**Therapeutic Advantages of Using Lego® Bricks**

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Submitted to the faculty of the Art Therapy Program
in partial fulfillment of the requirements for the degree
Master of Arts in Art Therapy
in the Herron School of Art and Design
Indiana University

May 2022

**Acknowledgments**

I want to acknowledge and give my deepest gratitude to Eileen Misluk, who made this work possible. Her advice and guidance carried me through all the stages of writing my project. Her encouragement and appreciation of my potential gave me a lot of inspiration. I would also like to thank all the professors, instructors, and supervisors for the enjoyable and meaningful lectures and insightful advice. They are wonderful mentors and marvelous partners who help me take one step closer as a professional.

I would also like to appreciate all of my beloved cohorts, Bailee, Baley, Gracen, John, July, Kate, Katelyn, Katie, Katy, Makenzie, Taylor M, and Taylor W. I would never have gone through the process without their emotional and practical support. I feel blessed to have met you all and sailed together for a couple of years. I have learned acceptance and non-judgmental perspectives from them. I am confident that I will be there for them as a friend and supporter after graduation.

Finally, I would like to give special thanks to my husband Jeongho for his continuous support and understanding when undertaking my research and writing the project. It is my privilege to have such wonderful little people as my children, Lucy and Elliot, who make me want to be a better person and mom. Their infinite love and warm hugs are the sources for me to live every second. Moreover, the prayers from my family in Korea were what sustained me this far.

## Dedication

This thesis work is dedicated to all the individuals who have devoted their time and energy to help me with their endless faith in me. I want to thank my parents, parents-in-law, and sisters in Korea for comforting and encouraging me whenever I need mental support.

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**Abstract**

Blocks are an effective tool for expression and communication and improve emotional regulation. Utilizing Lego®s in art therapy can reduce stress and increase creativity and self-expression, enhancing a sense of acceptance and problem-solving skills, leading to behavioral modification in children and adolescents. This literature review aims to provide information on the material, Lego®s, an overview of its benefits and fields of using Lego® interventions, knowledge of developmental stages of children and adolescents, and appropriate application of Lego® in school-aged children. It was hypothesized that effective Lego® interventions would increase a child's participation and encourage interest in art therapy by completing an integrative literature review methodology. The integrative literature review analyzed the outcomes of Lego® interventions in art therapy and related fields. Lego®-based art therapy with a developmental approach can be a resource for creating a school-based art therapy program. Appropriate interventions considering children's developmental status can lead to their emotional growth and social improvement as competent members of the community.

*Keywords*: Lego®, art therapy, developmental art therapy, children, adolescent

# Chapter I

## Introduction

The number of people diagnosed with mental illness is increasing globally (World Health Organization [WHO], 2022). According to data from the WHO, this increase includes a 13% rise in mental health conditions and substance use disorders since 2017. In particular, the increase in mental disease in children has paralleled this trend. About 20% of children and adolescents worldwide have mental health conditions, and suicide is the second cause of death between 15 and 29 (WHO, 2022).

In the United States, the rate of children's attention-deficit/hyperactivity disorder (ADHD), behavioral problems, anxiety, and depression continue to increase and affect the overall health of children and their families (Center for Disease Control and Prevention [CDC], 2021). These symptoms can cause significant impairment in long-term relationships with friends and family leading to poorer outcomes in adulthood (Fusaroli et al., 2016). Undeveloped social competence can lead to problems with accepting responsibility, self-regulation, and interpersonal skills (LaKaavia & Ray, 2021).

Children with anxiety may not outgrow the typical fears and worries in young children, or there are so many concerns that they interfere with school, home, or play activities, leading to an anxiety disorder (Khalid-Khan et al., 2007). Anxiety may present as agitation, irritability, and anger. The symptoms include trouble sleeping, fatigue, headaches, and stomachaches. It may lead to depression and feeling sad or hopeless. Persistent depression can lead to suicidality or self-harm (CDC, 2022). Appropriate interventions provide safe and caring environments for healthy development to address emotional regulation, withdrawal, and problem-solving (Parker

et al., 2021). Treatments that help children change negative thoughts into more positive, effective ways of thinking lead to more prosocial behaviors (CDC, 2021).

This study explores the therapeutic efficacy of utilizing Lego®s in art therapy with a child who has difficulties in emotional regulation and behavioral problems through an integrative literature review. The research questions in this study included: How will the Lego®-based approach to developmental art therapy help children receiving school-based services?

It is hypothesized that effective Lego® interventions would increase the client's participation and encourage interest in art therapy by completing an integrative literature review methodology. This study aims to provide an overview of the benefits of utilizing Lego®, the introduction of areas where Lego® is being used, the degree of development of clients for Lego® application, the consideration of Lego® as a tool in developmental art therapy, and the integration of Lego® into art therapy to address students in school-based therapy.

Books and various search engines collected the data, including Google Scholar, Journal of the American Art Therapy Association, Academic Search Complete (EBSCO), University Library Catalog (IUCAT) search system, and organization websites. The data was analyzed by specific search terms and topic qualifiers related to Lego® (Lego®, Lego® therapy, play therapy, social skills, collaborative play, social competence, group therapy), children, and autism (autism spectrum disorder, autistic disorder, development disorder, Asperger syndrome). Table 1 shows the types of resources in the data, and the formats were primary, secondary, journal, book, and website. Table 2 contains search engines 1 and 2 that show a list of search engines and their ratio.

The positive outcomes of a Lego® intervention in art therapy can be listed: self-expression, sense of acceptance, stress reduction, development of motor function, self-

exploration, creativity, and communication skills. Because of the characteristics of the material, children can have integrative experiences involving artistic expression, play, and sound. Its services effectively respond to children's diverse and altering needs in school. Utilizing Lego®-based intervention considering children's developmental level, cognitive status, emotional and physical capability addressed the beneficial results mentioned above.

**Operational Definitions**

**Concrete operational stage**: It is the third stage in Piaget's theory of cognitive development. In this stage, children develop organized and rational thinking. Thinking becomes more efficient and faster, allowing children to think about multiple things at a time (Broderick & Blewitt, 2020).

**Industry versus inferiority**: It is the fourth stage of Erikson's psychosocial development that occurs between six to twelve years old. A big part of this stage focuses on academics, competition, and social interactions (Broderick & Blewitt, 2020).

**Lego® therapy**: A social developmental treatment for children with Autism Spectrum Disorder (ASD) or related social communication difficulties. The therapy program is based on the structured, systemic, predictable character of Lego® play, which makes it appealing to children with social communication challenges (Legoff, 2004).

**Neuroplasticity**: It refers to the brain's ability to modify, change, and adapt both structure and function throughout life and in response to experience. It is the basis for changes in the neural structure (Malchiodi, 2012).

**Play therapy**: It is broadly used to help children's emotional and behavioral problems. Considering their developmental level, children in play therapy utilize toys, art supplies, and sensory materials such as clay, sand, and blocks to communicate through action rather than words (Goodman, 2015).

**Social skills**: An individual can interact with others while integrating cognitive, emotional, and behavioral abilities. Social skills competency is difficult to measure objectively and is often quantified as the culmination of observable social skills and perceived social success (Nangle et al., 2010).

# Chapter II

## Methods

The integrative literature review is a research method used to summarize existing literature to provide a comprehensive understanding of a particular phenomenon or healthcare problem (Whittmore & Knafl, 2005). Integrative reviews allow for the inclusion and analysis of various searches, which can assist in the development of knowledge in new, emerging, or under-researched areas. The method requires adopting a clear theoretical framework to guide the conceptual structure of literature (Torraco, 2005). The study includes research published in peer-reviewed academic journals related to the making of visual art, Lego®, or craft of any kind, by children and adolescents who have been diagnosed with a mental disorder in any setting. Studies were excluded if they were not associated with the target population.

The data collection utilized the following databases: organizational websites, Indiana University Purdue University of Indianapolis (IUPUI) Indiana University Library Catalog (IUCAT) search system, PsycARTICLES (EBSCO), PsycINFO 1887-current (EBSCO), Academic Search Complete (EBSCO), Journal of the American Art Therapy Association, and Google Scholar. Since Lego® related therapy is a relatively new intervention, the company website was utilized.

A literature matrix was used to organize relevant scholarly studies and resources. A thematic analysis was used to review the existing research to understand the integration of Lego® into art therapy materials through a developmental art therapy approach. The matrix was organized into four sections. The four themes included purpose, type of intervention, results, and

participant demographics. Qualitative data analysis was performed by three overarching principles: identification, organization, interpretation within a data set (Braun & Clarke, 2006).

# Chapter III

## Literature Review

The word "Lego®" comes from the Danish word "leg godt," meaning "play well". It is the most used toy worldwide regardless of age. Lego® pieces are made of plastic, and by connecting Lego® assembly parts, they form the desired figure (Rahnama et al., 2014). Lego® pieces are made in various sizes, shapes, and colors that, when joined together, can create endless creations. Different institutions use Lego® bricks for a variety of purposes. They are used to develop lesson plans and teaching materials (Lee, 2015) and also to support the social functioning of children and youth with ASD (Lindsay et al., 2017). The building materials have been adapted as an effective tool for self-expression in art therapy (Kato et al., 2013). Moreover, Shields (2017) found that building blocks aided in stress reduction, and creative construction tasks decreased children's behavioral problems (Rahnama et al., 2014).

Lego® blocks are often used as a diagnostic material to determine a child's cognitive ability or emotional state. Researchers in the field of education utilize Lego®s to measure a child's understanding of mathematics and teach fundamental skills (Rico-Bautista et al., 2020). For children with ASD, it can define the degree of their communication and social skills and develop group activities (Linsay et al., 2017) or establish specific programs to improve their interactions with others (Legoff, 2004). Huskens et al. (2015) conducted a study investigating the effectiveness of Lego® intervention on developing collaborative behaviors between children with ASD and their siblings during a play session. Three sibling pairs participated in the study, with an age range of 5 to 13. They limited the age gap to a maximum of five years between siblings. The children participated in 16 Lego® construction sessions, and they followed written

instructions and sample photos of the task. To observe siblings' interaction, responses, and the form of collaboration, all sessions were videotaped. The results indicated that the cooperation between the child with ASD and their typically developing siblings improved.

