

Effectiveness of Motor Skills through Traditional Children's Toys in Autistic Children

Imaniar Purbasari^{a*}, Nur Fajrie^b, Jayanti Putri Purwaningrum^c, Hutomo Rusdianto^d,
^{a,b,c,d}Universitas Muria Kudus, Email:
^aimaniar.purbasari@umk.ac.id,
^bnur.fajrie@umk.ac.id,
^cjayanti.putri.purwaningrum@umk.ac.id,
^dhutomo.rusdianto@umk.ac.id

Autistic children are unique to communication, social interaction, and behaviour. Games help them to get to know work instructions, interact with friends, discipline, hone their pleasure, suppress their fears. The purpose of this study is to look at the response of children with autism in action therapy games, motor development, and sound sensitivity of game therapy in children with autism. The stages of the research begin with an exploration phase of different activities as a therapy. The next stage is the action stage, observing the child to see the self-protection and self-confidence of the child during the game therapy process. The next stage is observation of defence efforts or the development of therapeutic measures. In the end, the goal of the research can be known as the success or therapeutic needs of autistic children—an autistic child functions as a thrusting toy with a thrust to make a sound. Rhythm-playing games with movement will focus the attention of children with autism so that changes in functional behaviour will feature in the game.

Keywords: *Motoric, Voice, Autism, Play, Therapy.*

Introduction

Equality of educational services for children with a variety of learning and special needs becomes an essential focus in the development of human resources in Indonesia. Growth in the number of children with autism in 2015 was 1.14% or reached 500 children/year. According to data from the Ministry of the Republic of Indonesia in the field of women's empowerment and child protection, the surge in symptoms of autistic children is related to the level of maternal intake during pregnancy, brain development disorders, neurodevelopment disorders, viruses, chromosomal abnormalities or genetics. The birth of a

child with symptoms of autism has a one in three chance of affecting boys. Research conducted by the 2013 Centres for Disease Control and Prevention states the prevalence of autism in the world today, ranging from 0.15 to 0.20%, including Indonesia (Mashabi, 2009).

The needs of autistic children in self-development are constrained by physical disorders and mental barriers to adapt to the environment. Difficulties in communication, social interaction, and sensory-related behaviour patterns result in decreased emotional stability. The design of impulse synchronisation to the brain does not match the general level of development of the child. Activity habits such as repetitive play or strong memory sequence abilities with an obsessive desire to maintain the regularity of their environment (Christensen et al., 2010; Dominguez et al., 2006; Grandin et al., 2015). Symptoms begin to appear before the age of three years, such as facial expressions may seem empty as if daydreaming, muttering, inability to calm down, playing with the fingers. It is challenging to attract the attention of children in small and natural things. The stimulus is also very sensitive to the modulations of different types of sound. The emotional classification of mild, moderate, and severe autism also influences impulsive, melancholy, and reactive patterns of behaviour.

Cases in children with autism are generally detected at the age of two to three years, the ages of experiencing the world of play as part of a child's natural needs. Autism children's interest in the game has several characteristics that are different from healthy children, such as activeness in running, jumping, spinning, swimming, and outdoor activities. There is also the pattern of the game in sorting objects according to shape, colour and structured size. The archetype of the child's activity tends to be identified in the type of action therapy game to foster adaptive behaviour. The targets of various services for autistic children are directed at the problem of direct communication interactions and stereotypical behaviour (Lord et al., 2000; Lovaas, 1987; Naber et al., 2008). The constraints of socialising become intrinsic factors such as the understanding of nonverbal communication synchronised by the weak focus of attention on eye function contact, so that there is no reciprocity with social correlations. The pleasure in the individual world is perceived in the imagination to get different preferences.

The limitation of language imitation, echolalia, and pragmatic delays results in autistic children not being able to start conversations that are mutually involved. The urgency of appropriate play activities is pleasantly conditioned in the form of individuality that shapes self-behaviour so that it can release egocentricity. Controlling the power of sensitivity related to the use of the senses can eliminate feelings of fear, emotions and sadness, crying, and even self-harming behaviour. Similarly, when an autistic child hears a loud and noisy sound or smells a pungent aroma, he/she will give a reactive response. Likewise, munching on the texture of rough food is not perfect (Bromfield, 1989; Lord et al., 2000). The psychological reaction to their senses will cause an angry response. Therefore these symptoms need to be

