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Effectiveness Of Cognitive Restructuring In Managing Mathophobia Among Secondary School Students Of Different Age Groups In Onueke Education Zone Of Ebonyi State, Nigeria

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Abstract
This study investigated the effectiveness of cognitive restructuring in managing mathophobia among secondary school students of different age groups in Onueke education zone of Ebonyi State, Nigeria. Two research questions and two research hypotheses guided the study. The study sample consisted of 60 participants whose ages ranged between 15 -18 years and above drawn from the entire population of 13,283 Senior Secondary Two (SS II) students who were randomly assigned to the treatment and control groups of 30 students per group using randomized sampling procedure to guarantee the equivalence/homogeneity of the two groups of study. A 21-item validated researchers' structured response questionnaire titled: Students Mathophobic Assessment Questionnaire (SMAQ) was the instrument used for data collection. Data collected were analyzed using mean, standard deviation and t-test statistics to answer the two research questions and two null hypotheses that guided the study. Results showed that cognitive restructuring is an effective therapeutic approach for managing mathophobia among secondary school students notwithstanding their age dichotomies. This was evident in the higher cognitive and follow up mean score achievements of the students in the treatment group in contrast with their control group counterparts. Hence, the null hypothesis 2 was rejected for the alternative. The implications of the findings in sum is that cognitive restructuring should be a must therapy for all students to enable them develop interest and confidence in studying mathematics. The study among others, recommended that every school across the world should have at least, one professional guidance counsellor to work more closely with mathematics teachers in the cognitive restructuring of students with mathophobia for a better society.

Keywords: *cognitive restructuring, mathematics, mahophobia.*

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I. Introduction

The importance of mathematics in human life cannot e overemphasized. It is the bedrock of every human commercial activities. Not surprisingly, Targetstudy (2014) noted that mathematics is all around us; one cannot do without it. This is due to human commercial activities that take place on daily basis. For instance, quantities of products are bought and sold on daily basis, bank deposits and withdrawals are made, even in cooking and baking as well as in dress making and room decorations, mathematics is involved in doing virtually everything in human life. Sule, Hassaint, Bashir and Garba (2016) considered mathematics as the central intellectual discipline of any technological society, without which understanding of natural problems would be superficial. Ernest-Ehibudu and Wayii (2017), in a similar view, noted that mathematics is an important subject that has been made compulsory for admitting candidate into almost all the disciplines in tertiary institutions across Nigeria and beyond. That is to say, mathematics at the secondary school level is classified as core course of study for every student. Similarly, Okafor and Anduka (2013) considered mathematics as a core subject offered in Nigeria secondary and primary schools, and is taught every day in all the schools, or at least, four times in a week due to its importance in both academic and daily human life. This clearly indicate that mathematics is inescapable because if you run away from it at one level of education, it awaits you on another level.

However, some people view mathematics as a subject for the few privileged with very high intelligence. Many of this group of people with such view end up developing fear for mathematics. Hamilton (2015) noted that mathematics for this category of students tends to be so precise and demanding by its nature that hearing the word, mathematics or the approach of mathematics quiz or examinations fill them with great anxiety and worries for their severe fear for mathematics generally referred to as mathophobia. Mathophobia, simply known as mathematics anxiety is the abnormal feeling of tension and irrational fear that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations

(Rossbab, 2006). Selvaraji (2011), in a similar view, described mathophobia as intense feelings of anxiety that people have about their ability to understand and solve mathematics. It is a psychological condition that not only scare but also prevents some people from the learning and using of mathematics in their daily lives for loss of interest and confidence in the subject. Nworie (2022) observed that the situation causes many students and pupils to freak out and panic at tests, quiz and from more difficult work involving mathematics. Such negative experiences commonly remain throughout most individual adult lives and thus prevent millions of them from maximizing professional and personal opportunities due to their unfounded fear or poor performance in the subject. Nworie pointed out and specifically made it clear that the phobia students have for mathematics is not just an academic problem that blocks many of them from entering into certain careers of their interest or choice but also interferes with work performance and productivity level of some people in work or business organizations as well.