**Benefits of Lego®**

Groenewald (2021) identified many benefits of using Lego®s. Children and young adults learn planning skills and overcome failures through the process of construction, destruction, success, and failure innate in the process. Furthermore, it offers an opportunity to experience organizing detailed plans according to construction planning. In the process, if the model is broken, it provides a chance to analyze the cause of failure and attempt the task again. Building blocks teach frustration and distress tolerance that can be applied in everyday life. Children learn to plan better with each try, and there is the potential to reduce stress and fear of failure. Learning from mistakes builds confidence and increases a sense of acceptance. Construction play requires patience, problem-solving skills, and the ability to find solutions resulting in learning new ways to address problems. Gathering the idea of diverse approaches to problem-solving facilitates respect for different points of view from peers (Groenewald, 2021). Furthermore, improving problem-solving techniques in children has lasting impacts on thinking skills and moral developments (Tongsakul et al., 2011).

Lego® intervention is an artistic method optimized for the characteristics of the targeted population, environment, and purpose. Rahnama et al. (2014) initiated Lego® directives to preschool children with behavioral problems to support its benefit in reducing behavioral problems and increasing emotional adjustment. Afari and Khine (2017) demonstrated that Lego® robotics in education offered children the opportunity to learn creative thinking, decision

making, organizing, and problem-solving techniques. Furthermore, Kato (2009) researched collaborative Lego® construction to prove its effectiveness in communication and the establishment of social skills in participating groups.

## Building with Lego®s

### *Building for Self-expression and Self-awareness*

In artistic operation, people can express their emotions, thoughts, and experiences through various means of non-verbal communication. Individuals' unconscious conflicts, which cannot be revealed in primary communication, can be reflected in artistic creation by images or shapes (Furth, 1988). It enables perceived self-awareness, authenticity, and role (Kato, 2013).

Building bricks demand creative thinking and artistic skills that produce many three-dimensional shapes and color combinations (Wolf, 2014). Many people are familiar with the toy, and it can be utilized as a tool for communication and self-expression in art therapy (Irie & Ohmori, 1991). Kimme (2016) reported that building blocks improved the mental status of veterans with post-traumatic stress disorder (PTSD). Kimme reviewed that making landscapes and portraits with blocks as the art medium enhanced social confidence and decreased psychological distress (2016).

Art therapy's contribution to the neuroscience field includes understanding artmaking in the visual processing system. Specifically explaining the role of artmaking in the central brain and the cortexes and the relation of hormones and neurotransmitters in the art-making process. Hass-Cohen (2008) hypothesized that repetitive artmaking contributes to positive brain function changes in communication or self-expression.

Neuroscience explains that the brain evolves and organizes based on an individual’s experiences, which propels people into action. Furthermore, neuroscience theory denotes that

specific parts of the brain are associated with emotional integration and cognitive functioning, resulting in complex social functions. Hass-Cohen highlighted the mind-body connectivity that enhances the complexity of an individual's intra and interpersonal interactions through non-verbal exploration and emotional expression.

Belkofer et al. (2014) researched the impact of art therapy in children on a neurological level. He used a pre-post electroencephalogram (EEG) to measure the effects of art-making in the brain after 20 minutes of drawing. There were 10 participants, consisting of six artists and four non-artists, who created a drawing in oil pastels. The results indicated significance in alpha rhythm associated with memory, relaxation, self-regulation, visual processing, and creativity. Demonstrating that drawing increases alpha rhythm, which results in lower cortical arousal and maintaining relaxed states (Belkofer et al., 2014).

***Acceptance***

Kato (2013) defined acceptance as the cognition of individuals' relationships with others, including friendship style and experiences of engaging in collaborative work. He examined the impact of making Lego® block creations on acceptance with 20 female undergraduate students (median age 20.15) at a Japanese women's university. The participants were divided into two groups with additional subgroups of three to four participants. The groups were allowed to create any formation with Lego blocks for 60 minutes and then completed the Sense of Ibasho Scale that assessed authenticity, sense of role, perceived acceptance, and relief. The definition of Ibasho is a place where a person feels a sense of belonging and purpose resulting from social relationships (Nakhnikian, 2019). The results indicated that collaborative creation using Lego® blocks enhanced a sense of acceptance using both verbal and non-verbal communication.

Furthermore, during the intervention, participant roles were naturally divided. The participants understood their specific roles and responsibilities that supported collaboration in idea sharing and led to enhanced self-confidence and a sense of acceptance. Kato's study required teamwork, collaboration, division of labor, communication, and social support. These actions include the development of shared goals, mutual understanding, and cooperation to provide a feeling of acceptance and synergy in a group.

This increased collaboration was noted in the work of Legoff. Legoff (2004) observed that his two clients with Asperger's disorder coincidentally brought their Lego® works to the clinic one day. Both were in the waiting room, and they excitedly played and had a conversation together about the Lego® creations. He confirmed that the two boys had low motivation in social interaction before this incident. As a result of this interaction, Legoff developed a Lego® therapy program for children with ASD. He believed that Lego® is an effective medium for children with ASD to communicate and accept others within their boundaries.

***Adaptability and Creativity***

Occupational therapy developed a Lego®-based therapy focused on encouraging adaptability and creativity (Harries, 2017). More specifically, it aims to improve fine motor skills, integration of physical, emotional ability, sensory skills, early intervention, visual performance, and play skills for children. Children with disabilities have fewer opportunities to participate in meaningful activities than non-disabled children (Lindsay & Lam, 2017). Children who are incapable of independently manipulating objects due to physical disabilities are often unable to engage, consequently leading to compromised quality of play (Cook et al., 2010). This can have considerable negative impacts on cognitive, social, and emotional development. Exploring types of play to determine effectiveness enhances engagement in play and self-

achievement. As Cook et al. (2010) noted, children with disabilities have experienced accomplishments in educational tasks when using robotic manipulators, or activities for daily life. Thus, appropriate treatments can support children's cognitive and emotional growth.

Cook et al. (2010) conducted an experiment using Lego® robots with ten participants, ages four to ten, with cerebral palsy and related motor conditions (Cook et al., 2010). While the participants played with the "roverbot," they challenged a range of cognitive tasks from single switch playback of pre-programmed movements to full control of two-dimensional movements. The results were analyzed with respect to individual variables on standard language scores, physical function tests, the brief IQ portion of the Leiter-R, and an interview with their teachers. The results showed that participants demonstrated more sophisticated cognitive skills in operating robots than conventional standardized tests. Additionally, the participants were able to perform unstructured tasks. Furthermore, the intervention provided children in need an opportunity to display their various cognitive skills by giving them adaptable tools.

***Stress Reduction***

Psychological symptoms resulting from stress affect an individual's emotional and mental health. These effects appear in mood disorders, such as anxiety and depression, cognitive difficulties, and problematic behaviors (Shields et al., 2020). Thus, stress management with suitable tools, plans, and supports to decrease stress levels is important for overall health. There are many ways to help reduce stress, and manipulating, paying with, and building in Lego® is one of them. Understanding this benefit, Lego® produced a building set for adults that helps ease anxiety and stress. It purports that an activity that combines organic forms and mechanical construction improves mental well-being by reducing stress and anxiety (Stanley, 2018).

Shields et al. (2020) conducted an art intervention and pre- post-surveys on 16 full-time undergraduate students to understand current levels of stress and stress reduction strategies. The participants were divided into three groups: control, coloring, and building. They completed eight one-hour sessions over one month. The building block and coloring group showed significance in stress reduction. Although, coloring showed greater significance, demonstrating the stress reduction properties found in the creative activity.

Harn and Hsiao (2018) proved that building with Lego® blocks reduced anxiety, fatigue, and depression levels. They conducted a Lego® intervention with seven participants aged 35 to 55. Each participant had a different job, including a university educator, corporate lecturer, social worker, personnel manager, human resource personnel, junior high teacher, and consultant. In the study, the workplace stress scale was adapted to measure participants' stress levels and 150 minutes of a Lego® workshop with the topics of "Good Friends" and "Bridge." The pre and post workplace stress scales were measured, and the results showed that the participants had lower mean scores on the anxiety and fatigue subscale. The Participants reported stress reduction and declining fatigue in the workplace. Demonstrating the Lego® intervention significantly reduced anxiety and stress. Harn and Hsiao (2018) noted that "the result indicated that a Lego®-based workplace stress reduction is able to nourish healing power, inspire deeper and more diverse reflection, and energize a workplace" (p. 64). As shown in the study results, Lego® intervention resulted in a decrease in stress and fatigue for participants at work, regardless of age, gender, and occupation.

***Behavioral Modification***

The rates of childhood behavioral problems continue to increase in the United States (American Psychology Association [APA], 2022). Behavioral problems are classified through

levels of severity, for example, difficulty following directions to physical outbursts. These disruptive behaviors are commonly identified in externalizing behaviors, as they express behaviors toward other people. This includes losing their temper, refusing to comply with adults, spitefulness, and annoying or blaming others (CDC, 2021). Parker et al. (2021) noted that behavioral problems are intrinsically obstructive, and students can often interrupt classes and experience academic problems.

Even children with behavioral problems need to explore playful interventions that foster a reduction in problematic behaviors. Lego® building is a process where children can create metaphors with bricks and incorporate storytelling, reflections, and feelings. They can facilitate realizations, complex systems, and potential resolutions that enable them to reduce problematic behaviors (Peabody, 2015).

Rahnama et al. (2014) conducted a clinical quasi-experimental study with a parental pre and post-test questionnaire and a control group. The group consisted of 18 preschool boys. The program administered 20 sessions of 45 minutes with Lego® blocks. The results indicated behavior problems in post-test scores of the experimental group were reduced significantly. The experiment confidently concluded that play therapy with Lego®s decreased behavioral difficulties in these preschool students. The study highlighted a characteristic of play, stating that using enjoyable and active games in treatment can increase children's participation, release tension and emotional aggression.

