

## **Play Therapy using Color Paper to Reduce Mathematic Anxiety on Children's**

**Prima Nadia Safitri, Marjohan, Alwen Bentri**

Universitas Negeri Padang, Indonesia

e-mail: nadiaprimasafitri@gmail.com

**Abstract:** This study aims to determine the application of Play Therapy using colored paper to reduce mathematical anxiety in children. The research method used is Single Subject Research with an A-B-A design. The subjects of this study were third-grade children of SDN 211 / IX Mendalo Darat. Determination of the subject of this study using purposive sampling technique with the criteria for children's mathematic anxiety conditions are in the very high category. The data collection instrument for this research is the mathematic anxiety scale, interview, and observation. The data analysis technique used is the visual analysis of data and graphics. The findings of this study indicate that Play Therapy using colored paper is effective in reducing children's mathematical anxiety in AA subjects, as the impact of counseling changes in the baseline phase increases during the intervention and stabilizes in the follow-up phase. It is suggested that school counselors apply Play Therapy in developing effective daily life (KES) and eliminating daily effective life (KES-T) which aims to form an independent person.

**Keywords:** Play Therapy; color paper; mathematic anxiety

### **INTRODUCTION**

Mathematics is one of the important subjects in elementary school and is not free from its complexity and the factors that influence it (Dico et al., 2023; HN et al., 2023). In general, student achievement in learning mathematics often becomes a reference for whether students need additional attention or vice versa (Ardi et al., 2019; Daharnis et al., 2018; Suranata et al., 2018). Students' learning difficulties are influenced by various factors, both internal and external factors. For example, the psychological condition of students is an important factor that is sometimes not paid attention to in the process of analyzing learning difficulties. These factors include students' math anxiety, math self-efficacy, and belief values (Daharnis et al., 2018; Suranata et al., 2018; Bentri, 2017).

There is a risk that can arise if this math anxiety is not resolved, namely that the material provided in the class is not in accordance with the basic competencies of students, first, the material is not impressive or very easy, simple and not advanced (Stylianides & Stylianides, 2007). So that it causes students to be bored and passive to learn. Second, the material presented is very high related to the basic competencies of students so that it involves difficulty understanding them. If it continues like that, students will meet failure. In fact, both conditions hinder learning and can contribute to failure among students. Thus, math anxiety needs to be alleviated to all students who experience it (Chaiklin, 2003; Sonia et al., 2020; Daharnis et al., 2018; Nirwana, 2012).

Based on the results of a survey program for international student assessment (PISA) of 15-year-olds in 2015, Indonesian students are ranked 63rd out of 72 countries (Kompas.com, 2018). This achievement is far behind other countries in Southeast Asia. With Vietnam, for example, the country with a star symbol turns out to be in 12th place, while Singapore is in the first place. Furthermore, it was found that data obtained through Past Research, Promising Interventions Program for International Students Assessment (PISA, 2015) explained that 59% of students reported experiencing worries about difficult exams, 66% of students worried about bad grades, and around 55% of students were eager for exams. if properly prepared by professional educators. It depends on educators so that students are ready to accept mathematics learning properly.

The importance of mathematics education needs to be applied to children from an early age, as stated by (Novikasari, 2018), namely; Basically, Mathematics helps children interpret the world outside of school and helps them master a strong foundation for success in school. Therefore mathematics can be integrated into programs in early childhood education. Applications of mathematical content such as numbers and their operations, algebra, geometry, measurement, and data analysis should be adapted to the cognitive development of children. Informal games and story problems can be introduced and modified to give children a chance to learn math.

Seeing the condition of the phenomenon above, the function of education to prepare generations who are responsible for their duties in the future seems difficult to be realized. It is necessary to seek assistance to train the younger generation to form a new skill so that students can alleviate their learning problems. The involvement of teachers and school counselors plays an important role in providing assistance in effective and efficient guidance and counseling services for students with low numeracy skills, one of which is group counseling services using Play Therapy techniques (Setiono et al., 2019).

