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Mathematics anxiety among prospective elementary school teachers and their treatment

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Abstract. Primary school teachers need to master a variety of subjects in the school and must have the competence to teach various subjects, including math. The phenomenon of mathematics anxiety experienced by the elementary school teacher candidate was exaggerated in the form of anxiety response related to learning activities, solving, and discussing math problems. If this anxiety continues, it can impact the declining performance in teaching. As a result, the learning process is not optimal. Such conditions are contradictory to the practical demands of elementary school teachers in schools. One of alternative treatments to reduce the anxiety is by using neuro-linguistic programming. The purpose of this research is to overcome mathematic anxiety of prospective elementary school teachers by using neuro-linguistic programming. This study uses Single Subject Research (SRS) desain A-B-A-B desain for eight respondents. Instruments used Mini Mathematic Anxiety Scale (MMAS) and observation. The results of the study found that after measuring the baseline conditions the level of mathematic anxiety respondents had decreased with an average score of 5.25. Based on the research findings, neuro-linguistic treatment programming can reduce of anxiety level of respondents.

1. Introduction

A teacher is an educator who plays an important role in transforming some knowledge to learners. The process of knowledge transformation takes place in the learning process and requires mastery of some competencies. The competencies that must be mastered by teachers are pedagogical, personality, social and professional competences. One of the competencies that must be owned by educational practitioners who work as elementary school teachers is the math. Ideally, teachers who teach mathematics should have four competencies so that they are confidence to teach math subjects. This is important because it is based on Government Regulation No. 19 of 2017 which states that teachers have the main task of educating, teaching, guiding, directing, training, evaluating and evaluating students in accordance with their education [1]. If the teacher who experiences mathematic anxiety will potentially affect the teacher's performance in carrying out the main task.

Mathematic anxiety experienced by primary school teachers who researchers find is in prospective primary school teachers, especially those who are studying elementary school teachers in college. Furthermore, based on the results of the study found that elementary school teachers have to dislike and fear of mathematics learning [2]. Further research findings also explain that students of



elementary school teacher education in college experience mathematical anxiety having their own differences when viewed from age, gender and level of education and refute the myth about mathematics [3]. However, the phenomenon that occurred in the field that the mathematic anxiety experienced by prospective elementary school teachers so that the learning process is not optimal [4]. This condition is certainly worth nothing because it is related to the preparation of prospective teachers, especially elementary school teachers [5].

Mathematic anxiety experienced by teachers is also caused by a traumatic experience during the teaching practice so that anxiety and fear of mathematics subjects [6, 7]. Furthermore, the phenomenon in the field of prospective elementary teacher was found to have mathematical anxiety characterized by a feeling of tension, anxiety, helplessness and nervousness when solving math problems [8, 9]. Other findings also explain that cognitive factors and pedagogical factors are related to mathematic anxiety of faced by elementary school teacher candidates who teach mathematics. It is thus related to the knowledge with the teacher's teaching skills [10]. According to research results of Baloglu & Kocak mathematic anxiety experienced by teachers, especially elementary school teachers [11, 12]. If mathematic anxiety in this teacher is not immediately addressed, then potentially will be contagious to the teacher's students [13, 14]. This finding is supported by Gresham's research that this mathematic anxiety can negatively affect student performance and mathematics achievement [15]. Frequently, there is a tendency when an individual (prospective teacher or student) has mental health disorders such as mathematic anxiety, ADHD [16], stress and other symptoms have an impact on achievement and performance. So the mathematic anxiety becomes a scary thing for both the teacher and the students.

The gender-mathematical anxiety is supported by Stoehr's research in the United States found that 90% of female elementary school teachers have a higher mathematical anxiety than male teachers [17]. Prospective math teachers interpret mathematic anxiety as a specific fear (loss of self-confidence, competence, and even identity) associated with solving math problems [4]. Furthermore, the indication of mathematic anxiety is also triggered by more dislikes of mathematics [18]. In addition, mathematic anxiety also has a relationship with the individual's mathematical beliefs [19]. Changes in views related to mathematic anxiety experienced by elementary school teachers are very important to do [20]. Mathematic anxiety is also influenced by the teacher's learning style [21]. In addition, the current math teacher preparation system does not help in reducing mathematic anxiety [22].