Johnson et al. (2000) studied a case of one child who was diagnosed with ADHD and developed Oppositional Defiant Disorder (ODD). The research was administered to improve the parent-child relationship and recommend specific techniques when the child shows uncontrollable behaviors. Researchers conducted five sessions - intake, initial treatment, child-

directed interaction phase, parent-directed interaction phase, and termination. The study implemented a systematic observation, coaching the positive aspects of relationships and teaching the parents specific behavioral techniques to manage the child's disruptive actions throughout the sessions. From the research, the participants were positively influenced by an objective understanding of the family system and changes in attitude. The researchers recommended follow-up sessions to parents to help them maintain shared strategies for consistent support.

**Lego® in Education**

Lego® is one of the educational materials used in STEM education. Science, technology, engineering, and math focus on innovation, problem-solving, and critical thinking. According to the U. S. Bureau of Labor Statistics (n.d.), STEM workers use their knowledge of science, technology, engineering, or math to understand how the world works and solve problems. The four fields are connected and work together. For instance, math provides the basis of physics, and physics uses engineering. Engineers can apply their knowledge of physics to make high-tech machines that can be employed to test theories.

Regardless of the culture, the academic curriculum is complex and becomes increasingly more challenging; this is especially true in mathematics (Rico-Bautista et al., 2020). For this reason, many elementary math teachers utilize a wide range of manipulatives and adaptive materials to engage a variety of learning styles. Lego® is a tool that is applied to help students master concepts in math (Stannard et al., 2001). Practical learning strategies using Lego® involve constructing shapes, patterns, and volumes, which serve as the direct experience of math. Providing an entertainable learning environment broadens students' engagement and academic motivation (Park et al., 2016). Lego® has evolved into a global phenomenon while influencing

many areas, particularly education. Overall, it supports children's three-dimensional thinking, organizing, and solving problems by constructing blocks. Polianskaya (2018) emphasized the effectiveness of using sight and touch through Lego® in an educational environment. The researcher stated that children prefer learning that offers direct experiences through senses and enables personalization of their knowledge acquisition.

Robotics implemented in schools is a representative curriculum that combines science, technology, engineering, and math. It is beneficial to developing students' cognitive and social abilities from preschool to high school. It plays a role in learning science, mathematics, and other school subjects or associative activities (Alimisis, 2013). Lego® is the most commonly used learning material in robotics due to its versatility in design and easy access for children. Lego® bricks can be connected and assembled in many ways to build objects, including vehicles and working robots. Afari and Khine (2017) noted that educational authorities in the United Arab Emirates are distributing Lego® Mindstorms kits to schools to promote their use in the curriculum. The kits provide the opportunity to build and program different kinds of robots and have been designed by cognitive development theories. They promote essential skills required in the workplace and society, such as creative thinking, research skills, decision-making, problem-solving, communication, and teamwork techniques. Eguchi (2014) stated that teaching robotics in educational settings is an effective agent for project-based learning where STEM, coding, computer programing, and engineering skills are incorporated into one project.

Educating children in coding requires a specific syntax of symbols and rules. Lego® robotics offers easy-to-learn kits that give children hands-on introduction to robotics, engineering, and computer science. First, children build their robot and then learn to program it. Many children are familiar with building Lego® blocks even though the coding might be new.

The children can follow the instructions to create a certain type of robot and work with an instructor to program the robots. The easy-to-use software code requires children to drag, drop, and string together. Then, the robot plugs into the computer to upload and execute the code (Prato, 2017).

Lego® is also partnering with professional fields that combine animation, video games, mobile games, and augmented reality (AR). According to the report from The Pew Research Center (2021), mobile technology has more than doubled in the past decade, from 35% in 2011 to 81% in 2019, with smartphone usage among young Americans. This trend is creating opportunities for using augmented reality in educational settings. It creates chances for educators to guide students to comprehend abstract concepts. Diegmann et al. (2015) listed the benefits of using AR in learning environments, these are: increased motivation, increased attention, increased concentration, increased satisfaction, increased student-centered learning, improved collaborative learning, increased details, increased information accessibility, increased interactivity, improved learning curve, increased creativity, improved development of spatial abilities, and improved memory. The listed advantages of AR and the application of Lego® opened a new paradigm in the educational field (The Lego® Group, 2019).

**Normative Development in Children**

The early years of a child's life are crucial for their health and development. Healthy development means that children of all abilities, including children who require special health care, can grow up where their emotional, social, and educational needs are met (Broderick & Blewitt, 2020). Children develop at their own pace. Thus, exactly when a child will learn a given skill is unknown. However, developmental milestones provide a general concept of expected changes as the child ages. According to the CDC (2021), developmental monitoring observes

how children grow and change over time and whether they meet the developmental standard in playing, learning, speaking, and behaving. If the developmental and behavioral screening tools recommended by the American Academy of Pediatrics identify areas of concern, a formal developmental evaluation is conducted by a trained expert to examine the child's development (CDC, 2021).

***Erikson and Piaget***

Erik Erikson maintained that personality develops in a predetermined order through eight stages of psychosocial development, from infancy to adulthood. During each stage, the person experiences a psychosocial crisis which could have a positive or negative outcome for personality development. According to psychosocial theory, successful completion of each stage results in a healthy personality and acquiring basic virtues. Basic virtues are characteristic strengths that the ego can use to resolve subsequent crises. Failure to complete a stage can result in reduced ability to complete further stages and, therefore, an underdeveloped personality and sense of self. These stages, however, can be resolved successfully at a later time (Broderick & Blewitt, 2020).

This study focuses on the psychosocial development of early school-aged children in Erikson's fourth psychosocial crisis, industry (competence) versus inferiority, that occurs during the ages of six and twelve. Children at this stage learn to read and write, do math, and have autonomy. Teachers begin to take an important role in the child’s life teach by teaching the child-specific skills. At this stage, the child’s peer group will gain greater significance and become a major source of the child’s self-esteem. The child now feels the need to win approval by demonstrating specific competencies that are valued by society and begin to develop a sense of pride in their accomplishments. If children are encouraged and reinforced for their initiative,

they begin to feel industrious and confident in their ability to achieve goals. If this initiative is not encouraged, children begin to feel inferior, doubting their abilities, and therefore may not reach their potential. If the child cannot develop a specific skill, or feel society is demanding, they may develop a sense of inferiority (Broderick & Blewitt, 2020).

It is one of the stages of an individual's formation of identity. Identity results from integrating all the scattered parts, involving inner and outer worlds. Thus, identity has to be seen as multifarious. Understanding identity formation makes professionals aware of the importance of multicultural influences and psychological impacts (Parisian, 2015).

Middle childhood delivers many changes in children's life. During this period, children can learn to have independence from their caregivers on small tasks. Attending school gives regular social contact with peers. As friendship becomes, more important, physical, social, and mental skills development is the key to children's growth. (CDC, 2021)

According to Piaget, children aged seven to 11 are in the concrete operational stage of cognitive development in which they learn to think logically about the world. This involves mastering the use of logic in concrete ways. Children can use logic to solve problems tied to their own experience but may have trouble solving hypothetical problems or considering more abstract problems. Children use inductive reasoning, thinking that the world reflects their personal experiences. At this stage, children use logical principles to solve problems involving the physical world. For example, understanding the principles of cause and effect, size, and distance (Broderick & Blewitt, 2020).

As children's experiences and vocabularies grow, they build schemas and can classify objects in many different ways. Classification can include new ways of arranging information,

categorizing information, or creating classes of information. Many psychological theorists, including Piaget, believe that classification involves a hierarchical structure, organizing information from broad categories to specific items (Malchiodi, 2012).

***Mental Health in Children***

According to the Anxiety and Depression Association of America (AADA), anxiety disorders are the most common and widespread mental disorders in the United States (2016). AADA (2016) stated that approximately 8% of children and adolescents experience an anxiety disorder, and 40 million people in America suffer from it. Braus and Morton (2020) pointed out that the COVID-19 pandemic increased anxiety in many people over the last two years. As a result, schools provide services for students to help with stress management (Shields et al., 2020). Especially for children, early treatment of emotional difficulties and problematic behaviors positively affect their social skills and education (Rahnama et al., 2014).

According to CDC reports (2021), young children with mental health problems can show distinct characteristics of neurodevelopmental disorders such as anxiety disorder, attention deficit hyperactivity disorder, behavioral disorder, depression, post-traumatic stress disorder, and autism. Toxic stress can damage the brain structure and increase the likelihood of serious mental health problems. Due to brain development and its continued effects on other organ systems, toxic stress can harm both school preparation, academic achievement, and physical and mental health throughout life. Situations related to family stress, such as persistent poverty, can increase the risk of serious mental health problems. Children who have experienced recurrent abuse,

neglect, domestic violence, parental mental health, or drug abuse are particularly vulnerable (CDC, 2021).

Mental health is an essential part of children's overall health. It has a complex interactive relationship with their physical health and academic or career success. Both physical and mental health affects how they think, feel and act on the inside and outside. Untreated mental health problems in children and adolescents constitute a public health crisis (Center on the Developing Child, 2022). Mental health problems in children and adolescents can lead to negative consequences, including failure to complete high school, substance abuse, involvement with the correctional system, lack of vocational success, inability to live independently, health problems, and suicide (APA, 2022).

Some individuals demonstrate resilience and perseverance in overcoming serious challenges in early persistent abuse, trauma, and emotional damage; however, there are limitations in children's ability to psychologically recover from adversity (CDC, 2021). Even when children are placed in nurturing homes away from traumatic environments, improvement in development is often accompanied by continuous problems of self-regulation, emotional adaptability, relationships with others, and self-awareness (Weir, 2014). The exceptional efforts of supportive adults can help children to overcome these challenges. These findings emphasize the importance of timely intervention and prevention of situations that place children at serious psychological risk (CDC, 2022).