Some writers including Plaisonce (2009) and Home School Math (2015) traced the root cause of fear of mathematics in students to the way the teachers teaching the subject feel about it while teaching it in classroom. They argued that if the teachers teaching mathematics show some level of enthusiasm, students would develop interest and improve in their understanding of the subject. In their opinion, mathematics anxiety in students is caused as a result of teacher-related behaviors. Others including Rossnan in Nworie (2022) traced the problem to the unfounded prior negative knowledge or experiences of the students concerning mathematics. Rossnan asserted that students develop mathophobia as a result of their negative experiences when learning or studying mathematics in the classroom or at home on their own. Such negative experiences when transferred into thoughts of any future mathematics exercise commonly result in some difficulties in understanding the subject (mathematics). Those who traced the root cause of mathophobia to the students' unfounded prior negative knowledge about mathematics like Rossnan contended that, cases abound where the mathematics teachers are enthusiastic about the subject, yet some students still end up having mathophobic behavior. Therefore, mathematics teachers, in the view of this latter group, might not be the only cause of mathophobia among students

Notwithstanding the cause of mathophobia among students, many writers among whom were Egbochukwu and Obodo (2025), Yeo, Tan and Lew (2015), Houston (2019), Marshell (2020) and Nworie (2022) reported that the problem seems to cut across all ages and sexes of learners in all school levels of study irrespective of location. In the opinion of Houston (2019), the ages of students mostly affected by mathophobia in secondary school level are those between 13 and 18 years. These ages of learners, according to Houston, and indeed, all other ages in general across all school levels need help in improving their self-esteem in order to reframe how they identify, interpret and evaluate their emotional and behavioral reactions to negative experiences and mathematics in particular. This is because mathophobia has severe negative consequences on learning of mathematics and without special assistance, students with mathophobia may only continue to compound their problem by tailing to learn the minimum arithmetic and algebra necessary for success in other academic programmes and social lives in general. Therefore, mathophobia among students needs to be seriously in order to restore their interest and confidence in the study and use of mathematics in their daily lives. To this end, cognitive restructuring has been suggested as an approach for tackling mathophobia among student population regardless of their school levels of study, sex differences and age range dichotomies.

Cognitive restructuring is a core counselling technique in Cognitive Behavior Therapy (CBT) for the treatment of common mental issues like anxiety and depression (Wignall, 2019). Therapist Aid (2021) described cognitive restructuring as a therapeutic process of identifying and challenging negative, irrational and self-defeating thoughts among those who are psychologically ill. The approach is designed to assist clients in eliminating negative emotional reactions by helping them to develop the mental capacity to think accurately. As Egbule in Nworie (2022) noted, cleints' emotional behaviors stem from "self-talk" or internalized sentences firmly rooted in negative or irrational beliefs, expectations or assumptions which, in turn influence their reactions to eents in their lives with far-reaching implications for the society interestingly, cognitive restructuring functions in replacing negative perception about things or realities if life with positive views; from "I cannot do it" to "I can do it". It is in this direction that this study focused attention on investigating the effectiveness of cognitive restructuring in managing mathophobia among secondary school students of different age groups in Onueke education zone of Ebonyi State, Nigeria.

Statement of the Problem

Mathophobia has been observed as a persistent problem that cut across all ages of students, particularly those between 13 and 18 years, notwithstanding their levels of study and location. Reports from various examination bodies like, the West African Examination Council (WAEC) and the National Examination Council (NECO) have shown that the problem has not only affected secondary school students' performance in mathematics examinations but also prevented some students from studying courses of their choice or interest and consequently, restricted them from entering certain careers where they would have excelled themselves for

Better society. The researcher have their doubts that given the severe negative consequences of mathophobia on learning of mathematics and without special assistance by way of restructuring the cognition of students with mathophobia they may continue to compound their problem by failing to learn the minimum arithmetic and algebra necessary for success in other academic careers with far-reaching implications/consequences for the society. It is against this background that the study explored the effectiveness of cognitive restructuring in managing mathophobia among secondary school in Onueke education zone of Ebonyi State, Nigeria.

Objectives of the Study

The study sought to:

1. Determine the effectiveness of cognitive restructuring in managing mathophobia among secondary school students of different age groups in Onueke education zone of Ebonyi State, Nigeria.
2. Ascertain the effectiveness of cognitive restructuring in managing mathophobia among secondary school students of different age groups after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria.

Research Questions

The following research questions guided the study.

1. What is the mean effect of cognitive restructuring in managing matophobia among secondary school students in Onueke education zone of Ebonyi State, Nigeria?
2. What is the mean effect of cognitive restructuring in managing mathophobia among secondary school students across age groups after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria?

Research Hypotheses

The following null hypothesis were formulated and tested at a 0.05 level of significance in this study.

H_{01}: There is no significant difference in the mean scores of secondary school students exposed to cognitive restructuring in Onueke education zone of Ebonyi State, Nigeria based on age.

H_{02}: There is no significant difference in the mean scores of secondary school students of different age groups exposed to treatment and those in the control group after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria.

