Research Article

The effectiveness of cognitive restructuring techniques to reduce mathematics anxiety in high school students

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Article Info	Abstract
	Mathematics is an important element in life. It is even said that all activities or things that exist in our daily life require mathematics in it. However, mathematics is often considered a difficult subject for students because the characteristics of mathematics are abstract, logical, systematic and full of symbols and confusing formulas. Students often feel frustrated and raise anxiety about mathematics. Cognitive restructuring techniques can be used to reduce anxiety by changing irrational and non-adaptive views into rational and adaptive ones. Therefore, this study aims to determine the effectiveness of cognitive restructuring techniques to reduce anxiety in high school mathematics subjects. The hypothesis of this research; cognitive restructuring technique is an effective to reduce anxiety about mathematics in high school students. The research was conducted using a quasi-experiment one-group pretest- posttest design. Anxiety towards mathematics was measured using the Anxiety Scale Against Mathematics (ASAM) developed by the researcher. The total subjects used in this study were 6 students. For each subject, the cognitive restructuring technique was carried out for 3 sessions, each session lasting 1- 1.5 hours. Based on the results of the study, it was found that $p(0.028)<0.05$ so it can be concluded that cognitive restructuring techniques are effective for reducing anxiety about mathematics in high school students.

To cite this article

Introduction

Mathematics is an important element in life. It is even said that all activities or things that exist in our daily life require mathematics in it (Riski, Indiana, & Isna, 2019). In line with this, in order to measure the mathematical ability of students in various countries internationally, several studies were carried out, one of which was Trends in International Mathematics and Science Study (TIMSS). This research is conducted every 4 years by the TIMSS & PIRLS International Study Center of Boston College. In 4 research periods, namely 2003, 2007, 2011 and 2015 it is known that Indonesia's mathematics achievement score is still below the international average (Hadi & Novaliyosi, 2019).

Mathematics is often considered a difficult subject because the characteristics of mathematics are abstract, logical, systematic and full of confusing symbols and formulas (Syafitri, 2017). Students often feel frustrated and have negative

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attitudes towards mathematics. This usually occurs when students have difficulty solving questions or during exams. If this condition occurs repeatedly, the negative attitude will turn into an anxiety towards mathematics (Syafitri, 2017).

The difficulty of students in understanding mathematics lessons is also getting worse with the outbreak of the COVID-19 pandemic. This pandemic causes learning that is usually carried out in schools to be carried out online. When the transition from face-to-face learning to distance learning occurs, students are required to adapt quickly (Suhendra, 2020). Many students felt unprepared, uncomfortable, and shocked by this sudden big change. Therefore, it was found that many students experienced anxiety during the online learning period (Oktawirawan, 2020).

So far there is still debate about whether anxiety about mathematics is an independent object of study independent of the study of anxiety in general. There is evidence that there is a correlation between general anxiety and test anxiety, and math anxiety (Dowker, Sarkar, & Looi, 2016). However, it was found that anxiety about mathematics was more correlated with anxiety about tests/exams. No treatment has been found that is considered appropriate enough to deal with anxiety about mathematics. However, there are some findings from recent research that seem promising for dealing with math anxiety. One of these findings is about the influence of cognitive factors on math anxiety so it is possible that cognitive interventions can help reduce anxiety (Dowker, Sarkar, & Looi, 2016).

This opens up the possibility for techniques that involve cognitive reappraisal of situations that cause anxiety. Research conducted by Ramirez et al (2011) involved people with anxiety doing a reappraisal of the source of anxiety and the consequences of anxiety on their math performance. It was found that by doing a reappraisal before carrying out the test, it will reduce the negative effects that arise as a result of anxiety and increase test scores, especially for students who often experience test anxiety (Ramirez & Beilock, 2011).

There are several treatments with a cognitive approach that can be given to students to reduce academic anxiety, especially anxiety in mathematics. One of the treatments that can be given is cognitive restructuring. Cognitive restructuring techniques are included in cognitive therapy (Beck, 2011). In its application, cognitive restructuring techniques can help students who have academic anxiety by making them reject irrational and maladaptive thoughts into more positive and adaptive thoughts.