## Therapeutic Professions and Approaches

### *Play Therapy*

The Association for Play Therapy (APT, n.d.) describes play therapy as "a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psychosocial difficulties and achieve optimal growth and development." Rahnama (2014) noted that play therapy is a treatment technique for treating children with disorders, however, various applications of play therapy are used for children with emotional and behavioral challenges. Play therapy is generally recommended for children aged three to 12 because it is widely used to treat emotional and behavioral problems in children, and their ability to think abstractly has not yet been fully developed (Goodman et al., 2015). Petruk (2009) mentioned that "play is a child's language, the toys in the playroom considered the words a child uses to express their inner experiences and how they perceive and experience the world" (para. 2). Unlike most adults who can express their emotions, frustrations, worries, and personal problems in language, children are not fully developed in language and expression. Thus, play therapy may assist children in exploring their emotions or relationships through play. Play therapy maximizes the potential capability of children by making the treatment approach inherent in children's play behavior. Such processes promote social-emotional competence supporting academic, behavioral, and mental resilience (Jones et al., 2015).

The integration of Lego®s into the clinical supervision of play therapists was explored in a study by Peabody (2015). Peabody utilized Lego® Serious Play (LSP), developed by The Lego® Group, to support creative thinking and problem-solving. In the case study, Peabody conducted the modified LSP process with six to 12 adults during a clinical supervision group.

The outcomes found that building with Lego®s incorporated metaphoric storytelling and thinking and required creative expression. This impacted the participants' professional identity and connected their identity to their work environment.

***Social Work***

Professionals in social work provide tangible services to help people in need, including individuals, families, and groups. As stated in the International Federation of Social Workers:

> Social work is a practice-based profession and an academic discipline that promotes social change and development, social cohesion, and the empowerment and liberation of people. Principles of social justice, human rights, collective responsibility, and respect for diversities are central to social work. Underpinned by theories of social work, social sciences, humanities, and indigenous knowledge, social work engages people and structures to address life challenges and enhance well-being. (International Federation of Social Workers, 2014, "Global Definition of the Social Work Profession" section)

Social workers use creative activities to reduce problematic behaviors and improve children's social ability and competence with developmental difficulties (Goodman, 2015). Artistic creation enables people to express their feelings and experience a sense of accomplishment by looking at their completed results. This leads to strengthening their confidence, affecting positive sociability in children (Kim & Rru, 2008).

For example, children in foster care have high rates of adverse childhood experiences and are at risk for mental health problems. Many children in foster care experience neglect, abuse, and exposure to drugs or domestic violence (Malloy, 2017). Foster care social workers support children and families who are part of the foster care system. Their responsibilities include ensuring that children are sufficiently nourished, checking on their living conditions, offering

support to foster parents in need of help, monitoring a child's progress, and helping place children into appropriate foster families (International Federation of Social Workers, 2014). Art, imagery, and play are involved in helping children. Foster care social workers utilize toys and games that can teach them to mentally prepare themselves for a variety of life situations.

***Counseling***

Counseling is a cooperative effort between the counselor and the client. Professional counselors help clients identify goals and potential solutions to problems that cause emotional distress. It enhances communication, improves coping skills, and strengthens self-esteem. It contributes to behavioral changes and optimal mental health for people in need (American Counseling Association, n.d.). Counseling in school settings encourages students' academic, social, emotional, and personal development. Counselors monitor students' development by their needs, such as aiding in personal insight to develop problem-solving skills. Counseling guides students' decision-making strategies to improve their abilities and skills to adjust to their environment in a healthy way (Glosoff & Pate, 2002).

Brick-based counseling is an innovative and dynamic approach to supporting children's social learning and development in counseling environments. Through practical activities using Lego® blocks, children participate in creative expression and explore various social insights and skills. Art and creative expression allow children to express themselves and explore concepts more easily than just through conversation. By using Lego® bricks as an art medium to explore social and emotional topics, children can reflect on topics as they build and create meaningful structures to represent what they are thinking and feeling (Tulluck, 2020). Swank (2013) indicated that integrating tangible and playful materials within school counseling helps students grasp five skills - goal orientation competitiveness, invoking ego processes, adhering to rules,

and fostering interpersonal interactions. She demonstrated the development of these skills by managing student-led rule-setting and respecting the physical and emotional boundaries.

Kato and Morita (2009) also demonstrated the effectiveness of employing Lego®s in school-based counseling. The study suggested that the projective use of blocks is an attractive medium in counseling for adolescents who played with Lego®s during their childhood. They experimented with general features of the participants' Lego® creations to develop an expressive technique using blocks in counseling. They measured the number of blocks the participants used, the size of the area they covered, and the types of blocks they used to assess a form and content. They recruited 33 participants in their late adolescence with no known mental health diagnoses. In the study, the participants were provided Lego® blocks, including base plates (25cm x 25cm) and shapes like animals, plants, and figures. The participants could make anything they desired using the blocks. After completing the block creation, all participants were asked to describe their impressions of the block technique and their past experiences of using Lego®s. All the completed pieces by participants were photographed and measured using a computer program. The study found a significant positive correlation between the number and type of blocks that the participants used and their engagement and creativity.

***Lego® Therapy***

Making figures with Lego® blocks is simple, predictable, and repetitive. Griffiths (2016) pointed out that Lego® is a preferred intervention for children with autism spectrum disorder (ASD) because it is repetitive and structural. Children with ASD tend to work independently and gravitate to repetitive activities rather than work with other children (Andras, 2012). Challenges with social and communication skills are diagnostic indicators in ASD (Baron-Cohen, 2004). For example, children with ASD frequently do not react to other people nor start to communicate

with them (Ganz & Flores, 2008; Janzen, 2003), causing challenges in interacting with peers. The lack of social intervention can negatively affect children's behaviors and emotions, leading to difficulties in building interpersonal relationships (Kaale et al., 2011). Considering that social participation is an important factor in the quality of life and general functioning, it is vital to develop social functioning skills for children and adolescents with ASD (Linsay et al., 2017).

Legoff and Sherman (2006) conducted a Lego®-based study to increase motivation to participate in social skills and communication for children with ASD. They examined the growth of participants' social competence, which is incorporated with self-initiated social contact, duration of social interaction, and reductions in stereotyped behaviors. They compared the pre and post results of the Lego® therapy group (60 children) and the non-Lego® therapy group (57 children). It was a 3-year study where participants met for 90 minutes weekly, and pre- post-test assessments using the Vineland Adaptive Behavior Scale Socialization Domain and Gilliam Autism Rating Scale Social Interaction Subscale were completed. The results showed that the Lego® group improved social competence compared to the non-Lego® therapy group. Additionally, it was found that the use of Lego®s supplied significant improvement in a wide spectrum of social skills, including lessening autistic type social behaviors consistent with ASD.

Legoff (2004) designed a 12-week group with seven groups with seven participants ages 6 to 16 diagnosed with ASD called the Lego® Club. The goal of the treatment program was to improve social competence, specifically three component skills - motivation for social contact and social contact with peers, duration of social interaction including communication, and deceased autistic rigidity. Overall, the study supported the use of Lego® as a therapeutic instrument for improving social competence in children with ASD. With a suitable instrument, they can grow social competence.

Social competence is defined as an individual's ability to effectively apply social skills to reach their goals in social interactions (Magelinskaite et al., 2014). According to Magelinskaite et al. (2014), children who lack social competence struggle in academic adjustment in school. They are more likely to be rejected by their peers and get less positive feedback from teachers, resulting in feeling anxious and depressed. The researchers found a notable correlation between social competence, learning motivation, and school anxiety.

Providing an effective and engaging learning environment for children can develop their social competence and skills such as taking turns, sharing, problem-solving, and compromising. In particular, children with ASD have difficulty generalizing, which means it is hard for them to take what they have learned and apply it to different situations. Thus, Lego® therapy assists them in engaging socially with peers supporting generalizing skills resulting in anxiety reduction in social interaction (Linsay et al., 2017).

***Art Therapy***

Art therapy is a mental health and human service field that enriches the lives of individuals, families, and communities through human experiences and active art production, creative processes, applied psychology theories, and psychotherapy relationships (American Art Therapy Association, 2022). Malchiodi (2012) stated that art therapy is based on the idea that the creative process of making art promotes recovery and is a form of visual communication of emotions and thoughts, noting the value of art materials that make art therapy different from all other psychotherapy approaches. People engaged in art therapy are encouraged to participate in visual self-expression, like drawing, painting, or construction. Accordingly, art therapists need to experience various art media to understand how to utilize materials in the therapeutic process with numerous clients and treatment settings (Wadeson, 2010). The active, embodied, sensory

experience of engaging with materials creates a connection between individual and cultural histories. Physical and sensory responses are the core of any interaction between maker and material, providing immediate emotional feedback (Moon, 2010). Moon (2010) emphasized the importance of materials in art therapy,

> Materials and media have not often been the subject of focused examination in art therapy, they have provided the core means of expression in clinical practice, and thus materials and media are embedded in almost everything art therapists say and write about their work with clients. (p 4-5)

Each art material has its characteristics, purposes of use, and visual effects. Traditional art materials used in art therapy can be broadly defined as fluid or resistive (Lusebrink, 1990; Hinz, 2009; Malchiodi, 2012). A fluid material can be explained as a less controllable material, and on the contrary, resistive material is easier to control. Materials with structure or solidity are described as resistive or more controllable mediums. Materials that flow easily are represented as being fluid or less controlled. Both types of materials can be appropriately introduced to clients depending on clients' emotional or cognitive contents, material preferences, and creative processes for self-expression (Malchiodi, 2012).

Rubin (2011) asserted that art therapists prefer simple media and processes to more complex ones. Most art therapy sessions, especially in clinical settings, are limited in time. It is possible in ongoing art therapy to work on an individual or group project that extends over days and weeks. There is much to be said for media that permit the creation of satisfying products within the space of an art therapy session. This allows for consideration of the product and the process within a single time frame.

**Building Material in Art Therapy.** Preformed three-dimensional materials, like Lego® blocks, are an attractive tool for expression, as colorful blocks can spark children's imagination and make miniature three-dimensional space. Art therapists often encourage children to use art expressions as catalysts for storytelling, dance, or dramatic enactment. Visual and sensory art-based processes naturally promote performance, sound, and movement. Three-dimensional materials for the creation stimulate multimodal and integrative experiences involving artistic expression, play, and sound (Malchiodi, 2012). As stated by Taylor and Statler (2014), the use of materials is one of the central features of art therapy. Since the early development of the profession, art therapists have carefully selected the materials they use in the treatment process. Over time, they have converged ideas about the relationship between materials and expressed emotion.

