the vital aspect of statistics. In most instances, statistics is offered as a course across academic disciplines most importantly at postgraduate level. Notably, students' view statistics as a rather difficult and anxiety provoking course more so for those learners who have challenges with mathematics and related numbers, figures and computations. Several studies have been carried out regarding statistics anxiety among students such as those of Lui, Onwuegbuzie and Meng (2011), Onwuegbuzie and Wilson (2003), Onwuegbuzie (2003), Onwuegbuzie (2004), Williams (2010), Vahedi, Farrokhi, Gahramani and Issazadegan (2012) among others. Onwuegbuzie et al. (2003) observed that many students experience high statistics anxiety levels and offering statistics as a course creates negative experiences to these students mainly because some academic background have nothing much to do with statistics. In fact Vahedi et al. (2012) reported that almost 66-80% of graduate students experience statistics anxiety. This finding rhymed with Onwuegbuzie's (2004) findings where 80% of graduate students experienced uncomfortable statistics anxiety levels. Students who experienced higher levels of statistics anxiety tended to perform poorly in statistics and statistics related courses like research and continually postponed assignments that involved statistics (Macher, Paechter, Papousek & Ruggeri, 2012, Onwuegbuzie, 2004).

Statistics anxiety is a pervasive problem in many fields of study (Macher et al, 2012). Onwuegbuzie et al. (2003) highlights different fields like education, psychology, sociology as some of the courses where it is prevalent. It is therefore no doubt that most students from such fields struggle with statistics related courses such as research methodology and statistical methods. This is because, statistics is all pervaded. Its applications have increased in recent years (Onwuegbuzie et al., 2003) as it has permeated into different fields. Statistics is a means to the end not an end in itself. It is used in research to come to conclusions.

In academics, statistics plays an important role as it assists students in undertaking empirical studies (Coetzee & Van der Merwe, 2010). It is worth noting that statistics anxiety will therefore cripple academic development as well as living life. It is applied in workplaces (Chew & Dillon, 2013), shopping malls, sports, accounts among others, therefore the importance of statistics cannot be underestimated (Chew & Dillon, 2014). The language of the universe is written in statistics. It is the water and salt of education, research and development.

Kampala International University, Uganda have post graduate courses in such fields like psychology, business, sociology, humanities, economics, education, management science, health sciences, applied sciences and technology Most of the students enrolled in these courses in most

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cases have limited and sometimes no statistical background yet they are supposed to do statistical methods in research. The researchers themselves believe and contend that statistical methods in research is more anxiety producing than other courses. Some students have even inquired whether they can complete their degrees without it. For reasons of validating and generating evidence-based data to serve as bases on how this existing phenomenon can be better dealt with, this study was thus embarked utilizing KIU as the setting and its post graduate students as the study population.

2. Statement of the Problem

Statistics have become inevitable in today's life both on personal and government levels as a whole (Chew et al, 2014 & Coetzee et al, 2010). The government policies are often based on statistics and these statistics are prepared by trained individuals through school (Chew et al., 2014). On the other hand, the importance of statistics to students cannot be underestimated as it is an important requirement for further studies at tertiary level, especially at post graduate level (Chew et al., 2013, Chew et al., 2014, Coetzee et al., 2010). Despite of the fact that statistics is a vital component for a degree and even a soft skill at that, students still fear and avoid statistics. Coetzee et al. (2010) opines that students view statistics as one of the biggest hurdles to their graduation. Students find it hard to grasp statistical concepts (Onwuegbuzie, 2003) which later affect their grades in statistics courses and other related courses like research methodology. The fear of statistics increases procrastination, lowers academic achievement and may lead to statistics course avoidance. Statistics anxiety is real and present in institutions of higher learning in the world and Uganda in particular. Its causes include challenging attitudes towards statistics, procrastination, prior mathematics knowledge, nature of the subjects, teacher's personalities, learning strategies, among others (Baloglu, 2003, Chew et al., 2014, Macher et al., 2012, Onwuegbuzie, 2004, Onwuegbuzie & Delay, 1999). Further, these causes have been grouped into three antecedents that are situational, dispositional and environmental. In this study then, the dispositional antecedents (perfectionism and procrastination) and environmental antecedents (gender) and statistics anxiety are interplayed in terms of relationships and differences.