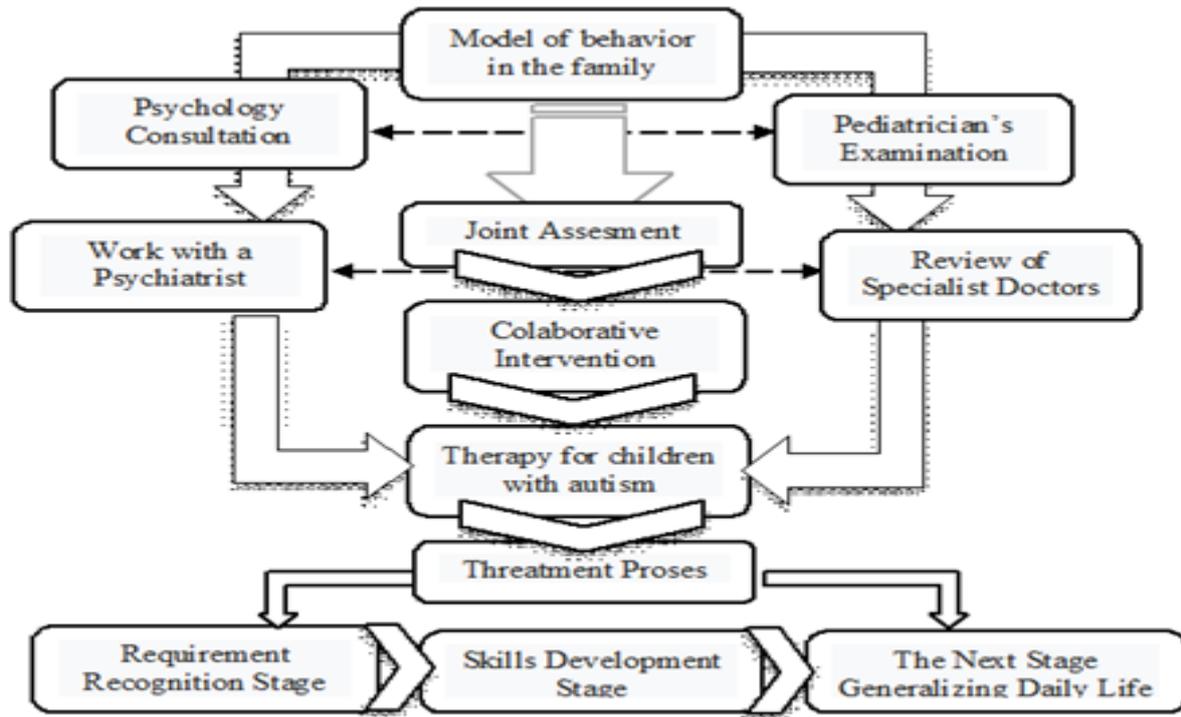


treated rather than rejected by children with autism. Besides the symptoms of repetitive motor movements, preoccupation with particular objects and inflexible adherence to routines are considered considerations of the type of play appropriate for autistic children (Chukoskie et al., 2013). Every autistic child has a varied spectrum with different challenges. Thus, the action will affect the development of autistic children sooner or later.

The findings of medical healing for autistic children have not been extensive. The progress of countermeasures and maximising efforts are shown in psychotherapy and art therapy studies. Some evidence shows that game therapy can help children treat the disorder. Early intervention in children with autism can encourage the physical and social growth and development of children (Grandin et al., 2015). The pattern of therapeutic games for autistic children must pay attention to sensitivity to touch, comfort the sound response, discuss oral toys, focus on playing toys, creations and focus on children and focus on objects around suddenly. Efforts to intervene include psychodynamic, psychoanalytic therapy, music therapy, and various children's play devices (Bromfield, 1989). Improvement adapted to the character of children with autism produces an atmosphere of excitement, regulating emotional and involvement behaviour when children are playing and are active in the performing arts. Self-compliance was observed in more in-game sessions and artistic activities. The results of this exploratory study found significant evidence supporting the therapeutic value of playing art in promoting social, emotional, and motivational development in children with autism (Kim et al., 2009). There are also lego games that have been adapted as therapeutic modalities to increase motivation to participate in social skills interventions, and provide a medium where children with social interaction and communication difficulties can be effectively (Legof & Sherman, 2006).

The pattern of therapy in the rehabilitation program of autistic children occurs in the family, school and medical treatment environments that apply expert collaborative treatment. The structure of handling autistic children can be described in the processes and approaches of various health and educational interests of children. The working scheme of therapy for autistic children can be seen in the following chart.

Figure 1. *Interwoven Autism Children Therapy System*



The individuality approach in the family environment with autistic children shows the development of subject interactions and children's social interactions—the ability to concentrate autistic children when teaching also increases using an individual approach. The activity process is applied routinely and repeatedly in understanding play activities and completing play activities (Ketcheson et al., 2017; Pan et al., 2017). The active role of family members and the support of the surrounding environment can improve motor difficulties such as how to hold patterned movements simultaneously and reduce the reactive sound of spontaneity. These activities are applied to play models that are fun to respond to, typically for physically and mentally regressive children with autism.

The findings regarding play behaviour contribute to the contradictions surrounding functional and symbolic play. The object of the game is significant to note because clinically, the practice of children experiencing the disorder. Play can be done if there is an intervention to increase motivation in autistic children (Dominguez et al., 2006). The manipulative, functional and symbolic play behaviour of an autistic child can be identified through the child's closeness to parents. The quality of children's play with the development of children's behaviour is a signal for parents to recognise the type of game needed. Play behaviour therapy shows that the level of sensitivity of the child's development is related to the attachment of the child and parents to recognise the child's disorders and needs (Naber et al., 2008). Individual approaches to natural play interventions for children with autism for a

certain period show the active participation of children with autism. Behaviour obedience, being present and active, playing, and conveying meaning through body language with therapists and parents is a response when an autistic child organises behaviour through play naturally. The need for a behavioural and play approach typically is a well-planned treatment effort to be applied to autistic children (Bernard-Opitz et al., 2004). Every play activity, both functional, symbolic, and repetitive, is coded to show the development of repetitive functional play behaviour (Charman et al., 1997; Christensen et al., 2010). The participation of autistic children in free play situations will be observed according to the rhythm of the game. Game strategies and the work of autistic children show the need for play schemes and repetitive action instructions, which ultimately make play more functional. Small action responses with imitation levels and the ability to sort the rhythm of the game must be maintained in the old game order (Freeman & Kasari, 2013). More specifically, autistic children with male sex show a preference for playing cars with the development of a typical way of playing (Harrop et al., 2017; Knickmeyer et al., 2008).

