

Effects of Rational Emotive Behaviour Therapy and Emotional Intelligence on Mathematics Anxiety of In-School Adolescents in Owerri Municipal Nigeria

By

¹Okoie Ojaga Emmanuel (PhD), ¹Ukah Petronilla Ngozi (PhD)
& ¹Nwoga Anayochi .N

Abstract

The impact of mathematics anxiety on the academic well-being of most in-school adolescents is quite frustrating. This development causes fear, apprehension and learned helplessness that can mar in-school adolescent's potentials. Therefore, in line with this context, this study through a pretest-posttest, control group quasi-experimental design investigated the effects of rational emotive behaviour therapy and emotional intelligence technique on the mathematics anxiety of in-school adolescents in Owerri Municipal Imo State Nigeria. Purposive sampling technique was used to select 60 participants from three randomly selected secondary schools in Owerri Municipal. The participants were randomly assigned to treatment and control groups. The two treatment groups were exposed to eight-weeks training in Rational Emotive Behaviour Therapy and Emotional Intelligence, while participants in the control group received no training. One validated instrument: Fennema-Sherman Mathematics Anxiety Scale (FSMAS) ($\alpha = 0.92$) was used. Four hypotheses were tested at 0.05 level of significance. Data was analysed using Analysis of Covariance. There was significant main effect of treatment on the ability of in-school adolescents to manage mathematics anxiety ($F(3, 56) = 26.98, p < 0.05$). Also, age was found to have significant main effect on the mathematics anxiety of in-school adolescents participants ($F(2, 57) = 4.287, p < 0.05$). The results further indicated that there was no significant main effect of gender on the mathematics anxiety of in-school adolescents between male and female participants. Likewise, there was no significant interaction effect of treatment, age and gender on mathematics anxiety of in-school adolescent's participants. School counselling psychologists could adopt the two interventions to manage mathematics anxiety of in-school adolescents.

Key-words: Adolescent, Rational Emotive Behaviour Therapy, Emotional Intelligence, Mathematics Anxiety, Owerri, Nigeria, School.

1. Introduction

The attainment of basic knowledge and competence in the application of mathematical skills by individuals and students in any nation is germane to the enhancement of national development, scientific and technological advancement. Nigeria

| ¹ Dept of Educational Psychology, Alvan Ikoku Federal College of Education, Owerri
Imo State, Nigeria

is not an exception in this context. However, the expended effort in the teaching of mathematics at the senior secondary school level as a buffer to the attainment of mathematics competence appears to be a mirage as many students experience apprehension and fear when dealing with numerical information (Okoiye & Falaye, 2011). Thus, despite its importance and applications in everyday life, mathematics is often considered a difficult subject.

Research has demonstrated that many students have learning difficulties and show poor performance in mathematics. One of the attributed reasons is the anxiety that an individual may have towards mathematics. In support of this assertion is Okoiye and Falaye (2011) report of the fact that mathematics anxiety seems like a benign problem to some people, but it can be potentially serious when it leads to high levels of distress and academic failure in otherwise capable students. They further posit that mathematics anxiety serves as stress, tension and strain that interfere with the proper functioning of an individual's body and mind considering the fact that it is accompanied by feeling of helplessness because the anxious person feels blocked and unable to find a solution to his problem. This implies that some Nigerian secondary school students due to mathematics anxiety could experience strain and stress that might impair their cognitive and intellectual ability when it comes to seeking solution to mathematical task.

This basically characterize the academic challenges faced by senior secondary school students in the present day Nigeria contemporary society as revealed by their consistent abysmal performance in mathematics subject in WAEC and NECO from 2008-2012, presented as thus; in 2008, only 13.76 per cent of 1,369,142 had credit pass in Mathematics; In 2009 NECO/GCE examinations, only 1.8 per cent of 236, 613 that sat for the examinations across 1,708 centers had credit pass Mathematics. In the same year, candidates who sat for SSCE did not do better. Out of 1,373,009 candidates, only 25.99 per cent had credit pass in Mathematics. Also out of 1,184,907 candidates that sat for May/June 2009 NECO, only 10.68 per cent had credit pass in Mathematics. Also, in June/July 2010 Secondary School Certificate Examination conducted by NECO, 24 per cent failed Mathematics. In NECO June/July 2011 SSCE school-based examination, less than 25 per cent of the 1,160,561 candidates had credit pass in Mathematics across the country. 2011 Nov/Dec (GCE) NECO results recorded a mere 11.3 per cent credit pass in Mathematics. Furthermore, only 38.81 per cent of 1,695,878million candidates that sat for the May/June 2012 West African Senior School Certificate Examination (WASSCE), obtained credit pass in Mathematics (ADESULU, 2012). This trend calls for concern among stakeholders and the need for prompt intervention to remedy the situation, which is the focus of this study.

