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Effects of a Lego® Intervention on Social Skills in Kindergarten Children with Autism Spectrum Disorder

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EFFECTS OF A LEGO® INTERVENTION ON SOCIAL SKILLS IN KINDERGARTEN CHILDREN WITH AUTISM SPECTRUM DISORDER.

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Dissertation Approval

This is to certify that the thesis presented to us by Marissa Yalamanchili

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Abstract

This study seeks to explore the outcomes of participation in a LEGO® group on social skills in kindergarten students with an Autism Spectrum Disorder diagnosis. Specifically, the researcher hypothesized that the students who participated in the LEGO® group would demonstrate greater increases in peer socialization, adult socialization, and social/emotional reciprocity, as measured by the Autism Spectrum Rating Scales (ASRS). Participants consisted of six students with an ASD diagnosis who were in kindergarten in a public school district in suburban New Jersey. A single case study with multiple participants design was employed to investigate patterns of performance among students in the treatment and control conditions. ASRS *T* scores were reported for participants at pre, peri-, and post- intervention. Additionally, dependent samples *t* tests were used to changes in behavior pre- and post- intervention implementation. Gender differences were also considered.

Although the participants in the LEGO® group as a whole failed to make greater social skill gains than the participants in the control condition, they did make individual improvements in social skills as defined by the ASRS, so the LEGO® group should continue to be considered when selecting an intervention for children with an ASD diagnosis in school. Therefore, the implications of these findings extend past the scope of this article to the educational setting itself. Given the fact that positive changes were reported in those who participated in the LEGO® group could indicate, potentially, that this may be a useful school-based intervention for students with social skill deficits.

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Chapter 1: Introduction

Introduction

Advances in Autism Spectrum Disorder detecting, screening, and diagnosing have resulted in a large population of students in school who stand to benefit from social skill remediation. In addition to academic support, students with Autism Spectrum Disorder require social, emotional, and behavioral intervention to maximize their functioning not only at school, but also at home and in the community. Academic success and well-developed social skills are often dependent upon one another, and a deficit in one area may lead to a deficit in the other. For example, language impairment, often related to Autism Spectrum Disorders, can be associated with social communication weaknesses (Fujiki, Brinton, McCleave, Anderson, & Chamberlain, 2013; Liber, Frea, & Symon, 2008). Therefore, students who have a language deficit may also have difficulty making validating comments to their peers during social play (Fujiki et al., 2013).

Communication is also necessary for developing interpersonal relationships (Erozkan, 2013; Liber, Frea, & Symon, 2008). Subsequently, children who have difficulty with expressive and receptive language will also have trouble with establishing appropriate interpersonal relationships; the quality of one's communication ability correlates with the quality of his or her interpersonal relationships (Erozkan, 2013). A relationship between cognitive, affective, and behavioral communication skills and social self-efficacy appears to exist (Erozkan, 2013). Furthermore, academic achievement (e.g., language) is positively related to social skills (e.g., social communication), and an inverse relationship also appears to exist.

Children who have peers and teachers who believe that they are skilled socially are more popular and are better liked by their peers, have more central positions in their social groups, and have more reciprocal friendships than children who have peers and teachers who believe they possess lesser degrees of social skills (Kwon, Kim, & Sheridan, 2012). Furthermore, students with a greater degree of social skills may perceive school more positively and perform higher academically (Engle, McElwain, & Lasky, 2011; Kwon, et al., 2012). Having friends in the classroom is related to less loneliness, less social discontent, and fewer internalizing problems among students (Engle, McElwain, & Lasky, 2011; DeRosier, Swick, Ornstein Davis, Sturtz McMillen, & Matthews, 2011). Likewise, establishing and maintaining friendships promote increased social competence, higher academic performance, better social skills, and school involvement. High quality friendships correlate with well-developed social skills, whereas poor quality friendships correlate with greater externalizing behavior problems (Engle, McElwain, & Lasky, 2011; Glick & Rose, 2011).

Statement of the Problem

According to the CDC, 1 in 88 children were diagnosed with ASD in 2008, and in 2010 this number increased to 1 in 68 (Baio, 2014). This is a 22.72% increase in prevalence over a two year period. In 2000, 1 in 150 children were diagnosed with ASD, and this corresponds to a 54.67% increase over a ten year period (Baio, 2014). Given the rise in students who are diagnosed with Autism Spectrum Disorder, school districts are welcoming increased numbers of students through their doors who are in need of special education and/or related services. Schools are legally responsible for providing students with a free and appropriate education; this includes those with documented disabilities.

Education for this type of learner involves remaining in compliance with the state code for special education, following Individualized Education Programs (IEPs), and offering various special education programs and related services. Students with disabilities (including those with Autism) require specific support and services, in addition to those supplied to their typically developing counterparts. It is important to select appropriate interventions for identified students in order to ensure progress or measureable gains. The "spectrum" nature of this disorder creates additional challenges when attempting to select the most appropriate intervention for a given student. There are various social skills intervention programs available to schools that promise skill remediation; however, schools continue to seek more effective programs that produce optimal results.

School districts are clearly responsible for seeking such programs, given the increased need for providing support to learners with an Autism Spectrum Disorder diagnosis. This is especially true, given the trend toward "least restrictive environment", as well as the importance placed on educating students among their typically developing peers. In order to accomplish this, school districts are required to provide students who have disabilities with the necessary programs, modifications, therapies, interventions, and support services. In order to supply students with the most effective services and appropriate education, school districts need to establish uniformity among their interventions, service delivery progress monitoring, assessment tools, and data collection. Compounding this is the inevitable need for increased resources, specifically in monetary form. Therefore, cost-effective interventions that can be incorporated into the school day are of great value to school districts. Practical, low cost, and effective interventions are

appealing to school districts as they support their exceptional learners and reduce their financial demands.

Interventions also need to take into account gender differences when they are being developed. Researchers found that the sense of sharing develops earlier in girls than in boys, and that children demonstrate sharing behaviors during middle childhood (Malti, Gummerum, Keller, Chaparro, & Buchmann, 2012). During this time period, children may also indicate not only increased sympathy towards unknown individuals, but also feelings of social acceptance (Malti, et al., 2012). Therefore, when designing social skills interventions for school-aged children, these developmental and gender-related differences should not only be acknowledged, but also steer the activities and goals of the group. Trust in others has also been found to increase following participation in collaborative expression using LEGO® blocks (Kato, Hattori, Iwai, & Morita, 2012). Developing trust in peers may contribute to an increase in sharing behaviors, something that is implicated in cooperative play. This suggests that many other factors are involved in play activities, especially when specific and designated roles are involved.

Based on these aforementioned findings, further research is warranted to produce effective social skill interventions including measures of progress monitoring. Despite the vast amount of social skill intervention literature, many fail to provide empirical evidence (LeGoff, 2004). This includes the outcome efficacy for improving social skills and variables affecting outcomes. Furthermore, “social skills” are not always operationally defined, thereby leaving specific areas found to be significantly improved post intervention unclear (LeGoff, 2004). Although it appears that LEGO® therapy is a viable option, other literature suggests that direct instruction may result in greater social skills

gains than do play activities (Kroeger, Schultz, & Newsom, 2007). On the other hand, another study indicated that, over a three-year period, students with Autism who had participated in a LEGO® group made significantly greater social skill gains than children with Autism who received assistance from 1:1 paraprofessional in school over a similar number of hours (Owens, et al., 2008). Also, the long-term effects of LEGO® therapy remain unknown, as well as whether or not LEGO® blocks will be equally motivating and engaging for students as they get older (LeGoff, 2004). In conclusion, more research regarding accurate measures of and interventions for social skills in children with an Autism Spectrum Disorder diagnosis is warranted to determine the most beneficial tools for designing interventions and for monitoring outcomes.

Purpose of the Study

The purpose of this study is to evaluate a social skills program for kindergarten–aged children with an Autism Spectrum Disorder diagnosis. Specifically, the intervention is based on LEGO® therapy and uses a group approach to building social skills. An advantage of LEGO® therapy is that it uses children's natural interest in play to motivate behavior change (Owens, Granader, Humphrey, & Baron-Cohen, 2008). It is a social skills intervention centered on collaborative play. Groups consist of three participants, each of whom takes on a specific, designated role: the "engineer", "supplier", or the "builder". LEGO® therapy involves a "social division of labor", and each participant must follow specific rules for creating the design. It is highly collaborative in nature, and participation in the LEGO® group itself is the reward (Owens, et al., 2008). LEGO® therapy is economical (requiring only the purchase of LEGO® blocks) and can be completed in a short period of time. This type of therapy may facilitate group

communication and increase social skills in each participant involved. Unfortunately, studies involving LEGO play therapy for social skill remediation in children with Autism Spectrum Disorder are limited.

Given the social component associated with Autism Spectrum Disorder, it is important to explore social skill outcomes in children with this disorder who participated in a LEGO® therapy group. This intervention would be tailored to school-aged children and could be easily implemented in a school setting on a weekly basis. By designing a structured, examiner-directed LEGO® therapy group for students in school, social skill behaviors can be measured before and after to determine success. Interest in this study stems from a desire to provide students with an effective social skills program that is cost-efficient and feasible. School psychologists, school social workers, and guidance counselors would have a data-based intervention to utilize with children with ASD in order to promote social skill development and attainment.

The intent of this study is to maximize social skills in students with Autism Spectrum Disorder by providing them with a group setting to acquire and strengthen their skills. If effective, this intervention will provide school districts with a viable option for servicing students with identified social skill deficits. It is economical and time effective and can be easily incorporated into the school day. The goal of this study is to explore a potentially effective social skills program that can be administered to multiple students at one time in an elementary school setting. It will provide school districts with an engaging (it is hands on), economical, and real-life role playing (via prompts from the group facilitator) intervention for use with students with Autism Spectrum Disorder. If

successful, the LEGO® intervention would assist participants in establishing a lexicon for social skills (or a meaningful representation) for skill generalization.

Chapter 2: Review of the Literature

Introduction

Advances in science, technology, and assessment have resulted in better detection of and treatment for Autism Spectrum Disorder symptomology. Children with a diagnosis of Autism Spectrum Disorder (ASD) present with a range of symptoms, and these symptoms may vary from individual to individual. Different children possess different ASD symptomology and therefore require different treatment plans. Therefore, interventions for students with ASD must take into account individual differences. Furthermore, given the better identification of ASD, schools across the country have observed increases in students with this diagnosis. School personnel have become more responsible for ASD symptomology remediation in their diagnosed students in order to maximize functioning, yet ensure that they also receive an appropriate education. Specifically, students with ASD experience difficulty with communication and socialization. School-based interventions commonly address social skill remediation in attempt to increase the social, adaptive, and occupational functioning of students with ASD.

Social Skills

Social skills can be defined as a set of behaviors that are used to engage in or elicit advantageous social outcomes. They serve either to enter or to escape social interactions (McIntosh & MacKay, 2008). According to the American Psychiatric Association, Autism Spectrum Disorder can be defined as, “Persistent deficits in social communication and social interaction across multiple contexts … and restricted, repetitive patterns of behavior, interests, or activities …” (2013). These deficits are

evident in social-emotional reciprocity, nonverbal communicative behaviors used for social interaction, and for developing, maintaining, and understanding relationships (American Psychiatric Association, 2013; Cotugno, 2009; Sperry, Neitzel, & Engelhardt-Wells, 2010). Social skills also include communication, sharing, following rules and instruction, and decision-making (Samanci, 2010; Sansosti, 2010). Stereotyped or repetitive motor movements, inflexibility and strict adherence to routines, narrow interests, and hyper- or hyporeactivity to sensory input are additional symptomology individuals with ASD may possess (American Psychiatric Association, 2013). These behaviors can make it difficult for students with ASD to engage in reciprocal play with peers, as well as to establish relationships.

It is important to note that the severity of ASD, as well as its symptomology, ranges greatly. Furthermore, although symptoms arise in early developmental periods, these may not become as obvious that a child presents with ASD as it does at the time when the child is required to produce social skills beyond his or her capability or when he or she is compared with typically developing peers. This commonly occurs when children enter school for the first time. They are given a new set of demands within a highly social environment. Although identification of ASD has become more refined over the years, there are still many children that receive ASD diagnoses after becoming students in school. Schools need to be equipped to provide support to these students through special education programming and intervention. This is true regardless of point in time or age at which the ASD diagnosis was made. Furthermore, individuals with ASD experience significant impairment in functioning, especially in regard to socialization with others (American Psychiatric Association, 2013). Therefore, given this aforementioned

symptomology and the argument that social functioning is the most sensitive to impairment, social skill intervention programs are highly beneficial for remediation of such weaknesses in individuals with ASD.

It is important to note that there are slight differences among the conceptualization of ASD according to the federal government (IDEA) and the American Psychiatric Association (DSM-5), with IDEA (2004) guidelines being somewhat more general, and less specific or exact (McGarry Klose, Plotts, Kozeneski, & Skinner-Foster, 2012). The federal definition of ASD is as follows: A developmental disability significantly affecting verbal and non-verbal communication and social interaction, generally evident before age three that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movement, resistance to environmental change or change in daily routine and unusual responses to sensory experiences (U.S. Department of Education, 2010). This difference in wording is important to consider when working in a school settings. Children are diagnosed with ASD by practitioners according to APA guidelines (DSM-5); then are students at school eligible for special education classification under federal (IDEA) guidelines. It is important for school personnel working with students with ASD to be cognizant of both working definitions of the disorder, as well as how each entity seeks to describe ASD.

Tools Necessary Interaction and Relationship Building

Early research indicates that learning, especially in regard to social skill acquisition, involves joint attention and task engagement (Reichow & Volkmar, 2009). This is true for communication interventions, which naturally include a social

component, given the nature of communication. Reichow and Volkmar (2009), who emphasize the importance of communication in teaching social skills to children, propose three different types of interventions: adult mediated, peer mediated, and combination approaches. Adult mediated interventions involve direct instruction from a teacher or therapist. Peer mediated intervention is especially popular in preschool populations. Combination approaches include the presence of peers and of adults in a social skills group setting (Reichow & Volkmar, 2009). According to authors, research indicates that the peer mediated approach to teaching social skills is most effective, especially for preschool-aged students (Reichow & Volkmar, 2009). The LEGO® group is more closely aligned with a combination approach to social skill acquisition, given the presence of an adult. However, great emphasis is placed on the peer mediated aspect. There is limited, direct instruction from the adult, and most of the learning that takes place in the LEGO® group is based on peer interaction.

The following four components are necessary for defining social competence: child, behavior, situation, and judge (Kwon, Kim, & Sheridan, 2012). Most social skills interventions determine success based on child and behavior alone. However, social skill attainment may not be necessarily generalizable across a variety of situations. Therefore, greater emphasis needs to be placed on the context in which the child is acquiring the behavior (Kwon, Kim, & Sheridan, 2012). A study that measured teacher perception of social skills indicates that there are four necessary components for developing such skills. They include school, family, environment, and personal characteristics (Samanci, 2010; Sansosti, 2010). Again, it is important to keep in mind that proper social skill

development is multi-factorial, and interventions should be designed accordingly to accommodate all areas.

It is important to consider how social skill development differs for children with ASD versus typically developing children. This is especially true when determining the skills needed for appropriate peer and adult interaction, as well as relationship building. There is often a “hidden curriculum” in schools, or a set of social norms and guidelines for behavior. These rules are not explicitly taught, yet all students are expected to be aware of and follow them. Students with ASD may have difficulty understanding these unwritten and indirect social norms, subsequently resulting in observable social deficits in behavior. This can ultimately lead to peer rejection and feelings of isolation. Students with ASD struggle to recognize the hidden curriculum for appropriate and prosocial behaviors, which stands in contrast to their typically developing peers (Cotugno, 2009; Mazurik-Charles & Stefanou, 2010).

Children with ASD often exhibit social reciprocity and social communication weaknesses, as compared with their typically developing counterparts (Cotugno, 2009; DeRosier, Swick, Ornstein Davis, Sturtz McMillen, & Matthews, 2011; Liber, Frea, & Symon, 2008; Sperry, Neitzel, & Engelhardt-Wells, 2010). This is an important consideration, given the trend toward classroom inclusion. Students with ASD who are being educated in a general education setting may experience greater social difficultly because they are functioning amongst peers with better-developed social reciprocity and communication skills (Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012; Sartini, Knight, & Collins, 2013; Sperry, Neitzel, & Engelhardt-Wells, 2010). Overall, children with ASD experience greater impaired social functioning than children without ASD.

These skills include social thinking or processing, social language, and understanding social cues. Children with ASD may continue to talk about a topic longer than a child without ASD. They may also experience greater difficulty transitioning from one conversational topic to another. They often have difficulty understanding and engaging in humor, regulating pitch and cadence of voice, understanding abstract concepts, and speaking in a superfluous manner (Laugeson et al., 2012). Furthermore, research indicates that communication-based intervention can result in IQ changes and emotional recognition associated with communication-focused interventions (Liber, Frea, & Symon, 2008; Ospina et al., 2008).