Theoretical Framework

This study utilized the Rational Emotive Theoretical model formulated by Albert Ellis in 1962, based on his belief in the cognitive control of behavior, to establish how careful application of cognitive restructuring on the management of mathophobia among students could help to dispel their fears for mathematics and resore their confidence in the study and use of mathematics I thei daily lives. Ellis, in the theory, traced most human problems and life challenges to irrationalities in thinking, otherwise known as "thinking errors" (Otubo, 2012:100). Ellis held/asserted that personality consisted of beliefs, constructs or attitudes. This, according to him, means that there is no marked difference between thinking and emotion. Emotion, to him, is biased or prejudiced thought or an intrinsically, attitudinal and cognitive process caused and controlled by thinking. Ellis believed that the two processes overlap and for given the fact that what one thinks determines one's emotion (that is, what one feels), both of which determine one's reaction or behavior. Put differently, the way one thinks affects the way one feels, both of which affect the way one reacts or behaves in response to what one weathers through in life. Therefore, thought processes and emotions are critical factors in the determination of human behavior, which in turn, largely depends on whether or not one is rational and logical or irrational or illogical in one's thinking.

Put in other words, human emotional feelings and reactions to emotive experiences (what one weather through in life) derive/result basically from one's perceptive analysis and interpretation or judgment of one's life events and situations that are threatening and causing one the feeling of anxiety. By this, Ellis concluded and maintained that human beings are responsible for most of their problems and life challenges which Ellis attributed to thinking errors. That is, irrationalities/inaccuracies in thinking, or the irrational and self-defeating ideas and belief systems held and perpetuated (acquired) over time by human through self-talks. Ellis, in his Rational Emotive Theory, firmly believed that such perpetuated irrational and illogical ideas such as unfounded deep-seated fears and hatred for mathematics held by some secondary school students can be restructured using "active and directive methods such as cognitive restructuring, teaching, persuasion, encouragement, and confrontation, as well as self-control methods such as homework or assignments, which are inherent in rational emotive group counselling/therapeutic activities"(Otubo,2015:93). This basic premise underscores the relevance and the applicability of the Ellis rational emotive theoretical approach to this study, which investigated the effectiveness of cognitive restructuring in managing methophobia among secondary school students in Ouneke education zone of Ebonyi State, Nigeria.

II. Methodology

The study employed a quasi-experimental research design. A quasi-experimental research design is a study involving the introduction of an independent treatment variable under controlled conditions followed by observing the effects of this introduction on one or more dependent variables (Nworie, 2022). This design is considered ideal for the study because it involves finding out the effectiveness of an independent variable, which in this case is cognitive restructuring that was introduced on the dependent variable which is mathophobia/ mathophobic behavior among secondary school students of different age group with view of dispelling unfounded fears for mathematics among them, which if not checked may continue to have negative consequences throughout their adult lives with far-reaching implications for the society.

The area of the study was Onueke education zone of Ebonyi State. Ebonyi State is one of the six state that were created by Abacha's Administration on October 1, 1996 with Abakaliki as the capital city. It is located in the South East of Nigeria. The state is bounded to the North by Benue State, to the West by Enugu State, to the East by Cross River State and the South by Abia State. The state has three education zones: Abakaliki, Afikpo and Onueke education zones.

The population of the study comprised thirteen thousand two hundred and eighty-three (13,283) Senior Secondary Two (SS II) students, made up of six thousand two hundred (6, 200) males and seven thousand eighty three (7,083) females of different age groups in the sixty five (65) secondary schools in the zone as at the time of this study (Ebonyi State Secondary Education Board (EBSEB, 2018). Senior secondary two (SS II) students were chosen because they were not yet in the external examination class, but are in their early preparatory stage for the external examination. The efficiency of the treatment would help to avoid mathematics anxiety among the students.

However, participants in the study consisted of sixty (60) SS II students composed of thirty (30) males and thirty (30) females who were drawn from the entire population size and were assigned into the experimental and control groups of fifteen (15) males and fifteen (15) female students totaling 30 students per group using randomized sampling procedure to guarantee the equivalence of the two groups of the study. Only those in the experimental group were exposed to cognitive restructuring while those in the control group were not but were compensated with general counselling centered on study habits and the need to take one's studies seriously.