Mathematics anxiety is a phenomenon that is often considered when examining students' problems in mathematics considering the fact that Mathematics anxiety is clearly an impediment to mathematics achievement (Ashcraft & Ridley, 2005; National Mathematics Advisory Panel, 2008). Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and tend to take the minimum numbers of required mathematics task, which has greatly limited their career choice options (Garry 2005). Thus, across a number of studies, individuals high in mathematics anxiety have been shown to perform more poorly than their low mathematics anxious peers on a range of numerical and mathematical tasks, from

counting objects and comparing numbers (Maloney, Ansari, & Fugelsang, 2011; Maloney, Risko, Ansari, & Fugelsang, 2010) to more complex arithmetic problems involving carrying. Beilock, Gunderson, Ramirez and Levine (2010) found that not only do young children experience mathematics anxiety, but this anxiety is associated with poor performance in mathematics. This is an indication of the fact that mathematics anxiety is a psychological dimension of learning that is important for educators to identify.

According to Arem (2009) mathematics anxiety is an emotional, mental and physical act related to the mathematical thinking and problem-solving process and resulting from uncomfortable past experiences related to mathematics. Feelings and experiences like this will further affect a student's ability to learn mathematics. Based on the study, students who have experienced disappointment in their mathematical abilities will have difficulty believing in their abilities in the future. Arem (2009) further contend that the contributing factors to mathematics anxiety are bitter experiences in mathematics, social pressure and the expectation to achieve outstanding results, the desire to excel, myths about the study of mathematics, societal gender stereotypes and negative self-talk. These factors give rise to feelings of deep shame for the student experiencing mathematics anxiety in the classroom setting. Furthermore, Arem (2009) reports that students with mathematics anxiety will often appear preoccupied with something else to avoid meeting face-to-face with their teachers. They are afraid to look up in class and quickly panic when their names are called. They are also afraid to raise their hands and when the teacher is waiting for an answer from them, they become even more afraid (Effandi, Normalizam, Nur & Ayu, 2012).

The findings of Franklin (2006) reveal that children at approximately nine years of age do not show consistent gender difference in relation to mathematics skills. However, in 17 out of the 20 countries examined, 13 year old boys tended to score higher than girls. Moreover, mathematics is often labelled as a masculine ability; as a result, girls often have low confidence in their mathematics capabilities. These gender stereotypes can reinforce low confidence in girls and can cause mathematics anxiety as research has shown that performance on standardized mathematics tests is affected by one's confidence (Dar-Nimrod & Heine, 2006). As a result, educators have been trying to abolish this stereotype by fostering confidence in mathematics in all students in order to avoid mathematics anxiety.

Likewise, Beilock, Rydell, and McConnell (2007) suggest that the sex difference is the result of the social stereotype that women are not good at mathematics. In terms of ability, females appear more likely to score at least as well as males in mathematics. However it seems females tend to have higher anxiety levels and to have a mastery approach to mathematics (wanting to learn to understand, rather than to show high performance) (Kenney-Benson, Pomerantz, Ryan & Patrick, 2006). Males, however, are more likely to believe themselves to be good at mathematics (Bartholomew, 2000). Gender can impact on the quantity and quality of interactions experienced by students in whole class discussions, with males generally are at an advantage (Black, 2004), thereby encouraging positive mathematical identities in males and not females.