It is also conspicuously noted that most evidence based studies on statistics anxiety were done outside Uganda. The studies of Onwuegbuzie (2004), Onwuegbuzie and Delay (1999), Rodarte-Luna et al (2008) and Ugumba-Agwunobi (2002) were all time bound and setting limited. With the current trends in technological growth, advances, work and skills demands in the knowledge economy and globalization, the students of today have become digital citizens with higher learning needs relevant for their future employability and immersion into the cyberspace. For more research based data, this study underscores to bridge some other gaps in information related to statistics anxiety in African setting and Uganda in particular.

3. Objectives and Hypotheses

Relationships and differences were determined in this study utilizing these constructs of antecedents of statistics anxiety namely academic procrastination, perfectionism and gender. The specific objectives were geared towards the (1) relationship between academic procrastination and statistics anxiety; (2) relationship between perfectionism and statistics anxiety; and (3) differences between gender and statistics anxiety.

The null hypotheses tested with relevance to this study were as follows: (1) there was no significant relationship between academic procrastination and statistics anxiety; (2) there was no significant relationship between perfectionism and statistics anxiety; and (3) there was no significant difference in statistics anxiety between the male and female postgraduate students.

4. Review of Related Literature

4.1 Statistics Anxiety

Statistics anxiety is defined "as the feeling of anxiety encountered when taking a statistics course or doing statistical analyses" (Cruise, Cash & Bolton, 1985: 92). While Zeidner (1991) defined statistics anxiety as an emotional state an individual exhibits in terms of extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal when exposed to statistics. This can be in terms of content, problems, and instructional situations. This emotional state interferes with manipulation of statistics data and statistical analysis. Macher, Paechter, Papousek, Ruggeri, Freudenthaler and Arendasy (2013) defined statics anxiety as a feeling of apprehension that occurs when a student is exposed to statistics content, problems, instructional situations and evaluative contexts. A more recent definition was stated by Chew et al. (2014) that statistics anxiety is

> "…a negative state of emotional arousal experienced by individuals as a result of encountering statistics in any form and at any level; this emotional state is preceded by negative attitudes towards statistics and is related to but distinct from mathematical anxiety" (p. 199).

Therefore, statistics anxiety is connected to negative emotional feelings that are exhibited when students are placed in situations that require working with statistics in terms of manipulation, analysis, application and interpretation.

Statistics anxiety is a multidimensional construct as reported by (Baloglu, 2003, Chew et al., 2013, Chew et al., 2014, Liu, et al., 2011, Macher et al., 2012, Onwuegbuzie et al., 1999, Onwuegbuzie, 2004). It consists of six factors which are: worth of statistics (concerned with students' perception of relevance of statistics); interpretation anxiety (feeling of uneasiness encountered by the student while interpreting statistical data); test and class anxiety (anxiety involved when taking statistics test or in statistics class); computation self-concept (experienced

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when attempting to solve statistical problems as well as student's perception of his/her ability to carry out computations); fear for asking for help (fear involved when seeking for help from fellow students) and fear of statistics teachers (students' perception of statistics instructor).

Earp conceptualized statistics anxiety also in six different constructs which are; anxiety, performance, history and self-concept, expectation, attitude and fearful behavior. He viewed anxiety as it relates to tests, math, the class, statistics content, numbers and interpretation of numerical data. He also contended that students who score highly in this domain will feel anxious in statistics class situations. Performance domain was defined by him as "self-reported, perception of course performance, ability to perform statistical operations and ability to learn statistical concepts". In terms of history and self-concept, he defined it in terms of "developmental history of success or failure in situations involving mathematics, low math self-esteem, low self-concept, prior educational experiences, perceived quality of prior mathematics classes, motivation to learn, difficulty of material in previous mathematics classes and quality of instruction in previous mathematics and statistics classes." Expectations domain was conceptualized by "social and cognitive expectations, unrealistically high expectations from parents and/or peers, and high expectation of punishment." Attitude was viewed in terms of attitude as it pertains to math, worth of statistics, and psychological arousal with respect to the level of personal fulfillment gained in the practice of statistics. Fearful behavior was in terms of extensive worry, intrusive thoughts, mental disorganization, tension, and fear as it relates to instructors, asking for help, past behavior, current behavior and future behavior (2007). In this study, the researchers used statistics anxiety in terms of anxiety, attitude towards statistics class, fearful behavior, attitude towards mathematics and performance.

