EFFECT OF COGNITIVE RESTRUCTURING AND TESTWISENESS TRAINING ON TEST ANXIETY AMONG NEWLY ADMITTED UNDERGRADUATE STUDENTS OF FEDERAL UNIVERSITY GUSAU, ZAMFARA STATE, NIGERIA

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ABSTRACT

Introduction: Test anxiety is relevant and highly complex issue in academic settings which can produce severe psychic problems and hamper academic achievement.
Purpose: Investigate the effects of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students of Federal University Gusau, Zamfara State.
Methodology: The study adopted quasi-experimental design employing the non-randomized pre-test, post-test, control group design. This study has three treatment groups and a control group. The treatment groups are Cognitive Restructuring Technique (CRT) group, Testwiseness Training (TT) group, combination of CRT group and TT group. The sample size of the study comprised 200 newly admitted 100 level undergraduate students of Federal University Gusau, Zamfara State, selected using multistage sampling techniques. The selected undergraduate students cut across the four (4) faculties in the University: Education, Humanities, Management and Social Sciences, and Sciences. The instrument used for data collection in the study is Test Anxiety Inventory (TAI). The data collected were analyzed using Analysis of covariance (ANCOVA) which is a technique for controlling extraneous variables and reducing within group differences.
Results: The results showed that Cognitive Restructuring Technique (CRT) and Testwiseness Training (TT) were efficacious in the reduction of the test anxiety among newly admitted undergraduate students exposed to the treatments. It was further revealed that combined treatments of CRT and TT were more effective than the single treatments.
Recommendation: Major recommendation is that Cognitive Restructuring Technique and Testwiseness Training should be incorporated by the lecturers of tertiary institution in their instructions to further improve test taking skills of their students in order to improve their performance.

Keywords: Cognitive Restructuring, Testwiseness training, Test Anxiety, undergraduate students.
PUBLIC INTEREST STATEMENT

The findings of this study will provide useful information to the lecturers of tertiary institution, undergraduate students, University administrations, test developers and researchers in educational testing. Such information would help lecturers of tertiary institution and undergraduate students to be aware of the effects of cognitive restructuring and testwiseness training on test anxiety.

INTRODUCTION

Test is considered to be an instrument which is used to measure and determine the level of achievement of students. In a school setting testing is a systematic procedure of presenting a set of questions, tasks or problem to the students in order to respond either orally or in written, and sometimes by practical performance. Testing is one of the processes of collecting assessment data and is the most popular in teaching and learning process in measuring the achievement of students in a learning task. Academic success can be reduced by students’ who are unable to display proficiency testing situations due to test anxiety (Kayode & Sheu, 2021). Test anxiety is thought to prevent some individuals from reaching their academic potential. Test anxiety is more than just being nervous in exams. As in other anxiety disorders, persons concerned severely suffer from their problem and show a pronounced avoiding behaviour. Test anxiety can at least lead to a decline in performance which can subsequently hamper the career of the affected person (Saß, Wittchen & Zaudig, 1996).

Test anxiety is a type of performance feelings that people experience whenever there is a situation when they are being evaluated. Test anxiety is a psychological condition in which people experience extreme distress and anxiety in testing situations (Okolo & Kolawole 2021). While many people experience some degree of stress and anxiety before and during examinations, test anxiety can actually impair learning and hurt test performance (Akinsola & Nwajei, 2013). Test anxiety can be a devastating problem for them because it may impair their performance and their well being later in life in the long run (Farooqi, Ghani, & Spielberger, 2012).

According to Okolo and Kolawole (2021), test anxiety is the drain behaviours and emotions that are manifested by learners who find it stressful preparing for and taking test and which are believed to affect their performance. Every year, millions of students perform poorly in schools and universities because of heightened test anxiety. Text anxiety is a complex and multi-dimensional construct that consists of cognitive, psycho-affective and behavioural components. The cognitive component involves worry or negative thoughts, depreciating self-statements that occur during assessments and performance inhibiting difficulties that may arise from anxiety (e.g. problem in recalling facts, difficulty in reading and understanding questions). The affective component includes the person’s appraisal of his/her physiological state such as tension, tight muscles and trembling. The behaviour component includes poor study skills, avoidance and procrastination of work (Spielberger & Vagg, 1995).