The physical development of an autistic child includes four aspects: (1) the nervous system that influences the development of intelligence and emotions, (2) the muscles that affect aspects of strength and motor development, (3) the endocrine glands that cause the appearance of a child's behaviour patterns, (4) the structure of the body in the form of height, weight and body proportions. Disorders of the nervous system functioning in children with autism cause interference in other aspects (Stewart & Ota, 2008). Generally, autistic children experience motor development (collapsed motion) at the age of 1-5 years. When eating disorders occur, motoric autistic children experience delays. Coordination of motor skills derived from the arrangement of nerves, muscles, brain, and spinal cord is not optimal, resulting in errors of motion instructions. The development of motor skills that are not appropriate for their age requires treatment in the form of therapy to direct the development of behaviour and motorists (Ketcheson et al., 2017; Provost et al., 2007). The movement will be seen as meaningful if the child's playing time is observed well. Movement patterns may be observed in the game training skill, speed, strength, flexibility, and accuracy of hand and eye coordination. Games may feature walking, running, sitting, jumping, throwing, catching, pushing, dancing, grasping, and so on (Lin et al., 2019). Good motor coordination in the body can reduce stiffness in autistic children due to impulse errors received by the body.

The type of play of autistic children with regressive types correlates with sensory stimulants (acoustic, air, light, and sound). Sensitivity to the elements of noise, wind, and light needs to be treated with routine and intervention on these three things. Natural ingredients are an antidote to the extreme sensitivity of the child's desired needs. Playing outdoors is good therapy for overcoming extreme sensitivity to sound. This study aims to address problems, including: (1) analysing the implementation of game therapy in autistic children (2) identifying changes in motoric skills in children with autism through game therapy, (3)

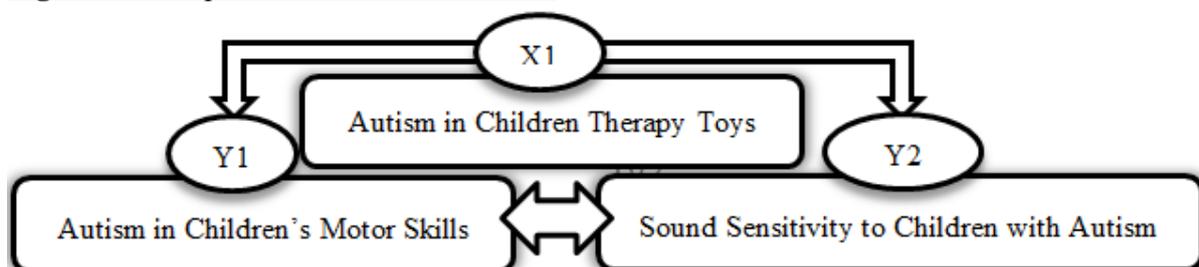
identifying shifts in the sound sensitivity of autistic children with game-based therapy environment, (4) describes changes in the behaviour of children with autism through game therapy.

Methods

Research with this game therapy applies measures to test, discover, and develop appropriate actions to be used in the treatment of motor skills and voice sensitivity of autistic children (Sugiyono, 2016). This research involves participants improving their skills, with strategy techniques to work on positively changing behaviour. Experiments on the action of game therapy in children with autism were conducted to determine the effectiveness and efficiency of the action. This research includes the following activities: (1) planning of the playing environment, playing tools and playing strategies for children with autism, (2) recording autistic children's actions in the form of motor responses, responses to sound sensitivity, and changes in behaviour due to play, (3) evaluating activities in the form of reinforcement and repetition, and maintenance of action that has been created.

This dual-action research was conducted by researchers to identify the types of problems, plan actions, test actions through careful observation, evaluate the percentage increases in motor skills, and voice sensitivity of autistic children. The researchers then conclude the assessment of the activities of autistic children to determine the effectiveness of children's toy therapy. The action research model with double action involves three variables, namely game therapy, motor skills, and voice sensitivity, which can be seen in the inter-variable picture as follows.

Figure 2. *Multiple Action Research Model*



This study uses a game therapy action approach with activities of observing, assessing, stimulating children, and supporting the dynamics of the results of action therapy games. Investigations are applied to see the child's expression through play language by using toys, games, art, or other means that overcome the motor problems and sound sensitivity of autistic children. Game therapy aims to identify, express the child's feelings, improve children's



motor skills, the ability to receive loud sounds, to help them live independently, and be able to interact socially. The steps in the study are explained as follows.

The first stage of the crucial period is the initial period of selecting a suitable therapy for the child. Children in need of therapy are prepared by building self-confidence and the ability to socialise with the environment freely. The therapist's approach to children helps the success of play therapy. Children begin to have a bond with each situation, treatment, and type of play. In autistic children, success is greatly influenced by the length of time required, intervention, improvisation, and the naturalness of autistic children. Children explore the playroom and toys. Some children will have the desire to touch and try everything they see to gain awareness about what is available to them. Other children will be doubtful and uncertain about what their role is in the playroom and find a therapist to lead. Through empathic responses, encouragement, and returning responsibility, the therapist will empower the child to take risks, start play, and ultimately lead. Children will also experience permissive play spaces, where limits are rarely set except to avoid injury to themselves, therapists, or damage to property. When children's sign communication can be understood, children can reflect their feelings and motivation to participate in the therapy process, the ability to control the behaviour that is lacking, then the first stage can be skipped.