The handling of anxiety to mathematics is only done through a program to establish teacher competence such as preparatory program preparation of teacher candidates, especially mathematics teachers [15]. However, his findings that the program is only able to support the level of competence of prospective teachers and not reduce the level of anxiety to mathematics [15]. Another thing done in order to reduce the anxiety of prospective teachers to mathematics is through the use of expanded micro teaching that is experimented with teachers [23]. The findings show that the use of expanded micro teaching is extended to the teaching of internship courses and has not been able to maximally reduce the anxiety level of teaching mathematics prospective teacher. This phenomenon is necessary to get the handling for mathematics anxiety experienced by primary school teacher candidates. Based on the explanation above it can be seen that mathematic anxiety raises several problems for prospective elementary school teachers. Should primary school teacher candidates do not experience mathematical anxiety because as elementary school teachers will be responsible for teaching, one of them is mathematics subject. This student mathematic anxiety problem needs to be overcome so that the teacher's performance in teaching can run optimally. One treatment that the researchers used in this case is neuro-linguistic programming (NLP). This treatment is an effort to handle mathematic anxiety through NLP treatment in order to reduce the anxiety level of prospective elementary school teacher.

2. Method

This research uses a single subject research (SSR) method [24, 25]. The subjects from this study amounted to eight respondents. Research design used A-B-A-B (Baseline (A1)-Intervention (B1)-Baseline (A2)-Intervention (B2)) [26, 27], with eight prospective elementary teachers (eight

respondents). The A-B-A-B design is a repetition of the design of the A-B. In the A-B-A-B design. The first step is to collect the target behavior data at the first baseline condition (A1). After the data stabilizes under baseline conditions, intervention (A1) is given. Data collection in intervention conditions is carried out continuously until the data reaches a clear trend and level. After that each condition is the baseline (A1), and intervention (B1) is repeated on the same subject. At this juncture, the first step was to collect data target behavior in the first baseline condition (A1) data collection, used the Mini Mathematic Anxiety Scale (MMAS) adaptation from DASS and observation sheet [28-35]. MMAS used five category: normal (0-4); low (5-6); medium (7-8); high (9-10) dan very high (11-21). After the data stabilized at the baseline condition, intervention (B1) was given. The collection under intervention conditions was carried out until the data reached a clear trend and level, then each condition baseline (A1) was repeated on the same subject. The data got analyzed used the statistical test of nonparametric, Wilcoxon signed-rank test and visual data analysis. The research data set can be accessed in Open Science Framework on the following page in <https://osf.io/7rjkb/>[36].

3. Results and Discussion

The description of research results can be explained as in the following table:

Table 1. Description of interventions in the design of A-B-A-B.

Subject	Baseline 1	Baseline 2	Baseline 3	Baseline 4
1	10	7	5	4
2	12	8	6	4
3	15	11	10	8
4	11	8	6	5
5	9	6	3	3
6	11	8	6	5
7	14	10	9	7
8	13	9	7	6

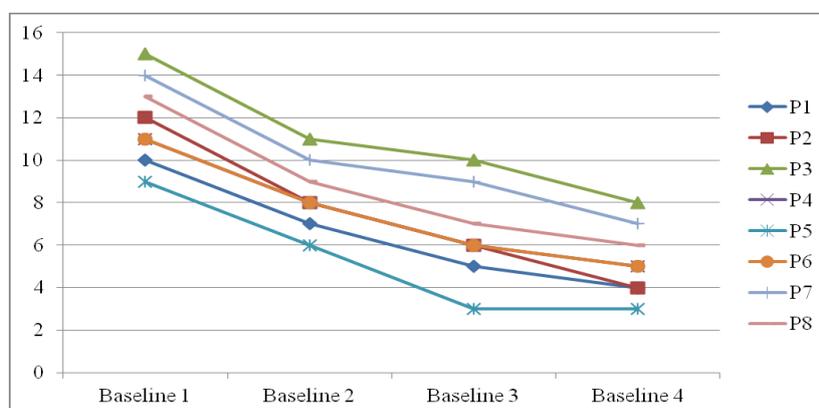


Figure 1. Graph of decreased levels of mathematic anxiety subjects.

Based on findings analysis results using single-subject research design A-B-A-B as in table 1 and figure 1. Measurement of the anxiety level was performed four times at the baseline phase (A1), then four times in the intervention phase (B) and four times in the next baseline phase (A2). At first target behavior (respondents) measured on condition baseline (A1), then conducted measurements on the condition's intervention (B1), after which it is repeated back measurement on condition baseline (A2) and intervention (B2) on that subject same. The estimation of the tendency of direction indicates at the phase of the baseline (A1) steady trend direction, i.e. the median value of 11.5 at the beginning of the observation until the end of the baseline observation (A1) and in the intervening phase (B) decreases. As for the median value of 8 down to 6 as well as in the baseline phase (A2) the trend showed a steady

decline to the median number 5. The anxiety level at the end of the baseline was 9, then 6 at the beginning of the intervention and gradually decreased to 3 second baseline (A2). After the second intervention (B2), the level of anxiety of respondents is at number 3. This indicates that the more intervention is given, the lower the target behavior. Therefore, treatment can be said to effectively lower the level of anxiety of respondents (prospective elementary school teachers).