This technique has begun to be widely studied in the field of education because it has proven to be quite effective in overcoming psychological problems experienced by students and increasing the locus of control of students. One of the studies conducted by Nikmaturohmah (2015) proves that cognitive restructuring techniques can improve the locus of control of high school students in class XI. In line with this, research conducted by Erfattini, Purwanto, & Japar (2016) proves that counselling with cognitive restructuring techniques has proven to be effective in reducing academic procrastination.

According to Beck (2011), the cognitive restructuring technique has several advantages compared to other techniques that both aim to reduce anxiety. These advantages include: 1) Simple and does not require a lot of money. 2) The stages carried out will make the subject evaluate and explore themselves a lot. This encourages the emergence of a better self-understanding for the subject. 3) Cognitive restructuring techniques are carried out verbally and are often referred to as talk therapy. This technique is still quite possible to do during the current pandemic.

Although there have been many studies on cognitive restructuring techniques in the field of educational psychology, there is still little research on cognitive restructuring techniques aimed at reducing academic anxiety. More specifically, anxiety about mathematics. Therefore, in this study, researchers were encouraged to conduct experimental research with the title "Cognitive Restructuring Techniques to Reduce Anxiety on Mathematics Subjects for High School Students". The purpose of this study was to determine the effectiveness of cognitive restructuring techniques to reduce anxiety about mathematics in high school students. The hypothesis of this study is that cognitive restructuring techniques are effective in reducing math anxiety in high school students.

Mathematics Anxiety

Anxiety about mathematics is a feeling of pressure, worry, anxiety, dislike, or fear of everything related to mathematics (Riski, Indiana, & Isna, 2019). According to Luttenberger and colleagues (2018), mathematics anxiety is defined as a feeling of fear and increased psychological activity when someone is dealing with mathematics, such as when they have to manipulate numbers, solve mathematical problems, or when faced with evaluative conditions (tests/exams) related to mathematics. with math.

Students who have math anxiety tend to avoid situations where they have to study and work on math problems (Syafitri, 2017). Anxiety about mathematics was also found to be correlated with problem solving math problems. If anxiety about mathematics is lower, one's mathematical problem solving ability will be higher and if anxiety about mathematics is higher, then one's mathematical problem solving ability will be lower (Riski, Indiana, & Isna, 2019).

According to Alexander and Martray (in Hunt, 2011) there are three types of anxiety about mathematics. The three types are mathematics test anxiety, numerical task anxiety, and math course anxiety. According to Haralson (2002) anxiety towards mathematics has symptoms that are divided into two aspects. These two aspects are physical symptoms and psychological symptoms.

➤ Physical Symptoms

Physical symptoms that appear when a person experiences math anxiety are nausea, increased heart rate, sweaty palms and soles, cold sweat, dry mouth, irregular muscle tension, clenched hands more often, stiff and tight shoulders. In more severe conditions, a person may feel short of breath, have a headache and feel faint.

➤ Psychological Symptoms

Psychological symptoms that arise when experiencing anxiety about mathematics are in the form of negative thoughts, panicking, feeling afraid, worried, anxious, wanting to run away and avoiding mathematics, feelings of helplessness and inability to solve problems related to mathematics, mental disorganization, thinking coherently, feeling failure and worthlessness, extreme tension, and an inability to remember the material being studied.

Cognitive Restructuring Technique

Cognitive restructuring technique is a treatment in which subjects are asked to realize and change negative, irrational, or maladaptive thought patterns that can be destructive and self-defeating into positive, rational and adaptive thoughts (Beck, 2011). Cognitive restructuring techniques can be done individually or in groups.

Cognitive restructuring techniques depend on the subject's ability to recognize thoughts that cause negative feelings to arise and interfere with mental well-being. Beck (2011) further explained that in its implementation, cognitive restructuring techniques will target automatic thoughts that are distorted from the subject and as much as possible stop and eliminate those automatic thoughts. According to Beck (2011) there are five main divisions in cognitive restructuring techniques. Here are the five steps in using cognitive restructuring techniques.