In the second stage, when the state of therapy is acceptable, the child will be confronted with the condition that has more emotional outbursts, wants more control, makes more mistakes, and will experience setbacks in their behaviour that they had previously mastered. These signs are part of developing emotional intelligence, self-confidence, self-control, and finding more adaptive ways of interacting with others. The discovery phase of the child's stage can take place in a variety of times; we can help instil trust and active communication towards their personal growth.

The third stage is the most extended play therapy phase. Children learn, heal themselves from difficulties, get out of their comfort zones, and make changes. We are expected to be sensitive to seeing positive progress in their self-esteem, behaviour, communication, and overall outlook on life. They will utilise imitation skills with a little encouragement, show self-regulation, and build resilience and flexibility with change. With these moments of growth, there are also occasional setbacks or regressions. New behavioural patterns help children produce comfort to nurture their old skills.

The fourth stage is when children consistently show their skills efficiently, and behavioural and emotional needs have stabilised in various environments. Usually, repetitive attempts to maintain their progress begin to diminish. This stage is to determine the level of readiness of children to face their world independently.

Figure 3. *Steps of the Research Model*

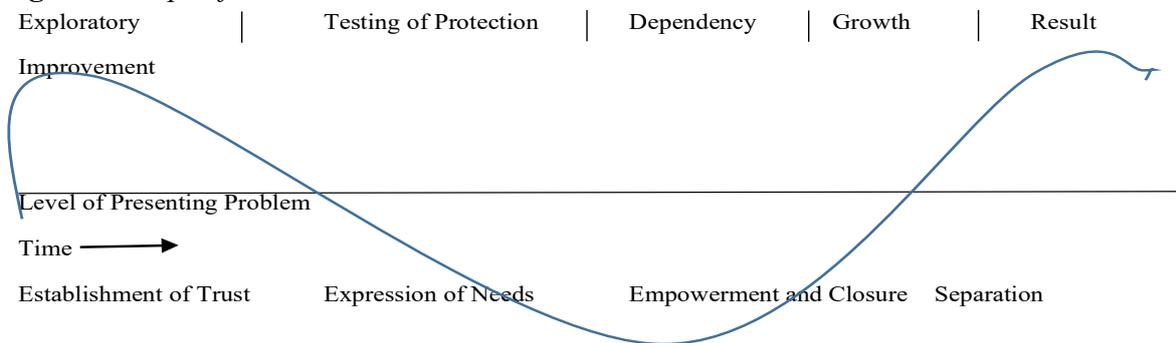


Figure 3. Steps of The Research Model

Results and Discussion

The results of this study address the problems of children with autism through data about; (1) implementation of game therapy in children with autistic children, (2) changes in motor skills of children with autism through game therapy, (3) changes in the sensitivity of autistic children with environment-based play and (4) changes in autistic children's behaviour through therapy games.

Child Funnel Therapy Game for Autistic Children

Children's games involve emotional, empathy, motoric, social, communicative when the play process is done. Children with meaningful play habits will produce activities that develop themselves. The burden of children's activities is not felt when the play process is done with joy. Recreational and entertaining activities provide fantasy for children. Thus, functional play is by the child's motor development. Interactive game tools can support motor development, socialisation, and social interaction—a type of interactive children's play equipment in the form of 3D and 4D objects. It is possible to get to know the types of toys that support children's growth and development by considering: (1) the kind of socialisation, (2) physical abilities, (3) mental abilities, (4) pedagogy, (5) problem solving, and (6) environmental factors.

This research utilises children's toys by focusing on motor functions and sound sensitivity as a means of playing therapy for autistic children. The elemental ability of children's toys helps the motoric needs of autistic children. A loud and distinctive sound will provoke the sensitivity of the music to an autistic child. The slow response shows the needs of autistic children with impaired empathy, mutual attention, and imitation to receiving instructions—repeated interventions to produce focused movements and functional play behaviour. So

autistic children's games are aimed at structured play activities with motor movements and voice sensitivity (Charman et al., 1997; Christensen et al., 2010). The development of traditional children's toys in Indonesia was based on culture, social values, education, and technology for children. Play was developed as therapy with rhythm and an interactive game tool that trains the motor and social of children. Interactive toy material for treatment is expected not to cause danger and anxiety in children. The traditional Indonesian game that can be used as a therapeutic tool is a kid's toy. The kid's toy has been identified with natural materials made with impulse structure designs, animal imitation designs or means of transportation, and television cartoons. The attractive design is also supported by colouring and sound features on toys that appeal to children. The kid's toys have a lively sound characteristic. Cheerful play encourages training in the strength of structured running and directed movement.

