International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 4, Issue 3, pp.222-237, September 2026, ISSN: 3043-4467 (Online), 3043-4459 (Print)
https://doi:10.5281/zenodo.23300022

Article History
Received: 19 July 2026
Revised: 27 August 2026
Accepted: 21 September 2026
Published: 12 October 2026

Interaction of Gender and Rational Emotive Behaviour Therapy (REBT) in Reducing Students' Phobia about Physics in Selected Secondary Schools in Awka Education Zone, Nigeria

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ABSTRACT

Background: Research evidence revealed that counselling interventions such as Rational Emotive Behaviour Therapy (REBT) interact with gender in the management of emotional distress, such as anxiety, stress, and depression. Research that interrogated the interaction of REBT and gender on the management of students' phobias, particularly in physics, is infrequent.
Objective: The study explored the interaction effect of REBT and gender on Nigerian senior secondary school students' Physics phobias.
Method: A quasi-experimental through a pre-test-post-test non-equivalent control group design was adopted for the study. A sample of 70 students (F=46, M=24) was drawn purposively for the study. A phobia scale with a reliability index of 0.73 was used to collect data. Descriptive statistics and repeated measures ANOVA were used for data analysis.
Results: Findings show that gender has a significant influence on students' phobias about Physics (F (1, 66) = 110.789, p< .001, η_p^2 = 0.627), with male students showing reduced phobias compared to their female counterparts, and that REBT and gender interact to reduce students' phobias about the subject (F (1, 66) = 10.783, p< .002, η_p^2 = .140).
Conclusion: The study concludes that the effect of REBT on students' Physics phobia is gendered.
Unique Contribution: The findings underscore the gendered nature of REBT in reducing students' phobias in physics; thus, highlighting the gender dynamics in students' phobias when addressed using REBT.

Keywords: Gender, interaction effect, REBT, phobia, and Physics

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INTRODUCTION

Evidence suggests that gender differences exist in students' phobias about Physics. According to Onah (2022), female students experience greater phobia about Physics than their male counterparts. This finding is consistent with Ihekwaba et al. (2020), who reported differences in the levels of Physics phobia between male and female students. Previous studies, including Hasani et al. (2016) and Momeni et al. (2015), also support this assertion. These findings suggest that students' phobias about Physics and other science subjects may be partly attributable to societal stereotypes surrounding the subject. Female students may be socialised into believing that Physics is a male-dominated subject. Society may reinforce this misconception, consciously or unconsciously, until it becomes ingrained in students' thinking and contributes to their fear of the subject. However, given the role of Physics in society, including its provision of theoretical and practical foundations for the physical sciences, engineering, and medical sciences, knowledge of the subject is essential for students of both genders. Therefore, such phobias need to be addressed through appropriate counselling interventions.

One counselling intervention with empirical support for managing psychological and emotional challenges, including stress, anxiety, and other mental health concerns, is Rational Emotive Behaviour Therapy (REBT) (Keyvan & Vaziri, 2022; Ugwuanyi et al., 2023). REBT provides therapeutic techniques for identifying irrational beliefs and replacing them with more rational and constructive ones (Lestari et al., 2023). It helps clients identify underlying thought patterns through guided questioning and other therapeutic techniques. REBT posits that irrational beliefs, rather than activating events or triggering conditions alone, contribute significantly to emotional and psychological distress. Therefore, challenging these beliefs is an important step towards addressing emotional difficulties. In the context of Physics phobia, irrational beliefs such as "Physics is difficult," "Physics is only for males," "Physics is meant for intelligent students," and "I am not intelligent enough" may reinforce students' fear of the subject, leading to avoidance and poor academic performance. REBT seeks to address the underlying causes of such phobias by identifying irrational beliefs and challenging them through disputation strategies. This process helps students develop more rational perspectives, including the understanding that Physics is accessible to both male and female students. However, an important question remains: Does REBT benefit male and female students equally in reducing Physics phobia, given the reported gender differences in students' experiences of the subject? Put differently, does gender interact with REBT in reducing students' phobias about Physics? The limited evidence addressing this question in the existing literature establishes the need for the present study, which examines the interaction effect of REBT and gender on students' phobias about Physics.

LITERATURE REVIEW

Academic Phobia about Physics and Students' Gender

Phobias occur in different forms, including specific phobia, social phobia, and agoraphobia. Specific phobia involves an intense and persistent fear of particular objects, persons, or situations. Social phobia refers to the fear of social situations in which individuals anticipate being assessed, judged, or negatively evaluated by others. Agoraphobia involves fear or anxiety about situations in which escape may be difficult or help may be unavailable if panic-like

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symptoms occur. In the context of this study, academic phobia is of particular interest. Academic phobia, also referred to as scholastic phobia, describes persistent and disproportionate fear or anxiety associated with particular academic subjects or learning environments (Alvi & Mahmood, 2021). It involves an excessive fear of a particular subject that may negatively affect students' learning and academic performance. Students experiencing such phobia may perform poorly, not necessarily because they have failed to study adequately or attend classes regularly, but because their fear interferes with their ability to engage with the subject. For instance, a student experiencing academic phobia may begin to tremble upon seeing an examination paper, experience difficulty recalling information, sweat excessively, or develop an increased heartbeat. These reactions may adversely affect the student's psychological and emotional well-being (Pascoe et al., 2019).