➤ Self-monitoring

To change negative, distorted, and unrealistic thought patterns, the first step needed is to find out what wrong thinking is being done. It is even better if the subject can be aware of what kind of situation, when and where can usually bring up negative thoughts.

➤ Evaluating Assumptions

The next stage is to make the subject able to rethink thoughts and assumptions, especially thoughts and assumptions that can hinder life productively. At this stage, the counsellor can teach the subject how to use Socratic questioning to help spot biased, distorted and illogical automatic thoughts.

➤ Gathering Evidence

The key step in the cognitive restructuring technique is gathering evidence. Subjects can find events that elicit negative responses, including with whom and what the subject was doing at that time. It would be better if the

subject knows how strong each response that appears and what memories arise as a result of the incident. The evidence that emerges can contradict the thoughts, assumptions and beliefs of the subject. Cognitive distortion is biased and does not match the evidence (facts), but can be deeply ingrained in a person's mind.

➢ Analysing the Benefit
At this stage, the subject will be asked to consider the advantages and disadvantages of each of the negative automatic thoughts that have been identified. Knowing the advantages and disadvantages will help the subject to consider the need to replace the wrong mindset.

➢ Bringing Up Alternatives
The last stage is helping individuals to find new perspectives to look at mathematics. At this stage, the subject is expected to be able to generate rational and positive alternative thoughts to replace the cognitive distortions that have been embedded from time to time.

There are several things that can hinder or thwart the efforts of cognitive restructuring techniques. Some of these are as follows.

➢ The presence of other automatic thoughts that have not been identified or explored.
➢ Evaluation of automatic thoughts is still too shallow, or inadequate.
➢ The person does not show sufficient evidence that he or she has automatic thoughts.
➢ Automatic thoughts are also core beliefs of the person.
➢ The person intellectually understands the existence of distorted automatic thoughts, but do not believe it has an impact on their performance.

Cognitive Restructuring effects on Mathematics Anxiety

According to research conducted by Adetola & Oladunmoye (2017) on high school students in two provinces in Nigeria, it was found that cognitive restructuring techniques were effective in reducing math anxiety. This research is a quasi-experimental study in the form of pretest-posttest control group. In this study, it was also moderated by gender, with the result that gender had a significant effect on changes in mathematics anxiety after treatment.

In line with the results of this study, a quasi-experimental study conducted by Anyamene & Ogugua (2019) found that cognitive restructuring techniques were effective in reducing anxiety on mathematics test anxiety. Mathematics test anxiety itself is one type of anxiety about mathematics proposed by Alexander and Martray (in Hunt, 2011). Therefore, researchers are interested in conducting research to determine the effectiveness of cognitive restructuring techniques to reduce anxiety about mathematics in high school students.

Cognitive restructuring technique is carried out by changing irrational and non-adaptive thoughts and views on mathematics into rational and adaptive thoughts. More specifically, the cognitive restructuring technique will stop the subject's flow of anxiety towards mathematics.

Problem of Study and Hypothesis

From the preceding information, the following research question can be derived: How effective cognitive restructuring techniques can help to reduce mathematics anxiety in high school students. Therefore, the research hypothesis is:

H1: cognitive restructuring techniques have a significant impact to reduce mathematics anxiety in high school students
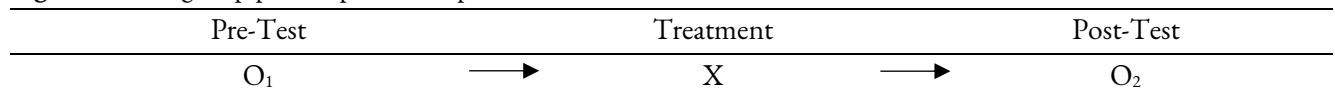
H0: cognitive restructuring techniques have no significant impact to reduce mathematics anxiety in high school students

Methods

Research Model

The research design used in this study was a quasi-experiment. The experimental research design used was the One-Group Pretest-Posttest Design all participants administered a pre- and post-test. Below is the illustration of the research model.