The impact of playing accompaniment therapy for autistic children can be identified as the wealth of Indonesian children's toys. The imitation process on the toy rattle provides stimulants in the form of work rules and social norms. Physical activities are playing with toys, training children's skills, intelligence, and strength during their growth and development. Communication and sensory sensitivity, especially hearing on the social environment, is the goal of the toy therapy. Children face concrete visual-spatial abilities through communication due to sensory sensitivity to children's play. There is a sense of humanism of children with autism towards the environmental design of the structure of the toy rattle. Cultural values in the form of an introduction to the eco-culture of toy materials and the socialisation of the play process characterise Indonesian toy culture to children with autism. The concept of science and technology from the elements of science work on the toy frame design and toy ornament design. The principles of simple science work to build more concrete knowledge needs. Autistic children have unique features in detail.

This game is done as routine play with an activity duration of fifty minutes. The first stage is the introduction of the environment and game activities; the second stage is carried out via the implementation of cheerful game therapy activities. The third stage sees the potential and evaluation of difficulties in the results of changes in motor skills and voice sensitivity. In the final stage, from the evaluation of therapy, it is known that these efforts strengthen, maintain, and promote new actions for children's development.

Table 1: *Implementation of "Sorongan" Children's Toy Therapy*

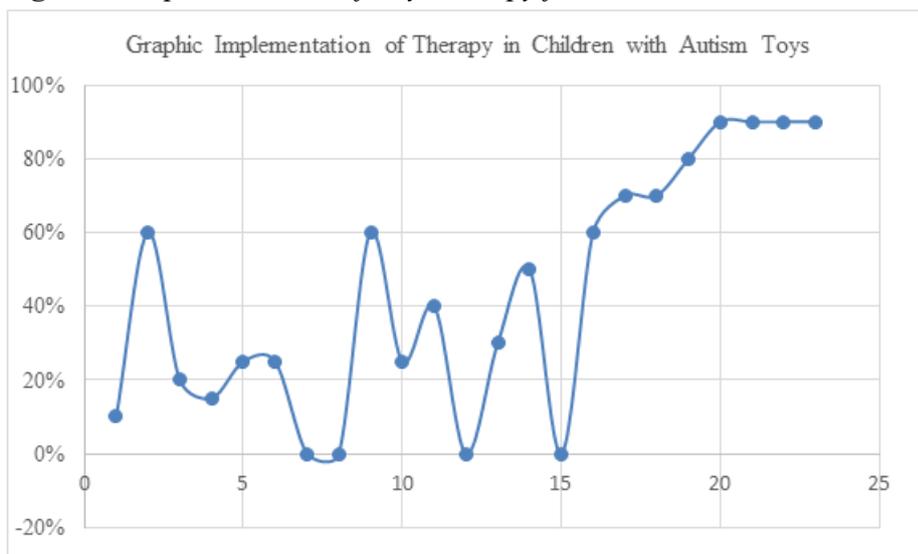
Stage	Activity Step	Percentage	Behaviour	The Response
Stage 1	Introduction to the game	10%	Eye contact is less than five seconds	Prompt
	Explore the playing environment	60%	Rotating, exploring the environment, distracting from the environment	Prompt
	Sympathetic Response	20%	Interest in the game	Prompt
	Empath Response	15%	Positive perception of the game	Prompt
	Initial Encouragement of Risk-Taking	25%	Trying without clear functions	Prompt
	Courage Trying to Play	25%	Holding, pushing, laying carelessly	Prompt
	Leading the Game	0%	Daydream and wait for instructions	Prompt
	Recognise the Formed Behaviour	0%	Play function not yet known	Prompt
Stage 2	Emotion starts the game	60%	Not forced, not yet focused	Advanced
	Control over obstacles	25%	Needs help	Advanced
	Error instruction	40%	Push and place it with a duration of less than ten minutes	Advanced
	Setback response	0%	Consistency and familiarity	Prompt
	Emotional intelligence	30%	Positive response to noise	Prompt
	Confidence	50%	Play with pleasure	Prompt
	Active communication	0%	Movement language	Prompt
Stage 3	Difficulty solving playing activities	60%	Move according to children's intervention and creation	Prompt

	Self-esteem	70%	Keep toys, clap	Advanced
	Strengthening	70%	Play consistency	Advanced
	Flexibility of change	80%	Playing duration is more than 20 minutes	Advanced
	Maintenance	90%	Instructions play with low intervention	Advanced
Stage 4	Repetition	90%	Instructions play with low intervention	Advanced
	Maintenance	90%	Play consistency	Advanced
	Confidence	90%	Environmental and social interaction therapy	Advanced

Researcher's Observation Data for 2020

Implementation of game therapy for autistic children shows an increase in motor activity of children. The introduction of the game environment and the game tool experienced a positive response but is still under intense intervention. While the action stage, motor function develops but is not yet accompanied by social and communication functions. The management of the activity of playing elements of motion creation and sound creation of toys has developed. The maintenance of autistic children has carried out instructions with moderate to low intervention. Game therapy in children with autism shows that play routines need action on communication and empathy for anxiety and problems independently.

Figure 4. *Implementation of Toy Therapy for Autistic Children*



Source: 2020 Researchers Analysis

The graph data shows that there is a dynamic response of children with autism at the stage of implementing actions and managing actions. Therefore, the need for intervention and time of therapy influences the successful formation of motor skills and the voice sensitivity of autistic children. Targets and evaluations are needed at the end of each action to determine the achievement and renewal of actions.