4.2 Antecedents of Statistics Anxiety

The antecedents of statistics anxiety are classified as situational, dispositional and environmental antecedents (Onwuegbuzie et al, 2003). According to Chew et al. (2014), situational antecedents refer to factors that surround the student, whereas dispositional antecedents refer to the personality of the student while environmental antecedents are events that occurred in the past of a student prior to statistics course. Situational factors of statistics anxiety are prompt and results from the statistics courses and include "statistics teachers, nature of statistics courses, lack of feedback from statistics instructors, pace of statistics instruction, and statistical terminology' (Vahedi et al., 2012:41). Other situational factors include statistics prior knowledge, statistics course grade, the state of the course (elective or required), major (statistics or non-statistics) and attitudes towards calculators (Onwuegbuzie et al., 2003). Dispositional factors include psychological and emotional characteristics such as attitudes towards statistics (Coetzee et al., 2012), perceptions, self-concept and learning styles (Vahedi et al., 2012). Researchers have also identified other factors such as perfectionism (Onwuegbuzie et al., 2003), procrastination (Onwuegbuzie, 2004) and level of self-esteem that contribute to statistics anxiety. Environment

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factors include gender, age, ethnicity, race and country of origin (Khavenson, Orel & Tryakshina, 2012, Onwuegbuzie, 2003, Vahedi et al., 2012). In this study, the researcher considered dispositional antecedents (procrastination and perfectionism) and environmental antecedent (gender) and corresponding relationships and differences where it deemed fit.

Academic procrastination occurs in the academic settings and is related to carrying out academic tasks such as studying for examinations, doing assignments, among others but one fails to do it within specified time (Jiao, DaRos-Voseles, Collins, & Onwuegbuzie, 2011). Solomon and Rothblum (1984) conceptualized academic procrastination as a multidimensional variable, divided into two constructs as academic procrastination (writing a term paper, studying for exams, keeping up with weekly reading assignments, academic administrative tasks, attendance tasks and school activities in general) and reasons for procrastination. In this study, the researcher adopted the constructs of areas of academic procrastination in measuring academic procrastination as well as reasons for procrastination.

Perfectionism is defined as a personality type where an individual (student) tries to be faultless and sets exceedingly higher goals in regard to academic performance and overly critiques his or her behavior (Stoeber, Schneider, Hussain & Matthews, 2014). Hewitt and Flett (1991) operationalized perfectionism into these three components: self-oriented, other-oriented and socially-prescribed perfectionism. In this study, the researcher measured all these components.

4.3 Related Studies

4.3.1 Procrastination as a Correlate of Statistics Anxiety

Different studies had been carried out in regard to academic procrastination (e.g. Onwuegbuzie, 2004 & Vahedi, 2011). Vahedi (2011) carried out the study on procrastination and statistics anxiety, applying a canonical correlations analysis, among 248 undergraduate Iranian female college students. A questionnaire was used to collect data and the constructs of statistics anxiety developed by Earp (2007) were used. He reported that the academic procrastination was positively correlated to constructs of statistics anxiety. In the study carried out by Onwuegbuzie (2004), he reckoned that statistics anxiety was responsible for the delays in enrollments of students in post graduate courses. In his study, the sample involved 135 post graduate students from a university in southeastern part of USA. He found out that there existed a positive significant canonical relationship between academic procrastination and statistics anxiety. In the study carried out by Rodarte-Luna and Sherry (2008) where a sample 323 students was used to investigate sex differences on measures of statistics anxiety and learning strategies, among other findings, they report that procrastination was positively related to statistics anxiety. Based on the findings of the previous studies, the researchers hypothesizes that:

H_1: *There is a positive significant relationship between academic procrastination and statistics anxiety.*

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4.3.2 Perfectionism as a Correlate of Statistics Anxiety

Various studies on perfectionism and statistics anxiety had been carried out. For example, Walsh and Ugumba-Agwunobi (2002) carried out a study on individual differences in statistics anxiety in such aspects as the roles of perfectionism, procrastination and trait anxiety where 93 students were selected for the study. The results indicated a modest link between inter-personal perfectionism and components of statistics anxiety. Onwuegbuzie and Delay's study (1999) on the relationship between perfectionism and statistics anxiety among graduate level research methodology students, a sample of 107 students was selected. Using a canonical correlation analysis, they found out that students who held unrealistic standards for significant others (other-oriented perfectionists) and those who maintain a perceived need to attain standards and expectations prescribed by significant others (socially-prescribed perfectionists) tend to have higher levels of statistics anxiety.

A recent empirical investigation by Comerchero and Fortugno (2013) examined the correlations between statistics anxiety and dimensions of perfectionism (adaptive and maladaptive) using the data obtained from 96 psychology graduate students. They found out that maladaptive perfectionism correlated with higher levels of statistics anxiety. In view of the above findings, the researchers in this study contend that:

H_2: *There is a positive significant relationship between perfectionism and statistics anxiety*

4.3.3 Gender as an Antecedent of Statistics Anxiety

Eduljee and LeBourdais (2015) investigated gender differences in the context of statistics anxiety among undergraduate college students and found out that the female exhibited greater anxiety on test and class anxiety than the male students . They also found out that males had no significant correlations between statistics anxiety and course grades and for females, there existed significant correlations between worth of statistics, course grades, computational self-concept and course grades. Rodarte-Luna et al. (2008) conducted a study on sex differences and how they relate to statistics anxiety and learning strategies where a sample of 323 was used. They found out that sex differences on statistics anxiety was statistically significant and that statistics anxiety varied between men and women. Men showed a higher positive relationship in terms of procrastination and asking for help, test anxiety and interpretation anxiety, while for women, procrastination was positively correlated to statistics anxiety. Within the context of the above findings, this study hypothesizes that:

H_3: *There is a significant difference in statistics anxiety between the male and female respondents.*

5. Methods and Techniques

The quantitative approach was employed in this study aimed at examining relationships between variables which were measured on instruments and numerical data analyzed using statistical procedures (Creswell, 2009). The study followed a post positivist's view that held a deterministic

philosophy in which causes (antecedents) probably determined the effects (statistics anxiety). Data were collected using a questionnaire that had three sections. The first section comprised of four organismic variables (gender, age, nationality and course type), the second section with 44 items on academic procrastination ($\alpha = 0.885$) adopted from Procrastination Assessment Scale for Students (PASS) developed by Solomon et al. (1984) and 45 items on perfectionism ($\alpha = 0.897$) adopted from the Perfectionism Multidimensional Scale (PMS) developed by Hewitt et al. (1991). The third section contained 43 items on statistical anxiety ($\alpha = 0.846$) adopted from Statistics Anxiety Measurement (SAM) developed by Earp (2007). Anchored on Cronbach's alpha reliability coefficient (1971), the questionnaire was reliable since the alpha coefficients were all above 0.5. The data were collected from 136 postgraduate students of Kampala International University, Uganda.

6. Results and Discussions

6.1 Demographic Characteristics of the Respondents
Table 1 shows that majority of the respondents were male (69.9%), Ugandan in nationality (61%) and more of the respondents were taking masters courses (70.6%). Data were analyzed using summary statistics (means and standard deviations), t-test and linear regression analysis.