Given the indirect nature of social cues, children with ASD tend to experience difficulty recognizing such indications during social conversation (Harper, Symon, & Frea, 2008). These indirect and ambiguous cues can be challenging for the child with ASD, indicating another way in which they differ from typically developing children. Social skill deficits in children with ASD are more pervasive and persistent than social skill deficits in children without ASD. Typically developing children can experience impairment in social functioning as well; however, the prognosis is typically less chronic and more likely to improve when given remediation. This is an important consideration, especially when selecting groups of students and interventions. Two children with social deficits may require different intervention programs for skill remediation depending upon the presence of ASD (Laugeson et al., 2012). Adolescents with ASD tend to have a more difficult time establishing and maintaining relationships than their typically developing counterparts. Although both groups of individuals learn social behaviors for relationship building from observation of others (mainly from their parents), adolescents with ASD

require additional training and support in order to acquire these skills. This is in part due to their difficulty with recognizing social cues. As previously explored, social cues are necessary for successful social verbal and nonverbal communication (DeRosier, Swick, Ornstein Davis, Sturtz McMillen, & Matthews, 2011; Laugeson et al., 2012).

Implications of Underdeveloped Social Skills

Social skills play a large role in successful school functioning. Children who have peers and teachers that believe they are skilled socially are more popular and well liked by their peers, have a more central position in their social group, and have more reciprocal friendships than children who have peers and teachers who believe they possess a lesser degree of social skills (Gagnon & Nagle, 2004; Kwon et al., 2012). Students with a greater degree of social skills may perceive school more positively and perform higher academically (Gagnon & Nagle, 2004). If a student's peers view him or her as having effective social skills, there is a good chance that the student has higher social status and is popular within the social group (Kwon et al., 2012). Establishing appropriate friendships require social skills, so without such abilities, it is difficult for children to make and maintain relationships with peers (Glick & Rose, 2011; Liber, Frea, & Symon, 2008; Sansosti, 2010). Furthermore, children who have higher quality friendships are typically well received or accepted among their peer group (Engle, McElwain, & Lasky, 2011; Glick & Rose, 2011). Therefore, it is important to educators to assess play behaviors at an early age (such as preschool) to screen for children with social skill deficits (Gagnon & Nagle, 2004; Whitted, 2011). Play-based interventions should be developed to target areas of weakness in order to improve social skills, thereby maximizing their success in school (Gagnon & Nagle, 2004).

Various school-based situations exist that require appropriate social skills. For example, academic success and well-developed social skills are often dependent upon one another, and a deficit in one area may lead to deficit in the other. For example, language impairment, often related to autism spectrum disorders, can be associated with social communication weaknesses. Therefore, students who have a language deficit may also have difficulty making validating comments to their peers during social play (Fujiki, Brinton, McCleave, Anderson, & Chamberlain, 2013). Pretend play has been found to correlate with the increase both in receptive and in expressive language skills in children (Stagnitti, O'Connor, & Sheppard, 2012). Furthermore, it has been found that language gains have been made at points similar in time to those made in play developments, indicating they are interrelated and therefore can influence one another (Stagnitti, O'Connor, & Sheppard, 2012).

Given the fact that academic achievement (e.g., language) is positively related with social skills (e.g., social communication), an inverse relationship also appears to exist. Children who have peers and teachers who believe they are skilled socially are more popular and better liked by their peers, have a more central position in their social group, and have more reciprocal friendships than children who have peers and teachers who believe they possess a lesser degree of social skills (Kwon, et al., 2012). Social skills are frequently associated with academic achievement. Students with a greater degree of social skills may perceive school more positively and perform higher academically (Kwon et al., 2012). Students with poor social skills often experience greater levels of teacher and peer rejection (McIntosh & MacKay, 2008). In addition to peer rejection, students with social skill deficits have been found to encounter poor social support and

isolation. They also report greater feelings of loneliness than children without ASD (Laugeson et al., 2012).

Another domain affected by social skill weakness includes daily living and interpersonal relationships (Laugeson et al., 2012; Sartini, Knight, & Collins, 2013). Negative life outcomes such as incarceration, delinquency, and gang affiliation have been documented as well. This may be related to the "deviant peer training" that occurs when numerous students with social skill deficits become involved with one another, sharing and modeling underdeveloped social qualities (McIntosh & MacKay, 2008). This phenomenon can be likened to Albert Bandura's 'Social Learning Theory", which suggests that children observe maladaptive behaviors from others before replicating or mimicking the actions themselves. This is important to keep in mind when working with groups of students, especially students with an ASD diagnosis.

Social skill deficits have been found to have a strong correlation with the development of later psychopathology in children. Weaknesses in social skills in children may result in the development of emotional problems (Groeben, Perren, Stadelmann, & von Klitzing, 2011; Samanci, 2010). Social skills training may decrease later depressive symptoms in children (Groeben, Perren, Stadelmann, & von Klitzing, 2011). When addressing emotional symptoms in children, it may be important to design interventions that include self-oriented social skills training. Intervention programs should focus on assertiveness and social-participation. Furthermore, such interventions should place greater emphasis on the two aforementioned self-oriented social skills than on other-oriented social skills (pro-social and cooperative behaviors). Typically, social skill intervention programs teach other-oriented social skills. This may work for some

students; however, when dealing with the child who is at-risk for emotional-symptoms, it may be rendered ineffective. Assisting a child who is shy in social participation may help him or her develop protective factors (i.e., friendships, peer support, ability to seek assistance) that shield the child from developing emotional problems in the future when he or she becomes older (Groeben, Perren, Stadelmann, & von Klitzing, 2011).

Other Considerations

Gender differences have been found to exist among children with ASD. Statistically speaking, ASD is almost five times more common in boys than in girls (Baio, 2014). According the CDC, in 2010, one in 42 boys had an ASD diagnosis whereas only one in 189 girls had this disorder (Baio, 2014). In addition to statistical differences, discrepancies have also been reported among males and females in the case of sharing behaviors in students. Sharing behaviors can be referred to as "other regarding", which may correlate with one's acknowledgement of others' wellbeing. This includes concern for others' needs and goals, as well as the motivation to help others in attaining these. *Other regarding* preferences in children may indicate other prosocial factors such as fairness, caring, and cooperation. Sharing develops earlier in girls than in boys. Specifically, 6 and 7 year old girls are more likely to share with others than are their same-aged male counterparts. These gender differences start to dissipate around age 8, given non-significant sharing differences among males and females at age 9 (Malti, Gummerum, Keller, Chaparro, & Buchmann, 2012). Second, female students may demonstrate a higher degree of contextual social skills than those of their male counterparts. Furthermore, female students may find more success socially (skill and status) than male students. Therefore, when evaluating students in these areas, it may be

important to differentiate between the two genders. Social skill interventions may be grouped according to gender, and specific strategies could vary among the two (Kwon et al., 2012).

Age differences have also been noted when considering how ASD symptomology and discourse varies from individual to individual. Children appear to indicate increased sympathy towards unknown individuals, as well as feelings of social acceptance, in middle childhood. Increases in sharing behavior from 6 to 9 years are positively correlated with increases in the ability to sympathize with unfamiliar individuals. Children also begin to demonstrate sharing behaviors during middle childhood. Children in the middle childhood stage demonstrate greater sharing behaviors toward the end of the stage than in the beginning (Malti et al., 2012). The preschool years may be an important time in which to introduce social skill interventions (Cunningham, 2012; Derelo, 2009; Whitted, 2011). Early identification has made it necessary to develop interventions for children ages three years and younger (Cunningham, 2012). During this formative time period, children acquire skills that are crucial for social success later in life (Derelo, 2009). Programs should consider children in their preschool years when selecting participants for social skills interventions because this is the time when most behaviors are formed (Derelo, 2009). One study indicated that students who attend formal preschool education display greater social skills in first grade than those who did not attend pre-school (Gulay, Akman, & Kargi, 2011). It is important to note that the study did not report specific information on the participants, including whether or not the children had an educational disability, an ASD diagnosis, pre-existing social skill deficits, etc.

In addition to gender and age, cultural variations are also important to consider. Differences may exist among parents' and caregivers' perceptions of adaptive social skills in their children with ASD across countries. Although they meet the same diagnostic criteria, children in the United Kingdom may demonstrate a greater impairment in adaptive social skills than those of their United States counterparts. Parents and caregivers of children from the United States perceive their adaptive social skills to a greater degree than parents and caregivers of children from the United Kingdom. In other words, children from the United Kingdom were reported as having less adaptive social skills than children from the United States. However, the mean age for the children in the United Kingdom was significantly higher, so it may not be a sufficiently accurate comparison. Therefore, further research comparing children of the same age is warranted to further support this finding (Sipes, Furniss, Matson, & Hattier, 2012).

The CDC reports that ASD is present among all racial, ethnic, and socioeconomic groups (Baio, 2014). Asia, Europe, and North America reported an average prevalence of ASD of one percent. A study in South Korea indicated 2.6 percent prevalence (Baio, 2014). Another study suggests that Caucasian children (non-Hispanic) are 30% more likely to be diagnosed with ASD than African American children (non-Hispanic). Caucasian (non-Hispanic) children are 50% more likely to be diagnosed with ASD 50% times more than Hispanic children (Baio, 2014).

Cognitive ability is also worthy of consideration. For children and adolescents with high functioning ASD, (unnamed) autonomous social skill programs have moderate efficacy (Maglione, Gans, Das, Timbie, & Kasari, 2012). Most studies focus on children and adolescents with high functioning ASD (Lerner & Mikami, 2012; Schreiber, 2011).

Gaps in the Literature

Various disparities have been found to exist among the literature on children with ASD, including the identification and assessment of the disorder, symptomology, treatment goals, interventions, and outcomes. Lack of parent involvement in social skill interventions is frequently noted throughout the literature (Laugeson et al., 2012). This may be due to the fact that most social skill interventions are school-based and occur during school hours. Many parents work and are unable to take a significant proportion of time out of the job to participate in an intervention that occurs in their child's school. Parent involvement is crucial for social skill generalization, however (Adams, Womack, Shatzer, & Caldarella, 2010). A home note program can assist parents in becoming and remaining involved in their child's social skill development by reinforcing at home, those skills that are taught in school (Adams, Womack, Shatzer, & Caldarella, 2010). Next, there is a limited amount research on interventions for high functioning adolescents. The majority of research is centered on lower-functioning children. Furthermore, research on interventions for adolescents with ASD, in general, is lacking compared with that for younger children. This is important especially in regard to friendships. Relationships such as friendships become more involved and meaningful in adolescence, and more research is warranted to explore how the development of such differs among populations (Laugeson et al., 2012). Last, one study reported that their LEGO® group failed to produce significantly higher communication or socialization skills than the control group after participation in the interventions (Owens, Granader, Humphrey, & Baron-Cohen, 2008).

Social Skill Generalization Across Settings

As with many programs, skill generalization is an issue that interventionists face when designing and implementing social skill remediation programs for children with ASD. The goal in such programs is for the child to create a lexicon for social skills (meaningful representation) for generalization, or the degree to which the child associates novel information with previously learned material. Research suggests that there tends to be poor generalization of social skills from the intervention group to the child's classroom. Often a failure to demonstrate increased social skills in the classroom after participation in intervention can be traced to poor generalization (Adams, Womack, Shatzer, & Caldarella, 2010; McIntosh & MacKay, 2008). Results of treatment success are often mixed with moderate (if any) effects during subsequent progress monitoring.

Implications for School Districts

School districts in particular have a vested interest in skill generalization following student participation in a school-based social skill intervention program. Districts allocate considerable resources to implementing social skill intervention programs within their school buildings. However, it appears that gains made during participation in the intervention are not as long lasting as intended. They do not always generalize to the classroom, indicating limited success. Instead, districts should place greater emphasis on skill generalization or maintenance. The scope of many school-based social skill interventions is far too narrow. Although social skill acquisition and development are key factors in intervention programs, it is crucial that skill generalization and maintenance are not overlooked (Adams, Womack, Shatzer, & Caldarella, 2010). Effective social skill intervention programs include stimulus

generalization. This involves the transfer of a skill learned in one context to a novel situation or context (McIntosh & MacKay, 2008). Another important aspect of interventions should be an “in vitro” to “in real life” component in order to make skills more applicable to students. Also, this increases the likelihood of the children receiving a personal benefit from skill acquisition and demonstration, thereby increasing generalization (McIntosh & MacKay, 2008).

Generalization

Effective social skill programs have a generalization component incorporated into the curriculum. In a school setting, there are several steps the individuals involved in the intervention can take to maximize the potential for skill generalization. Specially, the generalization component should be implemented at three different points throughout the intervention: pre, during, and post (McIntosh & MacKay, 2008). Before the intervention, the type of situation in which the social skills are intended to be used should be determined. This has been referred to as the “generalization setting”, or the place or places in which the acquired skills will be employed. By establishing the generalization setting, the physical gap between the locations in which the skills are taught and where they are intended to be used narrows (McIntosh & MacKay, 2008).

It is important to ensure that the individual teaching the skills should be the individual in charge of the generalizations setting. Next, consideration needs to be made for the specific students selected for the social skills intervention group. Ideally, the group’s participants should be the same individuals that make up the generalization setting. The last component of the pre-intervention modification is the type of social skills selected for remediation. The skills identified should be as broad as possible, and

they should be easily transferable from the intervention to the generalization setting (McIntosh & MacKay, 2008).

During the intervention, social skills should be taught explicitly and directly. It is crucial to select a program in which the skills presented are clear and exact. Moreover, the more the participants practice the skills (which have been explicitly delivered), the more likely the skills will be applied to the generalization setting. Another way to maximize the potential for skill generalization is to teach each skill in a variety of settings, and to use an array of prompts to elicit said skill. The last modification utilized during the intervention is the incorporation of other individuals that the students will have contact within the generalization setting. Other adults, parents, school personnel, etc. with whom the student will most likely come in contact in the generalization setting, and with whom they will be utilizing their newly acquired skills, should be included in the program instruction (McIntosh & MacKay, 2008). It is important to involve parents in social skill interventions to reinforce skills taught in school at home; this may be done, for example, through the use of a home note program (Adams, Womack, Shatzer, & Caldarella, 2010).

Paraprofessionals provide one example of an alternative, an individual who can assist in the maintenance and generalization of remediated social skills. The child is usually familiar with this individual, who functions in the generalization setting, with the possibility of expanding the setting as desired. When appropriate, paraprofessionals can afford children the opportunity for education in an inclusive setting among their typically developing peers. They are able to redirect and refocus behavior, prompt and cue certain skills, and provide positive reinforcement such as praise for doing so (Mazurik-Charles &

Stefanou, 2010). They can also support the tripartite model of skill generalization, because they will be working with the child pre-, during, and post-intervention.

Following the intervention, it is important for the implicated staff to manipulate the student's environment to maximize the potential for successful skill demonstration. To begin, teachers should coach students throughout the school day when opportunities present for skill engagement. Coaching includes prompting, cueing, altering the environment, and providing praise and/or feedback. Teachers should identify naturally occurring prompts as well. They should also capitalize upon "teaching moments" in which some aspect of skill instruction can be reviewed. Next, incentive systems are highly effective methods of skill attainment and generalization. Specifically, group contingencies are most successful in increasing the likelihood of skill production. Classroom reinforcement is a powerful tool in regard not only to skill demonstration, but also to generalization (McIntosh & MacKay, 2008).

Next, just as skills should be frequently practiced during the intervention, they should also be practiced post intervention in the generalization setting as much as possible. In order to reduce competing behaviors, or maladaptive social skills previously utilized in such settings, teachers should implement the aforementioned class-wide contingencies or incentive systems and eliminate any reinforcement of the previous (inappropriate) social behaviors. Hopefully, the post-intervention strategies for maintaining the newly acquired social skills will extinguish the previously used maladaptive skills. Last, by providing students with a reward for demonstration of the new social skills, the probability of skill generalization increases because they associate this with personal benefit (McIntosh & MacKay, 2008). Given these findings, it is crucial

for social skill interventions to include a generalization component in order to ensure overall outcomes.

Outcomes

At a 14-week follow-up assessment of social skill generalization, social cognition was the least generalizable skill. This can be attributed to the centrality of social cognition deficits in individuals with an ASD diagnosis, as well as the overreaching effects that social cognition has on overall social functioning. Social cognition is required in an abundant number of settings, including adaptive and occupational functioning. Therefore, interventions should place greater emphasis on increasing the awareness of the importance of social cognition in individuals with ASD as it relates to them (self-benefit). This will ideally maximize the social cognition abilities of these individual, thereby supporting other functions such as the recognition of social cues and nonverbal communicative interactions (Laugeson et al., 2012).

