



# Preschooler Fine Motor Binder Innovation As a Pre-Writing Stimulation Tool for Autism Spectrum Disorder Children

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**Abstract.** Autism Spectrum Disorder is a developmental disorder that has symptoms such as delayed communication and social interaction. Writing skills in children with Autism today are often delayed. This is due to a tactile impairment that can interfere with their soft skill coordination. To prepare for writing skills, pre-writing skills training is needed. The Innovation of a Fine Motor Binder for Preschool Children is one of the stimulation tools to improve pre-writing skills in children with Autism. This innovative product is a binder that consists of several activities to stimulate soft skills and improve visual motor integration and hand skills. Case Study on a 5-year-old Autistic Child who routinely undergoes occupational therapy at Hermina Hospital Depok has not been able to write independently, to Stimulate Pre-Writing Skills with the Applied Behaviour Analysis Method, for 48 meetings using the Preschool Age Children's Fine Motor Binder. After the therapy, the results showed an improvement in fine motor skills in pre-writing skills. This case study is an original scientific form that can be an interesting alternative for children with autism to improve their education.

**Keywords:** Preschooler Fine Motor Binder, Pre-Writing Skills, Autism Spectrum Disorder.

## 1 Introduction

Children with special needs have several problems including: physical, learning, and behavioral disorders such as Autism Spectrum Disorder (ASD) [1]. Autism Spectrum Disorder (ASD) is a group of syndromes due to disorders of the nervous system that create immaturity in children's developmental processes such as language, and behavior, and result in unusual repetitive behavior. Children with ASD are usually characterized by impairments in sensory modulation [2]. The incidence of ASD is increasing every year. Based on Research by the Centers for Disease Control and Prevention (CDC) in the United States reported that in 2008 there was an increase in ASD cases of 60 per 10,000 births or about 1 in 150 residents. comparison of ASD children with normal children in 2013 namely 1: 88 [3]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), ASD is part of pervasive developmental prob

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characterized by more frequent anger, tantrums, aggression, repetitive movements, and inability to coordinate their eyes and hands [4]. Proper parenting from parents can affect children's motoric development [5]. Learning in ASD children can be done with play stimulation. In the management, occupational therapy that can be done to overcome the difficulties of children with autism in early writing activities (pre-writing) is to design a learning media called Preschoolers Fine Motor Binder. This media is designed by using several types of games that are able to stimulate the sensorimotor function in children, such as: folding fingers, grasping, sticking or removing, and pulling or pushing until the child is able to position his fingers to hold the writing utensil. As for the application of the therapy program to An, the author uses the Sensory Integration and Applied Behavior Analysis (ABA) terms of reference. The selection of sensory integration aims to optimize the main sensory needs of tactile in the child's hand area so that it is expected to be able to provide sensory experiences that can help children deal with their fear of the texture of certain objects that touch their hand area. In addition, the use of the ABA framework is intended to modify children's behavior to minimize to eliminate unwanted behavior by bringing up expected behavior through the provision of rewards and consequences. In the implementation of ABA principles, children are trained to be obedient, this is because the therapy program has been modified from play activities and implemented consistently. ABA techniques have distinctive characteristics that are directed and organized, making them easier to control and develop. Based on the Journal of Clinical Child and Adolescent Psychology reported the provision of early intervention in the form of behavior therapy to children with Autism Spectrum Disorder showed better effectiveness. This encouraged the author to provide occupational therapist intervention in a program to improve writing skills through Preschooler's Fine Motor Binder media using the Applied Behavior Analysis framework.

## 2 Participant and Method

### 2.1 Patient Information

This study was approved by the ethics committee of our hospital. A 5-year-old girl with a diagnosis of Autism Spectrum Disorder (ASD) is routinely undergoing occupational therapy at Hermina Hospital Depok. The child came with not yet able to communicate verbally in two directions, still babbling (babbling), not yet able to establish friendships with others, has a sensitivity to the hand area (tactile defensiveness), not yet able to hold a pencil with a tripod grip pattern, still likes to be distracted and run without a clear purpose, has a short attention span. Based on the pre-intervention sensory profile examination, shows the child falls into the "More than Others" category in the seeking, visual, and oral components. For the sensitivity component the child into the category of "Much more than others" and for the auditory component the child falls into the category "Just like the majority of others"