Figure 1. One-group pretest-posttest experimental research model

Pre-Test	Treatment	Post-Test
O_1	$\longrightarrow$ X $\longrightarrow$	O_2

Description

O₁   : *Pre-test* (Measurement of anxiety on mathematics of subjects prior to treatment)

X   : Treatment (Provision of Cognitive Restructuring Techniques)

O₂   : *Post-test* (Measurement of anxiety on mathematics of subjects after treatment)

Participants

Pre-test was conducted on 132 students of senior high school, varying from first year student to the final year student. After their anxiety on mathematics measured, 6 students were selected to be research participants. These six students were chosen because they had very high anxiety scores on questions about mathematics. Based on the informed consent that were agreed and signed by participant of this research, any information that might revealed the participant identities is removed. Names of the participants of this research is replaced with an alias. Below is the information on each research participants.

Table 1. Research Participant Information

No.	Initial	Gender	*Pre-test Score*	**Math. Anxiety Classification**
1.	MAT	Male	173	Very High
2.	NFA	Female	162	Very High
3.	DFI	Female	157	Very High
4.	SER	Female	153	Very High
5.	NAS	Male	153	Very High
6.	SFA	Female	152	Very High

Data Collection Tool

Anxiety Scale Against Mathematics (ASAM)

This study uses the instrument "Anxiety Scale Against Mathematics" to conduct pre-test and post-test. The scale was developed by researchers from the types of anxiety about mathematics proposed by Alexander and Martray (in Hunt, 2011). Then the indicators of anxiety towards mathematics are compiled based on the theory proposed by Haralson (2002). This scale was greatly assisted and consulted with Dr. Sri Weni Utami, M.Si (Psychologist).

The validity test was carried out using the construct validity test to determine the validity of each item. The researcher used a significance level of 5%. Based on the calculation results, it is known that from 48 items, 44 items are valid because $p < 0.05$ and 4 items are invalid because $p > 0.05$. The following is a final blueprint for the "Anxiety Scale Against Mathematics".

Table 2. ASAM Blueprint

No.	Types of Anxiety	Anxiety Indicators	Item Number		Total
			Favorable	**Unfavorable**	
1.	Mathematic Test Anxiety	Physical	5,6,7,8	29,30,31,32	8
		Psychological	17,18,19,20	37,38,39	7
2.	Numerical Task Anxiety	Physical	41,42,43,44	21,22,23,24	8
		Psychological	33,34,35,36	13,14,15,16	8
3.	Maths Course Anxiety	Physical	45,46,47,48	10,11,12	7
		Psychological	25,28	1,2,3,4	6
Total			22	22	44

The internal consistency (Cronbach's Alpha) technique was used to determine the research tool's reliability, with the value of (alpha) determined for each paragraph in each study axis, as shown in the table below.

Table 3. The Internal Consistency Coefficient (Cronbach's Alpha) between the Items of the Scale

Scale	Cronbach's alpha	Number of Items
ASAM	0.904	44

Based on the calculation results, from 44 valid items, Cronbach's alpha results were =0.904. It can be concluded that the reliability of the "Anxiety Against Mathematics" scale is very high based on the reliability categorization according to Guilford (in Sugiyono, 2011).

Results

To understand the effectivity of cognitive restructuring technique to reduce mathematics anxiety, first we need to look at how each participant thought, feelings, and behaviour towards mathematics. Three counselling session is conducted for each participant, and below are the details of every counselling session on each research participant.

Subject MAT

Subject MAT is a 19-year-old male. At the time of the experiment, the subject is a final year senior high school student. Subjects do not have a specific schedule for study. Usually, the subject will study only when there is homework or exams. In his daily life he does not study even though there is nothing that takes time to study. This causes the subject's mathematical value to be less good.

Based on the pretest data, the subject has a score of 173 anxiety towards mathematics. This score is the highest score of all researched participants. The implementation of cognitive restructuring on MAT subjects was carried out in 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow a series of experiments that will be given.

The second session was held on March 31, 2021. In this session, the subject explained that he often felt anxious and afraid when dealing with mathematics. These feelings make the subject want to avoid mathematics. Further investigation revealed that the subject was worried that he would not be able to do the test. In addition, dealing with mathematical formulas makes the subject feel more anxious.