Rational emotive behaviour therapy ('REBT') views human beings as 'responsibly hedonistic' in the sense that they strive to remain alive and to achieve some degree of

happiness. However, it also holds that humans are prone to adopting irrational beliefs and behaviours which stand on their way of achieving their goals and purposes. Often, these irrational attitudes or philosophies take the form of extreme or dogmatic 'musts', 'shoulds', or 'oughts'; they contrast with rational and flexible desires, wishes, preferences and wants. The presence of extreme philosophies can make all the difference between healthy negative emotions (such as sadness or regret or concern) and unhealthy negative emotions (such as depression or guilt or anxiety) (Mulhauser, 2011).

REBT theory mainly focuses on how irrational thoughts affect people to the extent of causing detrimental effects and how these thoughts act as barriers to a happy self-fulfilling life, (Dryden, 2003). Usually, the irrational thoughts held by a person are often congruent with their behaviour as can be reflected in the person's attitude which also has the cognitive, affective and behavioural components similar to those of REBT theory. For example, Cognitive: I am unable to do Mathematics, affective: I feel bad just by thinking about Mathematics, Behavioural: the person puts in minimal effort towards Mathematics and as a result, they fail the subject (Corey, 2005). This implies that a negative attitude towards Mathematics could make students fail Mathematics until the day they decide to change their attitude. However, the therapeutic goal of REBT is to help clients develop a more positive outlook and the maintenance of positive cognitions by restructuring the irrational thoughts and beliefs they hold, (Corey, 2005).

Also, according to Fabio (2005) workshop interventions improve Emotional Intelligence (EI) competencies such as self-confidence conflict management, communication, and conscientiousness. EI training also affects stress management. One study incorporating EI into stress management programmes reveals that "those frontline operational police officers who were able to understand and manage their emotions report lower levels of stress and were, according to their reported lifestyles, at less risk of suffering from anxiety and stress in the future. These results were evident across the sample with no real differences evident regarding the age, gender, rank or length of service of the officers involved (Chapman & Clarke 2001). In other studies, EI awareness training appears to reduce officer burnout (Donna, 2003). Also, Okoiye (2011) report that emotional intelligence is increasingly relevant to organizational development and developing people, because the EI principles provide a new way to understand and assess people's behaviours, management styles, attitudes, interpersonal skills, and potential. Emotional intelligence is an important consideration in human management and development. Emotional intelligence links strongly to multiple intelligence theory which illustrates and measures the range of capabilities people possess, and the fact that everybody has a value.

Kumar and Rooprai (2009) contended that over the last decade emotional intelligence (EI) has drawn significant interest from academics and HR practitioners throughout the world. The development of emotional intelligence skills is important because it is an area that is generally overlooked when skills development programmes are designed. And yet research shows that emotions, properly managed, can drive competence, creativity and innovation. For instance, in the field of education, Brackett and Katulak (2007) in a study of EQ and its relation to student achievement among 200 eleventh and twelfth grade American students in Texas found that EI skills were significantly predictive of academic achievement. Also, in the field of psychology, Pishghadam (2007) examined the impact

of emotional intelligence on mental health and academic success in a sample of 220 Iranian university students in Isfahan. They reported that EQ was negatively correlated with psychological stress and positively with academic success.

2. Statement of the Problem

Mathematics anxiety is a barrier to the attainment of mathematic competence. Mathematics anxious and poorly motivated in-school adolescents perform poorly in a given task. These might be as a result of them having low academic self-efficacy, low self-esteem and expressed helplessness. These more often than not, have some implications not only on the well-being of in-school adolescents, but also on significant others and society. Mathematics anxious in-school adolescents are ill motivated to achieve academically. They believe that they have less control over their academic outcomes and have higher mathematics anxiety. Thus, they are not motivated to perform the tasks needed for academic success including use of efficient study methods. Hence, in-school adolescents expressing mathematics anxiety in Nigeria are often overwhelmed by the feelings of inadequacy and distress when they are faced with the new demands of their studies and once they lose confidence in their abilities, it becomes easy for them to give up. This is reflected in the falling standard of performance of in-school adolescents in their mathematics examinations in Nigeria as observed in the consistent poor performance in NECO and WASEC.