**Product Dimensions of Innovation.** 14 types of stimulation activities to improve pre-writing skills organized into a series in one book, adjusted to the stage of handgrip development until the child can position their fingers into a tripod grip, and the child

can write comfortably. The time required is 48 meetings. The selected programs are LTG 1 and LTG 2. LTG 1: An can sit quietly while playing Early Childhood Fine Motor activity media independently in 44 meetings. LTG 2: An can thicken vertical, horizontal, right oblique, left oblique, up and down lines, squares, small U and big U letters and numbers 0-10 independently within 48 meetings. The 14 types of stimulation activities consist of Sticking stickers according to the picture pattern, arranging pom-poms, weaving pictures, playing number shapes with play dough, arranging buttons to form number patterns, stringing beads and straws, painting dots according to the picture pattern using jumbo markers (Dot stamp markers), sewing, plaiting with straws, number and shape pin punching, painting dots according to the picture pattern using cotton buds (Dab a dot shapes and numbers Q-tip painting), tracing line, tracing numbers, imitate numbers. In making the product design, the author uses a binder with the brand "Bambi Insert Binder 2134M" A4 size, on the inside equipped with three rings shaped like the letter "D" and has a hard cover material. In making this innovative product for Preschool Children's Fine Motor Binder, the author uses 50 pocket file sheets to store worksheets from the 14 stimulation activity game media used, with each activity given one plastic clip with a cactus and pony pattern with a size of 21.2 cm x 17.1 cm to store the supporting elements of each stimulation activity, such as markers, buttons, stickers, and other materials. The supporting elements of each stimulation activity, such as markers, buttons, stickers, playdough, and so on are attached to each sheet of the back of the pocket file.

In the manufacture of innovation products, the author summarizes all the tools materials used: Bambi Insert Binder 2134M, Pocket file sheet, Plastic clips, Scissors, Cater, Glue Gun, Flannel Fabric, Colorful Corn, Creative Foam, Worksheet, stickers, clear insulation, pom-poms, origami paper, playdough, toy knife, colorful buttons, adhesive stickers, paper plates, paper straws, fox glue, string, eyes, beads, 850 ml jumbo markers, a paper punch, shoelace, woolen thread, paper straw, plastic needle, shape & number cards, sponge, toothpicks, cotton buds, acrylic paint, brush pen. The process of making an innovative product "Preschoolers Fine Motor Binder" consists of 20 stages of work, where stages 1-6 explain the procedure for making the cover of the binder cover, and stages 7-20 explain the procedure for making and arranging the contents of the binder which are components of 14 stimulation activities. The procedure for using media activities is as follows: pasting stickers, putting together pom-poms, picture weaving, playing with number shapes play dough, arranging buttons to form number patterns, stringing beads and straws, dot stamp markers, sewing, sewing with straws, number and shape pin punching, paint dots according to the pattern picture using cotton buds, tracing line, tracing number, number imitation.



simulator on the revised activity worksheet tracing line activity worksheet. From the simulation results with two different actors obtained a fact that shows if normal children aged 3 years and 10 months are already able to thicken the lines with perpendicular patterns and still have difficulty in the curved lines, and the child is also not yet able to position the grip into the tripod grip pattern but is still unable to position the grip into the tripod grip pattern. into the tripod grip pattern but still digital pronate grasp. Meanwhile, on the implementation of STG 5, the results obtained if children with autism aged  $\pm$  5 years old have been able to thicken and imitate the shape of the numbers 0-10 with the grip already able to tripod grip. The product can be effective in motivating children to play games that involve their fine motor skills. Most of the games provided in the Preschoolers Fine Motor Binder were found to maintain the child's attention span during play, improve eye-hand coordination skills, and develop hands-on work skills needed for pre-writing activities. The Applied Behavior Analysis (ABA) frame of reference has an effect on the success of An's therapy program in preparing for pre-writing skills, ranging from thickening line patterns to imitating numbers 0-10.