For students with language deficits, exposure to social communication skills will strengthen their ability to generalize these behaviors to the classroom when interacting with their peers. Specifically, they would develop more prosocial and adaptive play behaviors and communication with their peers (Fujiki et al., 2013). Conversely, unsuccessful programs view skill generalization as an afterthought. Instead, comprehensive plans need to be made to incorporate a generalization component into the social skills curriculum. Some may even argue that skill generalization is the most critical aspect of an effective social skills intervention (McIntosh & MacKay, 2008). For children with significant language deficits, the Picture Exchange Communication System (PECS) appears to have moderate efficacy (Maglione, Gans, Das, Timbie, & Kasari, 2012).

Commonly used School-Based Social Skills Training Programs

There are numerous social skill interventions that produce data classifying them as effective programs. Schools tend to select research-based programs and implement them “as is”; however, effective social skill intervention requires modification (McIntosh & MacKay, 2008). It is imperative that schools alter their selected social skill curriculum in order to accommodate a program that is individualized and tailored to each particular school. School climate and culture, as well student needs, strengths, and weaknesses, need to be considered when adopting a social skills intervention. Just as education is individualized to accommodate varying student needs, social skill programs also need to be individualized to best serve the specific population or group of students who are participating in the intervention.

Direct Instruction

A group format (as opposed to an individual format) for teaching social skills is a highly effective approach. Furthermore, teaching these skills in a structured group setting allows for repetition, which supports the initiation and maintenance of social skill performances among peers. Direct instruction of social skills (specifically via videotape), may significantly increase prosocial behaviors in children with ASD. Direct instruction and unstructured play activities will increase a child’s social skills significantly. With direct instruction, a child may have a greater chance of making even more social skill gains and of demonstrating a higher number of prosocial behaviors. This appears to be an effective intervention for promoting social skills in children with ASD (Kroeger, Schultz, & Newsom, 2007; Lopata, Thomeer, Volker, Nida, & Lee, 2008). In one intervention, paraprofessionals rehearsed techniques and strategies for social initiation with their

students. They also discussed the different types of prosocial responses that the student should make, once engaged in an activity with a peer. This is an example of explicit or direct instruction of social skills, a method that is largely supported in the literature (Licciardello, Harchik, & Luiselli, 2008; Lopata, Thomeer, Volker, Nida, & Lee, 2008). Lopata, Thomeer, Volker, Nida, & Lee (2008) recommend taking a part-to-whole approach to teaching social skills. They suggest explicitly teaching children with ASD more basic skills at first and then gradually introduce more complex social skills. Such techniques include teaching, modeling, role-play, and performance feedback (Lopata, Thomeer, Volker, Nida, & Lee, 2008). This should occur in a highly structured and predictable learning environment in order to maximize participants' success. Using delayed prompting, researchers found positive outcomes in three male students' play skills and peer requesting (Liber, Frea, & Symon, 2008). A time delay procedure can be an effective method of fostering language acquisition, pragmatic language, and sequential activities (Liber, Frea, & Symon, 2008).

TEACCH Program

Ospina et al. (2008) conducted a meta-analysis of published studies on social skill interventions. Researchers classified the TEACCH program as an integrative program (along with Lego Therapy). The TEACCH program includes understanding the "culture of Autism", developing individual plans, structuring the environment, and utilizing visual supports ("TEACCH Autism Program," n.d.). According to this meta-analysis, significant findings were also reported for the TEACCH program. This included improvements in fine and gross motor skills, cognitive performance, social adaptive functioning, and communication (Maglione, Gans, Das, Timbie, & Kasari, 2012; Ospina et al., 2008).

Furthermore, individual studies that analyzed the TEACCH program also report significant findings. It is important to note that for environmental programs like the TEACCH, the strength of efficacy is lower than more intense interventions, time- and duration-wise. However, when combined with programs like STAR, the Walden Toddler Program, and ABA, the TEACCH program was found to be more effective in improving core deficits (Maglione, Gans, Das, Timbie, & Kasari, 2012).

UCLA PEERS Program

The UCLA Peers Program consists of a social skills training program for adolescents and young adults. The intervention serves to assist individuals in the formation and maintenance of friendships by equipping them with the social skills necessary to do so. An investigation of the impact of this program found that high functioning adolescents with ASD significantly improved their social skills knowledge and responsiveness, as well as their overall skills in the areas of social communication, cognition, awareness, and motivation, including assertiveness, cooperation, and responsibility. They also increased the frequency with which they engaged in peer interactions and decreased overall autistic mannerisms. In regard to generalization, the majority of the participants maintained their skills at a 14-week follow-up assessment, indicating generalization had occurred (Laugeson et al., 2012).

The Group Setting

A group format for teaching social skills (as opposed to individual skills) is a highly effective approach for skill remediation in students with ASD. Furthermore, teaching these skills in a structured group setting allows for repetition, which supports the initiation and maintenance of social skill performance among peers (Kroeger et al., 2007;

Lopata, Thomeer, Volker, & Lee, 2008). Group settings also allow for peer interaction in a natural environment (Lopata, Thomeer, Volker, Nida, & Lee, 2008). The social relationships fostered during group therapy increases the likelihood that these interactions will continue occurring outside of the group setting in the real world (Lopata, Thomeer, Volker, Nida, & Lee, 2008).

Examples of effective small group settings for social skill interventions include: behavioral modeling, coaching, behavioral rehearsal, and performance feedback in small group settings (Laugeson et al., 2012). The Strong Kids Program and Second Step are interventions designed for the group setting and specifically target the social skill needs of students with ASD (Sansosti, 2010; Whitted, 2011). They can be implemented in the classroom and require only a relatively short period of time (Sansosti, 2010). Another effective group intervention is the Children's Friendship Training Program (CFT). All of these programs can be implemented in a school setting as well (Laugeson et al., 2012). The group setting also places children among other individuals of their own age, thereby maximizing the time spent in a social setting.

Social Communication Interventions

The Social Use of Language Programme (SULP) includes a clear curriculum with a hierarchical learning approach. SULP begins with social stories, then adult modeling, group interaction, and finally generalization. Stickers and treats are used to reward participation. The SULP group intervention utilizes direct and explicit teaching methods. For children with high functioning ASD who are demonstrating maladaptive behaviors, the SULP intervention may be a beneficial method of remediation. However, when looking to increase communication and/or socialization skills in children with high

functioning ASD, the SULP group may not be the most effective intervention. However, this is a low-intensity program that is easy implement. Therefore, this treatment group could easily be applied to a school or clinical setting (Owens et al., 2008). Furthermore, effective school-based social communication programs may increase validating comments in a 10-week period. However, increases in demonstrated prosocial behaviors and peer perceptions of acceptance in students with language difficulties may not increase in a 10-week period. Instances of aggressive behavior in a student undergoing a social communication intervention may reduce the degree of positive outcome in that particular student (Fujiki et al., 2013).

Think Social!

Think Social! is a 69-lesson curriculum developed explicitly to teach social, cognitive, and communication skills to students. This program can be successful with students with different types of disabilities, such as high functioning Autism, PDD-NOS, Asperger Syndrome, Nonverbal Learning Disability, and AD/HD. It can also be used with students who do not have a formal diagnosis but present with social skill deficits. Think Social! has a broad age range and can be used for individuals in kindergarten through adulthood. This social skill based curriculum teaches students how to work and think together in a group. It is based on collectivist principles and challenges students to consider multiple points of views. In addition to identifying their own thinking and perceptions, students who participate in the Think Social! program also consider the thinking of others. Additionally, Think Social! involves lessons in verbal and nonverbal communication to assist students in becoming more skilled in real-life settings (Winner, 2008).

Paraprofessionals

The Social Skills Training For Children and Adolescents with Asperger Syndrome and Social Communication Problems (SST) is another example of a documented intervention (Mazurik-Charles & Stefanou, 2010). This program employs the use of paraprofessionals to increase social awareness, social thinking and processing, autistic symptomology, and global social responsiveness in students with ASD. Paraprofessionals have used the SST intervention to teach social skills to students by means of providing visual cues. This intervention has been successful for students who were fully maintained in the general education setting, as well as students who were partially mainstreamed. It is important to note that significant gains were reported according to teachers' perceptions of social issues in each participant they were assessing (Mazurik-Charles & Stefanou, 2010).

Another study used paraprofessionals to preteach, reward, and prompt the initiation of social interactions with peers among four children (three males and one female) with an ASD diagnosis in grades first through fourth. Prior to peer contact, the paraprofessional reviewed techniques and strategies for social initiation, as well as appropriate responses once the student engaged in an activity with a peer. The paraprofessional and the student then practiced the initiation multiple times before the student actually made contact with a peer. Next, the paraprofessional prompted and coached the student as he or she engaged in the social interaction with a peer. This assistance was provided during initiation as well as throughout the play activity in which the student was required to respond appropriately (Licciardello et al., 2008).

Last, the paraprofessional rewarded the student with praise in an attempt to reinforce the new skills for social interaction. The paraprofessional also reminded the student that when the play activity concluded, he/she would receive a tangible object or have access to a preferred activity. Because the number of social interactions increased significantly (first in initiation and then in responses), direct instruction of social skills in the classroom by the paraprofessional, as well as prompting and reinforcement while social initiation and responses occurred, the program appears to be an effective intervention for both male and female elementary students with ASD (Licciardello et al., 2008).

Ineffective Programs

It is necessary to mention ineffective programs for students with ASD who are in need of social skill remediation. Given the nature of research publications, the majority of interventions reported in the literature indicate success. However, there are a few studies that suggest certain components within programs fail to provide significant and meaningful social skill increases. For example, it is not sufficient to improve social skills simply by increasing the student's proximity to his/her peers who do not have a developmental disability. Instead, direct intervention by an adult (not a peer) is necessary for producing meaningful outcomes or increases in social functioning in children with ASD (Licciardello et al., 2008).

Programs that measure only social responses or outcomes are not as complete as programs that measure social initiation prior to social responses. It is important to look at a child's ability to initiate or begin engagement in a reciprocal social activity with another individual. In addition to measurement, social initiation should also be part of skill

instruction. It is crucial for students with ASD to be as fluent in social response as in social initiation. Without this skill set, students with ASD will be limited to responding to others' social invitations for engagement as opposed to having the skills to do so themselves (Licciardello et al., 2008).

Outcome Measurement Tools

Accurate interpretation and measurement of social skills deficits is crucial for developing effective interventions centered on improving social competence and interpersonal relationships in children. Linking assessment to intervention is necessary for providing children with the proper treatment. Therefore, finding valid and reliable measures is an important component of this process (Gresham, Elliott, Vance, & Cook, 2011). When a child would benefit from remediation in social skills or problem behaviors, school personnel seek to create an intervention to target the specific areas of concern. In order to create an effective intervention, the school must initially assess the child's social skills and problem behaviors using the most valid and reliable measure available in order to ensure that the intervention addresses the child's specific needs (Gresham et al., 2011). Rating scales tend to be the most commonly used system for progress monitoring, especially in the schools. For initial identification, the *Autism Diagnostic Interview, Revised* (ADI-R) and/or the Autism Diagnostic Observation Schedule (ADOS) can be utilized to substantiate an ASD diagnosis. This would allow groupings of students to be created according to more specific individual levels of social functioning (Laugeson et al., 2012).

The *Autism Spectrum Rating Scales* (ASRS) is a 70- to 71-item assessment of social functioning, communication, atypical behaviors, and self-regulation. There is a

short form and a full-length version; the full-length form is recommended because it is more comprehensive. The full-length form takes about 20 minutes to complete. There are two versions available depending upon the age of the individual being assessed: 2–5 years (70 items) and 6–18 years (71 items). Both teachers and parents/caregivers are able to complete the ASRS; it is simple and easy to fill out and statistical examination of the ASRS indicates that this rating scale is reliable and valid. Measures of internal, test-retest, and interrater reliability, as well as content, criterion-related, and construct validity were all statistically significant. This suggests that the ASRS is a good indicator of ASD symptomology and can be used to implement and measure outcomes of related interventions (Simek & Wahlberg, 2011).

The *Social Skills Rating System* (SSRS), a 51- or 52-item questionnaire (teacher and parent reports, respectively) measures social functioning including cooperation, assertion, responsibility, and self-control. It is particularly useful when assessing high-functioning youth with ASD. According to Laugeson, et al. (2012), the SSRS is sensitive to change in observable social functioning behaviors, therefore making it a good option for progress monitoring or outcome measurement. However, Wang, Sandall, Davis, and Thomas (2011) indicated that although the SSRS is high in internal consistency, construct validity, convergent validity, and criterion validity, its ability to predict social skills in young children with ASD over time (or to measure intervention outcomes) is questionable (Wang, Sandall, Davis, & Thomas, 2011).

The *Social Skills Improvement System Rating Scales* (SSIS-RS) is the revision of the aforementioned SRS. Both the SSRS and SSIS-RS indicate high internal consistency estimates and moderately higher validity indices for total scores, both for social skills and

for problem behavior scales. Furthermore, the SSIS-RS yielded higher reliability than the SSRS in terms of internal consistency. In regard to validity, the strongest correlations were found between like-named subtests on the two measures. The SSIS-RS is a more accurate (reliable and valid) measure of social skills and problem behaviors than the SSRS. When deciding on a rating scale, it appears that the SSIS-RS is a more accurate measure than its predecessor, the SSRS. Therefore, when given the option of using either the SSRS or the updated SSIS-RS, selecting the latter may provide more reliable and more accurate results, thus resulting in a more effective intervention for the student at hand (Gresham, Elliott, Vance, & Cook, 2011).

The *Social Responsiveness Scales* (SRS) includes a 65-item rating scale that assesses ASD symptomology occurring in a natural setting according to acuteness. It addresses communication, shared social interaction, and emotionality (Cunningham, 2012; Mazurik-Charles & Stefanou, 2010). The *Gilliam Autism Rating Scale* (GARS) is a 56-item measure of ASD symptomology (Gilliam, 1995). It assesses social functioning (communication and interaction), restrictive/repetitive behaviors, emotion, cognition, and maladaptive speech. It has been used specifically to measure outcomes of LEGO® therapy and has produced meaningful results (LeGoff, Krauss, & Levin Allen, 2012; LeGoff, Krauss, & Levin Allen, 2010). The *Teacher Behavior Rating Scale* (TBRS) requires teachers to rate the frequency of behaviors (never, sometimes, or often). Two of the sociability subscales – prosocial and impulse control/likeability – are commonly used when measuring social skills in students with ASD (Fujiki, Brinton, McCleave, Anderson, & Chamberlain, 2013).

There are also two diagnostic tools – the *Autism Diagnostic Observation Schedule* (ADOS) and the Autism Diagnostic Interview Revised (ADI-R) – used to indentify ASD in individuals. Additionally, the ADOS and ADI-R have been used to monitor progress or determine outcomes (Cunningham, 2012). The ADOS is used to measure social and communication skills across developmental levels (Cunningham, 2012). A clinician trained in its administration completes the ADOS); it is void of parent or teacher perception (Cunningham, 2012) and it does not measure change over time. The ADI-R is a semi-structured parent interview (Cunningham, 2012). It includes 89 items that measure social interactions, communication skills, and presence of repetitive or restrictive interests (Cunningham, 2012).

LEGO® Group Theory

The use of LEGO® blocks in a social skill intervention is another effective method for remediation. It involves direct instruction while in a group setting, two previously discussed components of successful interventions. LEGO® therapy uses children's natural interest in play to motivate behavior change (LeGoff, Krauss, & Levin Allen, 2012; LeGoff, Krauss, & Levin Allen, 2010; Owens et al., 2008). LEGO® blocks, although designed for the purpose of play, can be used as an effective tool for increasing communication among individuals. LEGO® blocks have also been used as a means of self-expression in art therapy. In art therapy, LEGO® use has indicated increases in content and creativity of design with children who are mute. In autistic populations, use of LEGO® blocks with groups of children has been found to increase not only social skills, but also a positive mood in participants (Kato, Hattori, Iwai, & Morita, 2012).

LEGO® therapy is a successful method of social skill intervention for children with ASD due to its "constructive application". LEGO® blocks are generally engaging for children (including those with ASD), so incorporating LEGO® blocks into an intervention provides motivation not only for learning, but also for changes in behavior. Capitalizing on a stereotyped interest – LEGO® blocks – of children with ASD provides intrinsic motivation for learning social skills, whereas other external rewards are often short-lived. Use of LEGO® blocks provides children with ASD a genuine shared interest, thus creating a naturally occurring opportunity for social interaction and reciprocity (LeGoff, Krauss, & Levin Allen, 2010; LeGoff, 2004). Selecting a singular, obsessive interest such as LEGO® blocks as external rewards is encouraged for children with ASD. Shaping behaviors and interactions to encourage social skill acquisition is a benefit of LEGO® therapy and this can be accelerated by selecting natural reinforcers such as LEGO® blocks. Ultimately, this will lead to motivated participation in the LEGO® group, something that is necessary for effective outcomes (LeGoff, Krauss, & Levin Allen, 2012; LeGoff, Krauss, & Levin Allen, 2010). Furthermore, the blocks are aesthetically simple, thereby reducing the sensory stimuli for children with ASD (LeGoff, Krauss, & Levin Allen, 2012). Dewey et al. (1988) reviewed the effects of dramatic play, functional play, rule-governed games, and construction materials on social interaction skills in children with ASD. They found that construction materials (such as LEGO® blocks) were the second best indicator of social interaction skill improvements after rule-governed games.