Research findings on gender differences in students' phobias about Physics are mixed. Gender refers to the socially constructed roles, expectations, and norms associated with being male or female (Morgenroth & Ryan, 2018). These expectations may influence how students perceive their abilities and engage with academic subjects. Research indicates that female students experience greater phobia about Physics than their male counterparts (Farhane-Medina et al., 2022). Similarly, given the relationship between phobia and anxiety, Wang and Huang (2021) reported higher anxiety levels among women than men. Research on Mathematics, a subject closely related to Physics, has also found that female students experience greater phobia than male students (Sarfo et al., 2020). However, other studies have reported no statistically significant differences in the prevalence of phobias between male and female students (Eaton et al., 2018; Omaga et al., 2024).

Although a considerable body of evidence suggests that students' phobias about Physics and related subjects may vary by gender, much of the existing research appears to focus on describing these differences rather than examining whether gender interacts with an intervention to reduce such phobias. Given the psychological dimensions of phobia, appropriate counselling interventions may be necessary alongside instructional approaches. The present study therefore examines the interaction effect of REBT and gender on students' phobias about Physics.

REBT and Gender Interaction

REBT is a cognitive-behavioural therapeutic approach that aims to reduce cognitive, emotional, and behavioural difficulties, including anxiety, depression, social avoidance, and fear of public speaking (Lestari et al., 2023). REBT posits that irrational beliefs contribute to emotional and behavioural difficulties. Such beliefs may manifest as negative self-talk that undermines individuals' confidence and limits their ability to pursue their goals. These beliefs can contribute to psychological and emotional challenges, including phobias, anxiety, and depression. Irrational beliefs are often characterised by illogical, rigid, and extreme evaluations of oneself, others, and life circumstances, which may lead to negative emotional and behavioural outcomes (Turner et al., 2022).

According to Ellis (1994), four major categories of irrational beliefs are demandingness, awfulising, frustration intolerance, and depreciation. Demandingness involves rigid expectations expressed through statements such as "I must achieve this" or "I must get this." Awfulising involves exaggerating the negative implications of an event, as reflected in

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statements such as “This is terrible” or “This is too bad.” Frustration intolerance involves the belief that one cannot endure a difficult or uncomfortable situation, as expressed in statements such as “I cannot stand this” or “I cannot bear this.” Depreciation involves devaluing oneself or others through statements such as “I am worthless,” “I am useless,” or “I am not good enough.” These irrational beliefs impose rigid and unrealistic expectations on individuals and may prevent them from evaluating situations rationally. REBT therefore seeks to identify and challenge such beliefs as a pathway to psychological and emotional improvement.

The ABCDE model provides a framework for applying REBT. It involves identifying the activating event (A), the individual’s beliefs about the event (B), and the emotional or behavioural consequences (C). The therapist then employs disputation (D) to challenge irrational beliefs and facilitate the development of more rational beliefs and healthier emotional and behavioural responses (E). In the context of Physics phobia, this process may involve identifying students’ beliefs that Physics is inherently difficult, that it is suitable only for males, or that they lack the intelligence required to succeed in the subject. Through disputation, these beliefs can be challenged and replaced with more constructive perspectives that encourage confidence and participation in Physics.

Several researchers have applied REBT to address psychological and emotional difficulties. Ugwuanyi et al. (2023) used REBT to address depression among parents of children with intellectual disabilities and found it more effective than the control condition. Onwumere et al. (2025) incorporated REBT into cognitive behavioural therapy (CBT) to address job-related stress among academic staff and reported positive outcomes. Elvins et al. (2025) also examined the application of REBT in managing mental health challenges, regulating motivation, and addressing irrational beliefs among athletes.

Of particular relevance to the present study is evidence suggesting that the effectiveness of REBT and related therapeutic interventions may vary by gender. For instance, Keyvan and Vaziri (2022) investigated the effects of REBT-based group therapy on anxiety, depression, and psychological distress among individuals with anxiety disorders and reported significant interaction effects involving treatment and gender. Similarly, Ugwuanyi et al. (2020) reported gender-related differences in the effects of cognitive behavioural therapy (CBT) on reducing Physics test anxiety. Although CBT and REBT are related therapeutic approaches, they are not identical, and findings from CBT studies provide related rather than direct evidence of REBT’s effects.

