Measuring the Effectiveness of Play as an Intervention to Support Language Development in Young Children with Autism Spectrum Disorder: A Hierarchically-Modeled Meta-Analysis

by
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Abstract

The purpose of the current investigation is to analyze extant research examining the impact of play therapy on the development of language skills in young children with autism spectrum disorder (ASD). As rates of ASD diagnoses continue to increase, families and educators are faced with making critical decisions regarding the selection and implementation of evidence-based practices or therapies, including play-based interventions, to support the developing child as early as 18 months of age. Research on rare diseases and low incidence disabilities are difficult and lack available evidence as the conditions and responses to interventions vary by person. The following study investigates whether play-based interventions should be considered as effective means of increasing language development in young children with ASD. In addition, this study was conducted to identify specific moderators or variables associated with the effectiveness of play-based interventions. In order to conduct the present investigation, a meta-analysis was conducted, based on a collection of available research. Using data extraction software, the researcher conducted statistical analyses, Tau-U and Hierarchical Linear Modeling (HLM), to measure effect sizes across the available data and further assess whether specific moderators play a role in the usefulness or success of play therapy to promote language development in young children with ASD. The results revealed that play-based interventions are considered an effective intervention to support language development in young children with ASD and identified frequency, duration, and type of play-based intervention as significant predictors of language development for young children with ASD who participate in play-based interventions. Such findings offer insights for educators, families, clinicians, and others who are make decisions regarding

the recommendation, selection, and implementation of play-based therapy as an intervention to increase language development in young children with ASD.

Keywords: autism spectrum disorder (ASD), play therapy, language development, single-case design, hierarchical linear modeling

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TABLE OF CONTENTS

Chapter 1

Introduction

The purpose of the current investigation is to analyze existing research examining the impact of play therapy on the development of language skills in young children with autism spectrum disorder (ASD). Rates of ASD diagnoses continue to rise globally, with the Centers for Disease Control and Prevention (CDC, 2020) estimating about 1.9%, or 1:54, of 8-year-old children as being identified with ASD in the United States alone. Previously, estimated rates of ASD were reported as 1:59 in 2018, 1:69 in 2012, and 1:150 in 2007 (CDC, 2018a). Investigation of causal factors for this increase is not conclusive and suggests the answer is multifaceted. Currently, in addition to increases in awareness and education of ASD, adjustments to diagnostic criteria, routine infant screenings (Zwaigenbaum et al., 2015), and/or genetic and environmental factors (Bai et al., 2019), might all contribute to this growth. As a result, families and educators are faced with making critical decisions regarding the implementation of evidence-based practices or therapies, including play-based interventions, to support the developing child as early as 18 months of age.

The motivation for this researcher to enter the educational field was the desire to make learning achievable for as many children as possible. This researcher, whose professional background includes roles in early childhood education, school psychology, special education administration, state consultation, and presently, the executive director of a program for individuals with ASD, has worked with other educators and families in determining best practices and interventions to support the needs of the developing child.

Discovering methods that will allow children to become the best versions of themselves is an exciting challenge.

Statement of the Problem

There is a plethora of early intervention methodologies for young children with ASD, including popularly accessed interventions such as early and intensive behavioral interventions (EIBI) and play. The problem for physicians, mental health practitioners, educational leaders, and families in determining early intervention methods for young children with ASD, is the lack of consistency regarding the available evidence of play, EIBI, and other early intervention methods. For example, the importance of early identification and intervention for young children with ASD is well documented (Koegel et al., 2014; Smith et al., 2015; Zwaigenbaum et al., 2015), although inconsistencies regarding outcomes, especially between single-case design and meta-analytic studies exist. Such inconsistencies suggest that further investigation must be done in order that decisions can be made with greater certainty.

Play therapies are a commonly accessed, early intervention method because they are considered to be well- documented, empirically supported programs for supporting the development of a young person diagnosed with ASD (Barton et al., 2018). Although researchers have begun to inquire as to what makes play-based interventions successful or effective, there is limited implementation in educational and/or early childhood programming settings, and, more specifically, for young children with ASD. Play-based interventions implemented in the home and clinical settings have shown to increase communication skills and reduce symptoms of ASD in young children (Solomon et al., 2007; Solomon et al., 2014; Vander Paelt et al., 2016). Currently, a majority of play-

based interventions are derived mainly from person-centered or child-centered therapy techniques developed by Carl Rogers (1951). The techniques, when implemented with a focus on the individual child, his/her experiences, and the self, result in a form of relationship building based on discovery (Rogers, 1951). According to Landreth and Sweeney (1997), "child-centered play therapy is not a cloak the play therapist puts on when entering the playroom and takes off when leaving; rather it is a philosophy resulting in attitudes and behaviors for living one's life in relationship with children" (p. 17). Investigating key components of play-based practices across age, setting, gender, race, service delivery, scale of measurement, and time/duration, may assist educators in determining the feasibility of implementing such programming as components of core curricula for early childhood students.

Statement of Purpose

The purpose of this study is to inform educational leaders and/or parents of young children with ASD whether or not play therapy should be considered as an evidence-based practice to promote the development of communication. Additionally, by informing educational leaders of such considerations, one might better determine the types of play practices or methodologies to be incorporated into early childhood programming for students with and/or without disabilities such as ASD. The recognition of the importance of these identified effective interventions could then lead to greater accessibility. Although the term "play therapy" comes with a rich historical context, current research focused on play therapy's use with young children with autism is incomplete. Research on rare diseases and low incidence disabilities are difficult because the conditions and responses to interventions vary by person. Communication is the

primary focus because neuroscience points to the value of play in the development of language. Michael and Luke (2016) suggested, "neuroscience continues to emerge throughout the helping field, and play therapy is no exception" (p. 45). Furthermore, Stewart et al. (2016) noted that neuroscientific research can be applied by play therapists to promote neuroplasticity, or newly developed neural pathways, increase attention, and grow awareness in children. The use of meta-analytic procedures to measure intervention outcomes in individuals with ASD is necessary as the analyses account for the variability across participants. A study such as the present one could assist in determining whether or not the term, "evidence-based," is appropriate to use for supporting language development through play-based interventions in young children with ASD.

Conceptual Framework

The Association for Play Therapy (2019) defines play therapy as "the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psycho-social difficulties and achieve optimal growth and development." Dating back to the early 20th Century, psychoanalysts began implementing practices for children and an understanding developed regarding the use of play in facilitating a child's understanding of his/her world (Freud, 1929; Ray et al., 2001). Following that time, play therapy developed and was often integrated with leading counseling theories as each emerged. For example, Axline incorporated Carl Rogers' person-centered therapy and adapted the associated practices for use in children (Hillman, 2018; Overly et al., 2017). This form of child-centered play therapy is presently implemented following a series of refinements (Guest & Ohrt, 2018; Hillman, 2018). Moustakas (1959), an existential theorist,

developed therapeutic processes involving play known as relationship play. Others continued the development of play-based approaches resulting in Jungian-based play, gestalt-based play therapy, cognitive behavioral therapy ([CBT], Jensen et al., 2017; Ray et al., 2001). Such refinements, which began in the mid-twentieth century, have all played a role in the development of how play therapy is viewed presently (Jensen et al). One noted difference, however, is the incorporation of parents, caregivers, and educators as implementers, rather than clinicians alone.

Current play-based interventions for children with ASD or similar developmental disabilities incorporate a variety of methods that can be implemented in different settings with varying results. One example involves the utilization of block play in a small group instructional setting. This interaction involves pairs of students, one identified with or at-risk of being identified with a disability such as ASD with a student who does not meet such a criterion, and incorporates opportunities to interact socially in a variety of means (Barton et al., 2018). Although the results are limited in terms of generalization, progress in social skill development has resulted between peers within the educational setting (Barton et al.).

The PLAY Project Home Consultation (PPHC) program (Solomon et al., 2007; Solomon et al., 2014) as well as the Peer Play program (Prendeville et al., 2006) occur in the home or related settings such as a frequently visited parks or homes of another relative. Both intervention methods target social play between young children with ASD and either parents/caregivers or typically developing same-age peers (Prendeville et al; Solomon et al., 2007). The Peer Play program offers training for parents, caregivers, and/or other family members who offer observation, monitoring, and even prompts to

support play interactions, while two young children interact for play sessions (Prendeville et al.). The PPHC program is similar, but the play interactions occur between the young child with ASD and the trained parent or caregiver (Solomon et al., 2007). The PPHC program, an extension of Dr. Stanley Greenspan's (as cited in Solomon et al., 2007) "developmental, individualized and relationship-oriented (DIR) model" (p. 207) centers on the use of structured play opportunities to increase the child's social-pragmatic or functional developmental levels of communication. The areas assessed, based on the DIR model, include "(1) self-regulation and interest in the world; (2) forming relationships, attachment, and engagement; (3) two-way, purposeful communication; (4) behavioral organization, problem solving and internalization; (5) representational capacity; and (6) representational differentiation" (Solomon et al., 2007, p. 212). The major difference of the PPHC program with Peer Play, block play, or additional formalized methods is that how the child constructs his/her play and communication is observed in relation to how effectively the child welcomes the adult into his/her play opportunities (Solomon et al., 2007; Solomon et al., 2014). According to Wetherby et al. (2014), parent-coached interventions have been noted to improve areas such as social communication, daily living, social skills, and receptive language in young children with ASD.

The founders of the PPHC program believe the intervention to be a missing piece of the proverbial puzzle of early intervention methods for children ages 18 months through six years or even up to eight years of age who have been identified with ASD (Espe-Sherwindt et al., 2015; Solomon et al., 2007; Solomon et al., 2014). At the center of the team's rationale is the idea of the child's lack of preparedness for intensive behavioral interventions, especially in terms of language, communication, and social skill

development (Solomon et al., 2007; Solomon et al., 2014). This notion is further supported by Bulotsky-Shearer et al. (2014), who discussed the parallels that can be drawn between one student's readiness to learn and another's readiness to participate in intensive behavioral therapy, as both require a level of readiness or preparedness for some type of learning to occur.

Research Questions

The study is aimed to address the following set of research questions:

1. Are play-based interventions considered an effective means of increasing language development in young children with ASD?
2. What moderators or variables are associated with effectiveness of play-based interventions for students with ASD?