Table 1: Demographic characteristics of respondents

Description	Category	Frequency	Percent
Gender	Female	41	30.1
	Male	95	69.9
Nationality	Comorian	4	2.9
	Kenyan	11	8.1
	Nigerian	16	11.8
	Rwandese	4	2.9
	Somali	7	5.1
	South Sudan	11	8.1
	Ugandan	83	61.0
Course type	Masters	96	70.6
	PhD	40	29.4

6.2 Descriptive Statistics on Constructs of Academic Procrastination
Academic procrastination is a multi-dimensional variable with a total of 44 items with 18 items on academic areas of procrastination and 26 on reasons for procrastination all rated on a 5-point Likert scale. The descriptive statistics per subsection in each construct are shown in Table 2. According to the results in Table 2, keeping up with statistics reading assignments had the highest mean, slightly over 3 followed by studying for exams suggesting that students generally

procrastinate on these two aspects. The reasons for procrastination has the lowest mean (i.e 2.597) followed by procrastination in school activities with a mean of 2.837. This indicates that the students do not procrastinate on other school activities than those directly related to the study of statistics. The overall picture on academic procrastination suggests that students generally procrastinate (mean = 2.891), which is slightly above the average.

Table2: Descriptive statistics on constructs of academic procrastination

	Constructs	Mean	Std. Deviation
Academic	Writing statistics coursework	2.937	1.343
	Studying for exams	3.01	1.261
	Keeping up with statistics reading assignment	3.097	1.294
of Procrastination	Academic administrative tasks: Filling out forms, registering for classes, getting ID cards….	2.853	1.389
	Attendance Tasks: Meeting with your lecturer/advisor, facilitator, making an appointment with e.g. a lecturer	2.907	1.394
Areas	School activities	2.837	1.354
Reasons for Procrastination		2.597	1.407
Overall Mean		**2.891**	

6.3 Description of Constructs of Perfectionism

Perfectionism is a multi-dimensional variable composed of 45 items with 15 items on self-oriented, 15 items on other-oriented and 15 items on socially-prescribed perfectionism, all rated on a 7-point Likert scale ranging from strongly disagree to strongly agree. The summary descriptive statistics for each construct are shown in Table 3 below. The results reveal that self-oriented perfectionism has the highest mean (i.e mean = 3.775), followed by other oriented perfectionism (mean = 3.634) and socially-oriented perfectionism had the lowest mean (3.299). The overall mean is 3.569, almost 4 suggesting that the learners have a high perfection rates. Students try to be faultless and set higher achievement goals in statistics.

Table 3: Descriptive statistics on constructs of perfectionism

Constructs	Mean	Std. Deviation
Self-oriented perfectionism	3.775	1.380
Other oriented perfectionism	3.634	1.448
Socially prescribed perfectionism	3.299	1.532
Overall Mean	**3.569**	

6.2 Description of Constructs of Statistics Anxiety

Statistics anxiety is also a multi-dimensional variable consisting of 43 items based on a 4-point Likert scale to measure the 5 subscales of statistics anxiety, which are anxiety (12 items), attitude towards the class (9 items), fearful behavior (4 items), attitude towards mathematics (10 items), and performance (8 items). Table 4 below shows the mean responses in each category of constructs. Results reveal that performance is rated high with a mean = 2.938, implying that the students expect to perform on average. Fearful behaviour was rated the lowest (mean = 2.175) indicating that the learners rarely fear asking questions or avoid statistics classes.

Table 4: Descriptive statistics of constructs of statistics anxiety

Constructs	Mean	Std. Deviation
Anxiety	2.779	1.051
Attitude Towards the Statistics Class	2.492	1.036
Fearful Behavior	2.175	0.976
Attitude towards Mathematics	2.498	1.016
Performance	2.938	0.802
Overall Mean	**2.576**	**0.976**

6.4 Bivariate Analyses

Bivariate analysis was used to carry out preliminary hypothesis testing under this study.

6.4.1 Academic Procrastination and Statistics Anxiety

The test for normality by using skewness indicated that the skewness values are -0.033, -0.607 and -0.073 for statistics anxiety, academic procrastination and perfectionism respectively suggesting that the data were highly normally distributed. The Pearson's linear correlation coefficient was used to associate statistics anxiety with academic procrastination, yielding r = 0.185, p = 0.062 signifying the acceptance of the null hypothesis that there is no significant relationship between academic procrastination and statistics anxiety among post graduate students of Kampala International University. The correlations results are shown in Table 5 below.