As aforementioned characteristics of art material, Lego® bricks are resistive materials that permit clients to experience constructing and organizing skills. Lego® tends to elicit cognitive responses that evoke internal organization and contain emotional responses (Taylor & Statler, 2014). This kind of material can be effectively used to improve the problematic behaviors of children with ADHD. ADHD is a long-term neurodevelopmental condition. Its features include inattention to others instructions or interactions, forgetfulness, difficulties with organization or structure, impulsiveness, and low frustration tolerance, which may result in tantrum behavior (American Psychiatric Association, 2022). Throughout Lego® intervention, these symptoms can be reduced, affecting confidence or self-esteem. Linsasy et al. (2017) reported that group Lego® therapy improved ASD-specific behaviors and social interactions, participation, and confidence. She noted that Lego® intervention enabled children with ASD to express themselves in multiple ways, including eye contact, emotions, verbal expression, and

sharing materials. Because Lego®-based group therapy requires at least three roles: supplier, builder, and engineer, this could be a characteristic element of Lego® that is different from other materials. Through the collaboration of each role or experiences of each position, learning communication skills, turn-taking, and sharing can be expected. This improvement in socialization skills positively impacted problem-solving strategy with less frustration and increased confidence. There are many Lego® workshops for children with ADHD to facilitate them embracing perspectives, thoughts, and feelings of ADHD (Lindsay et al., 2017).

As mentioned earlier, it has been examined that the characteristics of Lego®'s (non-fluid, non-flexible, non-experimental) work differently for children with different problems (Moon, 2010). For example, it helped organize strategies for children with ADHD through an intervention that utilizes the nature of structured materials (Johnson et al., 2000). On the other hand, it facilitates social skills for children with ASD by using the characteristics of materials such that several pieces can be connected to create a finished work (Linsay et al., 2017). If so, it is necessary to look at how the resistive material promotes other aspects of therapeutic benefits. Moon (2010) explained that physical and tactile reactions are the core of the interaction between the creator and the material. She noted that "Bodily and sensory engagement, in turn, evokes memories and associations to times, places and experiences" (p. 61). That catalytic storytelling empowered self-expression (Malchiodi, 2012) for individuals with sensory impairments as a component of the therapeutic exchanges.

**Art Therapy in School.** There are three broad roles of school-based art therapists. Art educational therapists are counselors who combine an educational background in art therapy with art education. The role of this position is to provide art lessons while having the ability to identify pathologies from students' artwork. Clinical art therapists implement psychotherapy

using art to serve students referred from the school or family. Art therapists who focus on school personnel development. They are more like trainers who support school counselors, psychologists, and teachers by educating them about child development and art. Despite these unusual positions, art therapists within the education framework hold the key role of providing insight into their students and promoting students' emotional growth (Howie et al., 2013).

Keane (2017) specified the overall value of having art therapy in schools. When students are experiencing cognitive, emotional, and behavioral difficulties, therapists identify the symptoms and deliver interventions to support student learning. Accessing mental health services is frequently daunting and cost-prohibitive for at-risk students or families. Schools become the providers of mental health support to circumvent these barriers (Rowan et al., 2013). In schools, art therapy services effectively respond to students' diverse and altering needs. Art therapy helps by using art to restore healthy functions (Kapitan, 2014). Art therapy provides an effective means of solving problems because it provides an outlet for students to let their anxiety and aggression flow through the art-making process. The symbolic images allow students to express their feelings and thoughts about psychological conflicts and life experiences that are unable to be defined in verbal communication (Edwards, 2014). Art helps students organize the chaos of their inner world and antagonistic realities. Furthermore, art therapists can serve as a bridge between parents and teachers, thereby developing a more inclusive and comprehensive view of existing obstacles. Integrating art therapy services with other school services helps students, teachers, and families overcome obstacles and support students functioning (Keane, 2017).

Art provides children with the potential to tell stories, convey metaphors, and present worldviews through their art-making and subsequent reactions. The narrative qualities of children's artwork and their interest in narrating them offer the therapist a way to understand the

child's point of view. Specifically, conveying emotions and connecting these to the emotions of their inner world allows the therapist to respond through developmentally appropriate means (Malchiodi, 1998).

**Developmental Art Therapy**

Malchiodi (2012) noted researchers who recognized the power of art as a tool to enrich children's lives considering their developmental levels, including Viktor Lowenfeld, Edith Kramer, Geraldine Williams, Mary Wood, and Maureen Cox. Williams and Wood (1977) coined the term developmental art therapy based on their research on improving children's cognitive and motor skills. Lowenfeld's concepts of artistic developmental principles and Kramer (1993)'s idea of art as a healing factor. Lowenfeld (1987) established the stages of artistic development, and his theory still informs art therapists of the artistic learning theories. The artistic stages are related to children's developmental patterns as well. He claimed that there are five artistic developmental stages, beginning at age two: the scribbling stage, pre-schematic stage, the schematic stage, the gang age, and the pseudo-naturalistic stage. These stages are the development stages of the overall growth pattern, and art products are used as indicators of children's growth. Kramer (1993) considered children's cognitive and physical development in constructing a basic developmental model for providing materials. She noted the importance of materials and stated that certain tools allowing for versatility should be required in art therapy to provide a therapeutic experience. Based on Lowenfeld's concepts of artistic developmental principles and Kramer's idea of art as a healing factor, Rubin's model of artistic development

emphasized understanding children's cognitive, physical, and developmental status through engagement with materials.

***Definition and Population***

Developmental art therapy is most often applied to work with children whose cognitive or physical abilities deviate from the average range of their age group (Henley, 1992). The population generally includes children who may be challenged academically or using fine motor skills. It also includes children who demonstrate competencies above their same-aged peers. A developmental approach considers the level of a child's ability and capitalizes on art as the medium for improving skills in various aspects and overall development (Malchiodi, 2012).

The developmental approach to art therapy uses normative, creative, and psychological growth as a guide to understanding the individual. In Lowenfeld's (1957) theory, he presented that the art process contributed to many factors of a child's creative and mental progress. He believed that artmaking had the potential to enhance emotional well-being as a source of self-expression. He devised the term "art education therapy" to introduce the value of therapeutic and educational art activities with children who have psychological, cognitive, social, and physical barriers.

Throughout childhood, children follow expected, progressive changes in their artistic expression, developing artistic skills characteristic of each age group. Lowenfeld (1957) provided an overview of these stages' primary characteristics and graphic elements and approximate age ranges for each stage: the scribbling stage, the pre-schematic stage, the schematic stage, the dawning realism, the pseudo-realistic stage, and the decision stage. For most

children, these stages of artistic development follow neurotypical development. Some children may remain in one developmental stage for years. In other cases, the child may possess the ability to move forward but may need prompting or support from a skilled therapist. It is important to note that Lowenfeld's stages have not been rigorously reviewed to understand their applicability to a wide range of cultures and ethnicities.

Developmental art therapy focuses on fostering developmentally appropriate skills. Developmental art therapy supports behavior, communication, socialization, and areas in the pre-academic period (William & Wood, 1977). Additionally, Malchiodi (2012) listed three treatment goals in developmental art therapy - sensory stimulation, skill acquisition, and adaptation. Each of these goals will be further explained below.

**Behavior.** Behavior refers to encouraging or engaging children in activities. The behavior of art-making is part of a developmental process that begins with the child's kinesthetic encounters with the environment (Moon, 2016). It allows children to recognize and establish relationships with their environment. Before beginning the session, sensory activities such as smelling, tasting, and squeezing characterizes the child's engagement with the surrounding environment. In the therapy setting, the goal of introducing sensory materials is to enhance the child's cognitive, sensory, and motor awareness involvement (Malchiodi, 2012).

**Cognition.** Cognition, duration of focus, impulse control, and physical reactions to their surroundings are part of the process that begins to develop when children form relationships with their environment. Piaget (1952) believed that an individual's childhood experiences are vital and play an active role in a person's development. Specifically, the connection to nature and the

impacts on the development of human intelligence, including how knowledge is acquired and used. Based on Piaget's theory, children construct an understanding of the world around them, experience inconsistencies between what they know and what they discover in their environment, and then adjust their ideas accordingly.

**Communication.** Developmental art therapy expands communication skills for children by providing a non-verbal medium called art. Introducing novelty materials and experiences, it supports interest and participation (Riley, 2001). Communication includes the relationship between the therapist and other group members. Communication includes all forms of verbal and nonverbal interactions. When communication skills are improved, success in the ability to accept is experienced.

**Sensory Stimulation.** In addition, providing sensory stimulation increases awareness of the environment, sensitizes perception, and promotes independent thinking (Durrani, 2020). Through kinesthetic and sensory experiences, children process and gain insight by understanding their associations with the haptic nature of the art materials and their memory of the sensation. Sensory stimulation practices tactile, visual, muscle exercise and skills to interact with the therapist and other children using art and play materials. Children progressively construct knowledge and understanding of the environment by coordinating experiences through physical interactions with objects (Berger, 2014).

**Socialization.** Socialization is recognizing the existence of others and functioning as a member of a group. Sharing, taking turns, listening to others, and aiming for common goals can be developed through groups. Interacting with the therapist is also part of the socialization

process. In interactive group therapy, children can focus on actions and reactions that facilitate understanding and realizing that the world is continuously being reconstructed through interactions with others (Malchiodi, 2012). It teaches children responsibility, choice, and communal empowerment (Moon, 2016).

**Cognitive Process.** The entire academic course is a cognitive process that assists in solving problems. Learning skills to help identify senses, body coordination, classification, formalization, and recognition of details are necessary for developing more complex processing strategies. The cognitive process is reputational practice. This learning strategy is a tool for children to recognize abilities and discover their potential capabilities. Therefore, developmental art therapy supports cognitive development by focusing on individualized skill attainment. Thus, developmental art therapy focuses on individualized goals that follow logical processing and cognitive status.