Role of the Researcher

The role of the researcher in the present study includes gathering evidence-based journal articles focused on the use of the play in young children with ASD. Additionally, the researcher must carefully examine available research and determine if the qualification criteria have been met, the data are quantitative, and the research questions are appropriate and aligned to the current investigation. Following these steps, the researcher conducted statistical analyses, Tau-U and Hierarchical Linear Modeling (HLM), to measure effect sizes across the available data and further assess whether or not specific moderators play a role in the usefulness or success of play therapy to promote language development in young children with ASD.

Researcher Assumptions

The researcher's assumptions include the statistical analysis procedures, Tau-U and HLM, account for effect size and measure the intended outcomes across each of the four studies included in the current investigation. Additionally, the researcher assumed the assessed effects of age, gender, race, setting, type of therapy, assessment/outcome measure, frequency, and duration will offer key insights regarding program considerations and decisions for educational leaders.

Participants

A review of quantitative literature regarding the use of play therapy for young students with ASD was conducted. A database of 65 studies was generated from 10 journal publications. Of the 65 studies, data from four were considered based on the following evaluative criteria: (a) the participants were identified as being diagnosed with ASD, autism, or previously diagnosis related to ASD (e.g., Asperger's disorder, PDD-NOS) (b) the participants were between the ages of one and fourteen years, (c) outcome measures were focused on language or communication development, (d) interventions occurred in either a clinical, education-based, or home setting, and (e) both pre-test and post-test data were reported. Once the evaluative criteria were met, the methodological quality of each study was determined using the Single-Case Experimental Design (SCED) Scale (Tate et al., 2008). Data representative of 35 participants were utilized for all meta-analytic processes included in the present dissertation study.

Instruments

Data extraction processes were conducted using WebPlotDigitizer (Rohatgi,

2020). WebPlotDigitizer is a considered "a reverse engineer" that extracts data points directly from graphs presented in other research studies. Data extraction methods, such as WebPlotDigitizer have been found to be reliable and valid when graphs are clear and program users are trained and able to detect different phases, treatments, and/or variables in single-case designs (Moeyaert et al., 2016; Shadish et al., 2009).

Procedures

Using the WebPlotDigitizer program, data extraction and collection processes were conducted by scanning images of the data values for the examined studies. Each of studies, included as a part of the current investigation, were coded based on the following variables: age, gender, scale of measurement, and time/duration of the intervention. The methodological quality of each study was determined using the SCED Scale (Tate et al., 2008). Data points were then converted by the program and exported to Microsoft Excel. Data files were labeled based on their measured variables/conditions.

Tau-U was computed as an effect size measure across the four studies, including three journal publications and one doctoral dissertation. In order to measure the effects of the interventions while accounting for differences and eliminating potential bias, HLM was conducted (Woltman et al., 2012). HLM data were analyzed using a level-2 HLM model as a means of accounting for the measured variables related to the participants (level one) as well as the implementation of the intervention (level two). The results of this analysis are presented in Chapter 4.

Definitions of Key Terminology

Applied behavior analysis (ABA) – "…a scientific approach for discovering environmental variables that reliably influence socially significant behavior and for

developing a technology of behavior change that take practical advantage of those discoveries" (Cooper et al., 2007, p. 3).

Autism – a developmental disability that significantly affects verbal and non-verbal communication and social interaction. Autism is generally evident before age 3 and adversely affects a child's educational performance. Other characteristics often associated with autism include engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences (Individuals with Disabilities Education Act [IDEA], 2004). Autism is the term used for purpose of educational diagnoses and/or evaluations and is one of the 13 disability categories recognized by IDEA.

Autism spectrum disorder (ASD) - a complex developmental condition that involves persistent challenges in social interaction, speech and nonverbal communication, and restricted/repetitive behaviors. The effects of ASD and the severity of symptoms are different in each person (American Psychiatric Association, 2020). ASD is the terminology often used in clinical diagnoses as recognized by the American Psychiatric Association.

Early and intensive behavioral intervention (EIBI) – psycho-educational therapy for preschool-aged children (Smith et al., 2019). EIBI is based on the principles of applied behavior analysis (ABA), aimed at decreasing the severity of and/or impact of symptoms often associated with ASD (Reichow et al., 2018; Smith et al.).

Hierarchical linear modeling (HLM) – a quantitative statistical framework for analyzing complex nested relationships (Anderson, 2012). In this study, for example, there is a focus on factors that affect successful methods and/or practices associated with

play therapy. Specifically noting age, setting, gender, scale of measurement, and time/duration age, HLM allows researchers to examine the effect of each factor and their role on the assessed outcome(s).

Play therapy/play-based interventions - the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psycho-social difficulties and achieve optimal growth and development (Association of Play Therapy, 2019).

Tau-U – a quantitative approach for analyzing single-case experimental design (SCED) data, that combines nonoverlap between phases with intervention phase trend and can correct for a baseline trend (Lee & Cherney, 2018). In the present study, Tau-U was computed as an effect size measure across the individual participant data.

Treatment & education of autistic and communication related handicapped children (TEACCH) - an intervention method for individuals with ASD aimed at developing independence by addressing neuropsychological deficits and strengths using visual teaching strategies associated with individual interests of the learners (Siu et al., 2019).

Young children with ASD – specifically refers to the children 2 years through 14 years of age, diagnosed with autism spectrum disorder (ASD).

Organization of the Dissertation

Following the foundational information, including purpose, scope, and relevance of the current investigation provided the researcher offers historical contexts and a rich review of available literature regarding play therapy/play-based approaches in supporting young children with ASD. The researcher presents the methodology, including how one

conducts a meta-analysis when the available research and its resulting data are based on single-case studies and small sample populations. The rationale for selecting Tau-U and HLM as the primary statistical analytic procedures is provided. The results of the investigation present readers with answers to the investigation's research questions, including whether to consider play therapy as an evidence-based approach for language development in young children with ASD as well as the effects of the moderators analyzed. Finally, the researcher concludes the present study and offers implications, limitations, and the future relevance of further research in this area.

Chapter 2

Review of Literature

Since 2000, the CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network has been estimating the prevalence or rates of autism diagnoses in children across the United States. Most recently in 2020, the CDC's ADDM has estimated about 1.9%, or 1:54, of 8-year-old children [are] identified with ASD in the United States (CDC, 2020). Such results indicate an increase in the prevalence of ASD diagnoses when compared to previously reported rates of 1:54 (2016), 1:69 (2012), and 1:88 (2008) (CDC, 2020). In addition to the importance of identifying and addressing barriers related to the evaluation and diagnosis of ASD in young children, Baio et al. (2018) suggest how necessary evidence-based early intervention services are for supporting children with ASD in light of the rising rates across the United States and other parts of the world. Van der Paelt et al. (2016) note "the majority of children with ASD do not have access to intensive early intervention services," (p. 163) resulting in services, therapies, or programs that are available or easily accessible rather than purposeful or intentional. Two early intervention methods, play-based programming and applied behavior analysis (ABA) therapy, are both considered evidence-based practices which are frequently recommended by medical, mental health, and education professionals in an effort to increase language and social skills development in preschool and early elementary students diagnosed with ASD, between the ages of 18 months and 8 years (Barton et al., 2018; Solomon et al., 2014). Even though various play and ABA methods are frequently recommended, a review of foundational components reveal conflicting ideologies aimed at supporting similar outcomes in the developing child with

ASD. In order to have the methods incorporated more purposefully or made more accessible in different settings would require some evidence or rationale for doing so. Van der Paelt et al. (2016) referenced low level therapies that produce limited results as compared to intensive treatments that might produce greater outcomes. This would further reinforce the review of play and ABA as examples of more intensive approaches. Despite challenges in incorporating these intensive approaches into a setting such as school, ABA methods are visible in therapies, related services, and school-wide frameworks to support positive behavior development (Bethune & Kiser, 2017; Mohammadzaheri et al., 2014). When compared to ABA, the implementation of play therapy in educational settings is minimal (Solomon et al., 2014). The potential significance for strengthening play-based interventions to determine if they can be adapted to school is high. Additionally, the cooperative utilization of the intensive approach in both school and home could contribute to the realization of positive potential in students with ASD.

Autism Spectrum Disorder (ASD)

History

Historical highlights of autism's beginnings date back to 1911, when Eugen Bleuler used the term to describe a symptom of schizophrenia (Parnas et al., 2002). Throughout subsequent years, research was conducted to describe individuals with social and emotional limitations (Project Autism, 2013). In 1949, Leo Kanner conducted a study and used the term "refrigerator mother" which suggested that autism was caused by a lack of motherly love resulting in children who seemed to desire profound aloneness (Project Autism, 2013). Closely following that time, additional theories were presented

discussing the cause of autism and its origins remained quite uncertain (Project Autism, 2013). The influence of parents, caregivers, and families rose as evidenced by Bernard Rimland who founded the Autism Society of America which aimed at providing a voice for those diagnosed with the disability in an effort to advocate and defend other social stigmas (Project Autism, 2013). In the 1970s, formal education for those with autism began to take shape as Eric Schopler began the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) program in 1972. TEACHH provided training and other resources for individuals with autism (Project Autism, 2013).

Historically, rates of autism diagnoses were not analyzed and reported like they are presently; the diagnosis was continually studied with noted refinements. For example, in 1980, the DSM-III formally added autism as a category under the name "Infantile Autism" which allowed doctors to diagnose autism alone and differentiate the disability from schizophrenia (Parnas et al., 2002). This formal diagnosis, supported by advocacy organizations, was revised in 1987 when "Infantile Autism" was replaced by "Autistic Disorder" in the DSM-III-R (Mastropieri & Scruggs, 2018; Project Autism). Developments related to diagnostic criteria occurred, and by 1991, the United States Federal Government recognized autism as a special education category (IDEA, 2004). As special education services expanded across the United States, so did the focus on increased academic standards and inclusion for students with disabilities. As a result, specific instructional methods, interventions, and related services for students with autism became necessary (Mastropieri & Scruggs, 2018). The developments continued from the mid-1990s, noting additions to the DSM-IV such as Asperger's Syndrome, a higher functioning individual who manifests identifiable problems in social interactions, and

other variations, along with expanded research centered around the etiology of Autism (National Conference of State Legislature, 2016; Parnas et al.; Project Autism).