Play Therapy is a therapeutic activity that uses a creative process and is a form of expressive therapy to help the client/counselee in alleviating the problems/obstacles they are experiencing. This creative process can use many approaches and interventions, including drawing, making objects, singing, playing music, dancing, playing plays, and composing poetry. Through Play Therapy, the counselee engages in the manipulation of physical material and thinks about problems, and resolves them in new ways. In practice, representing conflict or feelings in pencil drawings, collages, or clay sculptures allows the counselee to see the counselee's problem from all sides (Gladding & Newsome, 2003; Stockton, 2010).

Malchiodi et al., (Malchiodi, 2013) stated that simple art activities such as drawing are very fun, appear to be effective because the sensory capacity makes the image deeper to remember real memories and positive details. (Collie, Backos, Malchiodi, & Spiegel, 2006) states that sketches, pictures, and paintings can be used in the Play Therapy process to help students think creatively.

Based on the overall background study that has been described, researchers assume an Play Therapy approach using colored paper to reduce mathematical anxiety in children is effectively used in school settings. This is also one reason researchers are intrigued to test the effectiveness of using an Play Therapy approach using colored paper to reduce mathematical anxiety in children. This research aims to reveal Play Therapy using colored paper to reduce mathematical anxiety in children.

## **METHOD**

The research design used a single subject (single subject research). Tawney & Gas (Sunanto, J. & Takeuchi, K., & Nakata, 2005) states that single-subject research (SSR) is experimental research conducted to find out how much influence a treatment is given to subjects repeatedly within a certain time. This study is research in the field of behavior modification (behavior modification). The principle of behavior modification must be understood in order to determine target behavior such as thoughts, feelings, or actions that can be recorded and measured.

The design chosen in this study is A-B-A; Baseline (A) intervention (B), follow-up (A'). A is the embodiment of the baseline phase conditions, B represents the conditions of the intervention or treatment phase, and A' is the follow-up phase or the control phase after the treatment is given. In the baseline and follow-up phases, at least three observation sessions are carried out, this is done to see trends in data conditions (Barlow, D. H., & Hersen, 1976; Sunanto, J. & Takeuchi, K., & Nakata, 2005).

The technique of taking the subject used in this study is a non-random sampling technique, namely the purposive sampling method. (Sugiyono, 2014) says "The sampling technique is not random, with certain considerations". Purposive sampling is the selection of a group of subjects based on certain characteristics which are considered to have a close relationship with previously known population characteristics.

There are two kinds of data collection instruments in SSR research used in this research, namely (1) automatic data recording, (2) data recording by direct observation (Barlow, D. H., & Hersen, 1976; Sunanto, J. & Takeuchi, K., & Nakata, 2005).

In this study, the data analysis technique used in this study was visual data analysis. Visual analysis in this study is to see the changes that occur in students as seen by changing the conditions shown by students by systematically observing the changes experienced by students. Also, the visual analysis contained in the single-subject design focuses on the clinical significance of changes in an individual's behavior rather than the statistical significance in the group (Alberto & Troutman, 2009). This study did not use statistical analysis because it looked at the stability of the subject's condition for each phase, this study did not intend to investigate new areas of research, there was no variability, and this study was very concerned about the slightest change in the subject (Barlow & Hersen, 1976).

Visual graphic analysis in this study is divided into two, namely analysis in conditions and analysis between conditions. The composition of the analysis in conditions is the length of the condition, the estimation of the direction of the trend, the stability tendency, the data-trace, the level of stability and range, and the level of change, while the analysis between conditions includes the number of variables changed, changes in trend and their effects, changes in stability, level changes overlapping data. Single-subject design research does not need to be analyzed using statistical analysis (Barlow & Hersen, 1976; Sunanto, Takeuchi, & Nakata, 2005).

## RESULT

The level of students' mathematic anxiety, which will be classified into five (5) categories, namely students with very high ( $\geq 156$ ), high (96-125), medium (96-125), low (66-95), very low mathematic anxiety ( $\leq 65$ ). Students who are targeted for intervention are students who have a high and very high level of mathematical anxiety. This scale is only filled once and the scale is not replenished by students after the intervention is given, this is done to avoid being bored of the research subject in filling out the same instrument. The criteria for students who were targeted for the intervention saw the results of the scale distribution, namely the level of mathematic anxiety being in the very high category.