**Fig. 2.** STG 5, the Child can position the tripod grip

## 4 Discussion

In the case of An, the author chose a long-term Goal (LTG) based on the priority of the problem that became the client's occupational problem. The first LTG aims to improve children's hands-on work skills while playing with the innovative product Preschoolers Fine Motor Binder which is targeted to be achieved by An. after 44 meetings with 3 Short Goals, each of which consists of three to four supporting activities. Meanwhile, the second LTG aims to develop children's pre-writing skills, which are targeted to be achieved by a child after 48 meetings with 5 Short Goals, each consisting of one to two supporting activities. The frames of reference used as guidelines in providing this therapy program are Sensory Integration and Applied Behavior Analysis (ABA). The selection of the two frames of reference is based on the limitations possessed by An. The

principle of the SI frame of reference is the main foundation that can optimize simple skills which are sensory stages to complex abilities, namely academic skills. Where based on The results of the Occupational Performance Component analysis on the child show that the child has several problems in tactile, proprioceptive, visual, and auditory sensory. Therefore, the use of SI in this case aims to improve the child's response to stimulus to several activities given in the therapy program. The effectiveness of the application of the SI method in Autism Spectrum Disorder cases can be seen in a study entitled "Sensory Integration Therapy for Autism Spectrum Disorders: A Systematic Review" which reported that out of 72 occupational therapists who worked with children with autism, there were of 72 occupational therapists working with children with autism, it was found that 99% implemented sensory integration regularly, Similarly, out of 292 occupational therapists it was found that the use of sensory integration was the most frequently used to treat children with ASD. Applied Behavior Analysis (ABA) was also chosen in the provision of the therapy program because the ABA method aims to design the formation of desired behaviors and eliminate unwanted (maladaptive) behaviors slowly. So that children are able to carry out each stage of stimulation activities contained in innovative products independently.<sup>7</sup> In the application of this method, the author uses the Discrete Trial Training (DTT) technique where the author divides the pre-writing skills target from the provision of sensorimotor stimulation activities such as sticking stickers, arranging pom-poms, weaving pictures, playing playdough, arranging buttons, stringing beads, painting, to sewing, each part is taught one by one until finally the child is able to independently do the activity of thickening simple line patterns to complex line patterns. The author also provides prompts (assistance) so that children are not confused when undergoing instructions, but assistance will slowly be reduced and eventually eliminated. This learning strategy is applied to teach the child each step intensively until the child can master it.

The innovative product Preschoolers Fine Motor Binder is a collection of fine motor games combined into a set in a binder. A study from the American Journal of Occupational Therapists entitled "Fine Motor Activities in Elementary School Children" revealed that the average kindergarten, second-grade, and fourth-grade elementary school student spends between 37.1% - 60.1% of their time on fine motor activities, with handwriting accounting for 3.4% - 18.0% of their time. The arrangement of stimulation games contained in this innovative product emphasizes more on improving fine motor skills, where the study also reports that optimizing fine motor skills at an early age will affect children's independence such as unzipping a backpack to remove toys, wearing and unbuttoning clothes, opening a food container or toy box, holding cutlery and then feeding it into the mouth, taking small pieces of food, putting coins in a piggy bank, tearing tissue and piggy banks, tearing tissue and wiping it in the toilet, pulling pants, making crafts, and removing or installing marker caps. Therefore, if analyzed more deeply, this innovative product actually also has many benefits that will affect the child's ability to achieve independence to carry out daily activities that involve fine motor skills and visual motor integration in pre-writing activities. Preschoolers Fine Motor Binder Innovation Products have considerations in the safety factors for its users, especially for children who use every game media provided This innovative product is

also designed to be able to improve the skills following skills tactile sensory, proprioceptive in the hand area, Laterality, Crossing the midline, Sequencing, Categorization, Memory, Attention span, Self-concept and self-control, Hand skills, Muscle strength and endurance in the hand area.

## 5 Conclusion

The innovative product Preschoolers Fine Motor Binder is able to effectively help children with pre-school age diagnosed with Autism Spectrum Disorder in preparing pre-writing activities. Applied Behavior Analysis (ABA) frame of reference affects the success of An. O's therapy program in preparing pre-writing skills, ranging from thickening the line pattern to imitating the numbers 0-10.

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