In 2006, the Combating Autism Act provided funding for ASD and developmental disabilities research, screening, treatment, and education (National Conference of State Legislature [NCSL], 2016). This act created a federal advisory committee called the Interagency Autism Coordinating Committee (IACC) which focused on developing a plan for the support and conduction of research on ASD (NCSL, 2016). As noted previously, from 2008 to 2020 the ratio of children with ASD in the United States went from 1:88 to 1:54 respectively (CDC, 2020). Within this statistic, ASD is 4.3 times as prevalent among boys as among girls (CDC, 2020). Additionally, in 2013, significant changes were made to the autism criteria in the DSM's revised fifth edition which focused on social communication/interaction and repetitive behavior which resulted in modifications to the disability's name. The diagnosable term became Autism Spectrum Disorder (ASD) and eliminated any sub-diagnoses such as Asperger's syndrome and Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS) which are now included under the umbrella term, ASD (CDC, 2018a; NCSL). According to Baio et al. (2018), the changes to the clinical definition have little or no impact on the percentage of school-age children identified as having ASD. In August 2014, the Autism Collaboration, Accountability, Research, Education, and Support (CARES) Act was enacted which reauthorized the IACC (NCSL). Over the course of 100 plus years, autism, now ASD, is recognized world-wide as a prevalent spectrum disorder with growing research, advocacy groups, education programs, and practices to support those affected across a variety of settings. Families and educators are faced with

making critical decisions regarding the implementation of evidence-based practices or therapies, including play-based interventions and/or other non-traditional school programming options, to support the developing child with ASD as early as 18 months of age.

Identification and Deficiencies in Language Development

Presently, one might ask who and/or how are children diagnosed with ASD? In short, children may be diagnosed in a clinical setting such as a pediatric center or hospital by a team of medical personnel, a psychiatrist, or psychologist. For educational purposes, an evaluation team within a school setting that often includes, but is not limited to a school psychologist, speech and language pathologist, and occupational therapist can also be engaged in the evaluation (CDC, 2018b). Clinically, an ASD diagnosis might be made prior to the child turning two years old (CDC, 2018b), although the number of comprehensive evaluations occurring within this time frame are not as numerous as they could be due to the possible lack of accessible high-quality healthcare and/or education for the general population (CDC, 2018a). In addition to observations, rating scales, and other diagnostic methods, families and caregivers are often required to assist professionals in gathering medical histories and other key sources of information related to a child's general functioning and development. Educationally, state systems across the United States might first consider an "outside diagnosis" of ASD, or one made by medical or mental health professionals, prior to any school-based evaluation procedures to determine whether a child may qualify for special education supports and services. When a child is diagnosed with a disability, or is suspected of having a disability, the Child Find mandate requires the public-school district of residence to complete a

comprehensive evaluation to determine whether or not a student qualifies for special education supports and services from birth through the age of 21 years (IDEA, 2004).

The Individuals with Disabilities Education Act (IDEA) (2004) defines Autism as:

> A developmental disability that significant affects verbal and non-verbal communication and social interaction. It is generally evident before age 3 and adversely affects a child's educational performance. Other characteristics often associated with autism include engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. [§300.8 (c)(1)]

The IDEA (2004) also stated that autism does not apply if a child's educational performance is adversely affected primarily because the child has emotional disturbance. The guidelines also note that a child may not be identified as having an educational diagnosis of autism until after the age of three years, the traditional start to preschool programming. The California Department of Developmental Services (CDDS) reports that there is no known single cause of ASD (2002). However, a common belief or understanding is that ASD is caused by abnormalities in brain structure or function (CDDS, 2002). Researchers are investigating links between heredity, genetics, environmental factors and problems during pregnancy as potential causes of autism (CDDS; CDC, 2018a). The CDDS stated that in many cases, families appear to have a pattern of ASD or related disabilities. Autism currently makes up 0.3 % of the school-age population and 3.7% of students served under the IDEA (Mastropieri & Scruggs, 2018). Autism is a spectrum disorder meaning that the symptoms and characteristics can occur

in multiple combinations and range from mild to severe (CDC, 2018a). Children diagnosed with ASD can be verbal or non-verbal and have varying skills and needs. Although there are specific criteria for identifying ASD in both the clinical and educational settings, as a spectrum disorder, ASD can be represented in a variety of ways, including varying cognitive, language, and academic abilities, as well as various exhibitions of behavior. Early intervention is key, although considered quite difficult as the disorder requires practices which "…focus on 'what works for whom'," rather than "one-size-fits-all treatment approaches for children with ASD" (Van de Paelt et al., 2016, p.162). In addition to the importance of early interventions improving symptomology and/or common characteristics of ASD, the practices might too support positive outcomes later in life for individuals with ASD (Tachibana et al., 2017).

In reflecting on the definition of ASD through the IDEA, and the areas of deficit that accompany the disorder, communication and social interaction are central. Therefore, language is a valuable tool for communication and social interaction and a factor that is not only significant but measurable. Reviewing whether language is enhanced through intervention approaches is a logical focus.

Early Intervention for Young Children with Autism Spectrum Disorder (ASD)

According to the CDC (2020), ASD continues to be one of the fastest growing developmental disorders in the United States, with a prevalence rate of 1:54 children. The importance of early intensive behavioral interventions (EIBI) to support social-emotional, language, and cognitive development of young children diagnosed with ASD can assist in reducing stereotypical behaviors often associated with ASD (MacDonald et al., 2014). Additionally, EIBI methods can aid in school readiness (Bulotsky-Shearer et al., 2014)

and support positive outcomes later in their lives. Two early intervention methods, applied behavior analysis (ABA) and play therapy, are both supported by research-based evidence, are frequently recommended by medical, mental health, and education professionals in an effort to increase language, communication, behavioral, and/or social skills development in preschool and early elementary students diagnosed with ASD (Barton et al., 2018; Solomon et al., 2014).

Applied Behavior Analysis

According to McPhilemy and Dillenburger (2013), ABA programming is the "gold standard for treatment of children with autism spectrum disorder ASD in most of North America" (p. 154). According to Hillman (2018), such a distinction is aligned to the fact that ABA stems from behavioral theories and are considered evidence-based. Much of the research on ABA focuses on two approaches: discrete trial training (DTT) and pivotal response treatment (PRT). According to MacDonald et al. (2014), EIBI utilizes principal components of applied ABA to support the social-emotional, language, and cognitive development of preschool-age children diagnosed with ASD. ABA therapy also aims at reducing problematic or stereotypical behaviors of ASD (MacDonald, et al.). Although ABA therapy is considered by many to be a general recommendation for young children diagnosed with autism, the researchers note that for children ages one through three years, "limited outcome research has been collected" (MacDonald et al., p. 3634). According to the Lovaas Model of Applied Behavior Analysis, programming is designed for children between the ages of two years and eight years, requiring as much as 40 hours per week of intervention delivery across settings, including education-based ones (Lovass Center, 2013; Rabideau et al., 2018).

Discrete Trial Training. DTT, considered to be the more structured or traditional approach to ABA defines specific intervention targets, "which are addressed through massed trials of antecedent-behavior-consequence chains," and often utilize, "adult-selected materials that are presented repeatedly to promote success" (Mohammadzaheri et al., 2014, p. 2770). Additionally, Rabideau et al. (2018) noted DTT's importance as a method for language acquisition skills and include methods from a collection of baseline data, determination of preferences, one-on-one program implementation, data collection, and generalization of behavior outside of training or therapy sessions. Important to note is the use of reinforcers to help shape appropriate behavior expectations or skills, such as language acquisition (Lambert et al., 2012). Outcome measures have been reported to include "medium to large effectiveness in term of intellectual functioning, language development, and adaptive behavior" gains in individuals with autism (Virués-Ortega, 2010, p. 397).

Pivotal Response Treatment. PRT, an extension of traditional ABA therapy, is a more naturalistic method focused on the improvement of responsiveness or rate of response (Harden et al., 2015). PRT differs from traditional ABA therapy in that children have a greater role in the construction of their therapy sessions, including the toys or manipulatives utilized, which is said to increase motivation (Harden et al.; Mohammadzaheri et al., 2014). In a similar fashion to the play-based intervention methods, parents and/or caregivers are considered critical agents to the success of PRT's implementation versus traditional ABA or DTT methods (Harden et al.). Additionally, whether implementing DTT or PRT, both methods require implementation from trained

professionals and/or parents, which is another similarity to play-based intervention methods (Mohammadzaheri et al., 2014; Movahedazarhouligh, 2018).

A review of available literature regarding the effectiveness of ABA therapy, suggests inconsistent results across the early childhood and elementary age groups up to eight years. For example, MacDonald et al. (2014) indicated the greatest gains with traditional ABA therapy for participants below the age of two years in regards to language development. Hardan et al. (2015), with a strong research design, reported positive results for the use of the PRT method that focused on the combination of parent or family education, training, and intervention delivery within a clinician-based setting. Mohammadzaheri et al. (2014), who simultaneously studied the effects of traditional ABA methods and PRT, noted no significant gains within either treatment group. One study of interest, conducted by Dawson et al. (2009), explored methods that combined traditional ABA with relationship-based approaches, known as the Early Start Denver Model (ESDM), which measured ASD symptoms after a two-year implementation of the intervention and noted a significant reduction resulting in a change of diagnosis from ASD to what was formerly known as Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS). ESDM has been reported to also reduce parent stress levels (Estes et al., 2014). Lastly, in addition to the positive outcomes reported by McPhilemy and Dillenburger (2013) in the areas of communication, challenging behaviors, and independence, the need for increased ABA therapy services in the educational setting was reported by a majority of participating families.

Play Therapy

According to Michael and Luke (2016), "play is the language of children" (p. 45). The Association for Play Therapy (2019) defined play therapy as "the systematic use of a theoretical model to establish an interpersonal process wherein trained play therapists use the therapeutic powers of play to help clients prevent or resolve psycho-social difficulties and achieve optimal growth and development." Dating back to the early 20th Century, psychoanalysts began implementing practices for children and an understanding developed regarding the use of play in facilitating child's understanding of his/her world (Freud, 1929; Ray et al., 2001). Following that time, play therapy developed and was often integrated with leading counseling theories as each emerged. For example, Axline incorporated Carl Rogers' person-centered therapy and adapted the associated practices for use in children (Hillman, 2018; Overly et al., 2017). This form of child-centered play therapy (CCPT) is still being implemented as a relational counseling approach (Schottelkorb et al., 2020) currently following a series of refinements (Guest & Ohrt, 2018; Hillman, 2018). Moustakas (1959), an existential theorist, developed therapeutic processes involving play known as relationship play. Others continued the development of play-based approaches resulting in Jungian-based play, gestalt-based play therapy, and CBT (Jensen et al., 2017; Ray et al., 2001). Such refinements, which began in the mid-twentieth century, have all played a role in the development of how play therapy is viewed in the present day (Jensen et al.). Most often, however, the techniques focus on the individual child, his/her experiences, and the self. The goal is the formation of a relationship through reciprocal communication based on discovery (Landreth & Sweeney, 1997). Kool and Lawver (2010), noted that effective play therapy results in "a

language children can comprehend and utilize" (p. 19). Play therapy's wide use is often associated with the intervention's responsiveness to the variability of needs associated with the developing child (Bratton et al., 2005).