Changing Motor Skills in Children with Autism through "Sorongan" Game Therapy

Autistic children are observed to have difficulty in performing the prediction of skills in necessary motor skills, knowledge of the meaning of movement, and representation in planned activities. Before decisions on therapeutic actions are made, children with autism should demonstrate the necessary skills and solid knowledge that they are not performing systematically. Age, IQ, spatial representation, transcoding, and execution influence structured movements. Abnormalities that cause errors, such as parietal, premotor, and motor circuits, involve the difficulty of children with autism connecting special and new orders (Dowell et al., 2009). Praxis in children with autism is highly correlated with social disorders, communicative, and problems associated with these problems, indicating perhaps the core features of autism or markers of neurological abnormalities that underlie such monitoring (Dziuk et al., 2007).

A child's physical or motor development can be observed through play movements. If a child can push a toy rattle with functional directional movement, motor coordination runs well. These are simple things, often not realised by parents as the child's sense of coordination. If the indications indicate delays or particular needs of children, it is said the child has a motor impairment. Gross motor movements are identified by moving the body from one place to another. Locomotor movements step by coordinating the foot forward, backward, sideways, walking with repeated steps and turns, running with a fast rhythm, jumping on the footstool, and landing on two legs, tiptoeing to move the body forward by leaning on one foot by landing on the same foot. This motoric is the basic movement of the cheering game that autistic children must master.

Therapy toys use "sorongan" by playing to encourage bamboo handles to run so that it makes the sound of *klothok klothok klothok*. Encouragement is the integration of the motion of the hand and foot muscles to produce sound and force. Encouragement is a physical movement that harmonises the activities of walking, encouraging, and harmonising steps (Eka Nugrahastuti, Endah Puspitaningtyas, Mega Puspitasari, Moh. Salimi, 2016). The development of a child's motor skills serve as a marker of the success of sensory and physical coordination activities. Treatments are used to develop motor skills with interventions that are tailored to the needs of children with autism (Bishop & Pangelinan, 2018). The motor skills intervention aims to improve motor skills, adaptive, and social skills of children with

autism. The impact of the intensity of interventions on autistic children is explored to find the ability to respond to functional games. Control of motor skills in children with autism can be improved by repetitive actions and treatments, with unlimited time limits.

Autistic children develop motor skills that are different; slower settings cannot be compared to one another, so that the intensity of the intervention of motor skills also varies with different actions. However, based on the results of therapy, the turn does not rule out the possibility of them participating in physical activity and self-potential. Variation of delivery and intervention focus for each autistic child is sometimes captured differently because of the tone of voice and the therapist's ability to control emotions, that must be stable. This research suggests the delivery and focus of close interventions as well as paying attention to children to produce positive responses to children's motor skills. The attention and touch of taste in autistic children is their sensitivity to response actions. Although autistic children have difficulty communicating, they can provide positive feedback if the intervention is firm and stable. They will refuse, get angry, cry, even be busy with their world if the intervention is done emotionally (Colombo-Dougovito & Block, 2019).

Deficit needs of children are targeted when play therapy is carried out to accompany the rhythm and consider the impact of the disorder on the independent activities of autistic children. This action is needed in stages of recognition, experimentation, problem-solving, and reinforcement to be lighters to improve the results of autistic individuals (Chukoskie et al., 2013). The initial stage is introduction, which is the key to synchronising the motor to the social environment. Implicit coordination of the bodies of autistic children becomes directed when they interact socially with the environment and therapist. Synchronising motoric and social control finds autistic children subjected to objective dynamic interventions, and motoric socialisation abilities can determine the deficit of autistic children (Fitzpatrick et al., 2017).

In the experimental phase, imitation activities on objects and the environment become a stimulus to integrate visual input and motoric output. The impact was observed on the motor acquisition and social skills of children with autism. Suitability between intrinsic activity, functional connections, motoric, and neuro-visual contributes to the ability to control functional play activities (Nebel et al., 2016). Visual motoric functional connectivity with imitation of the game environment and adjustment of the tempo of the intervention increases motor and social abilities.

At the stage of problem-solving, physical activity of games that have involved children will cause dynamics of difficulty, which requires intervening in the treatment of children with repetition, problem-solving, and maintenance of new recovery (Pan et al., 2017). Motor skills

in the form of physical activity and training are choices for maintaining patterned game movements.

At the maintenance stage, the therapist evaluates the motor skills of playing game therapy activities—a tool is used to balance the motion of the instrument with foot control towards the front, back, and side. The child will walk with steps and repetitive turns, run at a fast pace, jump on footstools, and land on two legs, tiptoe to move his/her body forward by leaning on one leg by landing on the same foot. Children can do the complexity of research on movement with autism but with a weak emphasis on movement. Muscle strength and speed of movement are still not perfectly coordinated.

Sound Sensitivity of Autistic Children through "Sorongan" Toy Therapy

Regressive type autistic children have extreme sensitivity to sensory stimulants (acoustic, air, light, and sound). The character of limiting stimulation in children with autistic regression in this study has a sensitivity to the sounds of thumping, roaring, rumbling, loud noise and hissing. They issued fear responses, running, hiding, avoiding, and even crying. The sound sensitivity of children with autism is a disorder that causes them difficulty with adjusting to environmental conditions.