LEGO® Therapy is a social skills intervention centered on collaborative play (Kato, Hattori, Iwai, & Morita, 2012; LeGoff, Krauss, & Levin Allen, 2012). Groups

consist of three participants, each of whom takes on a specific, designated role: the "engineer", "supplier", or the "builder". LEGO® therapy involves a "social division of labor", and each participant must follow specific rules for creating the design (LeGoff, Krauss, & Levin Allen, 2010).

The role of the 'engineer' is to interpret the instructions and describe the specific LEGO® blocks needed for each step of the assembly. The 'supplier' locates and retrieves the LEGO® blocks as indicated by the engineer and hands them off to the builder. The 'builder' is responsible for assembling the blocks according to the instructions given by the engineer. During this process, verbal and nonverbal communication skills are activated. Turn taking and sharing skills are also strengthened in the LEGO® group, because in each session the participants switch their roles as the engineer, supplier, and builder. The LEGO® group is centered on collaborative problem solving in order to build the structure. This can be achieved only if the participants remain in their assigned roles while assisting their teammates in fulfilling their own specific roles. Trust and reliance on others are also implicated in the LEGO® group (LeGoff & Sherman, 2006).

According to LeGoff, Krauss, and Allen Levin (2010), the majority of children who participate in LEGO® Therapy are referred either by word-of-mouth, by school staff, or by health care providers. In addition to serving children with ASD, LEGO® Therapy is also beneficial for children with anxiety, depression, and adjustment disorders. Typically, children with social and/or communication deficits are prime candidates for participation in LEGO® Therapy. This type of therapy is best executed in groups of two or three. With three children in the group, one child is the engineer, one child is the builder, and one

child acts as the parts supplier. Again, the children alternate roles throughout therapy to ensure exposure to each assignment (LeGoff, Krauss, & Allen Levin, 2010).

There are several requirements for LEGO® therapists as outlined by LeGoff, Krauss, and Allen Levin (2010). First, individuals must possess a bachelor's degree in psychology, education, or a related area of study. Experience working with children with an ASD diagnosis is required; however, it has been noted that "inexperienced volunteers" without formal training have successfully executed LEGO® Therapy. Last, therapists should be familiar with the LEGO® system, including the specific LEGO® designed being utilized in the particular therapy group (LeGoff, Krauss, & Allen Levin, 2010).

LEGO® Therapy sessions, in the beginning, highly structured in order to accomplish the goals of the intervention (LeGoff, Krauss, & Allen Levin, 2010). When the group members arrive, they are prompted to greet one another while maintaining eye contact. Next, there is a group review and a discussion about where an agenda is set. After a plan is made and goals are determined, the group assigns roles (engineer, builder, and parts supplier) before engaging in the main group activity. During this task, the therapist works to facilitate social and communicative experiences among members as these naturally occur within the group. Once the goals are achieved, the participants are afforded the opportunity to engage in free-play when they are able to use the LEGO® blocks in an unstructured manner. During this time, the therapist remains in a coaching position to maximize social skills, interaction, and communication among the group members. Approximately five to ten minutes before free-time concludes, the therapist informs the children that they have five (or ten) minutes left before having to clean up.

After the participants are finished putting the LEGO® blocks away, they are instructed to say goodbye to one another and to use each other's names. Last, if parents and/or teachers would like information regarding the session's contents, therapists are encouraged to take notes when the group has adjourned (LeGoff, Krauss, & Allen Levin, 2010).

There are multiple stages or levels throughout the course of the intervention that the children who participate in LEGO® Therapy move through in order to demonstrate skill attainment and mastery (LeGoff, Krauss, & Allen Levin, 2010). Children begin as "LEGO® Helpers" in order to either learn the process of building, to increase their ability to sustain their attention, or to increase the motivation to develop higher level skills. The next level is the "LEGO® Builder", acknowledged by a diploma. If someone at this level assembles an original freestyle creation using the LEGO® blocks, he or she receives a Creator Certificate and become "LEGO® Creators". Next, if a child decides to lead a design, including directing the project and assigning tasks to group members, he or she can become a "LEGO® Master". A "LEGO® Genius" is one step above the "LEGO® Master" and attainment requires creating a LEGO® movie script or story to be acted out by the group members. The group members then discuss whether or not the individual has earned a LEGO® Genius diploma based on their film project. The final stage is the "LEGO® Legend". This role is reserved for children who have attained all of their goals but wish to continue participating in LEGO® therapy. They take on a peer monitoring role and continue attending LEGO® therapy sessions as senior group members (LeGoff, Krauss, & Allen Levin, 2010). This hierarchy of positions within the group reflects the concept of "legitimate peripheral participation", or the promotion of members within a

group that is involved in a collaborative project. LEGO® blocks are an example of legitimate peripheral participation and can maximize the impact of an intervention (Pinksy, Gardner, & Kim, 2007).

The following rules are used in LEGO® therapy: "1. If you break it, you have to fix it; 2. If you can't fix it, ask for help; 3. If someone else is using it, don't take it; ask first; 4. No yelling. Use indoor voices; 5. No climbing or jumping on furniture; 6. No teasing, name-calling, or bad words; 7. No hitting or wrestling – keeps hands and feet to yourself and 8. Clean up – put things back where they came from" (LeGoff, Krauss, & Allen Levin, 2010). These rules are presented on a poster board in the LEGO® therapy room and are referred to whenever a new member joins the group. Instead of the therapist redirecting behaviors that are in violation of the aforementioned LEGO® group rules, group members are encouraged to assist one another in following the rules (LeGoff, Krauss, & Allen Levin, 2010). This "peer-mediated corrective feedback" is paramount to LEGO® therapy's effectiveness and to assisting participants in achieving their social and communication goals (LeGoff, Krauss, & Allen Levin, 2010). The internalization and demonstration of the rules are very important for success. Points and/or prizes can be incorporated into LEGO® therapy to reinforce various achievements during the sessions. Last, LEGO® therapy incorporates additional rules into the sessions, or "Rules of Cool". These unwritten rules are determined within each individual group as naturally occurring interactions transpire among group members (LeGoff, Krauss, & Allen Levin, 2010).

The majority of studies involving LEGO® therapy and/or LEGO® blocks include participants with high-functioning ASD (Golan & Baron-Cohen, 2006; Gray, 1998; Lerner & Mikami, 2012; Lopata, Thomeer, Volker, Nida, & Lee, 2008). Owens,

Granader, Humphrey, & Baron-Cohen (2008) used six to 11 year old children with high functioning ASD and Asperger Disorder to evaluate the effects of LEGO® Therapy and the Social Use of Language Programme (SULP). Inclusion criteria included an Intelligence Quotient (IQ) greater than 70. The average IQ reported for the LEGO® group was 113.93; the SULP group had an average IQ of 106.87, and the control group's IQ average was 108 (Wechsler Abbreviated Scales of Intelligence). Of the high functioning six to 11 year olds in this study, the children who participated in the LEGO® Therapy demonstrated greater social skill improvements than the participants in the SULP according to results on the GARS. Likewise, participants in the LEGO® Therapy group indicated a greater reduction in maladaptive behavior. Golan & Baron-Cohen (2006) studied social skill advances in adults with high functioning ASD; similar to that of Owens, Granader, Humphrey, & Baron-Cohen's (2008) study, the cutoff IQ score was 70. The average verbal and performance IQ for each group was greater than 108, indicating at least average cognitive ability, with the highest average score being 115.8.

Studies by Baron-Cohen (2002), Baron-Cohen (2006), and Baron-Cohen et al. (2003) suggest that children with high functioning ASD are highly motivated by LEGO® blocks due to their systematic nature. Furthermore, Golan & Baron-Cohen (2006) indicated that children with high functioning ASD can strengthen their ability to recognize emotion through the use of a system such as LEGO® blocks. Owens, Granader, Humphrey, & Baron-Cohen (2008) determined that LEGO® Therapy is most applicable to students with high functioning ASD who are mainstreamed or placed in an inclusion class at school. Mainstreaming a student with ASD will not produce sufficient skill gains without the incorporation of a social skills based intervention into their education plan.

This can be attributed to their difficulty with attending to, modeling, or imitating peers, given their ASD symptomology (Harper, Symon, & Frea, 2008). Instead, students with ASD require supplemental support and instruction in order to acquire more appropriate social skills.

Another study by Kato, Hattori, Iwai, and Morita (2012) involved 39 Japanese high school students between the ages of 16 and 17. The participants were assigned to various groups and instructed to design anything they would like, using LEGO® blocks in a collaborate fashion. Researchers indicated that scores for social skills and trust in others – as measured by the Kikuchi Scale of Social Skills (KiSS-18) – significantly increased following participation in the LEGO® activity.

Use of LEGO® blocks in a collaborative group setting can be traced back to 1988. Researcher Azmitia studied the effects of group work versus individual work, using LEGO® blocks as a medium for problem solving and learning in five year old children (1988). According to results, collaboration produced greater learning than individual work. Furthermore, participants working in a group generalized the skills learned to a greater degree than participants working alone (Azmitia, 1988). Azmitia (1988) also considered the features of collaboration that contribute to learning. Azmitia states that preschool aged children are less egocentric than Piaget describes them and can effectively work in a group setting in order to solve basic problems. Furthermore, children may spend more time problem solving when working with a partner or group than when working alone due to encouragement from others (Azmitia, 1988). This can prevent children from giving up on the task, thereby increasing the time spent engaged in the

activity. Lastly, Azmitia (1988) also credits Bandura's observational learning theory inherent in collaborative settings to the increased problem solving ability of group work.

Benefits of Participation in a LEGO® Group

Effectiveness of a LEGO® group can be witnessed in various functional arenas, such as trust and communication. Trust in others has increased following participation in collaborative expression using LEGO® blocks (Kato, Hattori, Iwai, & Morita, 2012). This is important because developing trust in peers may contribute to an increase in sharing behaviors, something that is implicated in cooperative play. Participation in a LEGO® group may facilitate group communication, increase social skills, and positively affect the moods of each participant involved. It is highly collaborative in nature, and participation in the LEGO® group itself is the reward (LeGoff, Krauss, & Levin Allen, 2010; Owens et al., 2008).

LeGoff (2004) found that social competence increased after 12 or 24 weeks of a LEGO® group intervention. This was a combination of individual (60 minutes) and group LEGO® (90 minutes) therapy. Participants demonstrated a significant increase in their social skill competence after exposure to the LEGO® intervention than had experienced previously, while on a three- or six month wait list. Therefore, time alone does not significantly improve social competence. Also, results of LeGoff's (2004) study indicate that the longer the duration of LEGO® therapy (24 weeks as opposed to 12), the greater the increase in social competence (LeGoff, Krauss, & Levin Allen, 2010). The participants demonstrated more social interactions during play time at school post intervention, and these occurrences also lasted for a longer period of time. Also, unlike other studies, age and gender differences post intervention were not found. This means

that LEGO® groups have the potential to be more accommodating to a greater number of participants (LeGoff, Krauss, & Levin Allen, 2010; LeGoff, 2004).

Other research indicates that intervention duration is important as well; the literature can be misleading because most studies include shorter interventions (15 hours or less), indicating social skill gains can be made in a shorter period of time (Preece & Mellor, 2009). However, longer lasting interventions appear to produce more significant results (Preece & Mellor, 2009).

Support for the Implementation of LEGO® Groups in Schools

LEGO® therapy is a promising intervention for social competence remediation for children with ASD. It can be easily incorporated into the school setting. It is also economical, requiring only the purchase of LEGO® blocks. The longer the LEGO® group can function, the more social competence gains the participants will make. This study also indicates that participants generalized their social competence skills from the therapy group itself to naturally occurring social settings (LeGoff, Krauss, & Levin Allen, 2010; LeGoff, 2004).

Previous literature indicates that LEGO® therapy (90 minutes per week in a group and 60 minutes per week individually) over a 24-week period significantly improves social competence in children with ASD. Furthermore, social competence gains were not reported during time spent on the waiting list for intervention participation. Over a three-year period, students with ASD who participated in a LEGO® group made significantly greater social skill gains than children with ASD who received assistance from 1:1 paraprofessional in school over a similar number of hours (Owens et al., 2008). Furthermore, participants in a LEGO® group demonstrated a significantly higher

improvement in autism-specific social interaction scores on the GARS (LeGoff, Krauss, & Levin Allen, 2010) than another treatment group (SULP), as well as the control groups (Owens et al., 2008). The LEGO® group also exhibited significantly lower maladaptive behaviors post intervention than the control group (Owens et al., 2008).

Collaborative expression has been found to influence social behaviors positively in LEGO® group participants. In particular, the social skill of interpersonal communication appears to be the most receptive to remediation. Group adaptation and positive regard for others are also benefits of participation in a LEGO® group. This type of collaborative expression group could easily be implemented in schools or group therapy. It is economical (requiring only the purchase of LEGO® blocks) and can be completed in a short period of time. This type of therapy may facilitate group communication, increase social skills, and positively affect the mood of each participant involved. Although levels of social skills and trust in others are found to increase significantly in participants after engaging in the LEGO® group as compared with the pre therapy experience, trust in oneself, however, was not found to increase or decrease significantly (Kato et al., 2012).

According to a meta-analysis of various social skill interventions, Ospina et al. (2008) concluded that LEGO® Therapy was effective for improving social skills and reducing ASD symptomology in participants. This finding was based on LeGoff's three year LEGO® Therapy study published in 2006. Ospina et al. (2008) categorized LeGoff's prospective cohort study as "Integrative Programs/LEGO® Therapy" for the purposes of the meta-analysis. There were 60 participants in the LEGO® Therapy group, and 57 participants in the control group. Results of LeGoff's 2006 LEGO® Therapy study

indicate improvements in social skills and ASD symptoms in the treatment group, as compared with the control group. Ospina et al. (2008) then evaluated each study based on numerous criteria. For LeGoff's study, researchers reported an inadequate report of selection criteria; the exposed cohort was somewhat representative; the report of therapeutic regimen was inadequate, and the report of treatment provider was inadequate. They also indicated that the measure of exposure assessment was reliable; the outcome assessment was blind to exposure status; the method of outcome assessment was valid and reliable; main potential confounders were incorporated in the design/analysis; there were no important differences between groups other than exposure to intervention; partial report of measures of precision; report of how potential confounders were distributed. There was also no funding for this study (Ospina et al., 2008).

Need for Further Research

Studies involving LEGO® play therapy for social skill remediation in children with ASD are limited. Despite the vast amount of social skill intervention literature, many fail to provide empirical evidence (LeGoff, 2004; Stagnitti, O'Connor, & Sheppard, 2012), especially in regard to generalizability of findings (Cotugno, 2009). Literature indicates growth in the areas of self-concept, locus of control, behavioral change, anxiety, and cognitive ability following participation in play therapy (Robinson, Landreth, & Packman, 2007). Elementary school counselors commonly use play therapy with their students. Furthermore, play therapy can be used as a preventative measure as well by developing interpersonal skills such as self-control and self-understanding (Robinson, Landreth, & Packman, 2007). Elementary aged students who participate in play therapy can use the aforementioned skills to make academic, social, behavioral, and emotional

gains as well (Robinson, Landreth, & Packman, 2007). Research suggests that play therapy can be very beneficial to students; further research on a specific population of students – those with ASD – is warranted. Furthermore, "social skills" are not always operationally defined; therefore is unclear whether or not specific areas have significantly improved, post intervention (LeGoff, 2004). In regard to social communication in children with ASD, more effective methods of increasing positive play and prosocial behaviors in students with language impairment are warranted (Fujiki et al., 2013).

The Influence of Rater Perception

The long-term effects of LEGO® therapy remain unknown, as well as whether or not LEGO® blocks will be equally motivating and engaging for students as they get older (LeGoff, 2004). Teacher perceptions become an issue especially in situations in which they are the only reporters of behavior. Given the reliance placed on "judges" for determining intervention success, it is important to also keep in mind the perception of the individual rating the child's behavior when drawing conclusions (Kwon et al., 2012). Teachers' perceptions of students' social skills may not be the best indicator of how those students function within their social groups. This is commonly referred to as "clique centrality" (Kwon et al., 2012).