Validated structured questionnaire developed by the researchers titled: Students' Mathophobia Assessment Questionnaire (SMAQ) composed of 21 items constructed on a 4 point Likert rating scale with the response format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) weighted accordingly as 4,3,2 and 1 was the data gathering instrument. The instrument has two sections. Section A focused on personal data of respondents in respect

of name of school, education zone and sex and age range. Section B which contained the main items of the instrument designed for answering the research questions required the respondents to respond honestly to the items by ticking (✓) under the column provided with response options: SA, A, D and SD that best indicated their opinions with respect to the statement items. Te instrument was trial tested on small group of 20 respondents outside the study area. Using the Cronbach Alpha statistical approach, the calculated reliability index of the instrument was 0.80, meaning it was adequate enough for the study.

Data were collected with the help of two mathematics teachers for the SS II class briefed on the purpose. The warm cooperation of the mathematics teachers and the direct as well as the on the spot approach in the administration and collection of the completed questionnaire forms from respondents made for a hundred percent return of the questionnaire administered. The data collected from the treatment and follow-up tests were statistically analyzed using descriptive statistics involving mean scores and standard deviations to answer the research questions which were answered on the individual item basis with a criterion mean value of 2.50 as the decision rule. The null hypotheses were tested at an alpha 0.05 level of significance using the t-test.

III. Results

Results of the data analysis conducted on the research questions hypotheses that guided the study are presented in tables 1 – 4 as follows:

Research Question One: What is the mean effect of cognitive restructuring in managing mathophobia among secondary school students in Onueke education zone of Ebonyi State, Nigeria based on age?
Data analysis answering research question is presented in table 1.

Table 1: Descriptive statistics showing mean scores and standard deviation analysis of the effectiveness of cognitive restructuring in managing mathophobia among secondary school students in Onueke education zone of Ebonyi State, Nigeria according to ages

S/N	Statement Items	Mean 15-17 Years No. 22	Std. 15-17 Years	Decision	Mean 18 Years Above No. 8	Std. 18 Years Above	Decision
1.	Mathematics is a very hard subject in school	2.09	0.61	D	2.37	0.51	D
2.	I feel scared each time I hear the word						
	"mathematics"	1.90	0.42	SD	2.00	0.00	D
3.	I so much like to study mathematics	3.63	0.49	SA	3.75	0.46	SA
4.	I feel sick anytime I heard of mathematics						
	class	1.77	0.42	SD	1.87	0.35	SD
5.	Mathematics is a subject for special people						
	other than me	1.95	0.37	SD	2.00	0.00	D
6.	I always visit my friends during mathematics						
	class	2.09	0.42	D	1.87	0.35	SD
7.	Mathematics is an interesting subject	3.54	0.50	SA	3.75	0.46	SA
8.	My mathematics teacher is wicked	1.86	0.35	SD	2.00	0.00	D
9.	Mathematics is for those who want to do						
	sciences only	1.95	0.37	SD	1.87	0.35	SD
10.	Mathematics is one of my favorite subjects	3.68	0.47	SA	4.00	0.00	SA
11.	I just manage to give mathematics a try	3.18	0.39	A	3.62	0.51	SA
12.	I enjoy our mathematics classes so much	3.90	0.29	SA	3.87	0.35	SA
13.	I consider mathematics as a subject for the						
	intelligent ones	1.77	0.42	SD	2.00	0.00	D
14.	I hardly participate in our mathematics						
	lessons for a lack of interest in the subject.	1.81	0.39	SD	1.75	0.46	SD
15.	I do not believe that mathematics is all that						
	difficult	3.68	0.47	SA	3.50	0.53	SA
16.	Having a fine mathematical brain is a matter						
	of developing interest in the subject	3.77	0.42	SA	3.87	0.35	SA
17.	Good knowledge of mathematics makes one						
	sharp in thinking or reasoning with greater						
	accuracy	3.81	0.39	SA	3.75	0.46	SA
18.	I hardly stay one day without trying to solve						
	mathematics	3.81	0.39	SA	3.87	0.35	SA
19.	I just hate mathematics	1.27	0.45	SD	1.25	0.46	SD
20.	Nothing can make me to develop interest for						
	mathematics	1.31	0.56	SD	1.50	0.53	SD
21.	I have no fear for mathematics any more	3.81	0.39	SA	3.62	0.51	SA
	Grand Mean	**2.70**	**0.42**		**2.76**	**0.33**	
Source: Field Work, 2021							

Table 1 results of the data analysis showed that 22 out of the 30 mathophobic students in the 15-17 age bracket and 8 other in the age group of 18 years and above have the age mean responses of 2.70 and 2.76 points respectively on the 4 – point rating scale of the research instrument with a marginal difference of 0.06 point in favor of the age group of 18 years and above categories. Obviously from the results, the difference that exists in the mean score achievements of the respondents in the 15 -17 age group and 18 years and above is very marginal. This marginal difference in the mean score achievements of the two age group categories of the students exposed to cognitive restructuring implies that the treatment effects on the students' mathophobic behaviors were the same regardless of their age dichotomies. By the impressive mean score achievement results of the students treated with cognitive restructuring notwithstanding their age differences, it can be strongly inferred that the mean effect of cognitive restructuring in managing mathophobia among secondary school students across ages in Onueke education zone of Ebonyi State, Nigeria is effectively high which answers the research question one.