Taken together, these findings suggest that gender may be an important consideration in the application of counselling interventions to address emotional and psychological difficulties. However, the interaction effect of REBT and gender on students’ phobias about Physics remains underexplored. The present study therefore investigates whether the effectiveness of REBT in reducing Physics phobia differs between male and female senior secondary school students in Nigeria.

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METHODOLOGY

Design of the Study

The study adopted a quasi-experimental research design, specifically, the pretest–post-test non-equivalent control group design, to examine the interaction effect of intervention and gender on students' academic phobia about Physics. Specifically, a 2 × 2 factorial design was employed, with the first factor representing the treatment and control groups and the second representing gender, with two levels: male and female. In quasi-experimental research, the assignment of participants to treatment groups may be constrained by structural factors, necessitating the use of intact classes (Nworgu, 2015). In school settings, existing class arrangements often limit the random assignment of individual students to treatment groups, making the use of intact classes necessary. The study was conducted in the Awka Education Zone because Physics teachers in the area had observed cases of Physics phobia among students.

Participants

The study involved 70 Senior Secondary School One (SS1) Physics students, comprising 46 females and 24 males. SS1 is the foundational level of senior secondary education, and addressing students' phobias at this stage may encourage their continued engagement with Physics and their consideration of Physics-related careers. The participants were selected through purposive sampling, whereby schools in which students had been observed to experience phobia-related difficulties in Physics were selected for the study. Four schools were selected, with two randomly assigned to the experimental group and two to the control group through simple random sampling without replacement. Each school had two intact classes, which were used for the study in accordance with the assigned group conditions.

The experimental group comprised 43 participants (15 males and 28 females), while the control group comprised 27 participants (9 males and 18 females). Across the four selected schools, 206 students were screened, of whom 70 were identified as experiencing phobia about Physics, while 136 did not meet the study's criteria for inclusion. Screening was conducted at the pretest stage using the Students' Physics Phobia Questionnaire (SPPQ). Students who scored 50 and above were classified as having high Physics phobia, while those who scored between 40 and 49 were classified as having moderate Physics phobia. Students who scored below 40 were excluded from the study.

Measures

The Students' Physics Phobia Questionnaire (SPPQ), developed by the researchers following an extensive review of the literature, was used for data collection. The instrument comprised two sections. Section A elicited participants' demographic information, specifically gender, while Section B contained 13 items structured on a five-point Likert scale ranging from "always" to "never." The minimum possible score was 13, while the maximum was 65. Scores of 50 and above indicated high Physics phobia; scores between 40 and 49 indicated moderate phobia; scores between 20 and 39 indicated low phobia; and scores below 19 indicated that phobia was not evident based on the study's classification criteria. These categories were intended to indicate the severity of the phobia experienced by the students. Low phobia

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indicated mild symptoms with minimal interference with normal academic engagement, participation, and achievement in Physics. Moderate phobia indicated noticeable symptoms that could affect academic functioning, while high phobia indicated intense and frequent symptoms that could interfere with academic engagement in Physics.

The face validity of the instrument was assessed by three experts, one each in Physics Education, Measurement and Evaluation, and Psychology. The experts recommended revisions to some items to minimise ambiguity. Furthermore, factor analysis was conducted using responses from 50 students to examine the factor structure of the instrument. Principal axis factoring (PAF) was employed, yielding a Kaiser–Meyer–Olkin (KMO) value of 0.710. The reported significance value was $p < .001$. Two factors were extracted: social phobia, comprising Items 1, 2, 6, 8, and 11; and specific phobia, comprising Items 3, 4, 5, 7, 9, 10, 12, and 13. All items loaded above the threshold of 0.40.

The reliability of the instrument was assessed to establish its internal consistency. A sample of 40 students from a different educational setting with characteristics similar to those of the study population was used for the reliability test. The resulting data were analysed using Cronbach's alpha, yielding a reliability coefficient of 0.73. Cronbach's alpha was considered appropriate because the instrument employed a non-dichotomous response scale.

Experimental Procedure

The experimental procedure comprised three stages: pre-treatment, treatment, and post-treatment.

Pre-treatment Stage

Before the intervention commenced, two research assistants, who were Physics teachers in the schools assigned to the experimental group, received three weeks of training from an expert in behavioural therapy in the Guidance and Counselling Unit of the Department of Educational Foundations, University of Nigeria, Nsukka. Following the training, the teachers demonstrated their understanding of the intervention procedures and were assessed by the counsellor, who certified them as competent to administer the intervention.

The two teachers in the control group were also briefed on the conventional school-based counselling approach to addressing Physics phobia. This approach involved explaining the possible sources and consequences of phobia and discussing ways of managing it. Following the training and briefing, the pretest was administered, and the responses were collated, sorted, and scored to identify students who met the inclusion criteria. The screening identified 43 students (15 males and 28 females) in the experimental group and 27 students (9 males and 18 females) in the control group as experiencing Physics phobia.