However, the classroom teacher is the individual most familiar with the students and the most highly qualified to report on behaviors over a period of time (Mazurik-Charles & Stefanou, 2010). A paraprofessional working with all of the students in the classroom may be an option as far as using a second rater to provide more inter-rater reliability and internal consistency. This would be indicated in the aforementioned

intervention involving the use of paraprofessionals to shape, maintain, and generalize social skills throughout the day in the classroom.

Benefits of the LEGO® Program

Given the previously noted findings, it is warranted to explore social skill outcomes in children with ASD who participated in a LEGO® therapy group versus those who did not. Research indicates that overall outcomes include improved social competence in natural settings (LeGoff & Sherman, 2006). Although higher functioning students with ASD tend to demonstrate greater gains, the LEGO® group provides all participants with social skill advancement. The collaborative problem-solving component of the intervention encourages group members to work together to achieve the desired outcome. If effective, LEGO® therapy groups will provide schools with a practical, economical, and engaging social skills remediation program. More importantly, it affords children with ASD an opportunity to develop and strengthen their skills in social, emotional, behavioral, and academic functioning.

Present Study

For the purposes of the present study, the following research questions were developed to assess further, the impact of a LEGO® group on the social skills of kindergarten-aged students with an Autism Spectrum Disorder diagnosis. First, do the kindergarten students with ASD who participated in the LEGO® group experience increases in social skills as indicated by scores on the Autism Spectrum Rating Scale (ASRS) (specifically, peer socialization, adult socialization, and social/emotional reciprocity)? Second, do social skills increase in the kindergarten students with ASD who did not participate in a LEGO® group as supported by ASRS scores (specifically, peer

socialization, adult socialization, and social/emotional reciprocity)? Third, what specific ASRS treatment scales increase or decrease in the participants after four and eight weeks? The fourth research question serves to investigate whether or not differences exist among the treatment and control groups' scores on the ASRS. Last, do gender differences exist among the male and female participants' scores on the ASRS?

These questions serve to explore the effects, if any, that participation in a LEGO® social skills group has on children with documented social skill deficits. It is important to note that unlike the LEGO® therapy discussed by researchers such as LeGoff, Krauss, & Levin Allen (2010), LeGoff (2004), and Owens et al. (2008), this study is not referenced as "therapy". Instead, it is a LEGO® group loosely based on the principles of LEGO® therapy coined by LeGoff (2004).

The research questions also consider the appropriateness of the ASRS for evaluating social skill gains, maintenance, or regression. Furthermore, if specific treatment scales are identified for predicting social skill changes in kindergarten aged children with a diagnosis of Autism Spectrum Disorder following participation in a LEGO® group, it would allow group facilitators to tailor progress monitoring tools to the specific intervention. Instead of completing the entire ASRS, teachers may need only to fill out certain treatment scales that may predict social skill outcomes in their students. In conclusion, the previously noted research questions serve to steer the methodology utilized in this study for investigating the effects of participation in a LEGO® group on social skills in kindergarten aged students with an Autism Spectrum Disorder diagnosis.

Chapter 3: Method

Overview

This study serves to investigate the effectiveness of a group social skills program on Kindergarten students diagnosed with Autism Spectrum Disorder. Specifically, the social skills program is centered on the use of LEGO® blocks to provide participants with a tactile medium to acquire and refine their social skills in a group setting. Furthermore, participants are afforded the opportunity to assist one another in the development of these skills. It is highly collaborative in nature and draws upon children's natural interest in LEGO® blocks and construction. Participants are required to work together to construct the given LEGO® design, a task that emphasizes and utilizes social skills for successful completion. It encourages participants to initiate and sustain communication with one another in order to achieve a goal. It also requires flexibility to switch roles with one another while following the LEGO® set's instructions. The LEGO® intervention takes a collectivist approach to teaching, strengthening, and reinforcing the development of social skills in a small group of students with Autism Spectrum Disorder.

The current study is quantitative and uses descriptive statistics to explore the outcomes of student participation in the LEGO® social skills group. Archival data were used to measure the hypothesis that children who participate in a LEGO® group will make more social skill gains than students who do not participate. This is a one-tailed, directional hypothesis. A case study with multiple participants design was used to test this hypothesis (Kazdin, 2011), given the small sample size that was available for this study. Additionally, a dependent samples *t* test including descriptive statistics was used to

evaluate scores. The dependent samples *t* tests and descriptive statistics were performed using IBM SPSS software.

Two independent variables were utilized in this study. The first was participation in the LEGO® intervention program, which has two levels, the treatment group and the control group. Participants in the treatment group participated in the eight week LEGO® social skills intervention, whereas the participants in the control group did not. The second independent variable was gender, consisting of two levels, male and female. The dependent variable was scores on the Autism Spectrum Rating Scale (ASRS). The dependent variable has three levels: pre-intervention assessment, peri-intervention assessment (after four weeks), and post-intervention assessment (eight weeks). The purpose of the design is to provide schools with the necessary tools for promoting positive student outcomes in learners with an Autism Spectrum Disorder diagnosis. Success of this program would afford schools the opportunity to support their students during the school day by developing and strengthening social skills, increasing social competence and interaction skills, and stressing the importance of collaboration and teamwork.

Participants

The participants in this study included six kindergarten students in a full-day Autism program at a public elementary school in a suburban school district in the Northeast. All of the students who participated in this study had an Autism Spectrum Disorder diagnosis, which was made prior to the start of the school year. These students were eligible for special education during the time of the intervention, and subsequently all had an Individualized Education Program (IEP). The students participated in a special

education program for the entire school day, and all were educated in the same Autistic kindergarten class. All of the participants were identified as being in need of social skill intervention and remediation, as per their IEP. The students were not receiving any other group social skill intervention during the school day. Social skill development was built into the curriculum and was supported, class wide, throughout the school day; however, this was typically administered on an individual basis through discrete trials.

The participants were divided into two groups, one treatment group and one control group. Two groups of three students were randomly assigned either to the treatment or to the control condition. All of the students participated in the intervention from the first session. They attended all eight sessions, and everyone received the same frequency, duration, and intervention. In regard to gender, four students were male and two students were female. Furthermore, each group consisted of two male participants and one female participant. Four students were six years old (three males and one female), and two students were five years old (one male and one female). In terms of ethnicity, two students were African American; two students were Asian; one student was White, and one student was biracial (half White, half Hispanic).

The inclusion criteria for this study involved individuals who had Autism Spectrum Rating Scales completed for them prior to the start of the intervention, at four weeks after participation in the intervention, and at post intervention (eight weeks after the program began). Exclusion criteria for this study consisted of individuals who did not have Autism Spectrum Rating Scales completed for them before, during, and after the intervention. Given archival data were utilized for this study; recruitment of such included the data set availability of kindergarten children in the Autism program who had

the Autism Spectrum Rating Scale completed for them before, during, and after the intervention.

Materials and Measures

Materials utilized in this study consisted of an age-appropriate LEGO® set (fire truck), a group facilitator (the school psychologist), and an empty room in the school building where the LEGO® group met. The room contained a table and four chairs for each of the participants and the group facilitator to sit at during the session. The LEGO® blocks were placed on the table where the participants were seated, and where they constructed the design. The specific LEGO® set used for this intervention was the LEGO® City Fire Truck 60002. In addition to the fire truck itself, the set included two firefighter minifigures with various accessories, an extendable ladder with a rotating base, a retractable house with a water element, and an opening hatch with an equipment-storing base. The dimensions of the LEGO® City Fire Truck 60002 are three inches by six inches by one inch. The item's recommended age range is five years to 12 years.

The assessment tool selected to measure progress and collect data for this study was the Autism Spectrum Rating Scale (ASRS). The *Autism Spectrum Rating Scales* (ASRS) is a 70- to 71-item assessment of social functioning, communication, atypical behaviors, and self-regulation. The full-length version was elected for this study, because it is more comprehensive than the short form. Scores on the ASRS can be analyzed in one of three ways: the Interpretive Report, Comparative Report, and Progress Monitoring Report (Simek & Wahlberg, 2011). The Progress Monitoring Report format was selected for this study for the purposes of comparing the three administrations of scores in order to gain insight into the participants' behavioral changes over time. The rating scales were

assessed using the ASRS Online Assessment Center, and *T*-scores for each scale were reported. The ASRS Online Assessment Center yielded Progress Monitoring Reports for each subject at all three evaluation periods to indicate how scores had changed over time. The computerized program transformed raw scores into *T*-scores. In addition to *T*-scores, percentile ranks, and confidence intervals are also provided. Statistical significance is also noted in the Progress Monitoring Report ($p = .05$, adjusted for multiple comparisons).

The students' classroom teacher collected the baseline data using the ASRS prior to the start of the intervention. The teacher then completed the ASRS to collect the progress monitoring data halfway through the intervention (after four weeks). Last, the teacher collected the outcome data using the ASRS after the intervention concluded (after the eighth week). Specific treatment scale areas of interest for this study included the Peer Socialization, Adult Socialization, and Social/Emotional Reciprocity. Each form took the teacher about 20 minutes to complete. Two versions were utilized, depending upon the age of the individual being assessed. Two students required the 2–5 years form (70 items), and four students required the 6–18 years (71 items) form. Statistical examination of the ASRS reveals the fact that this rating scale is reliable and valid (Simek & Wahlberg, 2011). Therefore, this assessment tool deemed a good indicator of ASD symptomology and was used to measure outcomes of this social skills intervention.

The group facilitator reviewed LEGO® Therapy literature, as well as other social skill intervention research as outlined in Chapter 2, before designing the LEGO® group. As advised by LeGoff, Krauss, and Allen Levin (2010), the group facilitator had a bachelor's degree in psychology (a master's and educational specialist degree in school

psychology, as well), experienced in verbal de-escalation techniques, frequently worked with children with an ASD diagnosis (including kindergarten aged children) in an educational setting, administered other social skill interventions in an educational setting, and was familiar with LEGO® blocks and designs.

As mentioned previously, the LEGO® group in this particular study was not part of LEGO® Therapy. However, the current intervention utilized the basic principles of the group format for teaching social and communication skills through the tactile medium of LEGO® blocks by capitalizing on idiosyncratic interests of participants. The stages or levels inherent in LEGO® Therapy that the participants move through were not used in this LEGO® group. Also, the group facilitator developed rules for the intervention (see Appendix A) and did not use that of LEGO® Therapy.

Procedure

The three participants of the LEGO® group and the facilitator (school psychologist) met one time per week for 20 minutes for eight weeks. During the intervention, the participants in the control condition remained in their classroom and worked in a one to one setting either with the classroom teacher or with an aide on their specific goals as outlined in their Individuals Education Program (IEP). Each week, the participants in the treatment condition (LEGO® group) rotated roles: the “engineer”, “supplier”, and “builder”. The function of the “engineer” was to interpret the directions that were included in the LEGO® kit. The instructions were presented in the visual modality (pictures and picture demonstrations). The engineer needed to perceive the visually presented material and then orally instruct the supplier on the specific blocks to locate, based on the pictures in the kit. The engineer was also responsible for interpreting

the visual directions in order to direct the builder in assembling the blocks. The job of the supplier was to listen to the instructions presented orally by the engineer, to visually scan all of the blocks laid out before him or her, and to select the appropriate blocks based on the engineer's description. After this was accomplished, the supplier passed off the necessary blocks to the builder. Last, the responsibility of the builder was to accept the blocks from the supplier, to listen to the orally presented directions from the engineer, and finally, to assemble the blocks accordingly. Only the engineer had access to the directions; the supplier and builder did not.

As previously mentioned, prior to the first session, the participants' classroom teacher completed the ASRS on all of the students, both in the treatment and in the control conditions. This served as the baseline data collection. After this was accomplished, the intervention began. The first session served as the introduction. First, the facilitator introduced herself to the participants. This individual was very familiar with the students because she is the building school psychologist. However, the participants were now interacting with the facilitator in a different capacity, so it was necessary to present the intervention and provide the students with an overview of the sessions. The nature and course of the intervention was explained in a developmentally appropriate manner. Second, the group rules were presented and discussed (see Appendix A). The facilitator read the rules aloud to the participants while holding up a sign displaying the same information. The rules were reviewed and reworded to ensure that all participants understood. Unlike LEGO® Therapy, when the rules are typically reviewed only when new members join, the rules in this LEGO® group were discussed at the beginning of each session (LeGoff, Krauss, and Allen Levin, 2010). This was, in part,

due to the young age of the participants, as well as to their intellectual ability. As an aside, unlike LEGO® Therapy, new members did not join this LEGO® group (LeGoff, Krauss, and Allen Levin, 2010). The same three participants took part in the LEGO® group for all eight weeks of the intervention.

The next six weeks served as the treatment. Again, the students met one time per week during these six sessions for 20 minutes. Each week, the facilitator greeted the students in their classroom and then brought them to the intervention location (the library). The participants and examiner sat down at an empty table in the library. There were no other individuals present in the room during the sessions. The LEGO® blocks and directions were laid out on the table. Each treatment session began with the oral and visual presentation of the group rules by the facilitator. The facilitator also referred to various rules throughout each session in order to refocus or redirect group behavior. The facilitator provided assistance, as necessary, to maintain the participants in their assigned roles. The facilitator prompted each participant while he or she executed his or her role. Again, the students switched roles at each session. Each participant assumed each role (engineer, supplier, and builder) two times over the six weeks of treatment. The group spent about 15 minutes actively working on the LEGO® block design. The group facilitator encouraged verbal communication among members during this time, especially as it related to the task at hand. The participants were given a five and a one minute warning toward the end of the construction. The final task involved group clean up. If there was time remaining, the participants were afforded “free play” time with alternate LEGO® blocks provided by the classroom teacher (not part of a specific LEGO® set or

design). They typically played alone but interacted with one another in order to obtain a LEGO® block they wanted.

The treatment goal for this LEGO® group was to increase social skills among peers and adults. Operationally defined, this meant initiation of social interaction with peers and adults, as well as receptiveness to social contact initiated by peers and adults. In addition to the ASRS (which was also used for the purposes of this study), the teacher recorded social skill observations on all six participants as students in her classroom, as per their IEP goals. This information – personal progress as outlined in the participants' IEPs – was not included in this study. During the six treatment sessions, in which the participants in the treatment condition engaged in cooperative play with the LEGO® blocks, the goal was to increase social interaction and communication among members. In order for this to occur, the group was designed to incorporate the three roles as described in LEGO® Therapy to provide members with specific assignments in which they remained during the entire duration of the session. The group facilitator also encouraged communication among members: some communication regarded the group activity and some, before and after with informational conversation. The members were encouraged to communicate verbally with one another while assembling the LEGO® design. They were also encouraged to do so in regard to non-activity discussion, especially during discussion. Given the limited cognitive and communicative ability of the participants, verbal interaction was somewhat limited and minimal. However, with a great deal of prompting from the group facilitator, the participants were able to converse with one another.

After the fourth session, the teacher completed the ASRS on all students in her classroom for a second time. This functioned as the progress monitoring data collection. After weeks six and seven, the participants were prepped on the program's conclusion, including the fact that the final week of their LEGO® group was approaching. The eighth and final week consisted of program termination and skill generalization. The facilitator concluded the intervention by summarizing the skills learned throughout the sessions. The facilitator reviewed some of the important skills such as sharing and teamwork in which the participants engaged. The students were encouraged to share what they enjoyed about participating in the group. After this session, the classroom teacher completed the ASRS for a third and final time for all of the students in both conditions. Last, the ASRS was scored using MHS' online ASRS scoring program for all six participants, for all of the treatment scales, with emphasis placed on each of the three intervals specifically considered for this study. The data were then analyzed for significance, using the ASRS Online Assessment Center's computerized program.

Chapter 4: Results

Overview

It was hypothesized that social skill differences exist between those kindergarten children with an Autism Spectrum Disorder diagnosis, following the participation versus the nonparticipation in a LEGO® group. Specifically, the students assigned to the treatment group would make more social skill gains than students who did not participate. In order to examine this objective, the following research questions were developed to explore trends in the data: 1. Do the kindergarten students with Autism who participated in the LEGO® group experience increases in social skills as indicated by scores on the Autism Spectrum Rating Scale (ASRS) (specifically, peer socialization, adult socialization, and social/emotional reciprocity)? 2. Do social skills increase in the kindergarten students with Autism who did not participate in a LEGO® group as supported by ASRS scores (specifically, peer socialization, adult socialization, and social/emotional reciprocity)? 3. What specific ASRS treatment scales increase or decrease in the participants after four and eight weeks? 4. Do differences exist among the treatment and control groups' scores on the ASRS? and 5. Do gender differences exist among the male and female participants' scores on the ASRS?