Liebert and Morris’s interference model in Cassady and Finch (2014) explains how anxiety interferes with individuals in testing situations. They assumes that during testing situations anxiety interferes with students’ ability to remember and utilize information that has been stored in the short or long term memory or that has been mastered. Interference model explains that test anxiety interferes with information recalling. This model is also referred to as “anxiety-blockage hypothesis. Anxiety affects performance during testing situations; feelings of worry or cognitive manifestation of anxiety such as negative expectations for success and concerns about one’s performance can interfere with performance by diverting attention from the task at hand.

Hebb’s theory of arousal of 1972 also explaining the relationship between test anxiety and students’ academic
The theory states that human beings seek out an optimal level of arousal such that too low arousal brings about boredom while too high arousal leads to stress. Test anxiety varies markedly from one individual to another. Thus, some individuals are relatively calm when it comes to completing a test, whilst others especially low-achieving students are generally “perceive test as more dangerous or threatening and experience more intense levels of anxiety when taking tests” (Spielberger & Vagg, 1995). Research studies such as Cassady and Johnson 2001; Kassim, Hanafi, and Hancock 2008; Ndirangu, Muola, Kithuka, and Nassluma 2009 found a negative relationship between test anxiety and achievement. They also found that a cognitive factor (worry) contributes more in test anxiety than affective (emotional) factor.

The impairment of academic performance in test-anxious persons is mostly explained with cognitive interference. Cognitive restructuring is a talk therapy that helps one to reframe an earlier negative or irrational belief or understanding one had about things which inhibited achievement of set goals or which discouraged one’s personal effort to achieve progress in life. Cognitive restructuring involves learning how to think differently, to change fundamental faulty thinking and replace them with more rational, realistic, and perhaps positive thinking. Cognitive restructuring can be defined as those interventions with the core assumption that what individual think directly impact how they feel and what they do (Graham, 2005). Cognitive restructuring according to Salman, Esere, Omotosho, Abdullahi, and Oniyangi (2010) is an insight behavioural procedure that emphasizes recognizing and changing negative thoughts and maladaptive belief. Cognitive restructuring also known as cognitive reframing is a technique drawn from cognitive behaviour therapy that can help people identify, challenge and alter anxiety provoking thoughts patterns and beliefs (Baxter, 2010).

The cognitive restructuring techniques are multimodal and integrative. It generally starts with clients disturbed feelings and intensely explores these feelings in connection with thoughts to behaviours. Akaneme and Ngwoke (2010) used some cognitive restructuring techniques such as applying rules of evidence, problem solving, examining and modifying beliefs, considering alternative explanations and modifying rules and imperative in the study of cognitive restructuring intervention programme on achievement orientation of schooling adolescents. Other techniques used cognitive restructuring include validity testing, cognitive rehearsal, guided discovery, writing in a journal (Journaling), homework, modeling; systematic positive reinforcement, aversive conditioning and application (Gaikwad, 2010). Researchers such as Jerrell, Cassady and Ronald (2002) and Unachukwu and Onwuka (2009) concluded that cognitive restructuring techniques reduce negative effect of test and decreased irrational thought about test, test anxiety and poor academic performance among the students.

Testwiseness on the other hand is being defined as that quality possessed by a testee’s at a particular period such time management, sentence construction, organization of answers, which enable the testees to do well in a test. Testwiseness according to Gbore and Osakuade (2016) is the skill that the testees possess, which is different from skills that the test is intended to measure. According to Alonge (2004) students who are test-wise always know how to manipulate their time, speed, manner of answering questions in the test and they have developed their writing skills for the essay questions. They also understand instructions quickly and as a result of this, their test anxiety always reduced and usually score high marks in examinations. Mustapha (2001) cited by Gbore and Osakuade (2016) was of the opinion that test-taking skills should be taught to all students at all levels of education in Nigeria. He further stressed that such training should focus on all components of test-wiseness such as how to prepare for a test, how to respond to different types of test items, how to avoid errors during tests, how to use idiosyncrasies built into a test by the teacher, how to use time effectively, how to eliminate incorrect alternatives, and...
how to avoid examination malpractice, who to use similar alternatives, stem cue, guessing strategy, content information, consistency in grammar, response set and abstract foils.