2.1. Theoretical Framework for the Study

This study is anchored on the theory of reason action (Fishbein & Ajzen, 1975) considering the fact that the theory of reasoned action is a model for the prediction of behavioural intention and predictions of attitude. Therefore, the precept of this theory can be used to access and analysis the behavioural intensions and attitudinal dispositions of mathematics anxiety secondary school students. The theory project the fact that behavioural intention measures a person's relative strength of intention to perform behaviour. This implies that if students experiencing mathematics anxiety are expose to psychological intervention training programmes that would enable them overcome their anxiety, they could be enthusiastic about it benefit. Therefore, as expressed in the assumption of the theory of reason action, a person's behaviour is determined by his/her intention to perform the behaviour and that this intention is, in turn, a function of his/her attitude toward the behaviour and his/her subjective norm. Thus, the best predictor of behaviour is intention. Consequently, since it is the intention of every senior secondary school student to attain mathematic competence and academic success in this subject area, this theory is germane in the application of cognitive restructuring and emotional intelligence technique in managing the mathematics anxiety of senior secondary school students.

2.2. Research Hypotheses

In this study the following hypotheses were tested at 0.05 level of significance:

1. There is no significant main effect of treatment on the mathematics anxiety of in-school adolescents.

2. There is no significant main effect of gender on the mathematics anxiety of in-school adolescents.
3. There is no significant main effect of age on the mathematics anxiety of in-school adolescents.
4. There is no significant interaction effect of treatment, gender and age on the mathematics anxiety of in-school adolescents.

3. Methodology

3.1. Research Design

The study adopted a pre-test, post-test control group quasi experimental design with 3x2x2 factorial matrix. The design is made of three rows representing the two treatment techniques, rational emotive behaviour therapy and emotional intelligence techniques and the Control Group (non-treatment group). There is also a column denoting gender (male and female) participants and age (younger and older) as shown in table 1

Table.1 A 3x2X2 Factorial Matrix Design to manage mathematics anxiety among in-school Adolescents

Treatment	GENDER				Total
	Male		Female		
	Younger 14-15 years	Older 16-17 years	Younger 14-15 years	Older 16-17 years	
A1 REBT	A1 B1C1n=5	A1 B1C2n=8	A1 B2C1n=3	A1B2C2n=4	20
A2 Emotional intelligence	A2 B1C1n=4	A2 B1C2n=5	A2 B2C1n=4	A2 B2C2n=7	20
A3 Control Group	A3 B1C1n=6	A3 B1C2n=5	A3 B2C1n=5	A3B2 C2n=4	20
Total	15	18	12	15	60

3.2. Population

The population for this study consists of all senior secondary school students in Owerri Municipal.

3.2.1. Sample and Sampling Techniques

The sample for the study comprised of sixty senior students (male and female) experiencing academic failure in mathematics as expressed in their mathematics performance of below 25% in two terms examinations 1st and 2nd terms in their cognitive cumulative record folder. Participants were purposively selected based on their

performance of below 25% in Mathematics from three randomly selected co-educational public secondary schools in Owerri Municipal Imo State, Nigeria.

3.2.2. Instrument

The Fennema-Sherman Mathematics Attitudes Scale (FSMAS) translated by Zakaria and Nordin (2008) was used to assess student's level of anxiety in mathematics. This questionnaire has 12 items, consisting of 7 positive statements and 5 negative statements. The five-point Likert scale was used to measure the students' anxiety levels, with a "1" representing "strongly disagree" and a "5" representing "strongly agree," The coefficient of reliability of the instrument is 0.92. This instrument has been used by Effandi, Normalizam, Nur and Ayu (2012) in their study of mathematics anxiety and achievement among secondary school students in Malaysia.

3.2.3. Procedure

The researchers got permission to carry out this research from the principals of the sampled secondary schools used for the study. Preliminary visits were made to the three secondary schools. And through this visits, the researchers informed the class teachers of the purpose of the study and liaised with them to get the needed information from the student's cognitive cumulative record folder as to facilitate effectively the process of purposive sampling of mathematics anxiety students who consistently scored below 25% in Mathematics in 1st and 2nd terms examinations for the purpose of the study. Similarly, the initial visit to the schools was used as a pilot study. The three schools were selected using the simple random sampling technique. Two of these schools were used as the treatment groups while one served as the control group. The treatment groups received eight weeks training while the control groups received no training. The groups were subjected to pre-treatment and post treatment sessions. The training was conducted during the participant's extra-curricular activities period. The study was completed within a school term so as to avoid time lag effects on the study.