As cited in Baggerly and Bratton (2010), a review of play therapy conducted by Phillips (1985) concluded that there was a need for additional research to support the efficacy of the intervention. As a follow-up study to his previous review, Phillips (2010) examined the effects of play therapy, including meta-analyses conducted by Leblanc and Ritchie (2001) and Bratton et al. (2005) which examined therapeutic methods such as CCPT, Child Parent Relationship Therapy (CPRT), and Child Teacher Relationship Training (CTRT) with populations of children with borderline disorders, behavioral disorders, and chronical illness. Phillips (2010) concluded with the following recommendations for future play therapy research:

- "define the population(s) and sample(s) precisely" (p. 20),
- (ii) "focus measurement activities on the critical issues defined within one's re-search question" (p. 20),
- (iii) "obtained data should define limits of one's conclusions" (p. 21).,
- (iv) properly account for small samples of participants

In a response to Phillips' (2010) review, Baggerly and Bratton (2010) recognized the limitations of meta-analysis, including challenges in identifying play therapy as evidence-based. However, Baggerly and Bratton (2010), cited "that play therapy researchers have made steady progress in building a firm foundation of play therapy research" (p. 35) from 1985 though 2010. Ray et al. (2015) conducted a review and meta-analysis which specifically focused on CCPT in the school-based

environments. Citing the rise for a need of mental health services offered in the educational setting, Ray et al. concluded CCPT should be considered as, "an effective intervention used in elementary schools" (p. 115). Evidently, the research on play therapies provides an indication of effectiveness. However, due to the variability of symptoms and specificity of needs, there is a need for research that focuses on play therapy with ASD.

Play Therapy for Young Children with Autism Spectrum Disorder (ASD)

The growing evidence of play therapy's usage remains strong for a wide range of young children, including those with ASD. According to Hillman (2018), "symptoms of individuals with ASD falls on a continuum, with some individuals showing mild symptoms and others…more severe symptoms" (p. 198). Due to the nature of a variability that exists across the autism spectrum, the need for adaptability, as a quality of intervention methods, seems to carry some level of importance. The variability of individuals with autism, co-occurrence of other disorders, and a high rate of prevalence, are all factors aimed at the importance of identifying evidence-based early intervention methods.

The PPHC program (Solomon et al., 2007; Solomon et al., 2014) as well as the Peer Play program, (Prendeville et al., 2006) occur in the home or related settings, such as a frequently visited parks or homes of another relative. Both intervention methods target social play between young children with ASD and either parents/caregivers or typically developing same-age peers (Solomon et al, 2007.; Prendeville et al.). The Peer Play program offers training for parents, caregivers, and/or other family members who offer observation, monitoring, and even prompts to support play interactions, while two

young children interact for play sessions (Prendeville et al.). The PPHC program is similar, but the play interactions occur between the young child with ASD and the trained parent or caregiver (Solomon et al, 2007.). The major difference between the PPHC program with Peer Play, block play, or additional formalized methods is that the child constructs his/her play and communication is observed related to how effectively the child welcomes the adult into his/her play opportunities (Solomon et al., 2007; Solomon et al., 2014). The program requires parent/family training, monthly visits from a licensed PPHC consultant to facilitate and offer supports for play, multiple methods of feedback and instruction (written, auditory, and/or video), and fidelity measures to ensure parents/caregivers are implementing play in-between consultation visits (Espe-Sherwindt et al., 2015). According to Wetherby et al. (2014), parent-coached interventions have been noted to improve areas such as social communication, daily living, social skills, and receptive language in young children with ASD.

The founders of the PPHC program believe the intervention might be a missing piece of the proverbial puzzle of early intervention methods for children ages 18 months through six years or even up to eight years of age who have been identified with ASD (Espe-Sherwindt et al., 2015; Solomon et al., 2007; Solomon et al., 2014). At the center of the team's rationale is the idea of the child's lack of preparedness for intensive behavioral interventions, especially in terms of language, communication, and social skill development (Solomon et al., 2007; Solomon et al., 2014). This notion is further supported by Bulotsky-Shearer et al. (2014), who discussed the parallels which can be drawn between one student's readiness to learn and another's readiness to participate in intensive behavioral therapy, as both require a level of readiness or preparedness for

some type of learning to occur. The PPHC program, an extension of Drs. Stanley Greenspan and Serena Weider's "developmental, individualized and relationship-oriented (DIR) model" centers on the use of structured play opportunities to increase the child's social-pragmatic or functional developmental levels of communication (Solomon et al., 2007, p. 209). The areas assessed, based on the DIR model, include

- "(1) self-regulation and interest in the world;
- (2) forming relationships, attachment, and engagement;
- (3) two-way, purposeful communication;
- (4) behavioral organization, problem solving and internalization;
- (5) representational capacity; and
- (6) representational differentiation" (Solomon et al., 2007, p. 212)

Similar to the play therapy's roots in psychoanalysis and child-centered therapy, the DIR model emulates relationship building, communication, and the development of oneself through self-regulation.

The Solomon et al. (2007) and Solomon et al. (2014) studies produced the strongest results of the play-based interventions reviewed as a part of the present study. Solomon et al. (2007) suggested developmental gains, including "45.5 percent of the children participating [making] good to very good functional developmental gains," as rated by parents (p. 219). Additionally, Functional Emotional Assessment Scale (FEAS) ratings collected from the trained consultants were measured to be higher, noting "66 percent of the children rated [making] very good gains" in areas such as self-regulation, forming relationships, problem-solving, and two-way communication (p. 219). Follow-up analysis in the Solomon et al. (2014) replication study resulted in similar gains in

communication skills, the reduction of autistic symptoms, but also revealed maintained stress levels in parents/caregivers as well as a decrease in depressive symptoms as reported by parents. Mahoney and Solomon (2016), in a secondary analysis of the of the data collected in the Solomon et al. (2014) study, noted the PPHC program "not only address[es] children's social deficits but also enhance[s] the learning processes that are the foundations for their developmental learning" (p. 1861). Although citing increased engagement and communication between the child with ASD and parent(s), Mahoney and Solomon (2016), claimed that "PLAY did not result in an overall reduction of autism severity" based on the symptoms presented on the Autism Diagnostic Observation Schedule (ADOS) (p. 1868). A question to be considered would be whether or not the PPHC program supports preparedness for learning without reducing observed symptoms associated with ASD. Despite improvements, limitations were recognizable when the PPHC program was implemented.

Learn to Play Therapy (Stagnitti & Pfeifer, 2017), for young children with ASD, centers around the child's ability to initiate pretend play. This play therapy aligns itself with therapeutic approaches that are relational and attempt to follow the child's lead. With a focus on three individuals, the authors acknowledged the importance of individualized methodology as opposed to randomized control trials. With this individualization the play approach proved to be efficacious. There appears to be evidence of limitations that come with individualization and a limited number of subjects with research that is being conducted on the population of individuals with ASD.

Despite having over 900 possible articles initially identified for review of literature regarding child-centered play therapy (CCPT) for children with ASD, Hillman

(2018) only included four studies with a limited number of subjects applicable to the identified population. Hillman (2018) cited positive outcomes in social -emotional behaviors but specific areas, such as language, were not recognized. Clearly, additional research must be conducted in order to determine the effectiveness of child-centered play therapy as an intervention for ASD. The need for a meta-analysis that can review the existing literature and glean evidence as to whether play therapy is effective is strong.

The Neuroscience of Play Therapy

Michael and Luke (2016) suggested, "neuroscience continues to emerge throughout the helping field, and play therapy is no exception" (p. 45). Furthermore, Stewart et al. (2016) noted that neuroscientific research can be applied by play therapists to promote neuroplasticity, or newly developed neural pathways, increase attention, and grow awareness in children. According to The Floortime Center (2020), common behavioral approaches such as ABA and other adult-led instructional methods for children with disabilities, such as ASD, are repetitive practices, which "focus on external observable behavior, not on what is happening on the inside of the child" (para. 2). Although such approaches allow for observable, measurable results, the practices differ from those often associated with client-centered play therapy and supported by neuroscience (Floortime Center, 2020; Stewart et al.). Stewart et al. discussed how play sets an ideal stage for children to experience interpersonal interactions that assist in the development of relations and the shaping and modifications in brain circuits. According to Perry (cited by Stewart et al.) a "safe relationship is our most powerful neurobiological connection" (p. 8). Although neuroscientific research provides evidence for the use of play therapy, Michael and Luke (2016) noted that the investigation can lead to the

surfacing of more inquiries than actual answers, including the methods application to play therapy in young children, including those with ASD. Despite the possibility of more questions being raised, Stewart et al. concluded that play provides tools for promoting significant change.

Educational Leadership

According to the National Policy Board for Education Administration (2015), district and school leaders are called to, "embody a research-and practice-based understanding of the relationship between educational leadership and student learning" (p. 3). Whether focusing on curriculum, instruction, assessment, community, and/or professional capacity, the educational leaders are to embrace, "high expectations for student learning" (p. 12) focused on "meeting the academic, social, emotional, and physical needs of each student" (p. 13). Dating back to federal legislation such as No Child Left Behind (NCLB) in 2005, the call for educational leaders to adopt evidence-based programming and instructional methods became mandatory (Beard, 2013). Presently, evidence-based rhetoric might be considered the norm and a part of regular vernacular for the majority of leaders; however, do all educational leaders define evidence- or research-based similarly? Whether leaders are working to developing curricula or assessments or focused on the promotion of safe and healthy school environments, they must do so with a strong level of authenticity (Beard, 2013). In doing so, actions should be carried out with purpose and intention, with the focus on all learners, including the most vulnerable, such as students diagnosed with ASD.

Determining evidence-based practices for students representing low-incidence populations has proven to be difficult due to single-case designs and the level of

variability from case to case (Bylers et al., 2012). Although adult facilitated play therapy for young children with ASD has demonstrated success in home and/or clinical settings, its use in traditional education settings is limited. However, if educational leaders function with authenticity and purpose (Beard, 2013), they are called to investigate key components of play-based practices across age, setting, gender, scale of measurement, and time/duration. In doing so, assumptions might be reduced and, with proper data collection and analysis, educators can determine feasibility of implementing such programming as components of core curricula for all early childhood students, including those with ASD.