**Table 1. Subject Condition**

Code	Score	Category
AA	159	Very high

The effectiveness of this technique is carried out into three phases, namely: the baseline phase (A) which consists of three measurement sessions, the intervention phase (B) which consists of five measurement sessions and at this stage students are given Play Therapy and the follow-up phase (A') which consists of three measurement sessions.

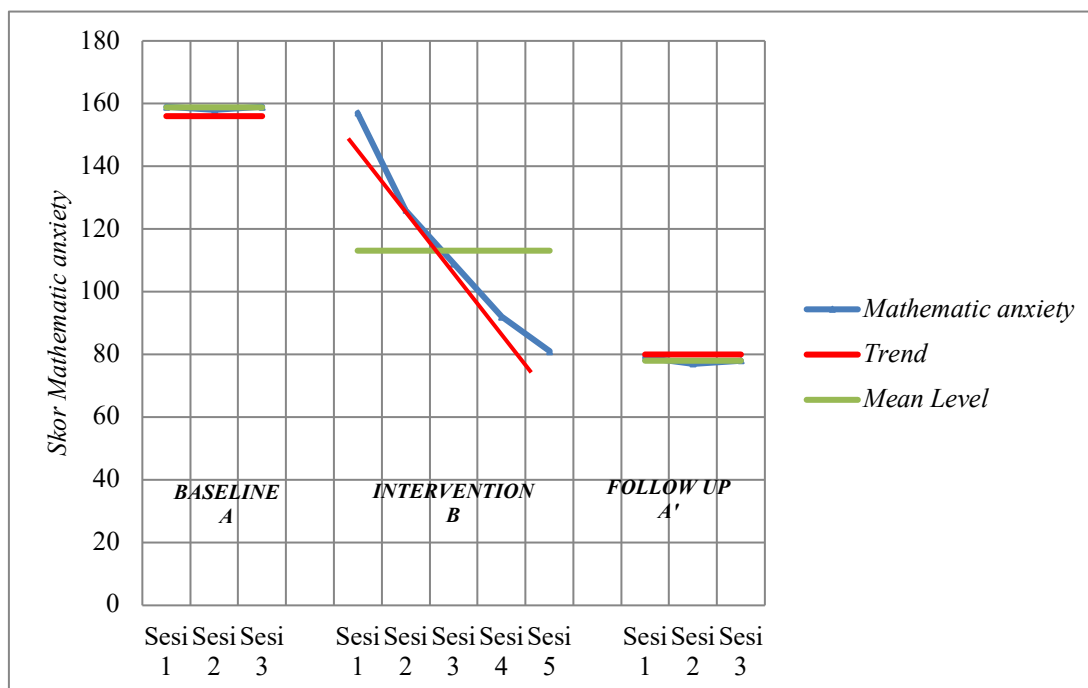
**Table 2. Phase, Time, Date**

Phase	Time	Date
Baseline 1	01.00-02.00 Pm	10 Dec 2020
Baseline 2	01.00-02.00 Pm	11 Dec 2020
Baseline 3	01.00-02.00 Pm	14 Dec 2020
Intervention 1	01.00-02.00 Pm	15 Dec 2020
Intervention 2	01.00-02.00 Pm	16 Dec 2020
Intervention 3	01.00-02.00 Pm	17 Dec 2020
Intervention 4	01.00-02.00 Pm	18 Dec 2020
Intervention 5	01.00-02.00 Pm	21 Dec 2020
Follow-Up 1	01.00-02.00 Pm	22 Dec 2020
Follow-Up 2	01.00-02.00 Pm	23 Dec 2020
Follow-Up 3	01.00-02.00 Pm	24 Dec 2020

**Table 3. Score Mathematic Anxiety on Baseline, Intervention and Follow-Up Phases**

Subject	Baseline A			Intervention B					Follow Up A'		
	Sessio n 1	Sessio n 2	Sessio n 3	Sessio n 1	Sessio n 2	Sessio n 3	Sessio n 4	Sessio n 5	Sessio n 1	Sessio n 2	Sessio n 3
AA	159	158	159	157	126	109	92	81	79	77	76

The measurement results in each session will then be analyzed the data using the visual graph analysis method. The following is a visual graph of the research.