Specific ASRS scales, considered for the purposes of this present study, that define "social skills" in the research questions are peer socialization, adult socialization, and social/emotional reciprocity. However, all scales are reported and explored for significant change. For individual patterns of performance, scores on the ASRS are reported for each subject in the treatment and control groups. Age and gender are noted as well. Due to the small sample size, individual performance at each point of assessment

(before the intervention, after four weeks of intervention implementation, and after the eight week intervention concluded) was explored. The average ASRS scores for the treatment group and control group are compared. Gender differences are also presented according to percent change.

Descriptive Statistics

Goldstein and Naglieri (2010) suggest that ASRS scores less than 60 are considered low to average, and scores greater than or equal to 60 are elevated. Goldstein and Naglieri (2010) and Simek and Wahlberg (2011) indicate that there are many more behavioral concerns consistent with that of an Autism Spectrum Disorder diagnosis than typically reported for children of the same age. Elevated scores fall within the range of 65 to 69 and indicate more concerns than are typically reported. Slightly Elevated scores fall within the range of 60 to 64 and suggest more concerns than are typically reported. *T*-scores within the Average range refer to scores of 40 to 59 and indicate a typical level of concern that is typically reported. Last, a *T*-score less than 40 equates to a Low Score, suggesting that there are fewer concerning behaviors than typically reported, compared with that of the average child that age (Goldstein & Naglieri, 2010; Simek & Wahlberg, 2011). Table 1, which is color coded, summarizes these ranges. In Tables 2 through 7, for each of the six participants, *T*-scores on the ASRS are reported for the three points of assessment (before program implementation or pre-intervention, after four weeks or peri-intervention, and after eight weeks at the conclusion of the program or post-intervention), as well as percentile ranks, A decrease in *T*-score indicates improvement in behavior or change in a positive direction. These tables are also color coded to match Table 1. The

darker colors indicate higher levels of behavioral concerns consistent with that of an Autism Spectrum Disorder diagnosis.

Table 1

Classification of ASRS T-Scores

	ASRS T-Score
Low	Below 40
Average	40 – 59
Slightly Elevated	60 – 64
Elevated	65 – 69
Very Elevated	70 and Above

Individual Subjects' Scores on the ASRS

Because there were only three subjects in each condition, individual changes in ASRS scores were observed. These individual scores are presented in the succeeding tables.

Control Subject 1. Table 2 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 2

Control Subject 1's Pre-, Peri- and Post-Intervention Scores on the ASRS

	Pre-Intervention (0)		Peri-Intervention (4)		Post-Intervention (8)	
Scale	**T-score**	**%ile**	**T-score**	**%ile**	**T-score**	**%ile**

Total Score	71	98	75	99	73	99
Social/Communication	68	96	76	99	70	98
Unusual Behaviors	69	97	69	97	70	98
DSM-5 Scale	75	99	80	99	79	99
Peer Socialization	74	99	75	99	76	99
Adult Socialization	54	66	62	88	62	88
Social/Emo. Reciprocity	65	93	72	99	64	92
Atypical Language	61	86	71	98	74	99
Stereotypy	76	99	72	99	72	99
Behavioral Rigidity	65	93	68	96	65	93
Sensory Sensitivity	60	84	57	76	66	95
Attn./Self-Regulation	58	79	60	84	53	62

Control Subject 1 is a five year old female. According to her records, an IQ score was unable to be obtained. This indicates severe impairment at the time of assessment, so the IQ test could not be completed. There appears to be no significant change at any of the three periods of skill analysis (pre- to post- intervention, pre- to peri-intervention, or peri- to post- intervention). In regard to the three specific areas intended for study (peer socialization, adult socialization, and social/emotional reciprocity), Control Subject 1's peer socialization score for all three assessments was in the Very Elevated range. Prior to the intervention, her score for adult socialization was in the Average range, and then increased to the Slightly Elevated range halfway through, and also at the conclusion. Her score for the social/emotional reciprocity scale began as Elevated, increased to Very

Elevated, and then decreased to Slightly Elevated. Both her total score and DSM-5 score remained in the Very Elevated category at all three points in time. Although not significant, most scores increased in severity from the first administration (pre-intervention) to the second (peri-intervention). Scores generally remained in the same range or decreased from the second to third (post-intervention) administration.

Control Subject 2. Table 3 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 3

Control Subject 2's Pre-, Peri- and Post-Intervention Scores

	Pre-Intervention (0)		Peri-Intervention (4)		Post-Intervention (8)	
Scale	**T-score**	**%ile**	**T-score**	**%ile**	**T-score**	**%ile**
Total Score	74	99	80	99	73	99
Social/Communication	63	90	70	98	67	96
Unusual Behaviors	79	99	84	99	73	99
DSM-5 Scale	70	98	83	99	75	99
Peer Socialization	71	98	75	99	73	99
Adult Socialization	60	84	70	98	64	92
Social/Emo. Reciprocity	55	69	62	88	62	88
Atypical Language	71	98	79	99	69	97
Stereotypy	69	97	70	98	67	96
Behavioral Rigidity	75	99	78	99	76	99

Sensory Sensitivity	66	95	75	99	60	84
Attn./Self-Regulation	54	66	61	86	62	88

Control subject 2 is a five year old male. According to his records, an IQ score was unable to be obtained. It appears that a possible increase in DSM-5 scale was found pre- to peri- intervention. This score remained in the Very Elevated range at all three points of assessment, but significantly increased four weeks after the intervention began. His total score was found to be in the Very Elevated range pre-, peri-, and post-intervention as well. In regard to peer socialization, his score was always in the Very Elevated range. For adult socialization, he was initially assessed in the Slightly Elevated range, increased to the Very Elevated range after four weeks, and then decreased to the Slightly Elevated range at eight weeks. His social/emotional reciprocity score began in the Average range, and then increased to the Slightly Elevated range at four and eight weeks. Although not significant, most scores increased in severity from the first administration (pre-intervention) to the second (peri-intervention). They generally stayed in the same range or decreased from the second to third (post-intervention) ASRS administration.

Control Subject 3. Table 4 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 4

Control Subject 3's Pre-, Peri- and Post-Intervention Scores

	Pre-Intervention (0)	Peri-Intervention (4)	Post-Intervention (8)

Scale	T-score	%ile	T-score	%ile	T-score	%ile
Total Score	58	79	65	93	59	82
Social/Communication	67	76	54	92	58	79
Unusual Behaviors	56	73	63	90	58	79
Self-Regulation	57	76	59	82	58	79
DSM-5 Scale	57	76	65	93	59	82
Peer Socialization	76	99	84	99	81	99
Adult Socialization	51	54	63	90	63	90
Social/Emo. Reciprocity	55	69	55	69	50	50
Atypical Language	62	88	68	96	68	96
Stereotypy	54	66	71	98	63	90
Behavioral Rigidity	53	62	55	69	48	42
Sensory Sensitivity	60	84	60	84	57	76
Attention	57	76	58	79	57	76

Control Subject 3 is a six year old male. His IQ score was reported in the extremely low range (Composite Score = 60). No significant change was reported among any of the ASRS treatment scales during the three assessment periods. His peer socialization scores remained in the Elevated range. His adult socialization score was initially assessed in the Average range and then was Slightly Elevated at four and eight weeks. His social/emotional reciprocity remained in the Average range for all three measures. His total score was in the Average range at pre-intervention, went up to the Slightly Elevated range at peri-intervention, and then went back down to the Average

range post-intervention. His DSM-5 score was initially assessed in the Slightly Elevated range before the intervention began, increased to the Elevated range four weeks later, and then decreased to the Slightly Elevated range at the conclusion of the program (eight weeks from initial assessment). Although not significant, most scores increased in severity from the first administration (pre-intervention) to the second (peri-intervention). They generally remained in the same range or decreased from the second to third (post-intervention) administration.

Treatment Subject 1. Table 5 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 5

Treatment Subject 1's Pre-, Peri- and Post-Intervention Scores

	Pre-Intervention (0)		Peri-Intervention (4)		Post-Intervention (8)	
Scale	**T-score**	**%ile**	**T-score**	**%ile**	**T-score**	**%ile**
Total Score	65	93	71	98	70	98
Social/Communication	54	66	60	84	64	92
Unusual Behaviors	67	96	73	99	65	93
Self-Regulation	66	95	68	96	68	96
DSM-5 Scale	64	92	68	96	70	98
Peer Socialization	63	90	66	95	69	97
Adult Socialization	71	98	73	99	75	99
Social/Emo. Reciprocity	58	79	60	84	67	96
Atypical Language	68	96	72	99	66	95

Stereotypy	60	84	54	66	60	84
Behavioral Rigidity	66	95	70	98	65	93
Sensory Sensitivity	73	99	79	99	73	99
Attention	59	82	63	90	63	90

Treatment Subject 1 is a six year old female. An IQ score was unable to be obtained at the time of test administration due to impairment. It appears that there may be an increase in her social/communication skills score before the intervention to after the intervention. An increase in score indicates that her behaviors become of greater concern after participation in the LEGO® group than before participation. No other changes in score were statistically significant. Her peer socialization score was assessed in the Slightly Elevated range before the intervention, in the Slightly Elevated range four weeks in, and in the Elevated range at the conclusion. Her adult socialization score remained in the Elevated range at all three points in time. Her social/emotional reciprocity score began in the Average range, was in the Slightly Elevated range at four weeks, and moved up to the Elevated range at the end of the intervention. Her total score started in the Elevated range before the program began, and then was in the Very Elevated range at four and eight weeks. Similarly, her DSM-5 score was initially assessed in the Slightly Elevated score pre-intervention, increased to the Elevated Range peri-intervention, and concluded in the Very Elevated range post intervention.

Treatment Subject 2. Table 6 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 6

Treatment Subject 2's Pre-, Peri- and Post-Intervention Scores

	Pre-Intervention (0)		Peri-Intervention (4)		Post-Intervention (8)	
Scale	**T-score**	**%ile**	**T-score**	**%ile**	**T-score**	**%ile**
Total Score	75	99	80	99	75	99
Social/Communication	79	99	77	99	78	99
Unusual Behaviors	81	99	85	99	80	99
Self-Regulation	52	58	60	84	53	62
DSM-5 Scale	85	99	85	99	85	99
Peer Socialization	84	99	83	99	80	99
Adult Socialization	63	90	65	93	55	69
Social/Emo. Reciprocity	72	99	74	99	70	98
Atypical Language	68	96	69	97	64	92
Stereotypy	75	99	85	99	85	99
Behavioral Rigidity	85	99	84	99	83	99
Sensory Sensitivity	77	99	79	99	73	99
Attention	48	42	59	82	49	46

Treatment Subject 2 is a six year old male. His IQ score was reported in the extremely low range (Composite Score = 57). No significant change was found to exist among scores pre-, peri-, or post- intervention. His peer socialization was consistently reported to be in the Very Elevated range. His adult socialization was in the Slightly Elevated range pre-intervention, in the Elevated Range after four weeks, and in the

Average range at eight weeks. In regard to social/emotional reciprocity, he remained in the Very Elevated range at all three points in time. His total score and DSM-5 score were reported in the Very Elevated range pre-, peri-, and post-intervention as well. Therefore, a decrease in concerning behavior was not reported for this particular student following participation in the LEGO® group.

Treatment Subject 3. Table 7 provides the ASRS raw scores and T-scores at the three intervention points: pre-intervention, peri-intervention, and post-intervention.

Table 7

Treatment Subject 3's Pre-, Peri- and Post-Intervention Scores

	Pre-Intervention (0)		Peri-Intervention (4)		Post-Intervention (8)	
Scale	**T-score**	**%ile**	**T-score**	**%ile**	**T-score**	**%ile**
Total Score	65	93	65	93	57	76
Social/Communication	52	58	56	73	61	54
Unusual Behaviors	76	99	73	99	67	96
Self-Regulation	58	79	58	79	51	54
DSM-5 Scale	65	93	66	95	61	86
Peer Socialization	64	92	68	96	66	95
Adult Socialization	63	90	65	93	62	88
Social/Emo. Reciprocity	53	62	54	66	62	50
Atypical Language	72	99	75	99	70	98
Stereotypy	75	99	69	97	63	90

Behavioral Rigidity	71	98	67	96	63	90
Sensory Sensitivity	73	99	70	98	62	88
Attention	48	42	48	46	43	24

Treatment Subject 3 is a six year old male. An IQ score was unable to be obtained for this student at the time of assessment due to impairment. A possible decrease was observed in his total score on the ASRS before the intervention was implemented to after (eight weeks), as well as during the intervention (four weeks) to after (eight weeks). This suggests that he demonstrated less concerning behaviors related to his ASD diagnosis after participation in the intervention than before his participation (positive change overall). His peer socialization score was assessed in the Slightly Elevated range prior to the intervention, and then in the Elevated range after four and eight weeks. His adult socialization score began in the Slightly Elevated range pre-intervention, increased to the Elevated range peri-intervention, and concluded in the Slightly Elevated range post-intervention. His social/emotional reciprocity score was reported in the Average range pre- and peri-intervention, and then in the Slightly Elevated range post-intervention. Again, his total score decreased over time, from the Slightly Elevated range at the pre- and peri- intervention assessments to the Average range at the post-intervention assessment. Likewise, his DSM-5 score decreased with his participation in the intervention, from the elevated range pre- and peri-intervention to the Slightly Elevated range post-intervention. Both his total ASRS score and DSM-5 score improved over time, indicating a reduction in concerning behavior.

Changes from Pre-Intervention to Post-Intervention for Individual Subjects

Because of the small sample size, *t*-tests were run comparing only pre-intervention to post-intervention scores for the control versus treatment groups. There were not enough participants to run a Repeated Measures ANOVA that would have included the peri-intervention time point. Presented first are the individual scores for the six subjects that compose the treatment and control groups.

Table 8 provides change scores from pre-intervention to post-intervention for each individual subject. Table 9 is a more graphic representation of the same data with green indicating at least a five percent improvement in behaviors, yellow indicating no change, and red indicating at least a five percent worsening of behaviors.

Table 8

Pre-Post ASRS T-Scores Percent of Change

	Control Condition			Treatment Condition		
Scale	Subject 1	Subject 2	Subject 3	Subject 1	Subject 2	Subject 3
Total Score	2.82	-1.35	1.72	7.69	0	-12.31
Social/Communication	2.94	6.35	-13.43	18.51	-1.27	17.31
Unusual Behaviors	1.45	-7.59	3.57	-2.99	-1.23	-11.84
DSM-5 Scale	5.33	7.14	3.51	9.38	0	-6.15
Peer Socialization	2.7	2.82	6.58	9.52	-4.76	3.13
Adult Socialization	14.81	6.67	23.53	5.63	-12.7	-1.59
Social/Emo. Recip.	-1.54	12.73	-9.1	15.52	-2.78	17

Atypical Language	21.31	-2.82	9.68	-2.94	-5.88	-2.78
Stereotypy	-5.26	-2.9	16.67	0	13.33	-16
Behavioral Rigidity	0	1.33	-9.43	-1.51	-2.35	-11.27
Sensory Sensitivity	10	-9.1	-5	0	-5.19	-10.42
Attention/Self-Reg.	-8.6	14.81				
Self-Regulation			1.75	3.03	1.92	-12.07
Attention			0	6.78	2.08	-10.41

Table 9

Pre-Post Change for Subjects on the ASRS: positive (+), negative (-), less than 5% or no change (=), not calculated ( )

	Control Condition			Treatment Condition		
Scale	Subject 1	Subject 2	Subject 3	Subject 1	Subject 2	Subject 3
Total Score	=	=	=	-	=	+
Social/Communication	=	-	+	-	=	-
Unusual Behaviors	=	+	=	=	=	+
DSM-5 Scale	-	-	=	-	=	+
Peer Socialization	=	=	-	-	+	=
Adult Socialization	-	-	-	-	+	=
Social/Emo. Recip.	=	-	+	-	=	-
Atypical Language	-	=	-	=	+	=

Stereotypy	+	=	-	=	-	+
Behavioral Rigidity	=	=	+	=	=	+
Sensory Sensitivity	-	+	+	=	+	+
Attention/Self-Reg.	+	-				
Self-Regulation			=	=	=	+
Attention			=	-	=	+

The following results were not statistically significant but are worthy of consideration. Positive and negative changes, as provided in the preceding tables, indicate only five percent (or higher) trends. Furthermore, it does not indicate statistically significant change. According to the results, as presented in the preceding two tables, Treatment Subject 3 improved the most overall. All three of the treatment subjects improved in the area of unusual behaviors, whereas only one of the three control subjects did. Atypical language decreased in all three of the treatment subjects but in only one of the control subjects. Likewise, behavioral rigidity improved in all three of the treatment subjects and in one of the control subjects. The DSM-5 scale indicated more ASD symptomology in all three of the control subjects at the conclusion of the program than at the beginning. Results were mixed for the treatment group, with one subject reducing symptomology, one remaining the same, and one increasing. Sensory sensitivity improved in two of the treatment subjects and in one of the control subjects. Attention and self-regulation improved in one treatment subject and in one control subject. Stereotypy improved in one subject in the treatment group and two subjects in the control group. Adult socialization skills decreased in all three of the control subjects but in only

one of the treatment subjects. Peer socialization skills decreased in all three of the control subjects and two of the treatment subjects. Social/emotional reciprocity increased only in one of the treatment subjects (by 2.78%). Social communication decreased by 17 and 18 percent in two of the three treatment subjects.