Research Question Two: What is the mean effect of cognitive restructuring in managing mathophobia among secondary school students across ages after six week treatment interval in Onueke education zone of Ebonyi State, Nigeria?

Data analysis answering research question 2 is presented in table 2

Table 2: Descriptive statistics of the mean and standard deviation analysis of the effect of cognitive restructuring in managing mathophobia among secondary school students across ages after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria

S/N	ITEMS	Mean Treat Group No. 30	Std. Treat Group	Decision	Mean Control Group No. 30	Std. Control Group	Decision
1.	Mathematics is a very hard subject in school	2.16	0.59	D	3.66	0.47	SA
2.	I feel scared each time I hear the word						
	"mathematics"	1.93	0.36	SD	3.56	0.50	SA
3.	I so much like to study mathematics	3.66	0.47	SA	1.43	0.50	SD
4.	I feel sick anytime I heard of mathematics class	1.80	0.40	SD	3.13	0.34	A
5.	Mathematics is a subject for special people other						
	than me	1.96	0.31	SD	3.56	0.50	SA
6.	I always visit my friends during mathematics						
	class	2.03	0.41	D	3.33	0.47	A
7.	Mathematics is an interesting subject	3.60	0.49	SA	1.16	0.37	SD
8.	My mathematics teacher is wicked	1.90	0.30	SD	3.50	0.50	SD
9.	Mathematics is for those who want to do						
	sciences only	1.93	0.36	SD	3.06	0.25	A
10. :	Mathematics is one of my favourite subjects	3.76	0.34	SA	1.73	0.44	SD
11. :	I just manage to give mathematics a try	3.30	0.46	A	1.86	0.34	SD
12.	I enjoy our mathematics classes so much	3.90	0.30	SA	1.26	0.50	SD
13.	I consider mathematics as a subject for the						
	intelligent ones	1.83	0.37	SD	3.40	0.49	A
14.	I hardly participate in our mathematics lessons						
	for a lack of interest in the subject.	1.80	0.40	SD	3.93	0.25	SA
15.	I do not believe that mathematics is all that						
	difficult	3.63	0.49	SA	1.20	0.40	SD
16.	Having a fine mathematical brain is a matter of						
	developing interest in the subject	3.80	0.40	SA	1.46	0.01	SD
17.	Good knowledge of mathematics makes one						
	sharp in thinking or reasoning with greater						
	accuracy	3.80	0.40	SA	1.76	0.43	SD
18.	I hardly stay one day without trying to solve						
	mathematics	3.83	0.37	SA	1.06	0.25	SD
19.	I just hate mathematics	1.26	0.44	SD	3.00	0.26	A
20.	Nothing can make me to develop interest for						
	mathematics	1.36	0.55	SD	3.06	0.25	A
21.	I have no fear for mathematics any more	3.76	• 0.43	SA	1.06	0.25	SD
	Grand Mean	**2.71**	**0.41**		**2.43**	**0.37**	
Source: Field Work, 2021							

From the summary results of the data analysis after six weeks treatment interval shown in Table 2, the 30 students of different age groups that constituted the experimental group of the study had an average score of 2.71 points per respondent with a standard deviation of 0.41 on the 4 – point rating scale of the research instrument; while their counterparts in the control group numbering 30 as well scored a follow – up mean score of 2.43 points per person with a standard deviation of 0.37. Clearly from the table 2 results, the respondents in the treatment group maintained the criteria mean score of 2.50 and above adopted for answering the research questions; while their counterparts in the control group never scored up to that. By these results, it means that the mean effect of cognitive restructuring in managing of mathophobia among secondary school students across ages after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria remained consistently very high after the six weeks follow up which addresses the research question two.

Hypothesis 1: There is no significant difference in the mean scores of secondary school students exposed to cognitive restructuring in Onueke education zone of Ebonyi State, Nigeria based on age.
The t-test analysis of null hypothesis 1 is presented in table 3.

Table 3: t-test analysis of difference between the mean score of students exposed to cognitive restructuring in Onueke education zone of Ebonyi State, Nigeria across ages.