6.4.2 Perfectionism and Statistics Anxiety

The Pearson's linear correlation coefficient was used to correlate statistics anxiety with perfectionism, yielding r = -0.333, p = 0.000, meaning that the null hypothesis is rejected therefore, there is a significant relationship between perfectionism and statistics anxiety and where it is shown that the relationship is negative and significant. The correlations results are shown in Table 5 below.

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Table 5: Correlation analyses between academic procrastination and perfectionism vs. statistics anxiety

Variables	r-value	p-value	Interpretation
Academic procrastination vs. Statistics anxiety	0.185	0.062	Insignificant
Perfectionism vs. Statistics anxiety	-0.333	0.000	Significant

6.4.3 Gender and Statistics Anxiety

The t-test was applied to determine the differences in statistics anxiety between the male and female respondents. The means in Table 6 suggest that the female students (mean = 2.6193) had slightly higher statistics anxiety than the male students (mean = 2.5814). However, the t-value (t = 0.554) with p-value (0.581) exceeds the yardstick significance $\alpha = 0.05$. Thus at five percent margin, the null hypothesis of no significant difference in statistics anxiety between the male and female respondents is accepted. The results are shown in Table 6 below.

Table 6. Descriptive and t-test results on gender and statistics anxiety

Gender	Count	Mean	St. Dev.	t-value	p-value
Female	27	2.6193	.28300	0.554	0.581
Male	91	2.5814	.39445		

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6.3.4 Multivariate Analyses

The bivariate analyses show that the three independent variables (academic procrastination, perfectionism and gender), perfectionism have a significant correlation with statistics anxiety while academic procrastination does not. It also show that there is no significant difference in statistics anxiety between the male and female respondents. Since gender is a categorical variable, multivariate analysis is done on only academic procrastination, perfectionism and statistics anxiety. Multivariate regression analysis takes into account simultaneous relationship between academic procrastination, perfectionism and statistics anxiety (Bakkabulindi &. Sekabembe, 2010). The results from multiple regression analysis are in Table 7 below.

The ANOVA table (a) signifies that the two variables are collectively good explanatory variables of statistics anxiety among post graduate students of Kampala International University (F = 12.167; p = 0.000 < 0.01) although they account for less than 20% of the variations in statistics anxiety (Adjusted R square = 0.187). The table on coefficients (b) suggests that of the two independent variables, only perfectionism was a significant correlate of statistics anxiety at 1% level of significance (p = 0.000 < 0.01).

Table 7: Regression results on statistics anxiety on academic procrastination and perfectionism

(a) ANOVA Table

F Value	Sig. value	Adjusted-R square
12.167	0.000	0.187

(b) Coefficients

Independent Variable	Beta	Sig. or p value
Academic Procrastination	.245	.019
Perfectionism	-.413	.000

7. Conclusions

7.1 Academic Procrastination and Statistics Anxiety
The study conformed with the findings of Onwuegbuzie (2004), Rodarte-Luna et al, (2008) and Vahedi (2011). The findings indicate that even though a positive relationship exist, it is not significant, a finding that earlier studies did not mention.

7.2 Perfectionism and Statistics Anxiety
The finding of this study indicate that there is a significant negative relationship between perfectionism and statistics anxiety. This finding implies that students with higher levels perfectionism tend to have lower levels of statistics anxiety. A significant conclusion is that higher levels of perfectionism significantly affects statistics anxiety negatively. On the other hand, this finding is in contrast with the findings of Comerchero et al. (2013) and Onwuegbuzie et al (1999).

7.3 Gender as an Antecedent of Statistics Anxiety
The finding reflected that the female students have slightly higher statistics anxiety than their male counterparts. Such finding is contrary to the findings of Rodarte-Luna et al. (2008) but similar with the finding of Eduljee et al (2015) though they did not tell whether the differences were significant or not. Thus it is concluded that there is insignificant difference in statistics anxiety between the male and female post graduate students.