Changes from Pre-Intervention to Post-Intervention for Treatment Versus Control Subjects

A dependent samples *t* test was used for the first independent variable to measure the difference among scores within each group before and after the intervention. Scores from the students who participated in the LEGO® group were compared for statistical significance to determine if behaviors increased or decreased from baseline (pre-intervention) to the conclusion (post-intervention). Pre-intervention and post-intervention scores from the students who served as the control group were also compared to determine progress as well.

Table 10

Mean (and Standard Deviation) Scores on the ASRS for Treatment and Control Groups

	Control		Treatment	
	Pre	Post	Pre	Post
Total Score	67.67 (8.51)	68.33 (8.08)	68.33 (5.77)	67.33 (0.29)
Social/Communication	62.67 (5.51)	65.00 (6.25)	61.67 (15.04)	64.33 (13.50)
Unusual Behaviors	68.00 (11.53)	67.00 (7.94)	74.67 (7.10)	70.67 (8.15)
DSM-5 Scale	67.33 (9.29)	71.00 (10.58)	71.33 (11.85)	72.00 (12.12)

Peer Socialization	73.67 (2.52)	76.67 (4.04)	70.33 (11.85)	71.67 (7.37)
Adult Socialization	55.00 (4.58)	63.00 (1.00)	65.67 (4.62)	64.00 (10.15)
Social/Emo. Recip.	58.33 (5.77)	58.67 (7.57)	61.00 (9.85)	62.33 (10.79)
Atypical Language	64.67 (5.51)	70.33 (3.22)	69.33 (2.31)	66.67 (3.06)
Stereotypy	66.33 11.24)	67.33 (4.51)	70.00 (8.66)	69.33 (13.65)
Behavioral Rigidity	64.33 (11.02)	62.00 (14.12)	74.00 (9.85)	70.33 (11.02)
Sensory Sensitivity	62.00 (3.46)	61.00 (4.58)	74.33 (2.31)	69.33 (6.35)
Attention/Self-Reg.	56.00 (2.83)	57.50 (6.36)		
Self-Regulation	57.00	58.00	58.67 (7.02)	57.33 (9.29)
Attention	57.00	57.00	51.67 (6.35)	51.67 (10.26)

Treatment Condition

Although there were some fluctuations in scores during the implementation of the intervention, there were no significant changes from pre-intervention to post-intervention for the treatment condition.

Control Condition

For students in the control condition, a dependent samples *t* test indicated that there is a significant difference in peer socialization skills scores before the intervention (M = 73.67, SD = 2.52) and after the intervention (M = 76.67, SD = 4.04), $t(3) = -3.67$, $p < .05$. Peer socialization skills decreased in the control subjects over the course of the eight-week period. This suggests that the students in the control group displayed fewer social skills than their same-aged peers after the group concluded than they did at the

start of the group. No other treatment scales were significant for a change in behavior pre- and post-intervention.

Gender Differences

The second independent variable, gender, was observed and the mean and standard deviation were calculated; these are present in Table 11. The post-intervention scores are presented for control and treatment participants combined; therefore differences cannot be solely attributed to gender alone. The pre-intervention scores, however, may provide a better indication of gender differences at baseline prior to exposure to the LEGO® group.

Table 11

Gender Differences Among Scores on the ASRS

	Females		Males	
Scale	Mean	S.D.	Mean	S.D.
Total				
Pre-intervention	68.00	4.24	68.00	8.04
Post-intervention	71.50	2.12	66.00	9.32
Social/Communication				
Pre-intervention	61.00	9.90	62.75	11.73
Post-intervention	67.00	4.24	63.50	11.68
Unusual Behavior				
Pre-intervention	68.00	1.41	73.00	11.52
Post-intervention	67.50	3.54	69.50	9.33
DSM-5 Scale				
Pre-intervention	69.50	7.78	69.25	11.79
Post-intervention	74.50	6.36	70.00	12.27
Peer Socialization				
Pre-intervention	68.50	7.78	73.75	8.42
Post-intervention	72.50	4.95	75.00	6.98

Adult Socialization				
Pre-intervention	62.50	12.02	59.25	5.68
Post-intervention	68.50	9.19	61.00	4.08
Soc/Emo Reciprocity				
Pre-intervention	61.50	4.95	58.75	8.88
Post-intervention	65.50	2.12	58.00	9.80
Atypical Language				
Pre-intervention	64.50	4.95	68.25	4.50
Post-intervention	70.00	5.66	67.75	2.63
Stereotypy				
Pre-intervention	68.00	11.31	68.25	9.91
Post-intervention	66.00	8.49	69.50	10.50
Behavioral Rigidity				
Pre-intervention	65.50	0.71	71.00	13.37
Post-intervention	65.00	0.00	67.50	15.42
Sensory Sensitivity				
Pre-intervention	66.50	9.19	69.00	7.53
Post-intervention	69.50	4.95	63.00	6.98
Attn./Self-Regulation				
Pre-intervention	58.00		54.00	
Post-intervention	53.00		62.00	
Self-Regulation				
Pre-intervention	66.00		55.67	3.21
Post-intervention	68.00		54.00	3.61
Attention				
Pre-intervention	59.00		51.00	5.20
Post-intervention	63.00		49.67	7.02

Although gender differences were not compared according to condition (treatment versus control) and scores on the ASRS are reported for both conditions combined, variations were found to exist among the genders. However, it is important to note that scores are not necessarily reflective of treatment in the LEGO® group versus the control group. Instead, the data serve to highlight differences among males and females over time, regardless of condition. Given the use of descriptive statistics to address this

research question, no significant findings were made.

Both males and females started the program with a baseline total ASRS score of 68 (which corresponds to the Elevated range). The females' total ASRS score increased to the Very Elevated range (M = 71.5), whereas the males' total ASRS score decreased (M = 66) but still remained within the Elevated range of impairment. The females' DSM-5 score increased in severity from pre- to post- intervention (M= 69.5 and M = 74.5, respectively), and the males' score generally remained the same (M = 69.25 at baseline and M = 70 at the conclusion). However, both males and females had similar DSM-5 scores at baseline measurement (M = 69.25 and M = 69.5, respectively).

Peer socialization in females started in the Elevated range (M = 68.5) and increased over the eight weeks to the Very Elevated range (M = 72.5). For males, peer socialization was initially reported in the Very Elevated range (M = 73.75) and ended in the Very Elevated range as well (M = 75). Males were scored as having greater difficulty with peer socialization than females prior to the intervention. Adult socialization in females was assessed in the Slightly Elevated range pre-intervention (M = 62.5) and increased to the Elevated range post-intervention (M = 68.5). Males scored in the Average range pre-intervention (M = 59.25) and increased to the Slightly Elevated range (M = 61) post-intervention. In contrast to peer socialization, females were reported as having greater concerning behaviors in the area of adult socialization than their male counterparts. In regard to social/emotional reciprocity, females were reported in the Slightly Elevated (M = 61.5) before the intervention, and in the Elevated range (M = 65.5) after the intervention. The males were scored in the Average range at the time of baseline measurement (M = 59.25) and in the Slightly Elevated range (M = 61) post-

intervention. Males and females demonstrated similar levels of social/emotional reciprocity before the program began.

Atypical language increased in females from the Slightly Elevated range (M = 64.5) to the Very Elevated range (M = 70) and remained in the Elevated range for males from pre- to post- intervention (M = 68.25 and M = 67.75, respectively). The females' social/communication scores went from Slightly Elevated at pre-intervention (M = 62.67) to Elevated at post-intervention (M = 65), whereas the males' social communication score remained in the Slightly Elevated range (M = 62.75 and M = 63.5). Stereotypy was assessed in the Elevated range for both males and females at pre-intervention (M = 68 and M = 68.25, respectively). Males were scored higher at pre-intervention for behavioral rigidity (M = 71) than females (M = 65.5).

Chapter 5: Discussion

Summary

The aim of this study is to explore the potential social skill gains in kindergarten students with an ASD diagnosis following participation in a LEGO® group. It was designed, specifically, to determine whether or not social skill outcomes differed on the ASRS scales for students who participated in the LEGO® intervention versus those who did not. In order to examine this, these research questions were developed: 1. Do the kindergarten students with ASD who participated in the LEGO® group experience increases in social skills as indicated by scores on the Autism Spectrum Rating Scale (ASRS) (specifically, peer socialization, adult socialization, and social/emotional reciprocity)? 2. Do social skills increase in the kindergarten students with ASD who did not participate in a LEGO® group as supported by ASRS scores (specifically, peer socialization, adult socialization, and social/emotional reciprocity)? 3. What specific ASRS treatment scales increase or decrease in the participants after four and eight weeks? 4. Do differences exist among the treatment and control groups' scores on the ASRS? and 5. Do gender differences exist among the male and female participants' scores on the ASRS?

This study provides a snapshot of the social skill development in six kindergarten students in the Autism program at one public elementary school in a suburban town in the Northeast. The students were in the same class and had the same teacher. The teacher completed the ASRS for each student three times. The first assessment occurred prior to the intervention and served as baseline data measurement. The second assessment was conducted four weeks into the program and was used for progress monitoring. The final

assessment occurred at the conclusion of the eight week LEGO® group. This archival data were used for the present study to evaluate participants' scores over the course of the eight week period and to determine whether or not social skill changes were made in both the treatment and control groups. Individual patterns of performance were explored, as well as differences among average scores for each ASRS scale according to condition and gender.

Findings for the Research Questions

Question 1

The first research question considers whether or not the kindergarten students with ASD who participated in the LEGO® group experienced increases in social skills as indicated by scores on the Autism Spectrum Rating Scale (ASRS) (specifically, peer socialization, adult socialization, and social/emotional reciprocity). No significant findings were reported for the treatment group. Although not statistically significant, individual scores did change over time in the students who participated in the LEGO® group. Treatment Subject 1's peer socialization skills decreased over the course of the eight week period during which she participated in the LEGO® group. She was initially reported in the Slightly Elevated range at baseline measurement, in the Elevated range at the four week assessment, and ended in the Elevated range, post-intervention. This is in contrast to the hypothesis and suggests that she regressed in the area of peer socialization while participating in the LEGO® group. Her adult socialization skills did not increase or decrease and remained in the Elevated range at all three points of assessment. Her social/emotional reciprocity skills decreased, indicating that there was a negative change in this area following participation in the treatment condition. She was in the Average

range at baseline measurement, increased to the Slightly Elevated at the four week assessment, and increased further to the Elevated range at the eight week post-intervention assessment.

Similar to Treatment Subject 1, Treatment Subject 2 did not demonstrate statistically significant increases or decreases in his social skills on the three specific ASRS treatment scales (peer socialization, adult socialization, and social/emotional reciprocity). Treatment Subject 2 did not demonstrate an increase or decrease in his peer socialization or social/emotional reciprocity skills and remained in the Very Elevated range on all three assessments. His adult socialization score started in the Slightly Elevated range, increased to the Elevated range, and then decreased to the Average range. Treatment Subject 3 experienced a decline in his peer socialization skills pre- to post-intervention (from the Slightly Elevated to Elevated range). His adult socialization score remained the same in the Slightly Elevated range. His social/emotional reciprocity score declined from the Average range pre-intervention to the Slightly Elevated range post-intervention.

Peer socialization and social/emotional reciprocity skills declined following participation in the LEGO® group for Treatment Subject 1. Treatment Subject 2 demonstrated an improvement in his adult socialization score, pre- to post- intervention. Treatment Subject 3 experienced a decline in skills on the peer socialization and social/emotional reciprocity scales. Results of this research question suggest that the students who participated in the LEGO® group did not make significant social skill gains. Only one of the three subjects demonstrated an increase in one of the three social skill measures on the ASRS (adult socialization). Therefore, the kindergarten students with

ASD who participated in the LEGO® group failed to demonstrate significant increases in social skills as indicated by scores on the ASRS (specifically, peer socialization, adult socialization, and social/emotional reciprocity).

Question 2

The second research question investigated whether or not social skills increase in the kindergarten students with Autism who did not participate in a LEGO® group, as supported by ASRS scores (specifically, peer socialization, adult socialization, and social/emotional reciprocity). Control Subject1's peer socialization score remained in the Very Elevated range throughout all three ASRS administrations. Her score for adult socialization declined, beginning in the Average range and increasing to the Slightly Elevated range. Her score for the social/emotional reciprocity scale decreased from start to finish as well (from the Elevated range to the Slightly Elevated range). Control Subject 2's peer- and adult- socialization scores did not increase or decrease during the time of data collection (remaining in the Very Elevated and Slightly Elevated range, respectively). His social/emotional reciprocity score declined pre- to post- intervention, going from the Average range to the Slightly Elevated range. Control Subject 3's peer socialization and social/emotional reciprocity scores remained in the same range with each ASRS assessment. His adult socialization score declined, however (from the Average range to the Slightly Elevated range). Similar to that of the treatment group, none of the increases or decreases was statistically significant. This suggests that there is no social skill benefit of participation versus non-participation in this particular LEGO® group.

Question 3

The third research question served to investigate what specific ASRS treatment scales increased or decreased in the participants after four and eight weeks, aside from the three indicated above. According to results, two statistically significant findings were reported for the participants in the treatment group. Treatment Subject 3 demonstrated a significant decrease in concerning behaviors on the total ASRS scale pre- to post-intervention (as well as peri- to post- intervention). This suggests that he demonstrated less concerning behaviors related to his ASD diagnosis after participation in the intervention than he did before his participation (or a positive change overall). It is important to note that these changes may not be due to treatment, however, and could be attributed to an unidentified personal characteristic that allowed him to demonstrate a significant gain. Conversely, Treatment Subject 1 indicated a significant increase in concerning behaviors on the social/communication skills scale, post-intervention. This means that this subject experienced a decline in her social/communication skills over the course of the eight week intervention in which she participated.

Control Subject 2 experienced a significant increase in the DSM-5 scale from pre- to peri- intervention. This score remained in the Very Elevated range at all three points of assessment, but significantly increased four weeks after the intervention began. This suggests that Control Subject 2's DSM-5 ASD symptomology increased in severity from baseline measurement to progress monitoring assessment (four weeks after the intervention began). No other significant increases or decreases on any of the ASRS treatment scales were reported for the subjects in the control group.

Question 4

Research question four seeks to explore whether or not differences exist among the first independent variable (condition). Specifically, the degree to which scores on the ASRS differ for the treatment and control groups was assessed. This was accomplished by comparing the average scores for each ASRS treatment scale for the treatment group and the control group. Given the small sample size, results should be interpreted with caution. Generalizability of such is also a concern. This will be discussed in more detail when considering the study's limitations.

Due to the small sample size, comparisons were made only from pre-intervention to post-intervention scores for the control versus treatment groups. There were not enough participants to run a Repeated Measures ANOVA that would have included the peri-intervention scores. Although some fluctuations were observed pre- to post-intervention for the treatment group, none was statistically significant. This indicates that, on a whole, the participants in the treatment group did not experience significant changes in social skills (positive or negative). Therefore, the LEGO® intervention did not produce compelling results on any treatment scale areas from baseline to post-intervention assessment.

For the control group, a significant change was observed from pre- to post-intervention in the area of peer socialization. Students in the control group demonstrated a significant decline in their peer socialization skills from the start of the intervention to the end. This suggests that the students in the control group displayed fewer social skills than their same-aged peers after the group concluded than they had displayed at the start. This difference in performance among treatment and control groups is important to note.

The treatment group maintained their peer socialization skills, but the control group decreased their skill level over the course of the eight week study. This could potentially indicate that the LEGO® intervention may prevent the regression of peer-based social skills in kindergartens students with an ASD diagnosis.

Question 5

The fifth and final research question applies to the second independent variable, gender, and asks whether or not gender differences exist among the male and female participants' scores on the ASRS. Baseline measurement or pre-intervention scores were examined to determine whether or not differences existed among the genders prior to treatment. It is important to note that when comparing males and females for significant differences, both treatment and control groups were combined. Therefore, this research question does not take into account any treatment effects. Overall, the total ASRS pre- and post- intervention scores were virtually equal for males and females. The males had an average total ASRS score of 68.33 at baseline and 67.33 after eight weeks. The females had an average total ASRS score of 67.67 at baseline and 68.33 after eight weeks. Similarly, both males and females had comparable DSM-5 scores at baseline measurement (69.25 and 69.5, respectively).