3.3. Control of Extraneous Variables

In controlling extraneous variables that possibly could affect the results of the study, the study involved several stages of randomization of treatment to the experimental group. Also, the Rosenthal effect was controlled by keeping the control group busy with their usual daily school routine during the experimental sessions. Via this measure it is hoped that the contaminations which are beyond the reach of the design and other procedures of the research was taken care of by using ANCOVA statistical tool for analysis.

3.4. Method of Data analysis

ANCOVA (Analysis of Covariance) was used as the statistical tool for the study. Analysis of Covariance (ANCOVA) was used to compare the differential effectiveness of the treatments.

Summary of Treatment Package

Experimental Group One: Rational Emotive Behaviour Therapy

Session One: General orientation and administration of instrument to obtain pre-test scores. Introductory talk (readiness to learn)

Session Two: Identification of psychological distraction

Session Three: Identification of unrealistic beliefs

Session Four: Turning failure to success

Session Five: Change in study habit

Session Six: Behaviour modification

Session Seven: Self-Confidence

Session Eight: Revision of all activities in the previous session and administration of instrument for post treatment measures.

Experimental Group Two: Emotional intelligence technique

Session One: Orientation and Administration of Pre-test measures Introductory talk (Importance of Education).

Session Two: Need for academic focus

Session Three: How to overcome academic failure

Session Four: How to overcome mathematics anxiety

Session Five: Goal setting

Session Six: Good study habit

Session Seven: Behaviour modification

Session Eight: Revision of all activities in the previous session and administration of instrument for post treatment measures.

4. Results

4.1. Hypothesis One

There is no significant main effect of treatment on the mathematics anxiety of in-school adolescents.

To test this hypothesis, Analysis of Covariance (ANCOVA) was employed to analyse the post test scores of participants on mathematics anxiety using the pre-test scores as covariates to find out if post experimental differences were significant. The result obtained was tested at 0.05 significant levels as presented in tables 2 & 3

The result in table 2 showed that there was significant main effect of treatment in the pre-post mathematics anxiety scores of in-school adolescents in the experimental and control groups ($F(3,56) = 26.98, P < .05$). This means that there is a significant main effect of treatment in the mean posttest mathematics anxiety scores of participants exposed to treatment and the control group. This implies that in-school adolescents in the experimental groups benefited from the treatment package as they were able to improve on their ability to manage anxiety. Therefore, hypothesis 1 is rejected.

Table 2: Summary of Analysis of Covariance (ANCOVA) of pre-post test interactive effects of mathematics anxiety scores of in-school adolescents in the Treatment Groups, Rational Emotive Behaviour Therapy and Emotional Intelligence Technique

Source	Sum of Squares	DF	Mean Square	F	Sig.
Covariates	820.341	1	45.575	37.831	.000
Main Effect:					
Treatment Group	3.041	1	3.041	2.524	.120
Age	650.104	2	325.052	26.98	.000
Gender	10.328	2	5.164	4.287	.020
2-way Interactions:					
Treatment Group x Age	1.090E-02	1	1.090E-02	.009	.925
Treatment Group x Gender	3.757	4	.939	.780	.545
Age x Gender	.975	2	.487	.405	.670
3-way Interactions:					
Treatment Group x Age x Gender	4.907	2	2.453	2.037	.143
Error	5.171	4	1.293	1.073	.382
Total	49.392	41	1.205		
	869.733	59			

4.2. Hypothesis Two

There is no significant main effect of age on the mathematics anxiety of senior secondary school students.

Table 2 showed that there was significant main effect of age in the pre-post mathematics anxiety scores of in-school adolescents between young and old ($F(2,57) = 4.287, P < .05$). This implies that based on the effect of the treatment, the older students expressed more confidence than the younger ones in their ability and capability to overcome their mathematics anxiety challenges. Therefore the null hypothesis is rejected.

Table 3: Scheffe Post-Hoc Pairwise significant differences among young and old students.