Summary

As the prevalence of ASD diagnoses continue to rise globally, Van der Paelt et al. (2016) noted "the majority of children with ASD do not have access to intensive early intervention services," (p. 163) resulting in the selection and participation in services, therapies, or programs that are available or easily accessible rather than purposeful, intentional, or based on the individual needs of a child. Two early intervention methods, play-based programming and ABA therapy, are both considered evidence-based practices, although the standards in identifying such a designation differ. Nonetheless, both methods are regularly recommended by medical, mental health, and education professionals (Barton et al., 2018; Solomon et al., 2014). Although ABA and play represent conflicting ideologies, both methods support the development of language and/or communication skills and have proven to be successful within particular parameters. Educators are faced with making critical decisions regarding the implementation of evidence-based practices or therapies, including play-based

interventions and/or other non-traditional school programming options, to support the developing child with ASD as early as 18 months of age. Prior to doing so, however, leaders are called to ensure play-based programming would be considered evidence-based for supporting language development through play-based interventions in young children with ASD. If one looks to neuroscience, the importance of investigating play is reinforced.

Chapter 3

Methods

The current investigation is a meta-analysis, or "analysis of analyses" (Glass, 1976, p. 3) of existing research examining the impact of play therapy on the development of language skills in young children with ASD. A term first presented by Gene Glass in an address to the American Educational Research Association (Rosenthal & DiMatteo, 2001), a meta-analysis referred, "…to the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating findings (p. 3). According to Rosenthal and DiMatteo (2001), meta-analysis provides researchers the opportunity to come to conclusions that are more accurate and valid than those that are the result of one study or that are explained without quantitative support. Furthermore, Borenstein et al. (2009) noted meta-analytic procedures have been applied to the fields of psychology and education to measure the impact or effectiveness of treatment, intervention, and/or educational practices on social-emotional and academic achievement outcomes.

In addition to the noted strengths of conducting a meta-analysis for the present study, it is equally important to note possible shortcomings or weaknesses of this research method. According to Finckh and Tramer (2008), "meta-analyses can only be as valid as the studies selected for the systematic review," (p. 3) and need to, "…take into account the methodological quality of the studies included" (p. 4) to reduce the possible influences on treatment effects or outcomes. Subsequent sections will address how such weaknesses of meta-analytic methods will be addressed by demonstrating sensitivity to

bias, accounting for disparities in effect size and utilizing methods to ensure the use of high-quality studies.

Individual participant data (IPD) reported in publicly available research study results were analyzed as a part of this study to allow the researcher to synthesize available outcome data and provide an accumulative result based on a larger sample size. The current study was considered a single-case design as the research considered for analysis was based on small sample size designs, which were representative of participants of a low-incidence population. A total of 35 cases representing children with ASD from four research studies gathered as a part of previous investigations were collected and analyzed using HLM to measure effectiveness across variables such as age/grade level, gender, individual delivering the intervention, and location of service delivery. According to Woltman et al. (2012), "Hierarchical Linear Modeling (HLM) is a complex form of ordinary least squares (OLS) regression that is used to analyze variance in the outcome variables when the predictor variables are at varying hierarchical levels…" (p. 52). Additionally, Woltman et al. noted, "HLM accounts for the shared variance in hierarchically structured data" (p. 52) and "…simultaneously investigates relationships within and between hierarchical levels of grouped data…" (p. 53). As a result, HLM is considered to be best practice in terms of accounting for variance within/between variables across levels (Woltman et al.). For example, young children with ASD who participate in play therapy in order to increase language development, have shared level-one variables such as gender and age as well as shared level-two variables such as location of therapy and adult implementor, to name a few. The future implications are important to note as results gathered as a part of the present study should

allow educators and clinicians to become more intentional in their selection of intervention methods, support decision-making efforts, and aid in redefining what is considered best practice in education individuals with ASD.

Sample

A review of quantitative literature regarding the use of play therapy for young students with ASD was conducted over a 12-month time period. Studies included in the current investigation were collected through extensive, electronic database searches. Online databases utilized for the literature review and analysis included EBSCO, Educational Resources Information Center (ERIC), JSTOR, and Google Scholar. Each of the noted databases are amongst those considered to be acceptable when conducting a meta-analysis (Bramer et al., 2017). Most of the research studies collected were published between 2010 through 2020. The inclusion of some publications prior to 2010 was done to provide an historical perspective of play therapy. In addition to published, peer-reviewed journal articles, doctoral level dissertations were also considered for inclusion. The following search criteria were used to assist in identifying relevant journal articles: play interventions autism, play programs autism, language development interventions autism, and play therapy communication autism.

A database of 65 studies was generated using the above search criteria, representing the following journal publications: *American Journal of Speech and Language Pathology*, *Clinical Child Psychology and Psychiatry*, *Early Childhood Education*, *Education and Treatment of Children*, *Journal of Autism and Developmental Disorders*, *Journal of Early Intervention*, *Journal of Emotional and*

Behavioral Disorders, *International Journal of Play Therapy*, and *Pediatrics*. Of the 65 studies, data from 4 were considered based on the evaluation of two reviewers on the following criteria: (1) the participants were identified as being diagnosed with ASD, autism, or previously diagnosis related to ASD (e.g., Asperger's disorder, PDD-NOS) (2) the participants were between the ages of one and 14 years, (3) outcome measures were focused on language or communication development, (4) interventions occurred in either a clinical, education-based, or home setting, and (5) both pre-test and post-test data were reported.

Data representative of 35 cases for a total sample size of 594 data points were utilized for the meta-analytic processes included in this study. Of the 35 cases, the present investigation includes data representing 22 males and 13 females, ages three through 12 years.

Instruments

Data extraction/collection processes were conducted using WebPlotDigitizer (Rohatgi, 2020). WebPlotDigitizer is a considered "a reverse engineer" (para. 1) which extracts data points directly from graphs presented in other research studies. The program has been found to have good reliability and validity when graphs are clear and program users are trained and able to detect different phases, treatments, and/or variables in single-case designs (Moeyaert et al., 2016; Shadish et al., 2009).

Design

The current dissertation study is considered a single-case design as the research included for analysis was based on small sample size designs. The participants included from other research studies are representative of young children diagnosed with ASD, a

low-incidence disability population. Prior to the collection and analyzation of data, approval from the Institutional Review Board (IRB) at Youngstown State University (YSU) was granted. The IRB (Appendix C) determined the current dissertation study meets the exempt definition due to the use of pre-existing data with no new or additional data being collected from human subjects.

Each of the three peer-reviewed studies and one dissertation, included as a part of the current investigation, were coded based on the following variables: age, race, gender, setting, outcome measure(s), type of intervention/play therapy, frequency of intervention, and time/duration of the intervention.

The methodological quality of each study was determined using the SCED Scale (Tate et al., 2008). The SCED Scale rates single-subject design studies on both their methodological and statistical analyses qualities including the following: clinical history, measurement, design, inter-rater reliability, statistical analyses, replication, and generalization (Tate et al.).

WebPlotDigitizer (Rohatgi, 2020), a web browser-based application, was used to extract data point values from each graph representing individual participant data. WebPlotDigitizer uses scanned image files to provide data values based on the x- and y-axes. To extract data, images of graphs were collected and uploaded into the WebPlotDigitizer program and magnified. The x- and y-axes were defined, and data points were noted by clicking in the middle of the desired data point. Data points were then converted by the program and exported to Microsoft Excel. Data files were labeled based on their measured variables/conditions.

Effect size measures and data points collected from the extracted graph data were

not consistent across all variables measured. For example, the amount of time/intensity of the play interventions varied across the four studies. Tau-U (τ_U) was computed across all effect size measures, including each of the studies, each participant's reported results (Appendix A) and across moderator variable (Appendix B). Tau-U, a popularly used and valid effect size estimate for single-case design studies (Parker, Vannest, Davis, & Sauber, 2011; Tarlow 2017), is measured on a scale from 0 to 1. Tau-U values ranging from .93 to 1 are considered strong, from .66 to .92 are large, and below .65 are weak (Bruni et al., 2017). Additionally, to measure the effects of the interventions while accounting for differences and eliminating potential bias, HLM was conducted (Woltman et al., 2012). HLM accounts for shared variance, while "accurately estimate[ing] lower-level slopes and their implementation in estimating higher-level outcomes (Woltman et al., p. 52). HLM Data were analyzed using a level-2 HLM model, accounting for the measured variables related to the participants (level one) as well as the implementation of the intervention (level two). HLM is one approach that has been identified as stable in terms of its reliability and validity to, "draw conclusions about the relative merits of different interventions because studies of those interventions may differ in other important ways besides the intervention themselves" (Shadish, 2014, p. 117).

Chapter 4

Results

The purpose of the current investigation is to analyze existing research examining the impact of play therapy on the development of language skills in young children with autism spectrum disorder (ASD). The researcher utilized meta-analytic techniques on a group of publicly available research studies that individually examined the effectiveness of variations on play therapy to support the development of language and/or communication skills in young children with ASD. The present hierarchical meta-analysis was guided by two research questions:

1. Are play-based interventions considered an effective means of increasing language development in young children with ASD?
2. What moderators or variables are associated with effectiveness of play-based interventions for students with ASD?

Descriptive Analysis

A total of four studies were analyzed, including one doctoral dissertation and three publications from the following journals: *American Journal of Speech-Language Pathology*, *Clinical Child Psychology and Psychiatry*, and the *International Journal of Play Therapy*. Outcome measures for each study were centered around language development and/or communication, both verbal and nonverbal. Based on the individual participant data collected, the present study yielded 35 cases for a total sample size of n = 594 data points. The number of data points is based on the multiple outcome measures related to language development and/or communication collected and analyzed for the

investigation. Tables 1-3 provide demographic data of the study's participants, beginning with participants by gender.

Table 1

Descriptive Data – Participants by Gender

Gender	*n*	*%*
Male	22	62.9
Female	13	37.1

As indicated in Table 1, there were almost twice as many male children diagnosed with ASD included as a part of the hierarchical meta-analysis compared to females. The Centers for Disease Control and Prevention's (2020) most recent estimates reveal that ASD diagnoses for males occur at a rate that is almost four-times greater than females. Table 2 presents data organized by age of participants.

Table 2

Descriptive Data – Participants by Age

Age (years)	*n*	*%*
0-2	0	0
3-5	6	17.1
6-12	29	82.9
13 or more	0	0

As indicated in Table 2, the ages of all individual participants included in the study, fell between three years and 12 years. A large majority of participants' ages fell between six and 12 years. Table 3 includes demographic data organized by participant

race.