Treatment Stage

Following the pretest, the experimental group received the REBT intervention, while the control group received conventional counselling. Both interventions comprised 12 sessions of 30 minutes each, conducted twice weekly over six weeks.

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An intervention package adapted from Grove et al. (2023) was used to deliver the REBT intervention. The package was based on the ABCDE model of REBT, in which A represents the activating event, B represents beliefs, C represents consequences, D represents disputation, and E represents the resulting effects of challenging irrational beliefs. The intervention began by identifying the irrational beliefs underlying students' phobias about Physics. The students were then guided to examine the consequences of these beliefs, challenge them through disputation, and develop more rational and balanced perspectives about the subject.

The intervention was administered by the classroom teachers who had received prior training. The expert counsellor and the researchers supervised the implementation to ensure adherence to the intervention guidelines and consistency in delivery.

For the control group, the existing school-based counselling approach was used to encourage students to develop a positive attitude towards Physics, study the subject, attend classes, complete assignments and classwork, and participate actively in Physics lessons and practical activities. The experimental and control groups received interventions of equal duration, with the principal difference being the counselling approach employed.

Post-treatment Stage

Following the completion of the interventions, a post-test was administered to both groups, and the students' scores were collated for analysis. A follow-up test was also administered two months after the post-test to assess whether the effects of the interventions were sustained. The pretest, post-test, and follow-up scores were subsequently collated and subjected to statistical analysis.

Control of Extraneous Variables

Several measures were adopted to minimise the influence of extraneous variables. First, separate schools were used for the experimental and control groups to reduce interaction and possible contamination between participants in the two conditions. Second, simple random sampling by balloting was used to minimise selection bias in assigning the schools to the experimental and control groups. Third, participants were encouraged to remain involved throughout the study to minimise attrition. Finally, the research assistants received training to promote consistency in intervention delivery and adherence to the prescribed protocols.

Method of Data Analysis

Data from the pretest, post-test, and follow-up assessments were analysed using descriptive statistics and repeated-measures analysis of variance (ANOVA). Repeated-measures ANOVA was employed because students' Physics phobia was assessed at three time points: pretest, post-test, and follow-up. This approach enabled the researchers to examine changes in phobia scores over time and assess differences associated with the intervention and gender. Effect sizes were interpreted using Cohen's (1988) guidelines. The normality of the data was assessed using the Shapiro–Wilk test.

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RESULTS

Table 1: Shapiro-Wilk Normality Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00001	,065	70	,200*	,985	70	,565

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

The normality assumption of the collected data was tested using the Shapiro-Wilk test. The result of the test, as shown in Table 1, reveals statistic (df=70) =0.985, and P= .565>0.05, which suggests that the collected data are normally distributed.

Table 2: Mauchly's Test of Sphericity

					Epsilon[b]		
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	,983	1,104	2	,576	,983	1,000	,500

To test whether the variances of different time measures (Pre-test, post-test and follow-up) are equal (Sphericity), Mauchly's test of sphericity (W) was conducted. From Table 2, W (2) =0.983, P=0.576 > 0.05 level of significance. Which shows that the sphericity assumptions were met.

Research Question: What is the interaction effect of intervention and gender on students' phobias?

Table 3: ***Mean and standard deviation of the interaction effect of intervention and gender on students' phobia about secondary school physics***

			Pretest		Posttest		Follow-Up Test	
Methods	**Gender**	**N**	**x̄**	**SD**	**x̄**	**SD**	**x̄**	**SD**
REBT Intervention	Male	15	42.80	2.01	26.60	1.24	27.27	1.67
	Female	28	42.82	2.65	28.61	0.99	32.14	2.03
Control	Male	9	43.22	1.99	37.11	3.41	35.56	2.60
	Female	18	43.00	1.81	41.28	4.32	44.78	3.42

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NB: REBT = Rational Emotive Behavioural Therapy; SD= Standard Deviation; N = Number of Respondents

The results presented in **Table 3** show that at the pre-test level, male and female students in the two groups have almost the same mean scores. Males in the treatment (*M*=42.80, *SD*=2.01), and females (*M*=42.82, *SD*=2.65), and for the control group, Males (*M*=43.22, *SD*=1.99) and the females (*M*=43.00, *SD*=1.81). But at the post-test level, their mean scores differed across the groups, for the treatment, the male (*M*=26.60, SD=1.24) and females (*M*=28.61, *SD*=0.99). Also, for the control group, males (*M*=37.11, *SD*=3.41), and their female counterparts (M=41.28, SD=4.32). The trend was also the same at the follow-up test. This means that gender differences exist in the phobia mean scores of the students across the groups.

Hypothesis 1: Gender has no significant influence on students' phobias about physics.