Mathematics Anxiety	Age	Sig
	Young	.000
Old	.003	

It is shown above that there were pair significant differences between the young and old.

4.3. Hypothesis Three

There is no significant main effect of gender on the mathematics anxiety of in-school adolescents. Table 2 showed that there was no significant main effect of gender in the pre-post mathematics anxiety scores of in-school adolescents ($F(2,57) = .009, P > .05$).

Hence, the null hypothesis is accepted. This shows that the impact of gender on mathematics anxiety is not significant.

4.4. Hypothesis Four

There is no significant interaction effect of treatment, gender and age on the mathematics anxiety of in-school adolescents. Table 2 showed that in 1-way analysis, both the Treatment Groups and age were significant but gender was not significant. Also, in the 3-way interactions, no significant interaction was found ($F(12,47) = 1.073$, $P > .05$). Hence, the null hypothesis is accepted. This implies that the impact of the interaction of treatment age and gender on mathematics anxiety was not significant. Therefore the null hypothesis is accepted.

5. Discussion of Findings

5.1. Hypothesis One: There is no significant main effect of treatment on the mathematics anxiety of in-school adolescents. The findings of the study showed that there was significant main effect of treatment in the pre-post mathematics anxiety scores of in-school adolescents in the experimental groups. This implies that in-school adolescents in the experimental groups benefited from the treatment package as they were able to improve on their ability to manage anxiety. Therefore, hypothesis 1 is rejected. However, in-school adolescents in the control group still express mathematics anxiety as they were not exposed to any treatment programme. The result further affirmed the fact that anxiety being a learnt behaviour can be unlearned through the application of appropriate therapeutic intervention programme that would facilitate behaviour modification. Thus, Corey (2005) posited that the therapeutic goal of REBT is to help clients develop a more positive outlook and the maintenance of positive cognitions by restructuring the irrational thoughts and beliefs they hold. Also, according to Fabio (2005) interventions improve Emotional Intelligence (EI) competencies such as self-confidence conflict management, communication, and conscientiousness. Furthermore, Okoie (2011); Brackett and Katulak (2007) found that EI skills were significantly predictive of academic achievement.

5.2. Hypothesis Two: There is no significant main effect of age on the mathematics anxiety of in-school adolescents. The result showed that there was significant main effect of age in the pre-post mathematics anxiety scores of in-school adolescents between young and old. This implies that based on the effect of the treatment, as revealed by the post-hoc analysis, the younger in-school adolescents expressed more confidence and were able to manage their anxiety much more than the older ones. Therefore the null hypothesis is rejected. The reason for this development could be that considering their age, the older in-school adolescents feel more frustrated over their inability to comprehend mathematics skills that would enable them solve mathematics tasks in the mist of younger in-school adolescents. In support of this finding is Arem (2009) assertion of the fact that the contributing factors to mathematics anxiety are bitter experiences in mathematics, social pressure and the expectation to achieve outstanding results, the desire to excel, myths about the study of mathematics

and negative self-talk. These factors give rise to feelings of deep shame for the student experiencing mathematics anxiety in the classroom setting. This would serve as barrier to their academic success.

5.3. Hypothesis Three: There is no significant main effect of gender on the mathematics anxiety of in-school adolescents. The result of the study revealed that there was no significant main effect of gender in the pre-post mathematics anxiety scores of in-school adolescents. Hence, the null hypothesis is accepted. This shows that the impact of gender on mathematics anxiety is not significant. This development could be aligned to the fact that either male or female; in-school adolescents are exposed to the same teaching and learning experience that is not gender biased. Also, in-school adolescents expresses same pattern of frustration and desire to overcome their mathematics challenge. However, this result is contrary to the report of Beilock, Rydell, and McConnell (2007) that females tend to have higher anxiety levels and males, however, are more likely to believe themselves to be good at mathematics (Bartholomew, 2000). Thus, Gender can impact on the quantity and quality of interactions experienced by students in whole class discussions, with males generally are at an advantage (Black, 2004), thereby encouraging positive mathematical identities in males and not females.