Item	Ages	N	Mean	Std.	t-calculated	t-critical	Decision
1	15-17years 18 years above	22 8	2.09 2.37	0.61 0.51	1.16	2.04	Accept
2	15-17years 18 years above	22 8	1.90 2.00	0.42 0.00	0.59	2.04	Accept
3	15-17years 18 years above	22 8	3.63 3.75	0.49 0.46	0.56	2.04	Accept
4	15-17years 18 years above	22 8	1.77 1.87	0.42 0.35	0.60 .	2.04	Accept
5	15-17years 18 years above	22 8	1.95 2.00	0.37 0.00	0.33	2.04	Accept
6	15-17years 18 years above	22 8	2.09 1.87	0.42 0.35	1.27	2.04	Accept
7	1 5-17years 18 years above	22 8	3.54 3.75	0.50 0.46	0.99	2.04	Accept
8	15-17years 18 years above	22 8	1.86 2.00	0.35 0.00	1.08	2.04	Accept
9	15-17years 18 years above	22 8	1.95 1.87	0.37 0.35	0.52	2.04	Accept
10	15-17years 18 years above	22 8	3.68 4.00	0.47 0.00	1.86	2.04	Accept
11	15-17years 18 years above	22 8	3.18 3.62	0.39 0.51	2.50	2.04	Reject
12	15-17years 18 years above	22 8	3.90 3.87	0.29 0.35	0.26	2.04	Accept
13	15-17years 18 years above	22 8	1.77 2.00	0.42 0.00	1.48	2.04	Accept
14	15-17years 18 years above	22 8	1.81 1.75	0.39 0.46	0.40	2.04	Accept
15	15-17years 18 years above	22 8	3.68 3.50	0.47 0.53	0.89	2.04	Accept
16	15-17years 18 years above	22 8	3.77 3.87	0.42 0.35	0.60	2.04	Accept
17	15-17years 18 years above	22 8	3.81 3.75	0.39 0.46	0.40	2.04	Accept
18	15-17years 18 years above	22 8	3.81 3.87	0.39 0.35	0.35	2.04	Accept
19	15-17years 18 years above	22 8	1.27 1.25	0.45 0.46	0.12	2.04	Accept
20	15-17years 18 years above	22 8	1.31 1.50	0.56 0.53	0.78	2.04	Accept
21	15-17years 18 years above	22 8	3.81 3.62	0.39 0.51	1.09	2.04	Accept
	Grand Mean				**0.84**	**2.04**	**Accept**

Source: Field Work, 2021

Table 3 results of the t-test analysis of difference showed no significant difference in the cognitive mean scores of students exposed to treatment on the basis of age. This was as a result of the calculated grand t-value of 0.84 for the both age group categories in the table found to be less than the critical grand t-value of 2.04 at a 0.05 level of significance with 28 degree of freedom (0.85 <2.04) therefore, the null hypothesis 1 which states that there is no significant difference in the cognitive mean scores of students exposed to treatment due to age in Onueke education zone of Ebonyi State, Nigeria was upheld in accordance/line with the decision rule.

Hypothesis 2: There is no significant difference in the mean scores of secondary school students o different age groups exposed to treatment and those in control group after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria.
The t-test analysis of null hypothesis 2 is presented in table 4.

Table 4: t-test analysis of difference between the mean scores of students of different age groups exposed to treatment and those in the control group after six weeks treatment interval in Onueke Education zone of Ebonyi State, Nigeria

Item	Methods	N	Mean	Std.	t-calculated	t-critical	Decision
1	Treatment Control	30 30	2.16 3.66	0.59	10.78	2.04	Reject
2	Treatment Control	30 30	1.93	0.36	14.37	2.04	Reject
3	Treatment Control	30 30	3.66	0.47 0.50	17.58	2.04	Reject
4	Treatment Control	30 30	1.80 3.13	0.40 0.34	13.67	2.04	Reject
5	Treatment Control	30 30	1.96 3.56	0.31 0.50	14.68	2.04	Reject
6	Treatment Control	30 30	2.03	0.41 0.47	11.24	2.04	Reject
7	Treatment Control	30 30	3.60 1.16	0.49	21.28	2.04	Reject
8	Treatment Control	30 30	1.90 3.50	0.30 0.50	14,77	2.04	Reject
9	Treatment Control	30 30	1.93 3.06	0.36 0.25	13.96	2.04	Reject
10	Treatment Control	30 30	3.76 1.73	0.34 0.44	17.89	2.04	Reject
11	Treatment Control	30 30	3.30 1.86	0.46 0.34	13.52	2.04	Reject
12	Treatment Control	30 30	3.90 1.26	0.30 0.50	24.79	2.04	Reject
13	Treatment Control	30 30	1.83 3.40	0.37 0.49	13.70	2.04	Reject
14	Treatment Control	30 30	1.80 3.93	0.40 0.25	24.37	2.04	Reject
15	Treatment Control	30 30	3.63 1.20	0.49 0.40	20.29	2.04	Reject
16	Treatment Control	30 30	3.80 1.46	0.40 2.01	6.22	2.04	Reject
17	Treatment Control	30 30	3.80 1.76	0.40 0.43	18.81	2.04	Reject
18	Treatment Control	30 30	3.83 1.06	0.37 0.25	33.22	2.04	Reject
19	Treatment Control	30 30	1.26 3.00	0.44	18.22	2.04	Reject
20	Treatment Control	30 30	1.36 3.06	0.55 0.25	15.23	2.04	Reject
21	Treatment Control	30 30	3.76 1.06	0.43 0.25	29.61	2.04	Reject
	Grand Mean				**17.53**	**2.04**	**Reject**