Table 4: Repeated Measures ANOVA Analysis of the influence of gender and interaction with counselling intervention on students' phobia about Physics

Tests of Between-Subjects Effects
Measure: MEASURE_
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	245542,028	1	245542,028	54502,269	<,001	,999
Treatment	2476,213	1	2476,213	549,638	<,001	,893
Gender	499,121	1	499,121	110,789	<,001	,627
Treatment * Gender	48,581	1	48,581	10,783	,002	,140
Error	297,341	66	4,505			

The result in **Table 4** shows $F(1, 66) = 110.789$, $p < .001$, $\eta_p^2 = .627$, which indicates that the null hypothesis should be rejected in favour of the alternative hypothesis. Thus, gender has a significant influence on students' phobias about physics. This shows that students' gender is a significant factor that influences students' phobias about physics. The result further shows the effect size of ($\eta_p^2 = .627$), which represents a very large effect size in line with Cohen's (1988) effect size guideline.

Hypothesis 2: Gender and intervention significantly interact on students' phobias about Physics

From Table 4, $F(1, 66) = 10.783$, $p < .002$, $\eta_p^2 = .140$ shows that gender and counselling intervention have a significant interaction effect on students' phobia physics. Also, an effect size of 0.14 shows a large effect size of the interaction of gender and counselling intervention on students' phobias physics. This finding on the interaction effect is further supported by the figure below.

Furthermore, the figure below shows the phobia mean plot of the interaction effect of intervention and gender on students' phobia mean scores about physics.

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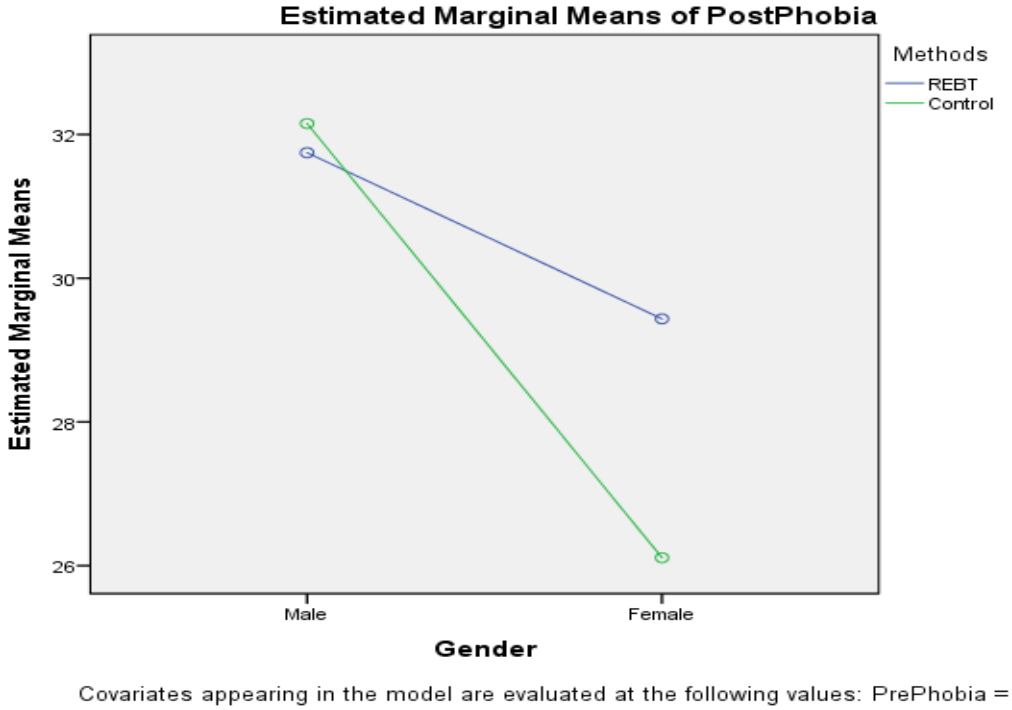

Figure 2: Phobia mean plot of the interaction effect of methods (or intervention) and gender about Physics

The above Figure 2 indicates that an interaction exists between gender and the counselling intervention (REBT) on students' phobias. This is evident by the intersection of the two lines representing the two gender groups, suggesting therefore the interaction effect of gender and intervention on students' phobia about physics.

Table 5: Pairwise Comparisons (Gender and Treatment)

Pairwise Comparisons
Measure: Phobia

Gender	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
Males	Experimental group	Control group	-6,407*	,517	<,001	-7,439	-5,376
	Control group	Experimental group	6,407*	,517	<,001	5,376	7,439
Females	Experimental group	Control group	-8,495*	,370	<,001	-9,234	-7,756
	Control group	Experimental group	8,495*	,370	<,001	7,756	9,234

Based on estimated marginal means
*. The mean difference is significant at the ,05 level.
b. Adjustment for multiple comparisons: Bonferroni.