Table 3

Descriptive Data – Participants by Race

Age (years)	*n*	*%*
White	2	5.7
Black	0	0
Hispanic	4	11.4
Asian	4	11.4
Other	2	5.7
Not Reported	23	65.7

As indicated in Table 3, race was not reported in almost 66% of the participant data collected. In the instances where race was reported, data reveal that Hispanic and Asian children with ASD were the largest group represented, followed by White and Other.

In order to determine the effectiveness of play-based therapy on increasing language development in young children with ASD, including potential moderators or variables related to the intervention's efficacy, further examination of participant demographic data was warranted. A total of four models using HLM were conducted. The first model using HLM was conducted to analyze the effect of independent variables such as gender, age, and/or race as predictors of language development in children with ASD who participated in play-based therapy. The HLM was conducted using a restricted maximum likelihood (REML) estimation to reduce bias in comparison to a full maximum likelihood estimation. The decision to conduct a REML was based on the small number of groups in the present investigation (Boedeker, 2017) and was used for each of the four

models/runs. The results were generated after four iterations and the following models were tested:

Level-1 Model $OUTCOME_{ij} = \beta_{0j} + \beta_{1j}*(PHASE_{ij}) + r_{ij}$

Level-2 Model $\beta_{0j} = \gamma_{00} + \gamma_{01}*(GENDER_j) + \gamma_{02}*(AGE_j) + \gamma_{03}*(RACE_j) + u_{0j}$
$\beta_{1j} = \gamma_{10}$

Mixed Model $OUTCOME_{ij} = \gamma_{00} + \gamma_{01}*GENDER_j + \gamma_{02}*AGE_j + \gamma_{03}*RACE_j + \gamma_{10}*PHASE_{ij} + u_{0j} + r_{ij}$

The $OUTCOME_{ij}$ noted for the Level-1 Model refers to the language/communication measure for participant "i" on level "j". The intercept for the Level-1 Model is β_{0j}, the slope for *PHASE*, β_{1j}, and r_{ij} accounts for the Level-1 error. In reference to Level-2, β_{0j}, refers to the results for the intercept. The intercept for the Level-2 Model is γ_{00}, the slope for *GENDER*, γ_{01}, the slope for *AGE*, γ_{02}, the slope for *RACE*, γ_{03}, and u_{0j} accounts for Level-2 error. Table 4 presents the results for the analysis of the two-level model.

Table 4

HLM Results for a Two-Level Model – Sex, Age, and Race

Fixed Effect	Coefficient	SE	*t*-ratio	≈*df*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	10.52	4.30	2.45	31	0.020
GENDER, γ_{01}	-0.09	1.27	-0.07	31	0.942
AGE, γ_{02}	-1.02	1.83	-0.55	31	0.584
RACE, γ_{03}	-1.14	0.47	-2.44	31	0.020
For PHASE slope, β_1					
INTRCPT2, γ_{10}	.33	0.03	11.56	558	<0.001

The results, as presented in Table 4, indicate race to be a significant predictor variable (p = .020) on the outcomes of play-based therapy for children with ASD, while gender and age were not significant ($p > .05$). Additionally, results indicate a significant difference across phases ($p < .001$), from baseline to intervention.

Upon review of participant demographic data by race (Table 3), most notably, the 65.7% of participants whose race was not reported, further examination of the calculated significance was warranted. As a result, an HLM was conducted to analyze the effects of race, following the removal of the all individual participant data where race was not reported. The decision to trim the data was made to assess the significance of race without the interference of the identified outlier group. The results were generated after three iterations and the following models were tested:

Level-1 Model $OUTCOME_{ij} = \beta_{0j} + \beta_{1j}*(PHASE_{ij}) + r_{ij}$

Level-2 Model $\beta_{0j} = \gamma_{00} + \gamma_{01}*(RACE_j) + u_{0j}$
$\beta_{1j} = \gamma_{10}$

Mixed Model $OUTCOME_{ij} = \gamma_{00} + \gamma_{01}*RACE_j + \gamma_{10}*PHASE_{ij} + u_{0j} + r_{ij}$

Consistent with the previous two-level model analysis, the $OUTCOME_{ij}$ noted for the Level-1 Model refers to the language/communication measure for participant "i" on level "j". The intercept for the Level-1 Model is β_{0j}, the slope for *PHASE*, β_{1j}, and r_{ij} accounts for the Level-1 error. The Level-2 β_{0j} refers to the results for the intercept. The intercept for the Level-2 Model is γ_{00}, the slope for *RACE*, γ_{01}, and u_{0j} accounts for Level-2 error. The results of the analysis of the two-level model are presented in Table 5.

Table 5

HLM Results for a Two-Level Model - Race

Fixed Effect	Coefficient	SE	*t*-ratio	≈*df*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	6.06	4.49	1.35	10	0.207
RACE, γ_{01}	-0.64	1.26	-0.51	10	0.621
For PHASE slope, β_1					
INTRCPT2, γ_{10}	.46	0.05	8.40	227	<0.001

The results, as reported in Table 5, indicate race is not a statistically significant predictor variable ($p > .05$). Following the additional analysis, as indicated in Table 4 and Table 5, gender, age, and race, are not statistically significant predictor variables on the outcomes of play-based therapy for children with ASD.

Model three was conducted to analyze the effect of independent variables such as intervention setting, language/communication assessment measure (*ASSESSMENT*), and frequency of intervention as predictors of language development in children with ASD who participated in play-based therapy. Like the previous two models, HLM was conducted using a REML estimation. The results were generated after four iterations and the following models were tested:

Level-1 Model $OUTCOME_{ij} = \beta_{0j} + \beta_{1j}*(PHASE_{ij}) + r_{ij}$

Level-2 Model $\beta_{0j} = \gamma_{00} + \gamma_{01}*(SETTING_j) + \gamma_{02}*(ASSESSMENT_j) + \gamma_{03}*(FREQUENCY_j) + u_{0j}$

$\beta_{1j} = \gamma_{10}$

Mixed Model $OUTCOME_{ij} = \gamma_{00} + \gamma_{01}*SETTING_j + \gamma_{02}*ASSESSMENT_j + \gamma_{03}*FREQUENCY_j + \gamma_{10}*PHASE_{ij} + u_{0j} + r_{ij}$

The $OUTCOME_{ij}$ noted for the Level-1 Model refers to the language/communication outcome measure for participant "i" on level "j". The intercept for the Level-1 Model is β_{0j}, the slope for *PHASE*, β_{1j}, and r_{ij} accounts for the Level-1 error. On Level-2, β_{0j}, refers to the results for the intercept. The intercept for the Level-2 Model is γ_{00}, the slope for *INTERVENTION*, γ_{01}, the slope for *ASSESSMENT*, γ_{02}, the slope for *FREQUENCY*, γ_{03}, and u_{0j} accounts for Level-2 error. The results of the analysis are presented in Table 6.

Table 6

HLM Results for a Two-Level Model – Intervention, Assessment, and Frequency

Fixed Effect	Coefficient	SE	*t*-ratio	≈*df*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	-5.11	3.26	-1.57	31	0.126
INTERVENTION, γ_{01}	-0.17	1.10	-0.16	31	0.876
ASSESSMENT, γ_{02}	-0.03	0.74	-0.05	31	0.964
FREQUENCY, γ_{03}	1.99	0.65	3.08	31	0.004
For PHASE slope, β_1					
INTRCPT2, γ_{10}	.33	0.03	11.58	558	<0.001

As indicated in Table 6, the results indicate that FREQUENCY of intervention sessions was found to be significant ($p = .004$). Results suggest that frequency of play therapy sessions is a predictor of language development in children with ASD who participate in play-based interventions centered around language development as an outcome. Additionally, the result show that both SETTING and ASSESSMENT were found to lack significance as predictor variables ($p > .05$).

The mean-effect size estimate of the moderator/predictor variables was computed using Tau-U (τ_U) and are reported in Appendix B. The results suggest heterogeneity within each of the moderators reported. Further examination of the setting of the intervention reveals the weighted mean-effect size estimate for the home setting (τ_U = .98) to be higher than the mean-effect size estimate for an education-based setting (τ_U = .65), which is higher than the mean-effect size estimate for mixed methods (τ_U = .38). Similarly, Tau-U computation results for assessment/outcome measure reveal verbal and nonverbal communication (τ_U = .98) has the highest mean-effect size estimate in comparison to verbal communication (τ_U = .70), nonverbal communication (τ_U = .65), and social and emotional skills (τ_U = .39). Lastly, in reference to the significant predictor variable, frequency of the intervention, its weighted mean-effect size estimate for interventions occurring two times per week (τ_U = .98) was found to be higher than both interventions which occurred two or more times per month (τ_U = .54) and weekly (τ_U = .47).

The fourth HLM model was conducted to analyze the effect of independent variables such as type of play therapy and duration of therapy sessions as predictors of language development in children with ASD who participated in play-based therapy. The results were generated after four iterations and the following models were tested:

Level-1 Model $OUTCOME_{ij} = \beta_{0j} + \beta_{1j}*(PHASE_{ij}) + r_{ij}$

Level-2 Model $\beta_{0j} = \gamma_{00} + \gamma_{01}*(THERAPY\ TYPE_j) + \gamma_{02}*(DURATION_j) + u_{0j}$
$\beta_{1j} = \gamma_{10}$

Mixed Model $OUTCOME_{ij} = \gamma_{00} + \gamma_{01}*THERAPY\ TYPE_j + \gamma_{02}*DURATION_j + \gamma_{10}*PHASE_{ij} + u_{0j} + r_{ij}$

The $OUTCOME_{ij}$ noted for the Level-1 Model refers to the language/communication outcome measure for participant "i" on level "j". The intercept for the Level-1 Model is β_{0j}, the slope for *PHASE*, β_{1j}, and r_{ij} accounts for the Level-1 error. On Level-2, β_{0j}, refers to the results for the intercept. The intercept for the Level-2 Model is γ_{00}, the slope for *THERAPY TYPE*, γ_{01}, and the slope for *DURATION*, γ_{02}, the slope for *FREQUENCY*, γ_{03}, and u_{0j} accounts for Level-2 error. The results of the analysis are presented in Table 7.