**Skill Acquisition.** Skill acquisition is mastering increasingly complex motor skills through sequential steps from easy to difficult to learning a particular activity. For this goal, the therapist can break a task down into simple steps depending on the child's ability and duration of solving the task. Additionally, they offer materials consistent with the developmental level and physical and cognitive capabilities (Moon, 2016). Various materials can be introduced, including pre-art materials used for expression, the release of tension, and activities concerned with devising organizing routines. Consequently, children experience stimulation and enrichment rather than frustration or discouragement.

**Adaption.** Therapists have used multiple criteria to select the materials available in therapy settings, including personal preferences and considerations of a budget, time, and space limitations (Rubin, 2011). For some individuals, utilizing art materials and tools can be challenging. Thus, preparing appropriate materials and environment can encourage children's self-confidence and self-reliance (Malchiodi, 2012). For example, using a paint roller instead of a pencil could be a great example of an adaptation of material. Also, making adaptations to the art therapy space based on the client's needs. For example, using partitions to section the room into small spaces can decrease overstimulation for children with hyperactivity disorder and support therapeutic goals.

Aach-Feldman and Kunkle-Miller (2001) proposed a model of working with children with developmental and cognitive impairments in Piaget's early stages of development, sensorimotor and preoperational. They examined the connection with kinesthetic materials in each developmental level and suggested treatments that can foster sequential development of specific motor skills. They conducted a case study with five sessions on two children. They started with interview questions and then followed an art-making protocol. It combined two or three of the following: non-directive works with traditional and pre-art media, structured work with traditional art media, and structured work with pre-art media. According to their findings, pre-art materials played an important role in enhancing perceptions and sensations in conjunction with processing movement and reflexes in the sensorimotor phase. Gradual exposure to material reduced children's reluctance to external stimuli, and through a series of art-making activities, children could be prepared to work with traditional art materials later. In the preoperational

stage, various materials, including pre-art materials, collaborate with traditional materials and develop the concept of integrative material usage (mixing pre- and traditional materials) and sequential development of motor functions. The results supported the potential power of art-making stimuli, and the necessity of utilizing these materials for children's development.

Powers (2006) performed a case study with a 12-year-old Caucasian male diagnosed with ASD. The 36 sessions were implemented in a classroom from January 2003 until mid-April 2004. The participant had both individual and group sessions two to three times a week to provide opportunities for self-expression and self-exploration through the use of artistic mediums. The data collection included narrative notes and session art products. The data analysis used an evaluation tool that the researcher based on criteria set forth by Malchiodi's stages of artistic expression. This year-long study detailed the growing artistic development of this participant. At the beginning of the study, the child was transitioning from stage II (basic forms of artistic expression) to stage III (human forms and beginning schemas). At this stage, the goal for the participant was to foster self-expression and self-exploration. The researcher used drawing dot-to-dots to create images and observed that the child enjoyed the technique. The dot-to-dot allowed the child to move quickly through the task developing confidence in his skills, although this led to a repetition of the technique that appeared to stifle growth in independent image development. Thus, she sat next to the child and drew together to help him indirectly acquire new drawing skills. The ability to replicate an image was observed, such as drawing according to the car's shape drawn by the researcher and drawing the back seat he created. After four months, the child began to formulate imagery and developed new schemas. Moving into

stage III, The child drew human forms, paralleling Malchiodi's developmental description, described as "rudimentary human figures are often called tadpoles" (p. 96). In the final session, the child was documented to have achieved stage IV, which includes the development of a visual schema, meaning that he began to draw images that were realistic and recognizable with consistent recognition of the graphic indicators. "His tadpole people grew bodies and then legs, arms, hair, and even glasses. His cars became more clear and detailed; he no longer relied on the dots" (Powers, 2006, p. 80). Children can depict appropriate imagery with more concentration on scale, relationships of objects, and perspectives in this stage. The researcher noted that the approach effectively maximized the participant's potential in creating and communicating skills

***Material Usage in Developmental Art Therapy***

Social and emotional growth occurs when children meet their respective destinations (CDC, 2021). Expression in various art media and a keen understanding of each child's needs is vital to their social and emotional growth (Rosen et al., 2016). Initially, introducing tactile materials might serve as a prelude to learning artmaking or attaining the ability to use materials (Malchiodi, 2012). Rubin (2011) recommended utilizing three-dimensional materials, clay, or fabrics with different textures or other tactile materials because they maximize touch, exercise fine motor skills, and support relaxation and control through non-indicative approaches. Wong and Au (2019) also noted that tactile materials train children's visual perception to improve cognition.

***Assessments in Developmental Art Therapy***

Malchiodi (2012) stated that most art therapists who work from a developmental framework conduct an initial assessment to determine goals and objectives for future sessions. She explained that assessment is based more on the stages of normal artistic development as a basis for evaluation rather than the symbolic content of the artistic expression. For example, children with developmental disorders are likely to have a delay in varying degrees of creative expression.

Betts (2013) summarized administration, setting, demographic data, and the effects of cultural differences on the results of the Levick Emotional and Cognitive Art Therapy Assessment (LECATA). LECATA was developed as a school-based tool to evaluate the therapeutic needs of children with special needs. Betts highlighted that the LECATA is the only art therapy assessment that scores developmental milestones manifested in graphic images in the cognitive and emotional domains. It can provide an overview of the child's developmental level. "With the LECATA, the art therapist can make a specialized contribution to the treatment team, providing information that has been gathered from drawings, creating access to understanding inner often hidden aspects of the individual's world, particularly when the individual is resistant, nonverbal, or highly defended" (Levick, 2001. p 3).

Art therapists employ various tools and methods for cross-cultural research resulting in interesting findings and implications (Malchiodi, 2012). This work highlighted the need for culturally sensitive approaches in art therapy, especially about assessment and diagnostic measures. With increased communication and the use of appropriate assessments in accordance

with clients' developmental and cognitive states, art therapists should be able to improve their cultural competence about the evaluation of clients (Betts, 2013).

***Role of Therapist***

Developmental art therapy applies to different populations, including children with anxiety, ADHD, or adolescents. It effectively explores attachment issues and trauma reactions throughout childhood and adolescence. Malchiodi (2012) notes that a developmental approach can serve as a basis for all art therapy approaches with children because it provides a method of evaluation and a framework for identifying treatment goals and objectives based on the foundation of normative artistic expression and brain development.

Vick (1999) noted the effectiveness of structured artistic intervention in group treatment. He designed the program for adolescents who had short-term stays in psychiatric hospitals. The participants' age range was 12 to 18, and the lengths of stay averaged from one to several weeks. He supplied the following media: magazine pictures, magazine words, photocopied images, cut and torn paper, traced shapes, and partial drawings. The program operated six hours a day and five days a week. Vick (1999) selected the materials and created structured directives so that the participants could "pursue a direction in their work that is more truly reflective of their personal issues" (p. 75). He described the findings obtained from the study as follows, "by creating and providing pre-structured art elements as the stimulus for artmaking, the art therapist can deemphasize more overtly directive verbal tasks in favor of an approach that allows the art material itself to create a structural framework" (Vick, 1999, p. 74-75). Awareness of the environment derived from sensory stimulation allowed nonverbal expression in art and

communication between group members or therapists. Pre-structured approaches enable freedom and have the potential to support goals such as within the structure, which is consistent with the aforementioned goals, behavior, cognition, and sensory stimulation.

As explained earlier in this chapter, using Lego® in a therapy setting promotes various benefits. It facilitates self-expression (Irie & Ohmori, 1991) and self-awareness, a sense of acceptance (Kato, 2013), adaptability, and creativity (Harries, 2017), and reduces stress and problematic behaviors (Shields et al., 2020). The Lego® intervention applied not only to individuals but also to groups depending on the treatment goals. Lego® is already widely utilized as a therapeutic tool in multiple fields, including clinical, medical, psychological, and educational environments (Groenewald, 2021). In particular, Lego® is a preferred material for children according to the purpose of Lego®'s initial development as a toy (Rahnama et al., 2014). Children can receive training for creativity and fine motor skills through play with Lego®s (Legoff et al., 2012). In addition, Lego®-based group therapy can help children experience collaboration and develop social skills (Legoff, 2016). The therapist's professional knowledge of the child's development process should be prioritized to achieve those strategies (Malchiodi, 2012). An accurate understanding of children's developmental level and providing an appropriate directive with Lego® will bring children the growth in behavior, cognition, communication, motor, and social skills, cognitive process, skill acquisition, and adaption.

# Chapter IV

## Results

It was hypothesized that children with depression, anxiety, and behavioral problems, and ASD would benefit from art therapy interventions utilizing Lego®s with consideration of the client's cognitive, social, and artistic developmental level. Lego® provides chances for self-expression and awareness, acceptance, adaptability and creativity, stress reduction, and behavioral modification. Additionally, this research suggests the efficacy of using Lego® for individuals and group settings.

The data used in this study included scholarly articles and books with search engines. The specific search terms and topic qualifiers were used, and it is related to Lego® (Lego®, Lego® therapy, play therapy, social skills, collaborative play, social competence, group therapy), children, and autism (autism spectrum disorder, autistic disorder, development disorder, Asperger syndrome).

This review includes 15 articles published over 21 years. It involved 238 participants with various Lego® interventions. Common components of successful interventions included having group therapy with or without one-on-one treatment. 11 articles introduced group interventions, and four articles conducted individual sessions, among 15 studies in total. The studies were directed by a clinician, therapist, or educator. The minimum time was 20 minutes per week for at least one weekly 3-year-session time.

Although, the outcomes of Lego® varied depending on the main focus or field of study. Out of 15 journals, six were based on art therapy, and three were in the fields of Lego® therapy

and play therapy. The areas of application of the two articles were psychology, and one was found in the educational field.

Table 1 shows the types of resources in the data. The structure of formatting the data was primary, secondary, journal, book, and website. The finding of information gathering in Table 1 displays that eighty percent of the resources were acquired through Google Scholar, IUCAT, and the American Art Therapy Association, which had the most resources used. The search engine shows that the least number of resources was from Lego.com, a website of the Lego® company. Table 2 organizes the search engines by their relevant content. Figure 1 demonstrates the percentage of the search engines used for the literature review.