When the researcher calculated the baseline condition (A1) in the last session of measurement (11.5) and the first session at the intervention condition (B), (8) then got the difference between the baseline's data points, the result of data treatment is 2.5. It means that the change decreases target behaviour shows an improved meaning (+) or effective treatment to reduce the level of anxiety of the respondent. The results of graphical analysis in groups can be concluded that NLP is effective to reduce the mathematic anxiety level of prospective elementary teachers.

Besides observation, the researchers also conducted data collection using a scale measurement model MMAS (Mini Mathematic Anxiety Scale). MMAS model measurement scale is given back to the respondents to measure the level of mathematic anxiety of the respondents after receiving treatment with NLP. The results of the MMAS model scale measurement also showed significant results of the observation process. Eight respondents are in a very high and high anxiety category based on the results of the MMAS model scale measurement scale before getting treatment with NLP. But, after receiving treatment with NLP eight respondents shows decreased levels of anxiety in the category of medium, low and normal. The test results in different levels of respondents anxiety through the pretest and posttest scale measurement model MMAS also showed supportive results to the results of the earlier analysis. As seen in the following table:

Table 2. The results of the Wilcoxon signed-ranks test

		Ranks		
		N	Mean Rank	Sum of Ranks
Pre Test - Post Test	Negative Ranks	0 ^a	,00	,00
	Positive Ranks	8 ^b	4,50	36,00
	Ties	0 ^c		
	Total	8		
a. Pre Test < Post Test				
b. Pre Test > Post Test				
c. Pre Test = Post Test				
Test Statistics ^a				
				Pre Test - Post Test
Z				-2,565 ^b
Asymp. Sig. (2-tailed)				,010
a. Wilcoxon Signed Ranks Test				
b. Based on negative ranks.				

The researchers also do a statistical test of nonparametric analysis used Wilcoxon signed-rank test, where the result of pre-test and post-test is negative rank 8b where Pre Test > Post Test with mean rank 4.5 and Sum of Ranks 36.00 means that occurrence decreased the anxiety level of eight respondents using NLP treatment. Based on Wilcoxon Signed-Rank Test results, obtained Z value of -2.565^b with p values (Asymp Sig 2 tailed) of 0.010 were less than the critical limit of the study 0.05 so that the decision that a difference meaningful between pre-test and post-test groups. With indication b that means based on negative ranks, which means that there are a pre-test and post-test from very high level to fewer anxiety level's category. Based on statistical test results with Wilcoxon Signed Ranks Test got data comparison between data scale of the measurement model MMAS after and before

treatment with NLP with total eight cases, all are negative. It means that the level of anxiety of the respondents after receiving treatment with NLP is smaller than before getting treatment using NLP. It shows the level of respondents anxiety after treatment intervention with NLP decreased.

However, based on observation and data analysis results can be explained and interpreted that treatment using NLP effective in reducing the level of mathematic anxiety prospective elementary school teachers. Because NLP can be linked and can affect the body and behavior [37]. Individuals through the programming of thoughts and feelings[38]. NLP comes from three words namely neuro, linguistic and programming [38]. NLP is a system of alternative therapy [39, 40] intended to educate people in self-awareness and effective communication, and to model and change their patterns of mental and emotional behavior. Furthermore, some researchers explain that the use of NLP can reduce anxiety levels [41-43]. NLP has also been used to reduce some mental-health problems [44-46].

NLP in this treatment is used to reduce mathematic anxiety of primary school teacher candidates specifically aimed at directing client feeling [47]. It attempts to program the body and behavior using the SMART and 5W+1H methods [48]. In addition, in building communication in NLP treatment required rapport [49]. The therapist in this case tries to build the convenience of communication with the client [44]. The existence of a good rapport between the therapist with the respondent (client) is also a supporting factor in implementing sensor acuity so that clients can provide the maximum response. Furthermore, the desired behavioral changes can be achieved, in particular, the decreased mathematic anxiety. In addition, the effectiveness of NLP is also due to the language used in accordance with current conditions of development [50-52]. In the current digital era, the use of a traditional approach is considered less effective. Unlike NLP, which prioritizes sensory utilization and optimization, the more sensory it becomes, the easier it is to perform the reduction process. NLP is very effective and highly recommended for teachers, counselors and social worker to use.

4. Conclusion

The elementary school teacher in the transformation of science teaches all the subjects, one of the subjects is mathematics. However, the phenomenon that occurs in the field is currently found prospective elementary teachers have a high mathematics anxiety. If such things continue, it affects the quality of the learning process in schools. In the framework of efforts to eradicate it, the authors use neuro-linguistic programming (NLP) to reduce the level of mathematics anxiety prospective elementary school teachers. The results show that NLP is effectively used to decrease the level of anxiety of respondents. So this treatment can be recommended to help prospective elementary school teachers who experience mathematics anxiety.

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