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Table 5 shows a mean difference=-6.407; 95% CL[-7.439, -5.376]; P<0.001. which indicates a significant effect of treatment on the dependent variable (phobia) with male students in the control group having more of the phobia, than their male counterpart in the experimental group evident by the negative signs in the mean difference and confidence interval. Similar results was obtained for the female students (mean difference= -8.495; 95% CL[-9.234, -7.756]; P<0.001. This means that the intervention (REBT) reduced students' phobia towards Physics more than the traditional counselling method. And male students benefited more on the REBT intervention than the female counterpart, evident in their mean differences.

Table 6: Pair-Wise Comparison (Measures-Pre-test, Post-test and Follow-up)

Measure: Phobia

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
Pre-test	Post-test	9,562*	,479	<,001	8,385	10,739
	Follow-up	8,025*	,451	<,001	6,918	9,132
Post-test	Pre-test	-9,562*	,479	<,001	-10,739	-8,385
	Follow-up	-1,537*	,505	,010	-2,776	-,297
Follow-up	Pre-test	-8,025*	,451	<,001	-9,132	-6,918
	Post-test	1,537*	,505	,010	,297	2,776

Based on estimated marginal means
*. The mean difference is significant at the ,05 level.
b. Adjustment for multiple comparisons: Bonferroni.

Table 6 reveals a mean difference= 9.562; 95% CL[8.385, 10.739]; P<0.001. This implies a significant pre-test over post-test of students' phobia towards Physics. Similar result also emerged between pre-test and follow-up (mean difference=8.025, 95%CL[6.918, 9.132};P<0.001). Also in the mean post-test and follow-up test, a small mean difference was found (a mean difference=-1.537; 95% CL[-2.776, -0.2975.376]; P<0.001) in favour of follow-up test.

DISCUSSION

The findings of the study reveal that male students' phobias reduced more than their female counterparts. This means that both male and female students experienced a reduction in phobia, but the decrease was more pronounced in male students. Attributable to this is the impact of the treatment on both genders. The intervention reduced males students' phobia more than the females. This means that students' gender was associated with the difference in students' phobia towards physics. These findings underscore that gender still holds a pervasive influence on students' phobias about the subject, even after counselling intervention has been applied. Findings of the study resonate with the findings of the previous studies (Checkley, 2010; Hasani et al., 2016; Ihekwaba et al., 2020; Mallow, 2006; Momeni et al., 2015; Onah, 2022) that variously found phobia differentiation based on students' gender.

The findings of the study also reveal that a significant interaction effect exists between the intervention and gender on students' phobias. This means that REBT intervention on students'

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phobias is gender-specific, favouring males more than their female counterparts. Understanding from this finding is that the female students still retain their phobia a little after the treatment intervention, highlighting the differentiated nature of the counselling intervention in addressing phobia in Physics. Similar findings have been reported by previous studies on the gender-specific nature of REBT. For instance, Keyvan and Vaziri (2022) reveal that there was a significant interaction effect of REBT-based group therapy and gender on anxiety, depression, and distress. This was also echoed by Obi and Nicholas (2020), who indicated an interaction effect of the intervention used (REBT) and gender on academic stress among undergraduate students. This again shows that REBT could be limited in handling students' phobias based on gender. However, caution should be applied in interpreting the findings wholly due to some obvious limitations of the findings as stated below.

LIMITATIONS

One major limitation of the findings of the study is the design employed. The use of a quasi-experimental design limited the chances of randomizing the subjects and ensuring a full control of the experimental conditions. Another limitation is the use of teachers who are not experts in counselling. Even though the teachers were trained, using trained counsellors would have yielded better results, given that they would bring their expertise to bear in the conduct of the study. Another limitation posed by the findings is that the study was conducted in an underserved community where resource allocation to education is limited. Limited resource allocation to the teachers and educational system generally has a way of making even the best education worse, considering that the teachers are underpaid, school infrastructural needs are not met, and so on. Cultural limitations also could affect the findings of the study, to the effect that gender-related factors are culturally dependent. A culture where females are not encouraged to study science courses invariably creates a phobia for the female group than for the males. Lastly subject-specific limitations could influence the findings, given that the study was on Physics, which evidently has been riddled with phobias. Given this, it is recommended that the study be replicated using a randomized control trial design, in other climates of different cultural orientations. Also, a similar study should be carried out using counsellors instead of teachers. A study of this nature should also be done in a country where its educational system is well-funded, and in other subjects, too.

CONCLUSION

Based on the findings of the study, it was concluded that the intervention (REBT) produced different effects on the students' phobia towards Physics across gender groups. Thus, the findings, underscore that REBT interacts with gender in reducing students' phobias about physics.

Acknowledgements

The researchers acknowledge all the principals their school were used for the study and teachers who served as research assistants in the schools where the study was conducted for their invaluable roles in the study's success. Also, the students are appreciated for agreeing to participate in the study.