Source: Field Work, 2021

Table 4 results of the t-test of difference showed that the calculated grand t-value of 17.53 is greater than the critical t-value of 2.04 which implies a significant difference in the cognitive mean scores of the treatment group of the students and those in the control group after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria in favor of the treatment group of the students. The null hypothesis was therefore rejected.

IV. Discussion

The findings of the study clearly demonstrated the effectiveness of cognitive restructuring in improving matophobic student's mathematica cognition and well-being. This is evident from the results of data analyses of the research questions and hypothesis presented in Table 1 – 4 which showed remarkable differences in the cognitive mean score achievements of students treated with cognitive restructuring and those in the control group who were never treated to the treatment variable. Table 1 results of the data analysis showed that 22 out of the 30 mathophobic students in the 15 – 17 age bracket and 8 others in the age group of 18 years and above had impressive group mean responses of 2.70 and 2.76 points respectively on the 4 – point rating scale of the research instrument with a very marginal difference of just 0.06 points in favor of those in the age group of 18 years and above. This marginal difference in the impressive mean score achievements of the two age group categories of the students exposed to cognitive restructuring implies that the students had the same cognitive improvement in their interest and attitudes toward mathematics regardless of their age dichotomies. Put in other words, the impressive mean score achievements of each of the two age groups of the respondents in the experimental group which is very well above the set criterion mean of 2.50 adopted for answering the research questions is an indication that the treatment package was highly effective in changing the initial negative impression the students had about mathematics prior to the experimental exposure notwithstanding their age range dichotomies.

The finding was buttressed by the result of the t-test analysis of the corresponding research hypothesis presented Table 3, which revealed that the calculated grand t-value of 0.84 for the both age group categories in the Table 3 is less than the critical grand t-value of 2.04 at 0.05 level of significance with 28 degree of freedom. Consequently, the null hypothesis 1 of no significant difference in the cognitive mean responses of the students treated to the treatment variable based on age was upheld. This means no marked difference existed in the cognitive mean scores of the students involved in the study due to their age. All of them benefited equally from

the treatment package and responded equally as well to the statement items on the questionnaire as it appealed to them regardless of their age differences.

The finding is consistent with the previous findings of Houston (2019) who had reported that cognitive restructuring has no age barrier or limitation. It can be used in improving self-esteem among depressed adolescents aged 13 to 18, as well in helping children and young people of all ages and school levels to reframe how the identify or perceive, evaluate and interpret their emotional and behavioral reactions to negative and emotional and behavioral reaction to negative and challenging life experiences for a healthier/better living. The technique, according to Houston, could also be used in treating children and young people of other various mental health conditions such as generalized anxiety disorder, obsessive compulsive disorder, school phobia, eating disorders, self-harm and conduct problems.

The findings of this study were affirmed and buttressed further by the results of the data analysis of the research question two and the corresponding research hypothesis two presented in Table 2 and 4 respectively. The summary results of the data analysis in Table 2indicated that the mean effect of cognitive restructuring in managing mathophobia among secondary school students across ages after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria remained considerably very high based on the consistent higher mean score advantage of the treatment group of the research subjects with 2.71 points over their control group counterparts with a follow up mean score of 2.43 points. This finding indicated the consistent lasting effect of cognitive status of the treatment group population. The findings were further affirmed by the result of the t-test analysis of research hypothesis 2 in Table 4, which succinctly showed that the cognitive mean score achievements of the research subjects in the treatment group and those in control group after six weeks treatment interval in Onueke education zone of Ebonyi State, Nigeria remained significantly different in favor of the students in the treatment group with consistent higher mean score advantage over their colleagues in the control group of the study.