Table 7

HLM Results for a Two-Level Model – Type of Therapy, Duration

Fixed Effect	Coefficient	SE	*t*-ratio	≈*df*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	42.01	11.41	3.68	32	<0.001
THERAPY TYPE, γ_{01}	-4.49	1.27	-3.44	32	0.002
DURATION, γ_{02}	-12.24	3.51	-3.49	32	0.001
For PHASE slope, β_1					
INTRCPT2, γ_{10}	.33	0.03	11.57	558	<0.001

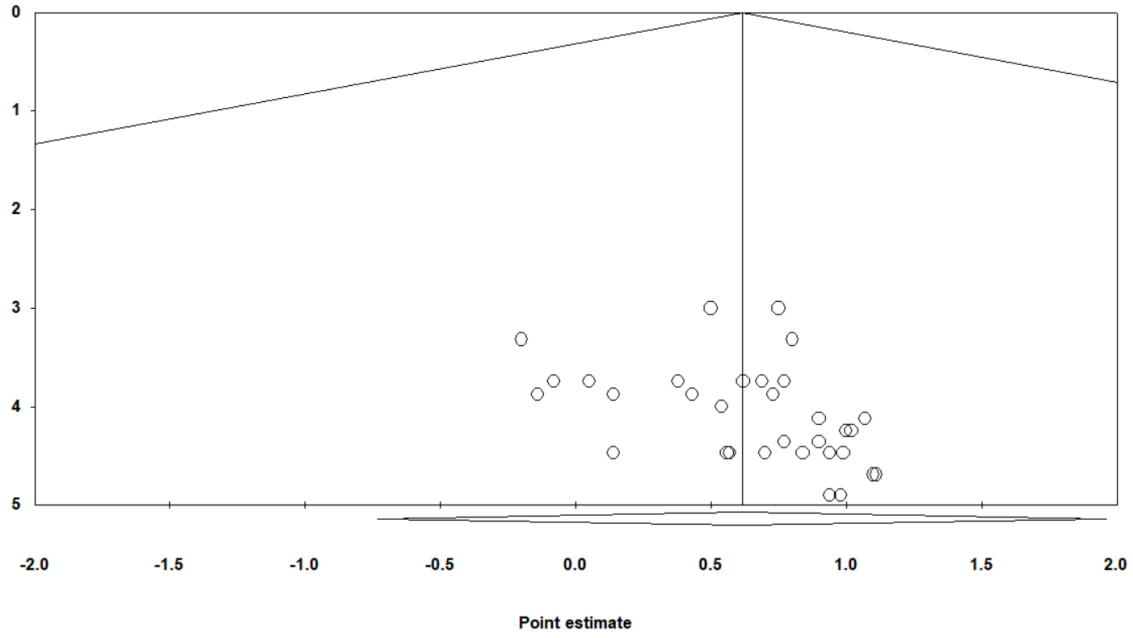
As noted in Table 7, the results indicate that there is significance across phases, THERAPY TYPE (p = .002), and DURATION (p = .001). The results suggest that in terms of the selecting play-based therapy, the type of play and the duration or length of intervention sessions are considered predictors of language development and/or communication skills in children with ASD.

As presented in Appendix B, Tau-U computation results, which measure the mean-effect size of estimates of each moderator/predictor variable, suggest heterogeneity within each of the type of intervention or play therapy moderator, but not within the duration of intervention moderator. Results for type of intervention or play therapy suggest the weighted mean-effect size estimate for adult modeling (τ_U = .98) to be higher than the mean-effect size estimate for child-centered therapy (τ_U = .65) and mixed methods (τ_U = .38). There is little difference between the Tau-U computation results for direction of intervention and both 20 to 40 minutes (τ_U = .65) and 40 to 60 minutes (τ_U = .65) and are considered weak effect size estimates.

Funnel Plot. A funnel plot is a type of scatterplot utilized for investigating publication bias in meta-analytic studies. Furthermore, funnel plots are, "…a measure of study size on the vertical axis as a function of effect size on the horizontal axis." (Borenstein, 2005, p. 194). A funnel plot representing a study with a large sample would appear towards the top of the graph and cluster near the mean effect size, while due to greater sampling variation in effect size, studies with small sample sizes would appear toward the bottom of the graph with estimates dispersed across a range of values (Sterne & Hardbord, 2005). The funnel plot examining publication bias in the current dissertation study is presented in Figure 1.

Figure 1

Funnel Plot: Point Effect Size Estimate by Standardized Score (z) divided by Number of Sessions



Note. A funnel plot examining publication bias.

The sample size in Figure 1, $n = 35$, represents the number of sessions included in the three journal publications and one doctoral dissertation used in the present meta-analysis. The small sample size is represented by the funnel towards the bottom of the graph. In cases were publication bias is absent, one would expect the studies to be distributed symmetrically about the combined effect size. If bias were present, one would expect the bottom of the plot to reveal a high concentration of studies on one side of the mean in comparison to the other. Figure 1 presents a cluster of studies that is generally equal on both sides, demonstrating little or no publication bias and reducing the likelihood of a file drawer problem in the present study.

Summary

Chapter 4 examined existing research regarding the impacts of play therapy on the development of language skills in young children with ASD. HLM results determined that frequency of intervention sessions was found to be a significant predictor of language development in children with ASD who participate in play-based therapy/intervention focused on language development as an outcome. In addition, HLM results also revealed both type of play therapy and the duration of therapy sessions to be predictors of language development and/or communication skills in children with ASD. Mean-effect size estimates were calculated using Tau-U and results indicate heterogeneity within the following moderators/predictor variables: intervention setting, type of play therapy, assessment/outcome measure, and frequency of intervention implementation. Further discussion of the outcomes presented in Chapter 4, along with implications, limitations, and recommendations for future research will be presented in Chapter 5.

Chapter 5

Discussion

As rates of ASD diagnoses continue to increase, families and educators are faced with making critical decisions regarding the selection and implementation of evidence-based practices or therapies, including play-based interventions, to support the developing child as early as 18 months of age. Since research on low-incidence disabilities such as ASD, and specifically play-based interventions, can be difficult to interpret, further analysis is warranted to help guide the decision making of parents, caregivers, educators, clinicians, and more regarding the effectiveness of interventions such as play. The purpose of this dissertation study is to analyze existing research examining the impact of play therapy on the development of language skills in young children with ASD and to determine whether play-based interventions should be considered as effective means of increasing language development in young children with ASD.

The study is considered a meta-analysis of available research based on single-case studies and small sample populations, which too examined various modalities of play therapy for children with ASD to support language/communication development. Included in the present chapter are a summary of findings, interpretations, contexts, implications, limitations, and future directions of the research.

Research Question One

Are play-based interventions considered an effective means of increasing language development in young children with ASD?

Summary of Findings

The investigation included the analysis of data representing individual participant outcome measures and variables from three journal publications and one doctoral study. The methodological quality of each study was determined acceptable based on multiple rater consensus using the Single-Case Experimental Design (SCED) Scale (Tate et al., 2008). Individual participant data collected for the present study yielded 35 cases for a total sample size of n = 594 data points gathered from single-case design and small sample size studies. Although play-based interventions and therapies are recommended for young children with ASD by medical, mental health, and education professionals with some regularity, (Barton et al., 2018; Solomon et al., 2014) the small sample size of the present meta-analysis is most likely the result of limited available literature on play therapy for young children with ASD that specifically focuses on language or communication development as a primary outcome measure. Results of the present study suggest play-based interventions are considered an effective means of increasing language/communication development in young children with ASD.

Research Question Two

What moderators or variables are associated with effectiveness of play-based interventions for students with ASD?

Summary of Findings

A total of four HLM models were conducted to assess the effect of the following moderator variables as predictors of language development in children with ASD who participated in play-based therapy: gender, age, race, intervention setting, language/communication outcome measure, frequency of intervention, type of play therapy, and duration of therapy sessions. Three of the nine moderator variables,

frequency of intervention, type of play therapy, and duration of therapy session, yielded significant results as predictors of the effectiveness of play. Additionally, significant results were reported across all phases. Mean-effect size estimates of the moderator variables and individual participants were computed using Tau-U (τ_U). The overall results of Tau-U indicated heterogeneity across the moderator variables reported. Examination of individual participant effect size estimates revealed that 21of the 35 children with ASD (60%) showed strong or large effect size estimates, indicating that for a majority of participants, play-based interventions produced the desired outcomes regarding language and/or communication development.

Interpretation of Findings

The results of the four HLM models, which examined a total of nine moderator variables, yielded statistical significance for three variables, including frequency of intervention sessions ($p = .004$), type of play therapy ($p = .002$), and duration of intervention session ($p = .001$), as predictors of language development in children with ASD who participate in play-based interventions or therapy. In addition to the group effects estimated by HLM, individual effect size estimates were calculated using Tau-U to best determine which of the variables are considered most effective across the studies utilized in this research. Tau-U estimation values ranging from .93 to 1 are considered strong, from .66 to .92 are large, and below .65 are weak (Bruni et al., 2017).

The effect size estimate computed for the moderator variable, frequency of intervention, indicates that a minimum of two intervention sessions per week ($\tau_{U} = .98$) is a strong effect size estimate, while the other frequency variables, weekly and two times or more per month, were estimated to be weak. The effect size estimates computed for

type of play therapy, indicate adult modeling (τ_U = .98) to have a strong effect, compared to child-centered and mixed methods, both estimated to be weak. In reference to duration of the intervention or therapy sessions, Tau-U estimates revealed both variables to have a marginally weak effect, 20 to 40 minutes (τ_U = .65) and 40 to 60 minutes (τ_U = .65). Although the estimates for duration are not considered to be strong or have a large effect, one should account for some error because the computation is an estimation based on the available data. Duration is still considered a significant predictor variable with estimated effects that provide little or no additional information or clarity regarding the length of intervention session.

Based on the existing research incorporated into the present study, and, the results of modeling using HLM and estimating effect size using Tau-U, families, educators, clinicians, and others whose goal is to support language development in young children with ASD, are provided some considerations. When selecting a play-based intervention, the following variables should be reviewed: frequency of session implementation, type of play therapy or intervention, and duration of session. More specifically, the aforementioned group of individuals might consider the following characteristics when selecting and/or implementing play-based interventions:

- interventions implemented at a minimum of two times per week
- interventions that incorporate adult modeling, prompting, and/or queuing as a central focus of practice
- duration of an intervention session that is considered meaningful for the individual child (e.g., consideration of the child's ability to attain, actively engage, and level of fatigue).

Results suggest that the proposed formula, with the above inclusion criteria based on significant and estimate effect, might in fact play a role in assisting families, educators, and clinicians in the determination of effective play-based intervention methods to support the development of language and/or communication in young children with ASD.