**Table 1**

*Types of Resources*

| Types of Resources | Primary | Secondary | Journal | Book | Website |
|---|---|---|---|---|---|
| Americanarttherapyassoiation.org | X | X | X | | X |
| A4pt.org | | X | | | X |
| EBSCO | X | X | X | | |
| Scholar.google.com | X | X | X | X | |
| IUCAT | X | X | X | X | |
| Lego.com | | | | | X |
| World Health Organization | | X | | | X |

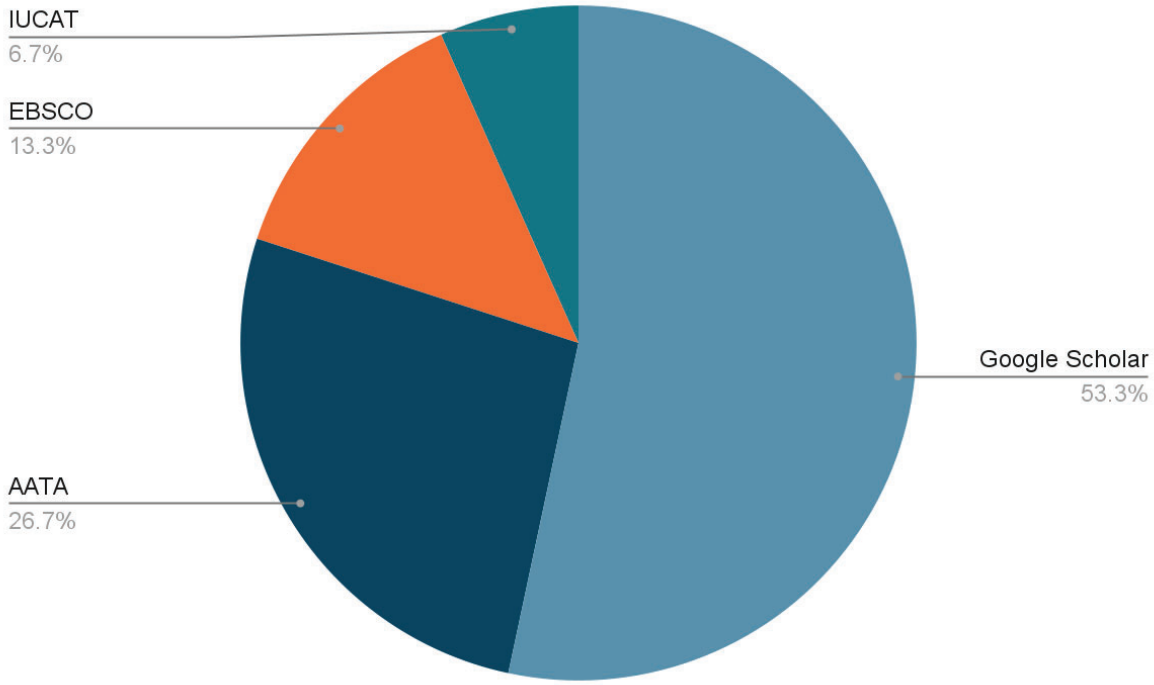
**Table 2**

*Search Engines 1*

| Search Engines | Lego® | Art Therapy | Children with anxiety, depression, or ADHD | Developmental Art Therapy | Development in Children |
|---|---|---|---|---|---|
| Americanarttherapyassoiation.org | X | X | X | X | X |
| A4pt.org | X | | X | | |
| EBSCO | X | | X | | X |
| Scholar.google.com | X | X | X | X | X |
| IUCAT | X | | X | | |
| Lego.com | X | | X | | |
| World Health Organization | | | X | | X |

**Figure 1**

*Search Engines 2*



Appendix A listed the search term containing different keywords and modifications. Appendix B included the literature matrix, which organized relevant scholarly studies and resources as author, keywords, search engines, types of resource. Additionally, it showed patterns and themes that could possibly address the answers to focused research questions. The first theme targeted on the population, which are the client's age and diagnosis, and number of individuals within each resource. The second theme focused on Lego® interventions used in the resource. The third theme included the main purpose of Lego® interventions related to clients' cognitive, psychological, physical status and diagnosis. The fourth theme demonstrated the results of intervention.

After conducting the integrative literature review, the researcher confirmed that Lego® is actively used in Lego® therapy, where studies on behavioral patterns and improvement of social skills of children with ASD are being conducted. Furthermore, Lego® was widely used as a learning material and tool for education.

Based on the literature, the researcher identified areas where information was limited: use and an experimental case of Lego® being used for art therapy, other materials or directives were combined besides using Lego®s as a single material in therapy, research of Lego® based on developmental art therapy.

# Chapter V

# Discussion

## Overview

This study explored the components of Lego® for children and youth that support it as an effective intervention. The focus on children and adolescents is vital because inherent social deficits can lead to social exclusion compared to typically developing peers. Lego® is a versatile and easy-to-use building material that has the potential to improve social and behavioral outcomes for children. Analyzing the role of Lego® for children can help inform the further development of such interventions and how the material can be used in the clinical setting.

The research hypothesized that utilizing Lego® interventions would increase participation and interest in therapy sessions. It aimed to provide an overview of the benefits of using Lego®, the introduction of areas where Lego® is being used, the degree of development in clients with Lego® application, and the consideration of Lego® as a tool in developmental art therapy.

### *Benefits of Using Lego®s*

Lego® intervention is an artistic method optimized for the characteristics of the targeted population, environment, and purpose. Lego® blocks are an attractive precast tool for children to express themselves with three-dimensional materials. The colorful blocks can stimulate children's imaginations and enable them to make a miniature version of three-dimensional space. Building small societies and characters addresses children to establish relationships between the characters and the places. The process allows children to practice social skills and behavioral and interpersonal training. Rahnama et al. (2014) found the effectiveness of reducing behavioral

problems in early school-aged children with behavioral difficulties. The study emphasized the characteristics of play that appropriate their energy level as a form of fun and active games in therapy can increase children's participation and lessen tension and emotional aggression. Legoff and Sherman (2006) found that Lego® intervention increases motivation to participate in social skills and communication for children with ASD. The research resulted in the growth of participants' social competence. They observed improved self-initiated social contact, duration of social interaction, and reductions in stereotyped behaviors of ASD.

***The Fields Where Use Lego®s***

Lego®s or building bricks are often used in various fields related to psychological areas. The materials are not only used as a tool in therapy but also served in program development. In particular, art therapy considers the importance of materials and uses them as a medium to connect therapists with clients or clients with their inner voice.

Art therapists often use artistic expression as a catalyst for directing and delivering stories to children. In that respect, Lego®'s characteristics that allow the creation of a simulated society can be a valuable tool to express children's unconscious thoughts, even for children who lack confidence in art activities.

Lego® therapy is a social development program that uses Lego® interventions within a group or individual setting to support the growth of a wide range of social skills in children with ASD. They tend to work independently rather than as a team and gravitate to repetitive activities (Andras, 2012). For that reason, making figures with Lego®s is a preferred intervention for children with ASD. The material's simple, predictable, and repetitive features match the

characteristics and needs of children with ASD. They can grow their social competence which incorporates social functioning.

Play therapy often utilizes Lego®-based interventions that are a method of building social competence in young children. It is a collaborative work where children can partner together and learn communication strategies. Using bricks in play therapy may assist children in exploring their emotions, practicing how to express their feelings, and learning about relationships through play.

The Lego®-based practice is an innovative and dynamic approach to supporting children's social learning and development in counseling environments. Children can explore various social skills and develop insights by participating in practical activities using Lego®s. It allows children to express themselves and explore circumstances around them more easily than just through conversation. Children can reflect on topics as they build and create meaningful structures to represent their thoughts and feelings (Tulluck, 2020).

STEM in education is a representative field that mainly uses Lego®s to increase learning efficiency for students. They teach children problem-solving skills and imaginative and critical thinking. It requires constructing shapes, patterns, and volumes, which serve as the direct experience of math. Providing an entertainable learning environment with the material broadens students' engagement and motivation in academics (Park et al., 2016).

***Developmental Gains as a Result of Lego® Intervention***

Providing Lego® activities following children's developmental levels can facilitate their ability to express themselves. Building bricks demands creative thinking that produces many

shapes and color combinations (Wolf, 2014). The process has the potential to tell stories, articulate metaphors, and view how they see their society. It contributes to many factors of a child's creative and mental development, as Lowenfeld claimed. He believed that artmaking promotes children to enhance emotional well-being as a source of self-expression (Lowenfeld, 1957). Completed Lego® pieces that reflect the creator's emotions or circumstances can separate the creator from them. The narrative qualities of children's artwork and their interest in narrating them offer themselves or therapists a way to understand the creator's point of view (Malchiodi, 1998). Specifically, showing emotions and connecting or detaching them using blocks allows the therapist to analyze and respond to them through developmentally appropriate resources.

***Applying Lego® in a Developmental Approach***

Kramer (1993) pointed out that the importance of materials and specific tools that permit versatility in art therapy should be required to provide a therapeutic experience. She considered children's cognitive and physical development in constructing a basic developmental model for supplying materials. Developmental art therapy fosters developmentally appropriate skills, such as age-appropriate behaviors, emotional regulation, and social manners. The study of Kato (2013) indicated that collaborative creation using Lego® blocks enhanced adolescents' sense of acceptance and socialization abilities. Both verbal and non-verbal communication naturally guided the participants to divide roles during the intervention. They understood their specific roles and responsibilities that supported sharing ideas and led to self-confidence in the group. Likewise, in young children, playful Lego® interventions reduced their problematic behaviors

and emotional regulation. For school-aged children, Lego® robots provide the opportunity to experience self-achievement and enhanced cognitive and emotional growth.

Rubin's model of artistic development in developmental art therapy emphasized understanding children's cognitive, physical, and developmental status through engagement with materials.

***Major Findings, Themes, and Outcomes***

The outcomes of the studies based in the field of art therapy reported self-expression, sense of acceptance, stress reduction, development of the motor function, self-exploration, creativity, and communication skills. The active, embodied, sensory experience of engaging with materials creates a connection between individual and cultural histories. As Moon (2010) stated, physical and sensory responses are the core of any interaction between children and materials, and it is to provide immediate emotional feedback. The tactile materials become a tool for children to express thoughts and emotions about psychological conflicts and life experiences that are difficult to articulate in verbal communication (Edwards, 2014).