5.4. Hypotheses Four: There is no significant interaction effect of treatment, gender and age on the mathematics anxiety of in-school adolescents. The result showed that in 1-way analysis, both the treatment groups and age were significant but gender was not significant. Also, in the 3-way interactions, no significant interaction was found. Hence, the null hypothesis is accepted. This implies that the impact of the interaction of treatment, age and gender on mathematics anxiety was not significant. Therefore the null hypothesis is accepted. The reason for this could be that in-school adolescents that experience mathematics anxiety expresses similar manner of confusion and helplessness. Therefore, they tend to approach mathematics task with the same level of apprehension and fear. In support of this assertion is Okoiye and Falaye (2011) report of the fact that mathematics anxiety seems like a benign problem to some people, but it can be potentially serious when it leads to high levels of distress and academic failure in otherwise capable students. They further posit that mathematics anxiety serves as stress, tension and strain that interfere with the proper functioning of an individual's body and mind considering the fact that it is accompanied by feeling of helplessness because the anxious person feels blocked and unable to find a solution to his problem. This implies that some Nigerian secondary school students due to mathematics anxiety could experience strain and stress that might impair their cognitive and intellectual ability when it comes to seeking solution to mathematical task.

6. Implications of the study

This study has several implications which include among others the fact that the study has proved that rational emotive behavior therapy and emotional intelligence

technique are effective intervention techniques in managing mathematics anxiety and fostering academic achievement among in-school adolescents. Therefore, since the two therapeutic techniques applied were effective, the skills learnt would enable in-school adolescents expressing mathematics anxiety develop the required confidence that would enable them succeed in finding solution to mathematics task. Furthermore, the study revealed the fact that mathematics anxiety among in-school adolescents can be managed through psychological intervention programmes.

6.1. Recommendations of the study

Parents should endeavour to give their wards the necessary academic support by providing textbooks and encourage them to cultivate good study habit that would enable them attain academic success in school.

Counselling / psychological intervention programmes should be put in place to help in-school adolescent experiencing academic challenges to self-rediscover their potentials, abilities and capabilities and improve on their academic competence.

Teachers should endeavour to use stimulating teaching methods while teaching mathematics as to make in-school adolescents interested in classroom teaching and learning activities. This would enable in-school adolescents develop mathematics competence and overcome mathematics anxiety.

Conclusion

The study revealed that learnt behaviour such as anxiety can be unlearnt through behaviour modification. This implies that mathematics anxiety is a behavioural challenge that can be managed and overcome by in-school adolescents.

References

- Adesulu, D., (2012). News ANALYSIS: On the tracks of mass failure in NECO exams: <http://www.vanguardngr.com/2012/04/news-analysis-on-the-tracks-of-mass-failure-in-neco-exams/>.
- Arem, C. A., (2009). *Conquering Math Anxiety*. 3rd Edn., Cengage Learning, Belmont, ISBN-10: 0495829404, pp: 215.
- Ashcraft, M. H, Ridley, K. S. (2005). Math--anxiety and its cognitive consequences: A tutorial review. In Campbell JID (Ed.): *Handbook of Mathematical Cognition* (315--327) New York: Psychology Press.
- Bartholomew, H. (2000). Negotiating identity in the community of the mathematics classroom. Paper presented at the *British Educational Research Association conference*. <http://www.mes3.learning.aau.dk/Papers/Bartholomew.pdf>.
- Beilock, S. L., Rydell, R. J., & McConnell, A. R. (2007). Stereotype threat and working memory: Mechanisms, alleviation, and spillover. *Journal of Studyal Psychology: General*, 136, 256–276.
- Bielock, S, Gunderson, E, Ramirez, G, & Levine, S (2010). "Female teachers' math anxiety affects girls' math achievement." *PNAS* 107, no. 5: 1860-1863.