STATEMENT OF THE PROBLEM
Test anxiety is a psychological condition in which people experience extreme distress and anxiety in testing situations. Test anxiety is a relevant and highly complex issue in academic settings which can produce severe psychic problems and hamper academic success. While many people experience some degree of stress and anxiety before and during examinations, test anxiety is mostly high among the newly intake undergraduate students of the university. This is the level that test anxiety begins to appear in many students. But it is difficult and often stigmatizing to identify students as “test anxious”, so it may be appropriate to provide the support and treatment for all students, even if they are not anxious. The researcher believed that multi-faceted approaches have the best opportunity to provide assistance. This study targeted at positively changing the high test anxiety of newly intake undergraduate students of the university using cognitive restructuring and testwiseness training.

PURPOSE OF THE STUDY
The study has the following purposes:
1. Examine the effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students at post-test.
2. Examine the effect of testwiseness training on the test anxiety among newly admitted undergraduate students at post-test.
3. Examine the combined effect of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students at post-test.

HYPOTHESES
1. There is a no significant effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students at post-test.
2. There is no significant effect of testwiseness training on the test anxiety among newly admitted undergraduate students at post-test.
3. There is no significant combined effect of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students at post-test.

METHODOLOGY
Research Design
This study adopted quasi-experimental design employing the non-randomized pre-test, post-test, control group design. This study has three treatment groups and a control group. The treatment groups are Cognitive Restructuring Technique (CRT group), Testwiseness Training (TT group), combination of Cognitive Restructuring Technique group and Testwiseness Training group.

Population and Sample
The population of the study comprised all newly admitted 100 level undergraduate students of Federal University Gusau, Zamfara State preparing for their second semester examination. They have experienced both internal and external SSCE examinations as well as first semester examination in the University. The sample size of the study comprised two hundred (200) newly admitted 100 level undergraduate students of Federal University Gusau, Zamfara State, selected using multistage sampling techniques. The selected undergraduate students cut across the four (4) faculties (Education, Humanities, Management and Social Sciences and Sciences) in the institution.

Instrument for Data Collection
The instrument used in the study is Test Anxiety Inventory (TAI). Test Anxiety Inventory (TAI) was developed by the researcher. The items were generated through experience and from literature. The TAI is a self-report instrument, which measures test anxiety. This inventory...

In collecting data for the study, a systematic two-phase procedure was adopted by the researcher. The procedures are the pre-treatment phase and the treatment phase; the treatment phase was a preliminary introduction and pre-treatment assessment which yielded the base line data for the study. The second phase was the treatment phase which deals with actual manipulation of the experimental conditions after which data were collected. The instruments were administered on face to face basis. The instruments were collected immediately subjects finish responding to the items on the questionnaire. Cognitive Restructuring Technique was administered on experimental group I of total of 50 students. The programme lasted for 6 sessions of one and half (1½) hours each spanning over a period of three weeks. Testwiseness Training treatment was administered on experimental group II of total of 50 students. The group also had 6 sessions of treatment with each session lasting for 1½ hours spanning a period of three weeks. Both Cognitive Restructuring Technique and Testwiseness Training treatments were administered on experimental group III of total of 50 students. The group also had 6 sessions of treatment with each session lasting for 1½ hours spanning a period of three weeks. The control group of total of 50 students was pre-tested and post-tested. However, they were not exposed to any form of treatment. As compensation, they were given talk on the best method to live on campus. Test Anxiety Inventory was used as pre-test as well as posttest. There is no difference between items in pre-test and post-test format of Test Anxiety Inventory. The only difference is that the Test Anxiety Inventory pre-test and Test Anxiety Inventory post-test items are reshuffled to avoid test-wisenedness. The arrangement difference was assumed to have no effect on the respondents’ ability to respond to an item in the pre-test and post-test format of the instrument.