Ethical Consideration

A letter to conduct the study was obtained from the Head of the Department to carry out this study. The letter was subsequently photocopied and distributed to all the principals of schools

International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 4, Issue 3, pp.222-237, September 2026, ISSN: 3043-4467 (Online), 3043-4459 (Print)
https://doi:10.5281/zenodo.23300022

Article History
Received: 19 July 2026
Revised: 27 August 2026
Accepted: 21 September 2026
Published: 12 October 2026

used for this study for their approval. The principals, in turn, communicated with the Physics teachers who participated in the study. Also, the study was registered with Ethics Committee of Faculty of Education, University of Nigeria, Nsukka with registration number of REC/FE/2025/00056.

Consent to Participate
A written consent was obtained from the teachers and students to participate in the study. They were assured of confidentiality and anonymity in participating in the study. This was ensured by anonymising their responses using pseudonyms.

Consent for Publication
All the authors gave their consent to publish the manuscript.

Declaration of Conflicting Interests
There is no conflicting interest in this work to declare

Funding Declaration
No funding was received to conduct this study

Data Availability Statement
Available data for this study can be obtained from the corresponding author upon request

Author's Contributions
E. I. Orji-Conceptualization, writing, data curation, analysis, interpretation, and supervision
D.T.Nweke-Conceptualization, writing, data curation, and interpretation
U.I.Ogbonnaya- Proofreading, supervision, integrity check, and approval

Artificial Intelligence (AI) Use Disclosure
The author(s) declare that no generative Artificial Intelligence (AI) or AI-assisted technologies were used in the writing, analysis, or preparation of this manuscript.

Citation

Orji, E. I., Nweke, D. T., & Ogbonnaya, U. I. (2026). Interaction of gender and Rational Emotive Behaviour Therapy (REBT) in reducing students' phobia about Physics in selected secondary schools in Awka Education Zone, Nigeria. *International Journal of Sub-Saharan African Research*, 4(3), 222-237. https://doi:10.5281/zenodo.23300022

REFERENCES

Alvi, E., & Mahmood, N. (2021). Students' academic phobia: Causes, consequences, and coping strategies. *Journal of Educational Research, 24*(1), 1-15.

Checkley, D. (2010). *High school students' perception of physics*. Lethbridge, Alberta.

International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 4, Issue 3, pp.222-237, September 2026, ISSN: 3043-4467 (Online), 3043-4459 (Print)
https://doi:10.5281/zenodo.23300022

Article History
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Published: 12 October 2026

Cohen, J. (1988). *Statistical power analysis for the Behavioral Sciences* (2nd ed.). Lawrence Erlbaum Associates, Publishers.

Eaton, W. W., Bienvenu, O. J., & Miloyan, B. (2018). Specific phobias. *The Lancet. Psychiatry, 5*(8), 678–686. https://doi.org/10.1016/S2215-0366(18)30169-X

Ellis, A. (1994). *Reason and emotion in psychotherapy* (Revised and updated). Birch Lane.

Elvins, M., Miller, A., & Turner, M. J. (2025). Examining the effects of Rational Emotive Behaviour Therapy (REBT) with Embedded Athlete Rational Resilience Credo (ARRC) on the irrational beliefs, motivation regulation, and mental health in student-athletes. *J Rat-Emo Cognitive-Behav Ther, 43*, 55. https://doi.org/10.1007/s10942-025-00619-9

Grove, A. B., Scott, S. M., & MacPherson, A. R. (2023). Rational emotive behavior therapy-informed treatment for anxiety and depression. https://www.mirecc.va.gov/visn6/Docs/0987_RICVA_REBT_PatientWkbk_F2b_508_compliant.pdf

Farhane-Medina, N. Z., Luque, B., Tabernero, C., & Castillo-Mayén, R. (2022). Factors associated with gender and sex differences in anxiety prevalence and comorbidity: A systematic review. *Science progress*, *105*(4). https://doi.org/10.1177/00368504221135469

Hasani, P.A. M., Mokhtaree, M,. Asadollahi, Z., & Fereidoni, M. (2016). The prevalence of social phobia among students of Rafsanjan University of Medical Sciences, Iran, and its relation with personality traits. *Journal of Occupational Health and Epidemiology, 5*(2),72-82. https://doi.org/10.18869/acadpub.johe.5.2.72

Ihekwaba, C. N., Nwokocha, C. C., & Onuike, P. C. (2020). Phobia and its effect on the academic achievement of Physics students in Imo State, Nigeria. *Advances in Social Sciences Research Journal*, *7*(2), 87-94.https://doi.org/10.14738/assrj.72.7791

Keyvan K. K., & Vaziri S. (2022). An investigation on the effect of rational emotive behavior therapy on reduction of anxiety, depression, and distress in people with anxiety disorder in the age of Corona. *Iranian Journal of Health Psychology*, *5*(1), 31–38. https://journals.pnu.ac.ir/article_8581.html

Lestari, L., Wangid, M. N., & Suwidagdho, D. (2023). The Effectiveness of Rational Emotive Behavior Therapy in improving interpersonal communication and confidence. *ASSEHR, 743,* 230–236. https://doi.org/10.2991/978-2-38476-034-3_29

Mallow, J.V. (2006). Science Anxiety: Research and action. *National Science Teachers' Association*,1, 3-14.