This sensitivity to sound is detected due to the consequences of weak social interaction in the life experience. Neural responses to sounds heard affect the emotional valence of children with autism (Blasi et al., 2015). The experience of an autistic child with noise needs to receive therapeutic measures. The audio noise level affects hearing nerve sensitivity. It was proven in an experimental study against noise from 35 dB to 0 dB, that the best nerve performance was expressive audio with an accuracy of 93.2% through a device. However, comfort measures or compresses have been made before the noise is acceptable (Lin et al., 2019). This indicates that the noise level for autistic children can be improved if they have successfully adapted to the environment conditions (Stewart & Ota, 2008; Swerts, 2009). Music therapy is also proven to have helped overcome the problem of noise sensitivity in children with autism. Music works with appellative descriptive programs with instrumental music to describe characters and represent them in rhythm according to the character of an autistic child. The process of creating music can be based on the stages of character analysis, describing the character to determine the selection of instruments based on experience (Cecilia, 2017). Music that is compatible with the character of an autistic child minimises extreme sensory sound sensitivity.

Sound interventions that make children reduce their emotions will bring up controlled social behaviour. Anger, indifference, running and crying responses are obtained when the child passes the stage of adapting the playing game. The action stage of the child does not cause



anxiety because the intervention is carried out within ten minutes by playing with the pattern. The problem-solving phase of therapy for autistic children must maintain a mood where the sounds of *klothokan* tend to be noisy but monotonous, and sounds only follow the movements of an autistic child. So we need activities that encourage dynamic gameplay. The maintenance stage of an autistic child needs intonation, rhythm, and the sound quality so that toys and instructions do not create boredom and distract focus.

Conclusion

This study applies a sling child therapy that has toy characteristics that activate motor motion and voice sensitivity. Types of individual games are used with interventions carried out with the stages of introduction, action, evaluation, and maintenance. Motor skills can be demonstrated with structured movements, but it requires coordination of muscle strength. Game rhythm and game time affect the emotional, social, and communication skills of autistic children. Sound sensitivity must match the character of an autistic child, minimising extreme sensory and emotional responses.

Acknowledgment

Our gratitude goes to the Ministry of Research and Technology BRIN, Ministry of Education and Culture, Universitas Muria Kudus, Elementary School Teacher Education Study Program, and Research Subjects of Autistic students who have contributed funding, space, and data. Researchers have the opportunity to find out the motoric potential and sound sensitivity of children with autism through child play therapy.

REFERENCE

- Bernard-Opitz, V., Ing, S., & Kong, T. Y. (2004). Comparison of behavioural and natural play interventions for young children with autism. *Autism*, 8(3), 319–333. <https://doi.org/10.1177/1362361304045212>
- Bishop, J. C., & Pangelinan, M. (2018). Motor skills intervention research of children with disabilities. *Research in Developmental Disabilities*, 74(November 2017), 14–30. <https://doi.org/10.1016/j.ridd.2017.11.002>
- Blasi, A., Lloyd-Fox, S., Sethna, V., Brammer, M. J., Mercure, E., Murray, L., Williams, S. C. R., Simmons, A., Murphy, D. G. M., & Johnson, M. H. (2015). Atypical processing of voice sounds in infants at risk for autism spectrum disorder. *Cortex*, 71, 122–133. <https://doi.org/10.1016/j.cortex.2015.06.015>
- Bromfield, R. (1989). Psychodynamic play therapy with a high-functioning autistic child. *Psychoanalytic Psychology*, 6(4), 439–453. <https://doi.org/10.1037/0736-9735.6.4.439>
- Charman, T., Swettenham, J., Baron-Cohen, S., Cox, A., Baird, G., & Drew, A. (1997). Infants with autism: an investigation of empathy, pretend play, joint attention, and imitation. *Developmental Psychology*, 33(5), 781–789. <https://doi.org/10.1037/0012-1649.33.5.781>
- Christensen, L., Hutman, T., Rozga, A., Young, G. S., Ozonoff, S., Rogers, S. J., Baker, B., & Sigman, M. (2010). Play and developmental outcomes in infant siblings of children with autism. *Journal of Autism and Developmental Disorders*, 40(8), 946–957. <https://doi.org/10.1007/s10803-010-0941-y>
- Chukoskie, L., Townsend, J., & Westerfield, M. (2013). Motor skill in autism spectrum disorders: A subcortical view. In *International Review of Neurobiology* (1st ed., Vol. 113). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-418700-9.00007-1>
- Colombo-Dougovito, A. M., & Block, M. E. (2019). Fundamental Motor Skill Interventions for Children and Adolescents on the Autism Spectrum: a Literature Review. *Review Journal of Autism and Developmental Disorders*, 6(2), 159–171. <https://doi.org/10.1007/s40489-019-00161-2>
- Dominguez, A., Ziviani, J., & Rodger, S. (2006). Play behaviours and play object preferences of young children with autistic disorder in a clinical play environment. *Autism*, 10(1), 53–69. <https://doi.org/10.1177/1362361306062010>
- Dowell, L. R., Mahone, E. M., & Mostofsky, S. H. (2009). Associations of Postural

Knowledge and Basic Motor Skill With Dyspraxia in Autism: Implication for Abnormalities in Distributed Connectivity and Motor Learning. *Neuropsychology*, 23(5), 563–570. <https://doi.org/10.1037/a0015640>