- Black, L. (2004). Girls' and Boys' Participation in Whole Class Discussions and the Construction of Learner Identities in Classroom Learning Processes, paper presented at the *Annual Conference of the British Educational Research Association*. 2004. Manchester.
- Brackett, M & Katulak, N (2007). "Emotional intelligence in the classroom. Skill-based training for teachers and students". In: Ciarrochi, Joseph/Mayer, John (eds.): *Applying emotional intelligence*. New York: 1–28.
- Chapman M & Clarke R (2001). *Emotional Intelligence Is a Concept That Can Be Used in Stress Management: A Response to Slaski*. Stress News.
- Corey, G. (2005). *Student manual theory and practice of counselling and psychotherapy*. California: Brooks/Cole publishers.
- Dar-Nimrod, I., & Heine, S., (2006). <http://www.medicine.mcgill.ca/epidemiology/hanley/tmp/Applications/WomenMath.pdf>>Exposure to Scientific Theories Affects Women's Math Performance. *Science*, 314, 435.
- Donna R (2003). *Emotional Intelligence, Negative Mood Regulation Expectancies, and Professional Burnout among Police Officers*. Ph.D. dissertation submitted to the Rutgers University.
- Dryden, W. (2003). *Rational Emotive Behavioural Therapy: Theoretical developments*. Windy Dryden (Ed.) London: Brunner-Routledge.
- Effandi, Z, Normalizam, M, Z, Nur A, A, & Ayu E., (2012). Mathematics anxiety and achievement among secondary school students *American Journal of Applied Sciences*, 9 (11), 1828-1832.
- Fabio, S., (2005). Do Programs Designed to Increase Emotional Intelligence at Work- Work? www.eiconsortium.org
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley
- Franklin, M., (2006). *Add-ventures for girls: building math confidence*, Junior High teacher's guide. Newton, Massachusetts: WEEA Publishing Center.
- Garry V. S. (2005). *The Effect of Mathematics Anxiety on the Course and Career Choice of High School*. Ph. D.Thesis (Unpublished), Philadelphia: Drexel University.
- Hirokawa K, Akihiro Y. & Miyata, Y., (2008). An Examination of the Effects of Stress Management Training for Japanese College Students of Social Work: *International Journal of Stress Management*: 9(2), pp. 113-123.
- Hope, D.A., Burns, J.A., Hyes, S.A., Herbert, J.D. & Warner, M.D. (2010). Automatic thoughts and cognitive restructuring in cognitive behavioral group therapy for social anxiety disorder. *Cognitive Therapy Research*, 34: 1-12.
- Kenney-Benson, G., Pomerantz, E., Ryan, A., & Patrick, H. (2006). Sex Differences in Math Performance: The Role of Children's Approach to Schoolwork. *Developmental Psychology*, 42, 1, 11-26.
- Kumar S and Rooprai K. Y. (2009).Role of Emotional Intelligence in Managing Stress and Anxiety at workplace *Proceedings of ASBBS Annual Conference: Las Vegas Volume 16 Number 1*
- Maloney, E. A., Ansari, D., & Fugelsang, J. (2011). The effect of mathematics anxiety on the processing of numerical magnitude. *The Quarterly Journal of Studyal Psychology*, 61, 10–16.
- Maloney, E. A., Risko, E. F., Ansari, D., & Fugelsang, J. (2010). Mathematics anxiety affects counting but not subitizing during visual enumeration. *Cognition*, 114, 293–297.
- Mulhauser, G. (2011). An introduction to rational emotive behaviour therapy: *Counselling Resource*.

- National Mathematics Advisory Panel (2008). *Foundations for Success: The Final Report of the National Mathematics Advisory Panel* (U.S. Department of Education: Washington, DC).
- Okoiye O. E., (2011). The inclusion of emotional intelligence in Nigerian police recruits training programme: agenda for police personnel prosocial development and effective policing *Journal of Research in Education and Society* Vol.2 No. 1, April 2011.
- Okoiye, O. E., & Falaye, A., (2011). Effectiveness of cognitive and group behavior therapies in managing examination anxiety among academically-at-risk secondary school students in Ibadan, Oyo State, Nigeria: *Journal of Research in Education and Society* Volume 2, Number 2.
- Pishghadam, R., (2007): On the influence of emotional and verbal intelligence on second language learning. Pd. D. Thesis, Allameh Tabataba'ii University, Tehran.
- Zakaria, E. & N.M. Nordin, (2008). The effects of mathematics anxiety on matriculation students as related to motivation and achievement. *Eurasia J.Math. Sci. Technol. Educ.*, 4: 27-30.