The third session will be held on April 7, 2021. This session is an extension of the second session. The subject explained that anxiety about mathematical formulas peaked when the formula was needed in a math test. The subject is afraid of not being able to do the exam and getting bad grades. However, the subject explained that the anxiety experienced by him had a positive impact, namely encouraging the subject to be more active in learning. Conversely, if

the subject feels too anxious then he really wants to run away from lessons or math exams. After realizing the anxiety about mathematics experienced by the subject, he stated that he was willing to look for alternatives in dealing with mathematics. The subject said that mathematics must be faced because it is useful. Therefore, the subject realizes that he must study harder.

After cognitive restructuring was carried out on the subject, it was obtained a score of 137 on mathematics anxiety in the post-test. So it can be seen that there was a decrease of 36 points.

Subject NFA

Subject NFA is a 19-year-old female. At the time of the experiment, the subject was a final year senior high student. Subjects have a certain schedule for studying, which is d after usk time. If she study too late, she has difficulty understanding the lesson. However, the study schedule that has been set by the subject itself is more likely to be carried out when facing exams. The place where the subject wants to study must be quiet and comfortable and snacks are needed to accompany the subject learning.

Based on the pretest data, the subject has a score of 162 on mathematics anxiety. This score is a very high score in the classification. The implementation of cognitive restructuring on subject NFA was carried out for 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow a series of experiments that will be given. Occasionally the subject asks the researcher related to the implementation of the experiment.

The second session was held on March 29, 2021. In this session, the subject explained that he was afraid and could not face mathematics. The research conducted by the researcher revealed that the subject was afraid because the mathematics teacher made the subject less comfortable to study. Subjects also have difficulty understanding mathematical formulas.

The third session will be held on April 5, 2021. This session is an extension of the second session. The subject explained that the fear and feeling of being unable to face mathematics was caused by less effective study time. The subject feels that the mathematics teaching teacher does not pay attention to whether the students really understand the material being taught or not. Subjects have not found the benefits of anxiety about mathematics. More subjects explained that the anxiety they experienced prevented them from being able to understand mathematics. The subject does not want to maintain negative thoughts towards mathematics. The researcher then helps the subject to find a new perspective on mathematics. The subject thought that she should study more and manage his study time. Therefore, the subject feels no need to worry too much about mathematics if he has studied well.

After cognitive restructuring was carried out on the subject, it was found that the anxiety score for mathematics was 129 in the post-test. So, it can be seen that there is a decrease of 33 points.

Subject DFI

Subject DFI is an 18-year-old female. At the time of the experiment, she is a final year senior high school student. DFI have a desire to learn mathematics and usually take the time to study mathematics after dusk. The duration of studying the subject is uncertain, sometimes 2 hours and sometimes less than that. In one week, subjects usually study mathematics a maximum of 2 times. Sometimes the subject only studies if there is a math test the next day. Based on the pretest data, the subject has an anxiety score of 157. This score is a very high score for mathematics anxiety in the classification. The implementation of cognitive restructuring on subject DFI was carried out for 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow a series of experiments that will be given.

The second session was held on April 2, 2021. In this session, the subject explained that he had difficulty with mathematical formulas. The difficulty made him feel worried about his bad math grades. The subject further explained

that the anxiety she experienced was caused by a formula that was difficult to memorize. In addition, she said that the subject teacher could not explain well so he felt bored when studying mathematics.

The third session will be held on April 9, 2021. This session is an extension of the second session. The subject explained that the situation that caused the subject to think that mathematical formulas were difficult to memorize was due to lack of time to study. Subjects are students who are in the cottage and can only study after dusk. Often the subject is tired before having time to study mathematics. Associated with the advantages and disadvantages of having poor thinking about mathematics, the subject explained that he thought that difficult mathematical formulas would not help her score to be good. Instead, she builds the idea that he should study more regularly so that he no longer sees mathematical formulas as difficult, and can get better grades

After cognitive restructuring was carried out on the subject, it was found that the anxiety score for mathematics was 128 in the post-test. So it can be seen that there is a decrease of 29 points.