8. Recommendations

On a general note, the occurrence of statistics anxiety among the postgraduate students of Kampala International University was not that prevalent over performing in statistics class. In fact, the educators/lecturers of the statistics course should be aware that the elements of fear and anxiety for statistics were not that alarming, however, the findings should rather encourage the educators/lecturers to employ innovative engagements to capitalize more interests and better performance on the students taking statistics course. At the beginning of the statistics course, an emphatic and non fearful orientation to the course and introduction of the topics can actually decapitate preconceived negative ideas, perspectives and notions related to statistics. The relevant educators/lecturers of the statistics course may have to endeavor welcoming warmly the

learners with a set of activities that can make the students feel personally involved, self-directed and self determined to engage in statistical procedures substantially in the aspects of cognitive, affective and psychomotor domains. Using technology as a driving force in statistics class is an engaging effort by blending the lectures with hands-on experience and more percentage of the class sessions be dedicated to computer-aided statistical applications.

References

Bakkabulindi, F.E.K. & Sekabembe, B. (2010). "Age, gender and culture as correlates of use of knowledge management systems in Makerere University." *International Federation for Information Processing*. pp. 30–42.

Baloglu, M. (2003). "Individual differences in statistics anxiety among college students. " *Personality and Individual Differences*. 34, 855–865, PII: S0191-8869(02)00076-4

Chew, K. H. P. & Dillon, D. B. (2014). "Statistics anxiety and the big five personality factors." International Conference on Education & Educational Psychology 2013 (ICEEPSY 2013). *Procedia-Social and Behavioral Sciences*, 112, 1177–1186, doi: 10.1016/j.sbspro.2014.01.1282

Chew, P. K. H., Dillon, D. B (2014). "Statistics anxiety update: Refining the construct and recommendations for a new research agenda." *Perspectives on Psychological Science,* 9(2) 196-208, doi: 10.1177/1745691613518077

Coetzee, S., & Van der Merwe, P. (2010). "Industrial psychology students' attitudes towards statistics." *SA Journal of Industrial Psychology*, 36(1), 1-8. doi:10.4102/sajip.v36i1.843

Comerchero, V & Fortugno, D. (2013). "Adaptive perfectionism, maladaptive perfectionism and statistics anxiety in graduate psychology students." *Psychology Learning and Teaching, 12(1),* http://Dx.Doi.Org/10.2304/Plat.2013.12.1.4.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed Methods approaches.* 3rd Edition. Los Angeles: Sage Publications, Inc.

Cronbach, L.J.: *Test validation*. In: Thorndike, R.L. (ed.) *Educational Measurement*, pp. 443-597. American Council on Education, Washington, D.C (1971).

Cruise, R. J., Cash, R. W., & Bolton, D. L. (1985). "Development and validation of an instrument to measure statistical anxiety." *ASA Proceedings of the Section on Statistical Education* (pp. 92-97).Alexandria, VA, EE. UU: American Statistical Association.

Earp, S, M. (2007). "*Development and validation of the statistics anxiety measure.*" A Dissertation Presented to the College of Education University of Denver in Partial Fulfillment of the Requirements for the Degree Doctorate of Philosophy.

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Under review for publication

Eduljee, N. B. & LeBourdais, P. (2015). Gender Differences in Statistics Anxiety with Undergraduate College Students. *The International Journal of Indian Psychology,* 2(3), 69-82.

Hewitt, P.L., & Flett, G.L. (1990). "Perfectionism and depression: A multidimensional analysis." *Journal of Social Behavior and Personality, 5,* 423-438.

Jiao, Q. G., DaRos-Voseles, D. Collins, K. M.T., & Onwuegbuzie, A. J. (2011). "Academic procrastination and the performance of graduate-level cooperative groups in research methods courses." *Journal of the Scholarship of Teaching and Learning*, 11(1), 119 – 138.