Momeni, M., Zeyghami, R., Moradi, M., Taherpour, M., Sarichloo, M.E. (2015). Prevalence and factors associated with social phobia in nursing and midwifery students. *Journal of Health and Care*, *17*(2),137-45

Morgenroth, T., & Ryan, M. K. (2018). Gender trouble in social psychology: How can Butler's work inform experimental social psychologists' conceptualization of gender? *Frontiers in Psychology, 9, 1320*. https://doi.org/10.3389/fpsyg.2018.01320

International Journal of Sub-Saharan African Research (IJSSAR)
Vol. 4, Issue 3, pp.222-237, September 2026, ISSN: 3043-4467 (Online), 3043-4459 (Print)
https://doi:10.5281/zenodo.23300022

Article History
Received: 19 July 2026
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Accepted: 21 September 2026
Published: 12 October 2026

Nworgu, B. G. (2015). *Educational measurement and evaluation: Theory and practice*. University trust publishers.

Obi, O. P., & Nicholas, I. J. (2020). Effect of Rational Emotive Behaviour Therapy on reduction of academic stress of undergraduate students in Rivers State, Nigeria. *Journal Of the Nigerian Academy OF Education, 16*(1), 293-303.

Omaga, J.O., Baba, M.M., & Bala, S.M. (2024). Undoing phobia in Physics through counselling strategies: Implications for national development: https://www.researchgate.net/publication/381280094

Onah, K. T. (2022). Effect of scaffolding teaching approach on students' academic achievement in Quantum Physics in Enugu Education Zone. *Greener Journal of Educational Research*, *12*(1), 13-21.

Onwumere, M., Onah, F. C., Chukwuma, I. S., Ezeanya, M. C., Zudonu, O. C., & Ugwuanyi, C. S. (2025). Effect of Rational Emotive Behaviour Therapy on job stress management among science and agricultural education lecturers in Nigerian universities: Implications for work ethics. *Journal of Academic Ethics, 23,* 1971–1990. https://doi.org/10.1007/s10805-025-09637-9

Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2019). The impact of stress on students in secondary school and higher education. *International Journal of Adolescence and Youth, 25*(1), 104–112 D. https://doi.org/10.1080/02673843.2019.1596823

Sarfo, J. O., García-Santillán, A., Adusei , H., Molchanova, V. S., Drushlyak, M., Semenikhina, O., Donyeh, P. S., Zand, S., Najafi, R., Enea, V., Malik, S., Ashrafi, F., Malik, N. I., Ansah, E. W., Wongcharee, H., Egara, F. O., Tipandjan, A., Cudjoe, J., Azam, U., Hassan, M. S., Helmy, M., & Vally, Z. (2020). Gender differences in mathematics phobia across cultures: A univariate analysis of variance among samples from twelve countries. *European Journal of Contemporary Education, 9*(4), 878-885. https://doi.org/10.13187/ejced.2020.4.878

Turner, M. J., Miller, A. J., Youngs, H., Barber, N., Brick, N. E., Chadha, N. J., et al. (2022). I must do this! A latent profile analysis approach to understanding the role of irrational beliefs and motivation regulation in mental and physical health. *Journal of Sports Sciences, 40*(8), 934–949. https://doi.org /10.1080/02640414.2022.2042124

Ugwuanyi, C. S., Ede, M. O., Onyishi, C. N., Ossai, O. V., Nwokenna, E. N., Obikwelu, L. C., Ikechukwu-Ilomuanya, A., Amoke, C. V., Okeke, A. O., Ene, C. U., Offordile, E. E., Ozoemena, L. C., & Nweke, M. L. (2020). Effect of cognitive-behavioral therapy with music therapy in reducing Physics test anxiety among students as measured by generalized test anxiety scale. *Medicine*, *99*(17), e16406. https://doi.org/10.1097/MD.0000000000016406

Ugwuanyi, L. T., Ede, M. O., Agbigwe, I. B., Onuorah, A. R., Amaeze, F. E., Edeh, N. C ·, Aye, E. N., Ezeh, N. E., Ubah, J.C., Onah, S. O., Chukwu, L., Ogidi, C. I., Nzewuji, U. A., Effanga, O. A., Ozoemena, L. C., Egwim, C. E., & Adene, F. M. (2023). Effect of Rational Emotive Behaviour Therapy on depressive symptoms in a sample of parents of children with intellectual disability. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 41*, 128–143. https://doi.org/10.1007/s10942-022-00454-213

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Article History
Received: 19 July 2026
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Wang, Y., & Huang, L. (2021). Gender differences in anxiety: A meta-analysis. *Journal of Anxiety Disorders, 78,* 102377. https://doi.org/10.1016/j.jandis.2021.102377