**Figure 1. Frequency of AA Mathematic Anxiety Baseline, Intervention and Follow-Up Phases**

Based on the results of the baseline 1, 2, 3, it was found that AA scored 159, 158, 159 consecutively with very high criteria. While the score for the stability range at the baseline was 23.9, the mean level was 158.7, the upper limit was 182.6 and the lower limit was 134.8. Meanwhile, the trend of stability was in the stable category, namely 100%. The results of the interview with the teacher revealed that AA was a quiet student in class, AA also rarely even never gave an opinion during the discussion, AA's friends often complained if one

group was with AA. Based on the interview with AA, it was revealed that AA did not have an interest in learning mathematics, it appears that when learning mathematics is always anxious, nervous, and worried in facing math problems given by the teacher. Therefore AA is lazy to study, so AA goes to school without a sincere intention from within.

Furthermore, interventions 1, 2, 3, 4, 5, Play Therapy were carried out and obtained successive scores, namely 157, 126, 109, 92, 81, with an intervention stability range of 23.6, mean level 113, upper limit 136.6, lower limit. 89.4, with a trend toward 80% stability. Based on these data, it can be concluded that students' mathematical anxiety has decreased in the Play Therapy intervention phase by  $157 - 81 = 76$ . Also, after the intervention, an interview was conducted with AA and obtained the results that AA would be more enthusiastic in learning because learning with songs and colors was very fun. AA said that the anxiety he experienced was because AA did not understand the concept of numbers, units, tens, or hundreds. AA's enthusiasm for learning will be further enhanced because AA realizes that mathematics is very important in learning for his future.

After the intervention is complete, a follow-up is given to see the post-intervention AA condition. The follow-up scores were 79, 77, 78, with a stability range of 11.9, mean level 78, upper limit 89.9, lower limit 66.1, respectively. In this follow-up phase, the AA stability was seen with the acquisition of a stability trend score of 100%. It can be concluded that there is no change in the condition of AA after the intervention and remains in the high criteria.

## **DISCUSSION**

The findings at the baseline stage (A) did not differ significantly in scores even though there was a difference between the mean scores between the sessions. This is independent of the validity that influences the subject in the study. This description is supported by (Egger et al., 2015; Hepner, P.P., Wampold, B.E., & Kivlinghan, 2008) that validity is likely to have an influence on the condition of this research subject, including internal validity and external validity which are assumed to affect the subject of this study. namely: history, past events experienced by the subject, Cambell & Stanley (Ross & Morrison, 2014), maturity, changes both biologically and non-biologically that can affect the subject (Kazdin, 2003), procedures for the occurrence of boredom that affect test results (Rosnow, R. L & Rosenthal, 2005).

The intervention phase (B) shows a decrease in students' mathematical anxiety before and after giving Play Therapy treatment. Based on the results of the study, it was shown that there was a change in students' mathematical anxiety in the subject in the baseline (A) phase and follow-up (A') Play Therapy intervention. Supporting the description of research results (Adriani & Satiadarma, 2011) states that through intervention between the researcher and the client, there will be a warm therapeutic relationship between the researcher and the subject. So that images become important in improving verbal communication between individuals and therapists in achieving understanding, conflict resolution, solving problems, formulating new perceptions which ultimately lead to positive change, growth, and healing (Case & Dalley, 2014).

## **CONCLUSION**

Based on the analysis of conditions and analysis between conditions, as well as visual graphic vision, the conclusion is that Play Therapy is effective in reducing students' mathematical anxiety. This is based on the criteria for saying the effectiveness of Play Therapy to reduce students' mathematical anxiety, which is marked by a decrease in scores from high to low results from the accumulated results of observations and interviews, overlapping data between the baseline phase and the follow-up phase by 0%, and the

occurrence of a positive trend line. A positive trend can be seen from the traces of data obtained in the intervention phase, which shows a gradual decrease in students' mathematic anxiety score levels. from the first session of intervention to the last session of intervention. The tendency for stability and its effects were stable in the intervention phase. With the occurrence of a positive trend, it is predicted that students will continue to gradually decrease mathematic anxiety.

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