The results of the studies in the area of Lego® therapy reported improvement in social competence and communication skills. In this field, most of the studies focused on children with ASD, followed by the fundamental purpose and goal of Lego® therapy. Lego®-based interventions increased motivation to participate in social skills and communication for children with ASD (Legoff and Sherman, 2006). Lego® therapy is a social skills activity working within a peer group. When children are in session, children are more likely to interact with each other through collaborative work. It facilitates children to grow social and communication strategies by turn-taking, sharing, listening, conversation, teamwork, and problem-solving. Furthermore,

one of the three studies shows that activities using Lego® bricks supplied significant improvement in a broad spectrum of social skills, including lessening autistic type social behaviors consistent with ASD.

The outcomes of the studies based in the field of play therapy reported enhancement of creative thinking, problem-solving skills, and parent-child relationships. According to Petruk (2009), play is a child's language, and toys are their words to express inner experiences that contain how they perceive the world. Thus, the selection of materials, which can be their words, and the intervention of materials are crucial depending on the degree of their cognitive and physical development. The integration of Lego®s into the clinical treatment improved children's creative thinking and problem-solving in the study of Peabody (2015) by adapting the LSP program.

The results of the studies in psychology reported improvement in cognitive skills and stress reduction. Cook et al. (2010) demonstrated the maintenance of motor skills of children with cerebral palsy and related motor conditions and improvement of cognitive abilities in their study that utilized Lego® robots. Experiencing a sense of accomplishment is essential for children with disabilities. The Lego® robots provided the opportunity to experience self-achievement, and it supported their motivation to engage in play and enhanced cognitive and emotional growth.

The outcomes in the field of education reported stress reduction in children that are affected by their anxiety. Shields et al. (2020) stated that psychological symptoms resulting from stress affect a child's emotional and mental health and physical development. These effects

appear in mood disorders, such as anxiety and depression, cognitive difficulties, and problematic behaviors. Therefore, stress management with suitable tools and directives to decrease stress is important for children's overall health. Many Lego® sets in the market require following directions to help reduce stress. The study of Shields et al. (2010) indicated that assembling Lego® bricks and sensory engagement of the material itself assisted in reducing anxiety and stress. It shows that sensory activity improves mental well-being by reducing stress and anxiety.

Social and emotional growth occurs when children meet their individual developmental needs (CDC, 2021). Therefore, expression in various art media and a keen understanding of each child's needs is vital for the child's social and emotional growth (Rosen et al., 2016). As Rubin (2011) recommended, utilizing three-dimensional materials such as clay or fabrics with different textures and other tactile materials maximizes sensory acquisition. Additionally, it provides opportunities to exercise fine motor skills and support relaxation and control through non-indicative approaches. This recommendation can be applied to the use of Lego as a therapeutic material.

**Limitations of the Review**

Using Lego® bricks in therapy presented children's engagement with the material and collaborative activity during the interventions. It was encouraging to see the consistently positive outcomes, despite the variations in methods and measures used across the studies. However, there was not much research directly connected Lego® and art therapy. Moreover, there was not much information about the delivery method and setting that affected the results in the few studies.

# Chapter VI

## Conclusion and Recommendations

This literature review provided information on the particular material, Lego®s, an overview of its benefits and fields of using Lego® interventions, knowledge of developmental stages of children and adolescents, and appropriate application of Lego® in school-aged children.

This review suggests that utilizing Lego® in art therapy considering psychological, cognitive, and artistic developments of children and adolescents has positive outcomes. They appeared in stress reduction, behavioral modification, improving social competence, enhancing self-expression, and learning problem-solving skills. The data was collected through research from various journal articles and books that utilized Lego® directives and hypothesized the effectiveness of specific populations regarding their diagnosis and developmental levels. Lego® interventions based on multiple clinical fields in this review had presented positive results for children and adolescents. Those interventions focused on emotional development and social growth that will be a foundation for them to become competent social members.

### Recommendations

Despite numerous advantages of Lego® intervention, current research tends to spotlight Lego® programs for children with ASD or STEM education due to the origin of the material. Several studies have already reported that the use of Lego® not only improves the social skills of children with ASD, reduces anxiety and stress in children, and enhances attention and problem-solving skills. Moreover, reports on the use of Lego® as research data in the field of art therapy that emphasizes the importance of art materials are very limited. Considering the characteristics

and accessibility of the material, more Lego® intervention research data within developmental art therapy is recommended. Therefore, further research on this topic with larger sample sizes would be recommended first. In addition, future research will be needed to investigate differences in outcomes and experiences within the program in different fields. More research is also necessary to design a Lego® intervention for school-aged children by determining the practical components of Lego and how they relate to individuals' needs. These can soon be linked to children's academic achievement in the case of school-aged children. The findings of this study can be a guide for school-based therapists, educational professionals, and parents to provide effective treatment for children. It may help academic improvements and social abilities and enhance family communication.

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## Appendix A

**Search Terms/Keywords**

| Keyword | Modification 1 | Modification 2 | Modification 3 | Topic Qualifier |
|---|---|---|---|---|
| Acceptance | Acceptance and Art | Acceptance in Art | | Creation<br>Friendship<br>Lego®<br>Lego® Block<br>Relationship |
| Adaptability and Creativity | Adaptability | Creativity | Adaptability or Creativity in Art | Creation<br>Fine Motor Skill<br>Lego®<br>Lego® Block<br>Lego® Robot<br>Occupational Therapy<br>Sensory Skill |
| Art Therapy | Art or Therapy | Art and Therapy | Art Therapy and School | ADHD<br>Anxiety disorder<br>Art<br>Art Educational Therapy<br>Art therapy<br>Building<br>Depression<br>Lego®<br>Lego® Intervention<br>Material<br>Mental Health |

| | | | | |
|---|---|---|---|---|
| | | | | Self-expression<br>Student |
| Behavioral Modification | Behavioral problem | Disruptive behavior | | ADHD<br>Behavioral Difficulty<br>ODD<br>Physical Outburst |
| Counseling | Counseling or Art | Counseling and Art | | Art and Creation<br>Brick-based<br>Counseling<br>Counseling in School<br>Counselor |
| Developmental Art Therapy | Development or “Art Therapy” | Developmental Approach | | Adaption<br>Art<br>Artmaking<br>Assessment<br>Behavior<br>Cognition<br>Cognitive Process<br>Communication<br>Developmental Approach<br>Lowenfeld<br>Material<br>Sensory<br>Skill Acquisition<br>Stimulation<br>Socialization |
| Lego® | Lego® or Blocks | Lego® or Bricks | Building material | Children<br>Construction |

| | | | | |
|---|---|---|---|---|
| | | | | Learning |
| Lego® Therapy | Lego® or Therapy | Lego® and Therapy | | ASD<br>Communication Skill<br>Participation<br>Socialization<br>Social Competence |
| Play Therapy | Play or Therapy | Play and Therapy | Play and Lego® | Children<br>Expression<br>Lego®<br>Play Behavior<br>Resilience |
| Self-expression | Self-expression or “Art Therapy” | Self-expression and “Art Therapy” | | Artmaking<br>Emotion<br>PTSD<br>Self-awareness |
| Social Work | Social Work or Art | Social Work and Art | | Foster Care<br>Social Ability<br>Social Competence<br>Social Service |
| Stress Reduction | Stress Reduction and Art | Decrease stress and Art | Lower stress and Art | Building Legos<br>Mental Health<br>Physical Health<br>Stress Management |

**Appendix B**

**Literature Matrix**

| Author/Date | Search terms/ Keywords | Search Engine | Type | Population | Intervention related to Art Therapy | Purpose | Result |
|---|---|---|---|---|---|---|---|
| Aach-Feldman, S., & Kunkle-Miller, C. (2001) | | IUPUI Library | Secondary | X | X | X | X |
| Belkofer, C., & Hecke, A, V, V. (2014) | | Journal of the American Art Therapy Association | Primary | X | X | X | X |
| Cook, A. M., Adams, K., Volden, J., Harbottle, N., & Harbottle, C. (2010) | | Google Scholar | Primary | X | | X | X |
| Harn, P., & Hsiao, C. (2018) | Lego®-based, workplace stress reduction, | Google Scholar | Primary | X | | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Lego® SERIOUS PLAY, Six Bricks | | | | | | |
| Huskens, B., Palmen, A., Van der Werff, M., Lourens, T., & Barakova, E. (2015) | ASD, children, robot-intervention, Lego® therapy, collaborative play | Google Scholar | Primary | X | | X | X |
| Johnson, B, D., Franklin, L, C., Hall, K., & Prieto, L, R. (2000) | | Google Scholar | Primary | X | | X | X |
| Kato, D., Asai, M., & Yoshie, M. (2013) | Lego® Blocks, acceptance by others, Ibasho, collaboration, construction, group | Journal of the American Art Therapy Association | Primary | X | X | X | X |
| Kato, D., & Morita, M. (2009) | | Journal of the American | Primary | X | X | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Art Therapy Association | | | | | |
| Legoff, D. B., & Sherman, M. (2006) | Autistic spectrum disorders, Lego® therapy, social skills | Google Scholar | Primary | X | | X | X |
| Legoff, D. B. (2004) | Social skills, autism, group therapy, play | EBSCO | Primary | X | | X | X |
| Peabody, M. A. (2015) | Play therapy, professional identity, supervision, metaphors, Lego® SERIOUS PLAY | Google Scholar | Primary | X | | X | X |
| Powers (2006) | | Google Scholar | Primary | X | X | X | X |
| Shields, M., Hunnell, W., Tucker, M., & Price, A. (2020) | Anxiety, mental health, young adults | EBSCO | Primary | X | | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rahnama, F., Hamedi, M., Sahraei, F., & Parto, E. (2014) | Play therapy, Lego® therapy, behavioral problems | Google Scholar | Primary | X | | X | X |
| Vick, R. M. (1999) | | Journal of the American Art Therapy Association | Primary | X | X | X | |