Peer socialization was reported in the Very Elevated range for both males and females at the eight week assessment. Males were scored as having greater difficulty with peer socialization than females prior to the intervention, however, suggesting that the females' skills in this area declined. In contrast to peer socialization, females were reported as having greater concerning behaviors than their male counterparts in the area of adult socialization. In regard to social/emotional reciprocity, males and females

demonstrated similar levels at the time of initial assessment prior to intervention implementation. Overall, social skills presented similarly in both male and female participants in this study.

Limitations

Various limitations innate to this particular study will be explored and considered. Specifically, questions involving internal validity, external validity, reliability and validity of the measures, and statistical analyses utilized will be discussed.

Internal Validity

It is difficult to attribute causal status to the independent variables for multiple reasons. First, archival data were utilized in this study, so the actual experiment cannot be accounted for. Second, a case study with multiple participants design was selected due to small sample size. For each independent variable (control and gender), there were only six subjects. With such a small sample size, it is difficult to draw conclusions regarding change based on such a limited number of subjects.

External stimuli may have influenced the dependent variable; this is also worthy of discussion. Potential confounding variables include the presence of other symptomology, IQ, related services being administered in school (i.e., Occupational Therapy, Physical Therapy, and Speech/Language Therapy), level of parental involvement, and outside activities or therapies. The LEGO® group may not be ideal for lower functioning students, given the results of this study. IQ or cognitive ability should be taken into account when selecting students for this intervention. In regard to parental involvement, it was lacking in the LEGO® group itself. Involving parents in the group may have promoted more favorable outcomes. Solomon et al. (2004) provided the parents

of children with high functioning ASD who participated in their social enhancement intervention with an educationally based group centered on increasing parent knowledge regarding the disorder (Lopata, Thomeer, Volker, Nida, & Lee, 2008). Although the positive results cannot be attributed to the parent education alone, it is worthy of consideration for future studies because social skill improvements were noted. Also in regard to parent involvement, it was not known whether or not the students were receiving supplemental social skill instruction or therapy at home or in the community. This is another variable that was not controlled for.

Cognitive functioning and speech/language deficits were not controlled for in this study. Because an IQ score was obtained for only one student in the treatment group (which was in the extremely low range of functioning), the participants in the LEGO® group were all in the low range of cognitive functioning. This most likely impacted their ability to participate to the same extent or to reach their goals at the same rate as a child with higher cognitive ability. Likewise, their speech and language deficits also made social communication difficult. According to Fujiki, Brinton, McCleave, Anderson, & Chamberlain (2013), students who have a language deficit may also have difficulty making validating comments to their peers during social play. Speech or language deficits could have affected the dependent variable and should be controlled for in the future. For this particular study, two of the three subjects in the treatment condition demonstrated a 17 and 18 percent regression in the area of social or communication on the ASRS from baseline to outcome measurement. However, all three subjects in the treatment group improved their atypical language (or demonstrated a decrease in atypical language over the course of the intervention). This is in opposition to the control subjects,

all of whom demonstrated an increase in atypical language from beginning to end. These confounding variables were not controlled for in the study and could impact the internal validity. For this reason, results should be interpreted with caution.

It is also important to note that for the first independent variable – condition – the treatment group level indicated participation in a LEGO® "group", not LEGO® therapy. The group, which did not follow the principles of LEGO® therapy, was more basic in nature. In addition to school psychologists, the LEGO® group could be facilitated by a school social worker or guidance counselor. Because it is not referenced as therapy in this study, structure and course of the intervention was different. For example, case notes were not provided along with the archival data, which would have further supported findings. Furthermore, the LEGO® group spanned eight weeks, rather than the 12 or 24 week sessions in LEGO® Therapy (LeGoff, 2004; LeGoff, Krauss, & Levin Allen, 2012; 2010; LeGoff & Sherman, 2006). Given the cognitive ability of the current study's participants, more frequent sessions (two to three times per week as opposed to once a week) may have been more advantageous. These kindergarten students benefit from additional repetition to a greater degree than that of the typically developing child, so convening the LEGO® group more than one time per week may have altered the results of the study. Moreover, extending the LEGO® group from an eight week intervention to a 12 or 24 week program may have produced more measurable results for children such as those included in the present study.

External Validity

Another area of concern is external validity. First, generalization of findings is an issue worthy of consideration. Again, due to the sample size of six, it is difficult to

generalize the findings to other populations or real-life settings. This study is very specific to the six kindergarten students in an Autism program at a public school. Therefore, results probably cannot be generalized to other populations or settings. Based on results, the participants themselves appeared to have difficulty generalizing the social skills presented in the LEGO® group to real-life social situations such as the classroom. Again, this is supported by results from the teacher rating scales, which were based on teacher observation of classroom performance. Another potential limitation is the nonexperimental setting in which the participants in the control group were situated during the intervention. They were in their kindergarten classroom with the teacher. The control subjects were in social situation during the intervention – their classroom – and could have been exposed to social skills during that time as well as adult and peer interaction (they were not receiving additional social skill instruction but could have occurred naturally or incidentally within the classroom environment).

Reliability, Validity, and Scope of Measures

The instrumentation and construct validity of the measure used – the Autism Spectrum Rating Scales – was based on one teacher's observation of specific behaviors. The rating scales are subjective in nature and based on the teacher's perception of the students' behaviors. Additionally, only a single measure was used to assess progress. Changes in social skills may have been better evaluated with multiple measures such as case notes from the LEGO® group's facilitator, an additional rating scale, or adding a second rater (such as the group's facilitator). Furthermore, three specific scales from the ASRS were selected to define "social skills" for the purposes of this study (peer socialization, adult socialization, and social/emotional reciprocity). Other scales reflected

increases and decreases in behavior over the course of the intervention as well. Additional scales on the ASRS could be included in the future to define social skills, or a second rating scale such as the Gilliam Autism Rating Scale (Gilliam, 1995) could be administered as well. The Social Interaction Behaviors scale on the GARS could be used in conjunction with the three ASRS to provide a more comprehensive picture of participants' social skills during the experiment.

Response bias can impact the validity of the ASRS rating scale used in this study. Specifically, social desirability should be considered when reviewing the results. The rater was also the classroom teacher. The teacher taught the students in the classroom and also completed the rating scales used in this study. One could argue that responding in a socially desirable way could be beneficial because this may indicate classroom progress as well. Expectancy may be another issue because the teacher was aware of which particular students participated in the intervention and which students did not. Therefore, rater reliability should be taken into account. There was only one individual who completed the rating scales; therefore, the reliability of ASRS scores presents another limitation of this study.

Results also indicated that almost all ASRS scores increased in severity at four weeks. This occurred both in treatment and in control groups. If it occurred only in the subjects who participated in the treatment condition, one could suggest an extinction burst. However, both treatment and control subjects were scored as displaying more concerning behaviors on the ASRS peri-intervention, negating the theory of an extinction burst. Again, rater reliability should be taken into account when considering the results of

the present study because this problem in measurement may have contributed to the findings.

Statistical Analyses

Due to the small sample size (N = 6), a case study with multiple participants was selected. Descriptive statistics were used, as well as dependent samples *t* tests. The study's design, given the small sample size, proves to be a large limitation of this study. Results were unable to analyze for statistically significant differences among pre-, peri-, and post-intervention scores among groups. A repeated analysis of variance could not be conducted due to the lack of statistical power, given the sample size. A larger sample of participants both in the treatment and in the control groups would provide more statistically sound results and potentially generalizability of findings.

LEGO® Group versus LEGO® Therapy

Upon comparison of this LEGO® group and LeGoff's LEGO® Therapy and LEGO® Therapy studies (2004), some similarities appear to exist. First, the same roles of Engineer, Parts Supplier, and Builder were used. The members also rotated roles. The group facilitator encouraged social interactions and communication during sessions. There was also a higher male to female ratio, similar to that of the original LeGoff studies (2004). Last, both studies share a similar goal of increasing initiation of social interaction with peers and adults.

Differences between the current study and LeGoff's work exist as well. First, the current study used the ASRS to measure goals, whereas LeGoff used direct observation of 30 minute intervals via frequency counts of "self-initiated social contact" (SISC) during free play time, direct observation of one hour intervals when the duration of social

interactions with peers (DSI) were timed, and the Social Interaction subscale of the Gilliam Autism Rating Scale to measure aloofness and rigid behavior (2004). Either LeGoff or a graduate student collected this data, whereas the classroom teacher completed the rating scale in the present study. The participants in the LEGO® group were lower functioning than those in LeGoff's study. The average age of participant was also much younger than that of LeGoff's. LeGoff (2004) used children between the ages of 6 and 16 years (mean age = 10–6, SD = 2.8), whereas the children in the present study were either five or six years old. In the present study, new members did not join the LEGO® group and the rules were reviewed prior to each session. Members did not move through LEGO® Therapy's levels or stages.

Participants in this study attended eight sessions over a two month period, whereas participants in LeGoff's study received LEGO® Therapy treatment for much longer than six months. LeGoff's therapy groups typically spanned 12 or 24 sessions. Furthermore, some of the initial members of LeGoff's LEGO® Therapy group attended sessions for seven years (2004). In the current study, the participants in the treatment condition remained in the group for the duration of the intervention and were not removed or placed in an alternate group, as with LeGoff's study. All of the children in the current study attended public school (LeGoff included children in private special education schools as well).

LeGoff (2004) used a waiting-list control group with repeated measures design (so all participants served as their own control group), whereas the current study used separate participants to constitute the control group (and a case study with multiple participants design was used due to the small sample size). A repeated measures design

as well as regression analyses to calculate inter-rater reliability were used in LeGoff's study (2004). The current study utilized descriptive statistics and dependent samples *t* tests. Participants in LeGoff's study had at least two individual therapy sessions in the LEGO® room prior to joining a group. The participants in the current study did not receive any additional therapy or counseling other than that from the LEGO® group. Last, LeGoff conducted the studies and sometimes used therapeutic aides (graduate students) to assist (2004). There was only a single adult present during the LEGO® group (the group facilitator), and no additional individuals took part in the intervention.

Future Research

Implications for future areas of study are vast. This study was conducted on such a small scale yet yielded varying results among the six participants. In addition to increasing sample size, the study should be extended to other populations. This includes age, gender, settings, and cognitive ability. In regard to age, increases in sharing behavior from six to nine years are positively correlated with increases in the ability to sympathize with unfamiliar individuals (Malti et al., 2012). Children also begin to demonstrate sharing behaviors during middle childhood. At this middle childhood stage, children demonstrate greater sharing behaviors toward the end of the stage rather than in the beginning (Malti et al., 2012). Given this finding from previous research, the LEGO® group may be more effective for children in middle childhood rather than early childhood. The participants in this study were five and six years old and may have been too young to reap fully the benefits of the LEGO® group intervention.

Kwon et al. (2012) suggest grouping participants according to gender. Malti et al., (2012) purport that sharing develops earlier in girls than boys. For this study, females

were assessed at baseline measurement as having better developed peer socialization skills on the ASRS than their male counterparts. Males, on the other hand, were reported to possess slightly better social/emotional reciprocity skills than females according to scores on the ASRS. A larger sample size would be beneficial to further explore whether or not a social skill gap exists among the genders for children with an ASD diagnosis.

When developing other independent variables for inclusion in future studies, cognitive functioning and speech/language skills may be worthy of consideration. Design improvements could also be made to include more participants in order to obtain greater statistical power for evaluating results. Also, pre- and post- intervention assessments may be sufficient, as opposed to including a peri-intervention assessment. Methodological changes could also be made, such as adding additional measures as mentioned previously (i.e., case notes, additional rating scales, including the LEGO® group facilitator in the rating process). This may provide a more comprehensive way of defining social skills for the purposes of this study or LEGO® group.

Given the results, follow-up studies should include additional evaluation measures, raters, and participants. Given the broad nature of the ASRS, another measure may serve to address its sensitivity issue and the difficulty with identifying small gains made throughout the intervention. A LEGO® group questionnaire could also be developed to measure specific areas intended for study by the researchers. The questionnaire could be designed in such a way that addresses the specific group's goals. For the study, the questionnaire could query sharing behaviors, eye contact, initiating a verbal interaction with a peer, initiating a verbal interaction with an adult, appropriately responding to a verbal stimulus from a peer, appropriately responding to a verbal

stimulus from an adult, expressive and receptive language, social interactions with peers, social interactions with adults, teamwork skills, and so on. The questionnaire would need to take into account the cognitive and communicative functioning of the group (as determined by its members) and be structured accordingly.

In addition to the independent variable of condition (treatment versus control), the second independent variable could include IQ, cognitive functioning, or speech or language skills. In order to increase sample size, more LEGO® groups would need to be established. Instead of one group of three students, there should be multiple groups of three. This would require a group facilitator who had ample time to devote to leading the LEGO® groups throughout the school day. Ideally, someone would exclusively facilitate LEGO® groups in the schools in order to gain as many subjects as possible. It would be important that the same individual facilitate all groups to avoid variance in intervention administration. Including a second rater such as the group facilitator would address the issue of response bias and social desirability as described previously, given the fact that the classroom teacher had knowledge of which students were assigned to the treatment condition and which students were assigned to the control condition when she completed the rating scales.

These findings provoke various questions that could be further explored in future research. For example, do individual characteristics determine treatment outcomes more than the LEGO® group itself? Each participant in the treatment and in the control conditions were scored differently on the ASRS at all three points in time. It may be beneficial to assess students with the ASRS prior to grouping in order to control for some of the variance among individual characteristics or differences. Speech or language and

cognitive ability should be considered as well. By grouping students at the pre-intervention by level of cognitive functioning, appropriate modifications could be made to the LEGO® group in order to accommodate those with lower ability and remain consistent with their level of functioning.

A larger sample size would better answer the question of whether or not a gap exists in social skill attainment among males and females. Isolating gender differences may also indicate whether or not the LEGO® groups should contain subjects of both genders, or if they should be separate. In the future, confounding variables should be better identified and controlled for to reduce limitations inherent within the study. Another area of further investigation would be the decline in social/emotional reciprocity for the participants in the LEGO® group. The social/emotional reciprocity scale was used to define "social skills", yet the treatment subjects regressed in this area. It is also important to investigate the reasons why the unusual behaviors, atypical language, sensory sensitivity scales decreased in the subjects in the treatment condition. The treatment condition demonstrated a reduction in concerning behaviors on the aforementioned three ASRS scales (indicating positive change). These scales were not originally considered when defining social skills, yet all changed in a positive direction. This finding could also be better understood with future research.

Based on the data, future LEGO® groups should be conducted without the expectation of grandiose outcomes. Because LEGO® Therapy literature indicates greater gains than that of the current LEGO® group, it may be advantageous to align the intervention with the original LEGO® Therapy. This is would involve training the group facilitator in LEGO® Therapy, recruiting older and high functioning participants, and

extending the length to 12 or 24 sessions. LEGO® groups may be more beneficial for older students without an ASD diagnosis who display some social skills deficits, as opposed to low functioning kindergarten students with ASD.

Conclusion

In conclusion, participants both in treatment and in control conditions experienced increases and decreases in various areas of social skills over the course of the eight week intervention. Although no statistically significant pre- to post- intervention findings were noted for the treatment group, the control group demonstrated a significant decrease in peer socialization skills. This could potentially suggest that treatment in the LEGO® group had a protective effect on decrease in peer socialization skills, as observed in the control group. Further research is warranted to investigate this possibility. No definitive conclusions can be made regarding the effectiveness of this particular LEGO® group or the hypothesis that children who participate in a LEGO® group make more social skill gains than students who do not participate. However, there were some findings noted that may become more evident in a study of larger scale.

The participants in the treatment group made individual improvements in social skills as defined by the ASRS, so the LEGO® group should continue to be considered when selecting an intervention for children with an ASD diagnosis in school. An advantage of the program is that it is feasible, because it requires only one LEGO® set, one group facilitator, is cost effective, and can be easily implemented during the school day. It is a natural interest-based social skills program that can be applicable to different ages that enjoy LEGO® blocks. It is a developmentally appropriate social skills program for children of different ages. An area of concern lies in generalization, or the degree to

which the children in the LEGO® group associated novel information regarding social skill development with previously learned material. With a greater sample size, this could be explored further.

This intervention is engaging, hands on, and economical. It involves real life role-playing through prompts from a group facilitator. In addition to school psychologists, school social workers and guidance counselors can also facilitate the LEGO® group. The school is the ideal setting for this type of intervention because participants can work together in the LEGO® group and then hopefully generalize those interactions to the classroom. Ideally, students would be grouped with other members of their class in order to maximize skill generalization. Individual patterns of performance will differ from student to student, but the decrease in concerning behaviors is the overall goal of the LEGO® group. Positive changes were reported on a measure of social skills in students who participated in the LEGO® group, indicating that it can be a successful school-based intervention.

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Appendix A

LEGO® Group Rules

Listen when others are talking

Everyone takes turns doing each job

Give others time to do their job

Only do your job