Method for Data Analysis

Analysis of covariance (ANCOVA) which is a technique for controlling extraneous variables and reducing within group differences was used to test null hypothesis 1-3 at 0.05 level of significance.

RESULTS

Hypothesis 1: There is a no significant effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students at post test.
Table 1: ANCOVA result on significant effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students

Tests of Between-Subjects Effects (ANCOVA)
Dependent Variable: Posttest

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>35667.059</td>
<td>4</td>
<td>8916.765</td>
<td>173.658</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
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<td>1</td>
<td>2889.536</td>
<td>56.275</td>
<td>.000</td>
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<tr>
<td>Pretest</td>
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<td>1</td>
<td>2413.976</td>
<td>47.013</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
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<td>1</td>
<td>132.502</td>
<td>2.581</td>
<td>.112</td>
</tr>
<tr>
<td>Method</td>
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<td>1</td>
<td>35184.344</td>
<td>685.230</td>
<td>.000</td>
</tr>
<tr>
<td>Gender * Method</td>
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<td>1</td>
<td>784.388</td>
<td>15.276</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>4877.941</td>
<td>95</td>
<td>51.347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1087074.000</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>40545.000</td>
<td>99</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

a. R Squared = .880 (Adjusted R Squared = .875)

The result of ANCOVA test in table 4.2 above revealed F-calculated value of 685.230 and a P-value of 0.000. The P-value 0.000 is less than 0.05 level of significance. This implies that the hypothesis of no significant effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students at post test is rejected. Based on the result, it was concluded that Cognitive Restructuring Technique (CRT) has significant effect on the test anxiety among newly admitted undergraduate students.

**Hypothesis 2:** There is no significant effect of testwiseness training on the test anxiety among newly admitted undergraduate students at post test.

Table 2: ANCOVA result on significant mean of effect of testwiseness training on the test anxiety among newly admitted undergraduate students

Tests of Between-Subjects Effects (ANCOVA)
Dependent Variable: Posttest

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
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<td>8266.920</td>
<td>176.360</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>3134.443</td>
<td>1</td>
<td>3134.443</td>
<td>66.868</td>
<td>.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>1498.623</td>
<td>1</td>
<td>1498.623</td>
<td>31.970</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>1233.581</td>
<td>1</td>
<td>1233.581</td>
<td>26.316</td>
<td>.000</td>
</tr>
<tr>
<td>Method</td>
<td>25322.778</td>
<td>1</td>
<td>25322.778</td>
<td>540.215</td>
<td>.000</td>
</tr>
<tr>
<td>Gender * Method</td>
<td>293.723</td>
<td>1</td>
<td>293.723</td>
<td>6.266</td>
<td>.014</td>
</tr>
<tr>
<td>Error</td>
<td>4453.161</td>
<td>95</td>
<td>46.875</td>
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<tr>
<td>Total</td>
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<td>100</td>
<td></td>
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<tr>
<td>Corrected Total</td>
<td>37520.840</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .881 (Adjusted R Squared = .876)
The result of ANCOVA test in table 4.4 above revealed F-calculated value of 540.215 and a P-value of 0.000. The P-value 0.000 is less than 0.05 level of significance. This implies that the hypothesis of no significant effect of testwiseness training on the test anxiety among newly admitted undergraduate students at post test is rejected. Based on the result, it was concluded that Testwiseness Training (TT) has significant effect on the test anxiety among newly admitted undergraduate students.

**Hypothesis 3:** There is no significant combined effect of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students at post test.