Subject SER

Subject SER is a 17-year-old female. At the time of the experiment, the subject is a final year senior high school student. Subjects have a fairly regular schedule for learning mathematics, namely after dusk to completion. The subject said that she could study mathematics for more than two hours, but often less than two hours. If there is no math exam, the subject usually studies 1-2 times per week and even then because there is an assignment. So far, the learning method used is memorizing formulas.

Based on the pretest data, the subject had a score of 153 on mathematics anxiety. This score was included in the very high classification. The implementation of cognitive restructuring on SER was carried out for 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow series of experiments that will be given.

The second session was held on April 1, 2021. In this session, the subject explained that he did not understand mathematics. This makes the subject feel restless and anxious to get unsatisfactory scores. The subject explained that the anxiety she experienced was caused by a mathematical formula that was difficult to understand. At the time of the exam the subject often cannot think because the mind is full of worries when dealing with mathematics.

The third session will be held on April 8, 2021. This session is an extension of the second session. The subject explained that the situation that caused him to feel anxious was because he was worried about getting unsatisfactory grades. Besides, she can't see formulas when doing math. These thoughts have a positive impact on the subject. The subject explained that the worries he felt made her provoked to study. On the other hand, excessive anxiety interferes with her understanding mathematical formulas. The subject said that she would change his thinking and habits in dealing with mathematics. He will study harder and be braver in facing mathematics because he thinks that mathematics is important.

After cognitive restructuring was done on the subject, it was found that the anxiety score for mathematics was 125 in the post-test. So, it can be seen that there is a decrease of 28 points.

Subject NAS

Subject NAS is a 19-year-old male. At the time of the experiment, the subject is a final year senior high school student. Subjects have a schedule for learning mathematics, which is to go home from school with a duration of about 1 hour. In one week, the subject can carry out the schedule about 3 times. However, the subject still has difficulty understanding mathematics, so he often chooses to study with his friends.Based on the pretest data, the subject had a score of 153 on mathematics anxiety. This score was included in the very high classification. The implementation of cognitive restructuring on NAS subjects was carried out in 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow a series of experiments that will be given.

The second session was held on March 29, 2021. In this session, the subject explained that he did not feel integrated with the lessons taught by the teacher. The subject admitted that he did have anxiety about mathematics, but more in the form of being less comfortable.

The third session will be held on April 5, 2021. This session is an extension of the second session. The subject explained that the situation that prompted him to feel uncomfortable about mathematics was that the learning provided by the teacher in class was not in accordance with the ideal learning expectations he had in mind. The subject thought that after studying in class, he would understand a lot of mathematics. But apparently, he did not get a good understanding. The subject said that thinking too much about expectations and discomfort in learning in class made him less focused. After discussing with the researcher, the subject said that he would change his mind. The subject believes that he must study harder and take mathematics more seriously.

After cognitive restructuring was done on the subject, it was obtained a score of 116 on mathematics anxiety in the post-test. So it can be seen that there is a decrease of 37 points.

Subject SFA

Subject SFA is an 18 year old female. At the time of the experiment, the subject was a final year senior high school student. Subjects have a schedule for learning mathematics after dusk with a duration of about 2 hours. Sometimes the subject wakes up at 3 am and studies after the sunnah prayer until dawn. This study schedule is usually carried out about 3 times a week. Based on the pretest data, the subject has a score of 152 on mathematics anxiety. The score is included in the very high classification. The implementation of cognitive restructuring on SFA was carried out for 3 sessions.

The first session was held on March 28, 2021. The first session was the introduction stage, approval of informed consent, development of rapport, delivery of research objectives, and explanation of anxiety about mathematics. The subject pays attention to the researcher's explanation and is willing to follow a series of experiments that will be given.

The second session was held on March 30, 2021. In this session, the subject explained that she was afraid of mathematical formulas. Subjects also feel afraid of math exams because there are too many formulas. However, she said that so far, it's not too bad. The subject explained that there were many formulas that had to be memorized, so when she saw mathematics, he immediately felt anxious about getting a bad score.