Khavenson, T., Orel, E. & Tryakshina, M. (2012). "Adaptation of survey of attitudes towards statistics" (SATS 36) for Russian sample. *Procedia-Social and Behavioral Sciences,* 00, 000–000.

Lavasani, M. G., Weisani, M. & Ejei (2011)."The role of achievement goals, academic motivation, and learning strategies in statistics anxiety: testing a causal model." *Procedia Social and Behavioral   Sciences,*   15,   1881–1886, doi:10.1016/j.sbspro.2011.04.020.

Liu, S., Onwuegbuzie, A. J., & Meng, L. (2011). "Examination of the score reliability and validity   of the statistics anxiety rating scale in a Chinese population: Comparisons of statistics   anxiety between Chinese college students and their Western counterparts." *Journal of   Educational Enquiry,* 11(1), 29-42. ISSN: 1444-5530.

Macher, D., Paechter, M., Papousek, I., & Ruggeri, K. (2012). "Statistics anxiety, trait anxiety learning behavior, and academic performance." *European Journal of Psychology Education,* 27, 483-498, doi: 10.1007/s10212-011-0090-5.

Macher, D., Paechter, M., Papousek, I., Ruggeri, K., Freudenthaler, H. H. & Arendasy, M. (2013). "Statistics anxiety, state anxiety during an examination, and academic achievement." *British Journal   of   Educational   Psychology*,   83,   535–549, doi:10.1111/j.2044-8279.2012.02081.x.

Onwuegbuzie, A. J & Daley, C. E. (1999). "Perfectionism and statistics anxiety." *Personality and   Individual Differences*, 15, PII: S0191-8869(98)002141.

Onwuegbuzie, A. J. & Wilson, V. A. (2003). "Statistics anxiety: nature, etiology, antecedents, effects, and treatments- a comprehensive review of the literature." *Teaching in Higher Education, 8(2), 195– 209*

Onwuegbuzie, A. J. (2003). "Modeling statistics achievement among graduate students." *Educational and Psychological Measurement,* 63(6), 1020-1038, doi: 10.1177/0013164402250989.

Onwuegbuzie, A. J. (2004). "Academic procrastination and statistics anxiety." *Assessment & Evaluation in Higher Education,* 29(1), 3-19.

Rodarte-Luna, B. & Sherry, A. (2008). Sex differences in the relation between statistics anxiety and cognitive/learning strategies. *Contemporary Educational Psychology*, 33, 327–344; doi:10.1016/j.cedpsych.2007.03.002

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive-behavioral correlates. *Journal of Counseling Psychology*, 31(4), 503-509. doi: 10.1037/0022- 0167.31.4.503

Stoeber, J., Schneider, N., Hussain, R., & Matthews, K. (2014). Perfectionism and negative affect after repeated failure: Anxiety, depression, and anger. *Journal of Individual Differences,* 35, 87- 94, doi: 10.1027/1614-0001/a000130

Vahedi, S. (2011). "Canonical correlation analysis of procrastination, learning strategies and statistics anxiety among Iranian female college students." *Procedia - Social and Behavioral Sciences*, 30, 1620 – 1624. doi:10.1016/j.sbspro.2011.10.314

Vahedi, S., Farrokhi, F. Gahramani, F. & Issazadegan, A. (2012). "The relationship between procrastination, learning strategies and statistics Anxiety among Iranian College students: A canonical correlation analysis." *Iran Journal Psychiatry Behav Sci,* 6(1). 40s-48

Walsh, J.J. & Ugumba-Agwunobi, G. (2002). "Individual differences in statistics anxiety: the roles of perfectionism, procrastination and trait anxiety." *Personality and Individual Differences,* 33, 239-251, PII: S0191-8869(01)00148-9.

Williams, A. S. (2010). "Statistics anxiety and instructor immediacy." *Journal of Statistics Education*, 18(2), 1-18, www.amstat.org/publications/jse/v18n2/williams.pdf

Zeidner, M. (1991). "Statistics and mathematics anxiety in social science students: Some interesting parallels." *British Journal of Educational Psychology*, 61, 319–328.