The findings stemmed from the calculated grand t-value of 17.53 which is greater than the table grand t-value of 2.04 at an alpha level of 0.05 with 28 degree of freedom as shown in the Table 4. As a result, the null hypothesis of no significant difference was rejected, implying that there is significant difference in the cognitive mean score achievements of students treated with cognitive restructuring and those in the control group in favor of treatment group of students. The significant difference in the cognitive mean score achievements of the two groups of participants in favor of those in the treatment group obviously resulted from the effectiveness of cognitive restructuring to which those in the control group of the study were not exposed. The findings are in line with research findings of the Otubo (2015) who had in his own study reported the strength of cognitive restructuring approach to counselling in helping individuals to reverse their earlier negative attitudes and belief systems for a better living. this is evidently clear in the positive attitudes and interest towards the learning of mathematics demonstrated by students in the treatment group who were counselled with cognitive restructuring approach in contrast to their counterpart in the control of the study who were exposed to the treatment package. the findings also proved the efficacy of cognitive restructuring in alignment with Wignall (2019) who had previously postulated that cognitive restructuring in alignment is a core technique in cognitive behavior therapy (CBT) and most effective approach for treating people of various common mental health issues such as unfounded tears/phobias and depression resulting from distorted cognition thinking errors

Counselling implications of the study

The counselling and educational implications of the findings of the study in sum is the cognitive restructuring as a treatment approach for managing math phobia among secondary school students has no age barrier or limitations from the impressive cognitive mean score achievements of the treatment group of the student involved In this study who were exposed to the treatment package . The approach has proven to be an effective approach for the treatment of mathophobia among phobia patients or victims across all school levels not withstanding their age differences. this calls for the concerted collaborative efforts of governments and school authorities as well as students and school authorities, as well as parents and school counsellors to liaise closely with the mathematics teachers saddled with the mandate to teach the rising generation across school level in a way that will enable them identify and recognize the irrationalities in their thought and behavioral reaction which disable many of them from maximizing professional and personal opportunities due to their fears or p[poor performance in mathematics . this measure will not only help the youngsters to restructure and root out dysfunctional cognitive biases for mathematics but also enable them to embrace all the desirable educational experiences offered them both within and outside the formal school system to develop their potentials to their maximum and use the same to improve themselves for a better society.

V. Recommendations

Based on the research finding and implications, the study recommends as follows:

1. Cognitive based counselling techniques like cognitive restructuring be adopted as conventional counselling approach in managing mathophobia among students and phobia patients in particular to enable them improve their cognitive adjustment and wellbeing. This measure may help them become more rational in thinking and behavior in the course of their academic pursuit.
2. Students across school levels should be adequately sensitized through seminars and workshop and encouraged to always seek the expertize services of their counsellors to clear ant area of doubt or challenges as they sojourn in the course of their school life. this would not only assist them to rediscover themselves the more for positive use, but also strength them in facing the realities of life with minimal stress for improved academic work and career performances.
3. School administrators and counsellors should endeavor to work more hand in hand with mathematics teachers in motivating student's interests and confidence in mathematics through the adoption of cognitive restructuring approach in counselling them.
4. Every school and indeed, all educational institutions across the country and the world over should have a functional unit or center with at least, one professional counselor who should be saddled with the sole mandate to work more closely with pupils and students on regular basis. This will help I no small measure to cater for the varied consoling needs of the student population through the provision of adequate cognitive and psychosocial services, which only consoling can provide to the for their overall growth and national development.

VI. Conclusion

In conclusion, the findings of this piece of research have brought to limelight the effectiveness of conative restructuring in helping mathophobic students to dispel their fears for mathematics which is not only detrimental to their academic success but also affect their careers as well as work performance. In view of the findings and given the crucial role mathematics plays in human and national lives as well as the severe negative consequences of mathophobia on learning of mathematics, and without special assistance by way of restructuring the cognition of students with mathophobia, they may continue to compound their problems by failing to learn the minimum arithmetic and algebra necessary for success in other academic careers with far-reaching implications for the society if nothing is done to tackle the situation, the need for intensive and consistent cognitive restructuring of students in general and phobia patients in particular across school levels is quite obvious and indispensable for accomplishment if the aims and objectives of school instruction are to be achieved. It is from these basic premises that the researchers, in conclusion, wish to enjoin governments, parents, teachers, healthcare professionals and indeed, all those with interest in improving habits and self-care behaviors among students and pupils at all school levels to work closely together to ensure academic excellence and proficiency in work performance for a better society.

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