The third session will be held on April 6, 2021. This session is an extension of the second session. The subject explained that the situation that caused her to feel anxious was a formula that had to be memorized too much and was too complicated. The subject explained that the presence of anxiety about mathematics can be a driving force for learning mathematics. But on the other hand, he also feels that if he is too anxious, it will interfere with the process of understanding mathematics. After discussing with the researcher, the subject explained that he should not be too worried about mathematics. It is better if he learns to deal with mathematics more because he already has the right way and tempo of learning.

Table 4. Changes in Mathematics Anxiety

No.	Initial	*Pre-test*	*Post-test*	Changes	Changes (%)
1.	MAT	173	137	-36	20,81
2.	NFA	162	129	-33	20,37
3.	DFI	157	128	-29	18,47
4.	SER	153	125	-28	18,30
5.	NAS	153	116	-37	24,18
6.	SFA	152	107	-45	29,61

After cognitive restructuring was done on the subject, it was obtained a score of 107 on mathematics anxiety in the post-test. So, it can be seen that there is a decrease of 45 points.

Based on these results, it is obvious there are changes in anxiety towards mathematics in each research subject. Further analysis is conducted to make sure the effectivity of cognitive restructuring technique to reduce mathematics anxiety. Therefore, the following is a table that presents the data for the analysis.

Table 5. Wilcoxon Ranks Results

	Ranks			
		N	Mean Rank	Sum of Ranks
Posttest - Pretest	Negative Ranks	6[a]	3.50	21.00
	Positive Ranks	0[b]	.00	.00
	Ties	0[c]		
	Total	6		

Based on these data, the Wilcoxon test was performed and obtained p value (0.028) <0.05. Then H0 is rejected, and H1 is accepted. So, it can be concluded that the cognitive restructuring technique is effective in reducing math anxiety. In addition, based on tables above, it can be seen that there is a change in anxiety scores towards mathematics with a percentage change between 18.47% to 29.61%.

Table 6. Wilcoxon Signification Test Results

	Posttest - Pretest
Z	-2.201[a]
Asymp. Sig. (2-tailed)	.028

Discussion and Conclusion

Cognitive restructuring is a technique that can be done to help someone in dealing with anxiety through the process of changing irrational thoughts into rational ones (Beck, 2011). Cognitive restructuring techniques change thoughts that says such as "I can't" to "I can", with consequences for follower actions that need to be done afterwards. The subject's cognitive restructuring procedure was carried out on March 28 - April 8, 2021 with each subject getting 3 sessions. The implementation date of each research subject is different, and not all subjects have the same interval between sessions. To overcome unwanted things due to the difference in intervals, during the second and third sessions the researchers conducted a review of the implementation of cognitive restructuring in the previous session and ensured that the subject was ready to move on to the next session.

According to Alexander and Matray (in Hunt, 2011) there are three types of anxiety towards mathematics, namely: 1) mathematical test anxiety, 2) numerical task anxiety, 3) math course anxiety. Based on the results of the pre-test of this study, students with very high mathematics anxiety were mostly grade XII students. According to this research, the students of final year senior high school student indeed tend to have high anxiety compared to first and second year senior high school student. This is in accordance with what was expressed by Saputra (2014) which also stated that final year student has higher anxiety rather than other. Many students view math exams as a problem in their lives because they think they will not get good grades and are not prepared to face them.

Based on the process of the first stage of the cognitive restructuring technique, namely self-monitoring, it is known that the research subjects know that they have anxiety about mathematics. They feel afraid and anxious about math formulas and exams. The cause of anxiety about mathematical formulas (numerical task anxiety) is because the subject assumes that mathematical formulas are difficult to memorize and complicated. For example, subject SFA explained that there were too many mathematical formulas for high school students. The same thing was also expressed by subject MAT. The subject said that he had great anxiety towards mathematics because the formulas were not easy to understand.

Another opinion is also given by subject NAS. He explained that the anxiety about mathematics was triggered by the feeling of not being integrated in the lessons taught by the teacher. A similar opinion was also conveyed by subject NFA who felt that the process of delivering material by the teacher was not comfortable. This is in accordance with the explanation of Alexander and Matray about one type of anxiety towards mathematics, namely maths course anxiety.