Dziuk, M. A., Larson, J. C. G., Apostu, A., Mahone, E. M., Denckla, M. B., & Mostofsky, S. H. (2007). Dyspraxia in autism: Association with motor, social, and communicative deficits. *Developmental Medicine and Child Neurology*, 49(10), 734–739. <https://doi.org/10.1111/j.1469-8749.2007.00734.x>

Fitzpatrick, P., Romero, V., Amaral, J. L., Duncan, A., Barnard, H., Richardson, M. J., & Schmidt, R. C. (2017). Evaluating the importance of social motor synchronization and motor skill for understanding autism. *Autism Research*, 10(10), 1687–1699. <https://doi.org/10.1002/aur.1808>

Freeman, S., & Kasari, C. (2013). Parent-child interactions in autism: Characteristics of play. *Autism*, 17(2), 147–161. <https://doi.org/10.1177/1362361312469269>

Grandin, T., Fine, A. H., O'Haire, M. E., Carlisle, G., & Bowers, C. M. (2015). The Roles of Animals for Individuals with Autism Spectrum Disorder. In *Handbook on Animal-Assisted Therapy* (Fourth Edn). Elsevier Inc. <https://doi.org/10.1016/b978-0-12-801292-5.00016-x>

Harrop, C., Green, J., & Hudry, K. (2017). Play complexity and toy engagement in preschoolers with autism spectrum disorder: Do girls and boys differ? *Autism*, 21(1), 37–50. <https://doi.org/10.1177/1362361315622410>

Ketcheson, L., Hauck, J., & Ulrich, D. (2017). The effects of an early motor skill intervention on motor skills, levels of physical activity, and socialization in young children with autism spectrum disorder: A pilot study. *Autism*, 21(4), 481–492. <https://doi.org/10.1177/1362361316650611>

Kim, J., Wigram, T., & Gold, C. (2009). Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. *Autism*, 13(4), 389–409. <https://doi.org/10.1177/1362361309105660>

Knickmeyer, R. C., Wheelwright, S., & Baron-Cohen, S. B. (2008). Sex-typical play: Masculinization/defeminization in girls with an autism spectrum condition. *Journal of Autism and Developmental Disorders*, 38(6), 1028–1035. <https://doi.org/10.1007/s10803-007-0475-0>

Legof, D. B., & Sherman, M. (2006). Long-term outcome of social skills intervention based on interactive LEGO© play. *Autism*, 10(4), 317–329.



<https://doi.org/10.1177/1362361306064403>

- Lin, R., Costello, C., Jankowski, C., & Mruthyunjaya, V. (2019). Optimizing voice activity detection for noisy conditions. *Proceedings of the Annual Conference of the International Speech Communication Association, Interspeech, 2019-Septe*, 2030–2034. <https://doi.org/10.21437/Interspeech.2019-1776>
- Lord, C., Risi, S., Lambrecht, L., Cook, E. H., Leventhal, B. L., Dilavore, P. C., Pickles, A., & Rutter, M. (2000). Lord2000_Article_TheAutismDiagnosticObservation. *Journal of Autism and Developmental Disorders*, 30(3), 205–223. <https://doi.org/10.1023/A:1005592401947>
- Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, 55(1), 3–9. <https://doi.org/10.1037/0022-006x.55.1.3>
- Mashabi NA, Tajudin NR. Pengetahuan gizi ibu dan pola makan anak autis. *J Makara Kesehatan UI*. 2009;13(2):88–90
- Naber, F. B. A., Bakermans-Kranenburg, M. J., Van Ijzendoorn, M. H., Swinkels, S. H. N., Buitelaar, J. K., Dietz, C., Van Daalen, E., & Van Engeland, H. (2008). Play behavior and attachment in toddlers with autism. *Journal of Autism and Developmental Disorders*, 38(5), 857–866. <https://doi.org/10.1007/s10803-007-0454-5>
- Nebel, M. B., Eloyan, A., Nettles, C. A., Sweeney, K. L., Ament, K., Ward, R. E., Choe, A. S., Barber, A. D., Pekar, J. J., & Mostofsky, S. H. (2016). Intrinsic visual-motor synchrony correlates with social deficits in autism. *Biological Psychiatry*, 79(8), 633–641. <https://doi.org/10.1016/j.biopsych.2015.08.029>
- Pan, C. Y., Chu, C. H., Tsai, C. L., Sung, M. C., Huang, C. Y., & Ma, W. Y. (2017). The impacts of physical activity intervention on physical and cognitive outcomes in children with autism spectrum disorder. *Autism*, 21(2), 190–202. <https://doi.org/10.1177/1362361316633562>
- Provost, B., Lopez, B. R., & Heimerl, S. (2007). A comparison of motor delays in young children: Autism spectrum disorder, developmental delay, and developmental concerns. *Journal of Autism and Developmental Disorders*, 37(2), 321–328. <https://doi.org/10.1007/s10803-006-0170-6>
- Stewart, M. E., & Ota, M. (2008). Lexical effects on speech perception in individuals with "autistic" traits. *Cognition*, 109(1), 157–162. <https://doi.org/10.1016/j.cognition.2008.07.010>



Swerts, M. (2009). The relevance of visual prosody for studies in language and speech-language pathology. *International Journal of Speech-Language Pathology*, 11(4), 282–286. <https://doi.org/10.1080/17549500902906347>

Sugiyono. (2016). *Metode Penelitian Tindakan Komprehensif*. Jakarta: Alfabeta.