Context of Findings

According to Michael and Luke (2016), "play is the language of children" (p. 45). Common present-day techniques of play-based interventions or therapy, such as those presented in this study, are centered in or based on the individual child, his/her experiences, and the self, with the goal of forming relationships through reciprocal communication based on discovery (Landreth & Sweeney, 1997). Kool and Lawver (2010), noted that effective play therapy results in "a language children can comprehend and utilize" (p. 19). Play therapy's wide use is often associated with the intervention's responsiveness to the variability of needs associated with the developing child (Bratton et al., 2005), including those with ASD, whose differences in play are often attributed to deficiencies in communication skills (Morgenthal, 2015). The growing evidence of play therapy's usage remains strong for a wide range of young children, including those with ASD. According to Hillman (2018), "symptoms of individuals with ASD fall on a continuum, with some individuals showing mild symptoms and others…more severe symptoms" (p. 198). To account for the vast variability, identifying and further defining specific predictor variables, might in fact assist families, caregivers, educators, and others on the types of play therapy to implement for young children with ASD to support language development.

Results of the HLM modeling suggest that play-based interventions are considered an effective means of increasing language development in young children with ASD. Furthermore, predictor variables such as frequency of intervention sessions, type of play therapy, and duration of intervention sessions are significant predictors of language development in children with ASD who participate in play-based interventions or therapy. Frequency and duration of interventions are often associated with the intensity of a treatment plan or therapeutic method being considered. Consider the following definition of intensive intervention, which includes, "…active engagement of the child at least 25 hours per week, 12 months per year…" (American Academy of Pediatrics, 2007, as cited in Lindgren & Doobay, 2011). Based on that excerpt of the definition for intensive interventions, none of the play-based methods included in the present study would meet the requirements outlined. As noted, the results of the present study suggest frequency of approximately two times per week as a significant predictor for yielding positive outcomes, along with duration. A review of literature suggests the recommended frequency and duration of play-based intervention or therapy methods demonstrate variability regarding both the number of and length of intervention or therapy sessions.

The PLAY Project Home Consultation (PPHC) program (Solomon et al., 2007; Solomon et al., 2014) suggests a frequency of 15 hours per week and a duration of eight to 12 months. Similarly, both Barton et al. (2018) and The Floortime Center (2020) suggest daily implementation, with The Floortime Center (2020) noting increases in the number of sessions depending on the level of severity (e.g., six to ten, 30-minute sessions per day). Like the studies included for the purpose of the current research, a review of literature presents variability in both frequency and duration of intervention

implementation that is often based on the variability of skills, abilities, and characteristics representative of the child, student, or client with ASD (Van de Paelt et al., 2016) participating in the play-based intervention or therapy.

In reference to the significant predictor variable, type of play-based intervention, those which incorporated adult modeling were found to have the strongest levels of estimated effect. Based on a review of literature regarding play-based intervention methods for children with ASD, the results of the current study are consistent with those findings. Both the PPHC and the Peer Play program, with demonstrated positive effects, target social play between young children with ASD and either parents/caregivers or typically developing same-age peers (Prendeville et al; Solomon et al., 2007; Solomon et al; 2014). Additionally, parent-coached and/or modeled interventions have been noted to yield improvement in areas such as social communication, daily living, social skills, and receptive language in young children with ASD (Wetherby, 2014).

Implications of Findings

Determining evidence-based practices for young children or students representing low-incidence populations, such as ASD, has proven to be difficult due to single-case designs and the level of variability from case to case (Bylers et al., 2012). With much of the adult-facilitated, frequently implemented play therapy for young children with ASD being implemented in home or clinical settings, its use in education settings remains limited. The present research study, however, offers insights for educators, families, and others, regarding significant predictor variables such as frequency, duration, and type of play therapy for supporting language development in young children with ASD who participate in play-based interventions. For example, an educational leader might begin to

determine the feasibility of offering play-based interventions multiple times each week in an early childhood or primary setting for students with ASD. Additionally, the educational setting provides considerable opportunity for developing personal knowledge of children. Awareness of a child's capabilities, stamina, and interests could be integrated into decisions regarding the when and how play is to be implemented. Such information could be shared with parents in order to contribute to the development of a stronger partnership in the intervention process. This joint involvement would likely enhance benefit to the child as a greater continuum of intervention could be realized.

Limitations

The purpose of the present meta-analysis was to analyze existing research that examined the impact of play therapy on the development of language skills in young children with autism spectrum disorder (ASD). Although the study provides information regarding significant predictor variables and estimation of effects regarding the frequency, duration, type of play therapy, limitations are noted. The first limitation to consider is the participants' diagnoses of ASD. Although this was a criterion for acceptance into the study, the level of severity of ASD was not reported. Therefore, comparisons across the participants should be interpreted with caution.

A second limitation regarding additional demographic data such as socio-economic status and enrollment in other early intervention programs should be considered. Such effects might possibly impact the implementation of the intervention and account for areas of progress unrelated to the play interventions examined.

A third limitation, also regarding demographic data, is the 23 of 35 participants who did not report race. As a result, no decisive conclusions can be drawn regarding race.

Future Directions of Research

The current investigation provides a starting point for determining the effectiveness of play-based interventions on the language development of young children with ASD, but further research is warranted to increase the significance and understanding of the computed results and their impacts on the decision-making of educational leaders. In reference to play-based interventions, the narrow scope of research regarding its effectiveness on language and/or communication development proved to be limited. Throughout the investigation, however, multiple relevant studies were identified with aggregate data to support future development of this topic. Further exploration on combining data from single-case and/or small sample research studies with aggregate data could increase usefulness, applicability, and generalizability of this research topic.

Play-based interventions were selected due to their unnatural association with ASD along with the researcher's own personal and professional interests. As noted in the current investigation, Applied Behavior Analysis (ABA) therapy and its various modalities are considered the gold standard for early, intensive intervention for children with ASD. In addition to play, further meta-analyses regarding ABA therapy, sensory supports, speech and language therapy, academic instruction methods, and other interventions, programs, and other commonly implemented practices for children with ASD could be explored using HLM. This would provide a more detailed and wholistic approach to understanding and benefitting children with ASD. A more intensive investigation is not suggested to negate what is has already been established as gold standard, but rather a means to enhance effectiveness. Settling for what is currently

available short-changes what other possibilities can be utilized in order that children with ASD could more optimally achieve their potential.

Identifying significant predictor variables on a specified outcome measure, like play-based interventions on language development, could be utilized in future research in educational, clinical, and home settings. Seeking to understand the outcomes and their applicability in real-world settings, could further support the generalizability of the results gathered and provide information that is essential to those most intimately involved in facilitating the development of those with ASD. This can become a significant piece for a child's completed puzzle.

Conclusion

This study, a hierarchically-modeled meta-analysis based on single-case and small sample design studies, revealed that play-based interventions are considered an effective intervention to support language development in young children with ASD. Additionally, results of the study yielded frequency, duration, and type of play-based intervention as significant predictors of language development for young children with ASD who participate in play-based interventions. The information gathered is useful not only for educational leaders in determining student programming and/or supports, but for families/caregivers, clinicians, and others whose work is centered around improving outcomes for children with ASD. An outcome based on purposeful and intentional partnerships focused on the continuum of evidence-based practices for children with ASD seems likely.

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Appendix A

Participant Weighted Tau-U Estimates
**indicates a strong or large mean effect size estimate (Bruni et al., 2017)*

Moderator	Mean	Moderator	Mean
*Chad_a	1.07	Jack_a	0.43
*Chad_b	0.90	*Jack_b	0.73
*Cody_a	1.00	Jack_c	-0.14
*Cody_b	1.02	Jack_d	0.14
*Adam_a	0.77	*Patrick_a	0.75
*Adam_b	0.90	Patrick_b	-0.20
*Sam_a	0.94	*Patrick_c	0.80
*Sam_b	0.99	Patrick_d	0.50
*Ben_a	1.11	Annie_a	0.38
*Ben_b	1.10	Annie_b	0.62
*Lily_a	0.98	*Annie_c	0.69
*Lily_b	0.94	*Annie_d	0.77
John	0.54	Jasper_b	0.05
Mary_a	0.57	Jasper_c	-0.08
*Mary_b	0.84	Jasper_d	0.31
Mary_c	0.70		
*Mary_d	0.94		
*Mary_e	0.94		
Mary_f	0.14		
Mary_g	0.56		

Appendix B

Moderator Weighted Tau-U Estimates
**indicates a strong or large mean effect size estimate (Bruni et al., 2017)*

Moderator	Mean
Intervention Setting	
Education	0.65
*Home	0.98
Non-natural/Clinical	0.38
Type of Play Therapy	
Child-centered	0.65
*Adult Modeling	0.98
Mixed Methods	0.38
Assessment/Outcome Measure	
*Verbal Communication	0.70
Nonverbal Communication	0.65
*Verbal & Nonverbal Communication	0.98
Social & Emotional Skills	0.39
Frequency of Intervention	
Weekly	0.47
Two Times or More per Month	0.54
*Two Times per Week	0.98
Duration of Intervention	
20-40 Minutes	0.64
40-60 Minutes	0.65

Appendix C

Youngstown
STATE UNIVERSITY

One University Plaza, Youngstown, Ohio 44555
www.ysu.edu

November 3, 2020

Dr. Karen Larwin, Principal Investigator
Mr. Gregory Boerio, Co-investigator
Department of Teacher Education and Leadership Studies
UNIVERSITY

RE: HSRC PROTOCOL NUMBER: 016-2021
TITLE: Measuring the Effectiveness of Play-Based Therapy as an Intervention to Support the Development of Communication in Young Children with Autism Spectrum Disorder: A Meta-Analysis

Dear Dr. Larwin and Mr. Boerio:

The Institutional Review Board has reviewed the abovementioned protocol and determined that it meets the expectations of DHHS 45 CFR 46.101(b)(4) and therefore is exempt from full committee review and oversight. Your project is approved.

Any changes in your research activity should be promptly reported to the Institutional Review Board and may not be initiated without IRB approval except where necessary to eliminate hazard to human subjects. Any unanticipated problems involving risks to subjects should also be promptly reported to the IRB.

The IRB would like to extend its best wishes to you in the conduct of this study.

Sincerely,

Dr. Severine Van Slambrouck
Director Research Services, Compliance and Initiatives
Authorized Institutional Official

SVS:cc

c: Dr. Marcia Matanin, Chair
Department of Teacher Education and Educational Leadership