The second stage of the cognitive restructuring technique is evaluating assumptions. The research subjects explained that they were anxious about mathematics because they thought that mathematics was difficult to understand. One of the subjects, SER, explained that when he thinks mathematics is difficult, she will feel more anxious. Subject MAT explained that the anxiety was stronger when facing math formulas and exams.

Researchers explore these problems and help research subjects to realize that these thoughts interfere with the subject's productivity. The study subjects agreed that it interfered with their productivity when dealing with mathematics. Furthermore, for example, subject NAS explained that negative thinking about mathematics made him not focus during math class. Subject NFA explained that the anxiety they experienced prevented her from being able to understand mathematics.

The researcher then facilitated the subject to enter the fourth stage of cognitive restructuring, which was analysing usefulness. At this stage the researcher helps the subject to consider whether or not a change is needed in looking at mathematics. This stage is an important stage in the successful process of cognitive restructuring and will later lead to a new perspective in looking at mathematics.

Subject NFA explained that no longer wanting to maintain old thoughts about mathematics was difficult because it prevented her from understanding mathematics. In line with this, subject DFI explained that if she always thought that mathematical formulas were difficult, it would not help her math grades to be good. Subject NAS also realized that negative thinking about math made them less focused when studying.

Subject SFA explained that excessive anxiety when dealing with mathematics made her unable to understand mathematics, but mild anxiety also had a positive impact. She explained that feeling a little anxious about mathematics could encourage her to study mathematics. The same thing was conveyed by subject MAT. He explained that excessive anxiety sometimes made him run away from math class, but that anxiety sometimes made him study harder. The same thing was conveyed by subject SER. This explains that having a little anxiety about mathematics, makes the subjects worry about their grades and makes them motivated to study.

The research subjects explained that they no longer wanted to be too anxious and thought that mathematics was a very difficult subject. Instead, they want to change that thought. The subjects explained that they wanted to feel capable and better prepared for mathematics. The researcher then helped the subject to come up with a new perspective on mathematics by providing motivation. Furthermore, the researcher also helped the subject to realize that with new thinking there would be consequences that needed to be done. The consequence is for example in the form of learning to be more disciplined. Some research subjects also understand the consequences that must be done without the need for help from researchers. For example, on the subject SER which explains that she will be more diligent in studying. Then on subject SFA who explained that she no longer needed to worry too much about mathematics because she only needed to discipline her schedule for studying. After giving cognitive restructuring technique, the subjects have the view that mathematics is important and useful, so it must be faced and mastered.

Based on the process that has been carried out, it is known that this research succeeded in growing a new perspective on mathematics in the six research subjects. At first the research subjects viewed mathematics as complicated, difficult to memorize, and would not get good grades in mathematics, causing them to be anxious. Then after implementing cognitive restructuring, they agreed to change their thinking towards mathematics. The research subjects showed optimistic and positive thoughts towards mathematics and some stated that mathematics was important and they should not be too anxious about mathematics. This indicates that cognitive restructuring has succeeded in influencing the research subjects.

From this study also obtained the results of the Wilcoxon test where the p value (0.028) <0.05. So it can be proven that cognitive restructuring techniques are effective in reducing math anxiety. This is in accordance with the research of Anyamene & Ogugua (2019) and research by Adetola & Oladunmoye (2017) which also found that cognitive restructuring was effective in reducing math anxiety.

This study has proven that cognitive restructuring techniques can help to reduce anxiety towards mathematics. However, researchers have not been able to find out their performance from the new point of view that each research subject has. Therefore, it is not known for certain whether there is a change in the academic performance of research subjects in the field of mathematics. According to Beck (2011), the cognitive restructuring technique will get more optimal results if it is continued by giving behavioural interventions. This can be the input for further research.

Recommendations

Based on the research that has been done, the researcher provides several suggestions that can be improved and improved for further research. (1) Improving the design of the implementation of cognitive restructuring techniques and increasing the number of meeting sessions. (2) It is recommended that the practice of implementing cognitive restructuring techniques be carried out by professionals such as psychologists. (3) Involving more research subjects so that the results obtained are more representative and giving more statistical significance.

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