Table 3: ANCOVA result on significant combined effect of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
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<td>Corrected Model</td>
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<td>4</td>
<td>7049.097</td>
<td>130.108</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>3556.503</td>
<td>1</td>
<td>3556.503</td>
<td>65.644</td>
<td>.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>1595.830</td>
<td>1</td>
<td>1595.830</td>
<td>29.455</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>338.323</td>
<td>1</td>
<td>338.323</td>
<td>6.245</td>
<td>.014</td>
</tr>
<tr>
<td>Method</td>
<td>24365.443</td>
<td>1</td>
<td>24365.443</td>
<td>449.721</td>
<td>.000</td>
</tr>
<tr>
<td>Gender * Method</td>
<td>.104</td>
<td>1</td>
<td>.104</td>
<td>.002</td>
<td>.965</td>
</tr>
<tr>
<td>Error</td>
<td>5147.003</td>
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<td>54.179</td>
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<tr>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>33343.390</td>
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</tbody>
</table>

a. R Squared = .846 (Adjusted R Squared = .839)

The result of ANCOVA test in table 4.6 above revealed F-calculated value of 449.721 and a P-value of 0.000. The P-value 0.000 is less than 0.05 level of significance. This implies that the hypothesis of no significant combined effect of cognitive restructuring and testwiseness training on test anxiety among newly admitted undergraduate students at post test is rejected. Based on the result, it was concluded that combined effect of cognitive restructuring and testwiseness training techniques have significant effect on test anxiety among newly admitted undergraduate students.

**DISCUSSION**

Findings from hypothesis one showed that there is significant effect of cognitive restructuring on the test anxiety among newly admitted undergraduate students. Based on the result, it was concluded that the treatment Cognitive Restructuring Technique (CRT) had a positive effect on the treatment group. This finding supports the early findings of Anoka, Candace, & Sasha (2016) concluded that cognitive restructuring techniques reduce negative effect of test and decreased irrational thought about test, test anxiety and poor academic performance among the students. The result is consistent with Unachukwu and Onwuka (2006) which indicated that systematic desensitization as a cognitive restructuring technique was more effective than other therapeutics training in reducing test anxiety of students. The result is also in line with Jerrell, Cassady & Ronald (2002) concluded that cognitive restructuring techniques reduce negative effect of test and decreased irrational thought about test, test anxiety and poor academic performance among the students.

Findings from hypothesis two also showed that Testwiseness Training (TT)
has significant effect on the test anxiety among newly admitted undergraduate students. This finding is in line with the finding of Phakiti, (2003), Scharnagl, (2004) and Chiu (2011) which reported that teaching test-taking strategy can reduce test anxiety among students. The study also in consistent with Gbore and Osakuade (2016) reported that testwiseness training in Mathematics had positive impact on the adolescent secondary school students’ test anxiety levels. That is, Adolescent students without testwiseness training in Mathematics are more test anxious than the adolescent students with testwiseness training in mathematics.

Findings from hypothesis three also showed that combined effect of cognitive restructuring and testwiseness training techniques have significant effect on test anxiety among newly admitted undergraduate students. The findings support the conclusion of Kayode and Sheu (2021) that multi-faceted approaches have the best opportunity to provide assistance in reducing test anxiety among undergraduate students. The findings also in line with Baxter (2014) concluded that Cognitive restructuring combining with other techniques highly effective in reducing test anxiety of low-achieving students.

CONCLUSION
Based on the findings of the study, it was concluded that Cognitive Restructuring Technique (CRT) and Testwiseness Training (TT) were efficacious in the reduction of the test anxiety among newly admitted undergraduate students exposed to the treatments. It was further concluded that combined treatments of Cognitive Restructuring Technique (CRT) and Testwiseness Training were more effective than the single treatments.

RECOMMENDATIONS
The study therefore recommended that:
1. Cognitive Restructuring Technique (CRT) and Testwiseness Training (TT) should be incorporated by the lecturers of tertiary institution in their instructions to further improve test taking skills of their students.
2. Workshops and seminars should be organized to train lecturers of tertiary institution on how to use the Cognitive Restructuring Technique (CRT) and Testwiseness Training (TT) in the classroom since the techniques have significant effect on test anxiety of undergraduate students.
3. Concerted effort should be made in the area of encouraging the students to be more aware of the effect of test anxiety and how it can be reduced with the aim of promoting their test taking skills.
4. Test-taking skills should also be taught to all students at all levels of education in Nigeria. That is, students who are test-wise always know how to manipulate their time, speed, manner of answering questions in the test that is

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Author’s Bionote: The author of this research is an expert in Educational Research, Measurement and Evaluation, and staff of Federal University Gusau, Zamfara State.

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