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Joint Attention Intervention with Assisting Parent Mediated Techniques to Increase a Toddler with Autism Spectrum Disorders' Use of Joint Attention: A Single Case Study

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Joint Attention Intervention with Assisting Parent-Mediated Techniques to

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Single Case Study

By

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Joint Attention Intervention with Assisting Parent-Mediated Techniques to Increase a Toddler with Autism Spectrum Disorders' Use of Joint Attention: A Single Case Study

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This thesis has been examined and approved by the following members of the student's committee.

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Abstract

The purpose of this single-case study was to determine whether a Joint Attention Intervention (JAI) conducted by graduate researcher, parent, and caregiver, would change the use of joint attention (JA) by a three-year-old suspected of having Autism Spectrum Disorder (ASD). The participant was a three-year-old child suspected of having ASD. Intervention was conducted twice per week for 30-45 minute duration by the student graduate researcher at a university clinic under the supervisor of Dr. Bonnie Berg, CCC-SLP. The parent and child's caregiver were trained in JAI and implemented the intervention daily in the home environment.   The author's research question was, "Will the use of a JAI parent-mediated intervention model increase the JA of a three-year-old suspected of having ASD over a bi-weekly 5 week intervention period?" Following JAI, JA use to respond to JA was inconsistent, but the child increased her ability to initiate JA acts. The child's expressive language also increased throughout the study.

Chapter 1

Introduction

Statement of the Problem

Autism is a severe developmental disability which occurs in the first three years of life. The disability involves deficits in the areas of social interaction, as well as verbal and non-verbal language (American Psychological Association, 2014). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders ("DSM-5 Diagnostic Criteria, n.d.) now categorizes autism based on three levels of severity. These levels are summarized as requiring very substantial support, requiring substantial support, and requiring support. To determine severity, a number of diagnostic criteria has been provided. This criteria includes deficits involving lack of social communication skills such as "Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication" ("DSM-5 Diagnostic Criteria, n.d.). Prior to this change, the entirety of the autism spectrum was labeled Autism Spectrum Disorders (ASD).

Children with ASD are falling behind their peers without the correct social gestures and communication to appropriately interact with others. Early intervention has been shown to positively benefit children with ASD and their families in many aspects of their lives. A promising early intervention strategy is

joint attention intervention (JAI), which teaches children with ASD how to initiate and respond to joint attention bids. Joint attention (JA) is the "…simultaneous engagement of two or more individuals in mental focus on the same external thing" (Murray et al., 2008, p. 5). Two important components of JA are initiation and response. Initiation is the initiation of a communication act, like eye contact, or declarative pointing. The responding component of JA is when the communication partner responds to this initiation and also attends to the entity. Murray et al. (2008) state that only an act with includes both initiation and response of JA is constituted as a JA act (p. 5). Joint Attention Intervention (JAI) is an intervention which teaches children how to initiate and respond to JA. For example, when a mother points to a plane in the sky, she looks at the plane and points. The mother's eye gaze and pointing gesture's make up the initiation component of JA. Following initiation, a typically developing child will then follow the mother's eye gaze and point by shifting their eye gaze towards the plane. This eye gaze is the response component of JA. This example shows a successful JA interaction. Kasari, Paparella, Freeman, and Jahromi (2008), discussed how teaching children with ASD to respond to JA bids is easier than teaching initiation of JA. They discussed, however, that children with ASD fail to initiate and respond to JA bids without intervention (Kasari, et al., 2008). Johnston (2007) echoed this by explaining the need for intervention in both the initiation and responding components of JA (2007).

There are several studies demonstrating success in teaching initiation and responding components of JA and using parent-mediated models as an interaction

method (Roberts & Dissanayake, 2013; Schertz & Odom, 2007; Kasari, Gulsrud, Wong, Kwon & Locke, 2010). Parent-mediated models involve the child's parent(s) and/or guardian(s) providing therapy at home similar to the therapy provided by the professional.   Roberts and Dissanayake (2013) stated, "Parent-mediated intervention potentially provides parents with the knowledge and skills to persist with engaging their children with ASD at a young age and facilitate the development of social communication skills including language" (p. 2480). Roberts and Dissanayake (2013) discussed that all interventions should involve a collaborative approach so the strategies implemented in therapy can concurrently be applied in the child's natural setting. In addition, they stated that the therapy strategies will be most effective when integrated in to the child's daily routines. Therapists, teachers, parents, siblings, and guardians should all be using similar therapy techniques to provide the most efficient and effective service to the child. Training of others can be accomplished through training sessions, informative handouts, and regular meetings. When everyone closest to the child is implementing consistent intervention strategies there is less confusion for the child and, in theory, better outcomes.

The research revealed it is imperative children with or suspected of having ASD are taught how to properly initiate and respond to JA in the therapy setting as well as in their home environment (Schertz & Odom, 2007; Kasari et al., 2010). Without such interventions, the impairments linked with ASD can cause substantial challenges for children with ASD and their families.

Professors in the fields of psychology and speech-language pathology are encouraging professionals to study the use of effective interventions for children with ASD. Increasing amounts of research in the area of JA and JAI for children with ASD have been conducted. With more attention on this area, professionals are calling for more studies to determine the effectiveness of JA interventions. Specifically, Lawton and Kasari (2012) emphasize the need for efficacy studies on the quality and quantity of JA intervention. Kasari et al., (2010) also stated the need for future attention in the area of caregiver mediated JA approaches, considering it is a newer area of research and cost-effective (p. 1054). Johnston (2007) explained that JAI is an important area of research as "Joint attention plays a critical role in both social and language development and is often absent or impaired in children with autism" (p. 190).

Purpose

The purpose of this single-case study was to determine whether a Joint Attention Intervention (JAI) conducted by both a graduate researcher, parent, and caregiver, would change the use of joint attention (JA) by a three-year-old suspected of having Autism Spectrum Disorder (ASD).

Research Question

Will the use of a JAI parent-mediated intervention model increase the JA of a three-year-old suspected with ASD over a bi-weekly 5 week intervention period?

Hypothesis

The use of a JAI parent-mediated model will increase the JA of a three-year-old suspected of having ASD.

How Findings Will Be Used

Findings will be used to demonstrate the possibility of improvement or gain in the child's use of JA use through JAI with other appropriate individuals, and to encourage additional research in the efficacy of this treatment.

Chapter 2

Review of Literature

Autism Spectrum Disorders

Autism Spectrum Disorder (ASD) is ever changing and becomes more prominent yearly. "Early large-scale studies of clinical and community samples estimated ASD prevalence from 1 in 330 children to 1 in 90, with an accepted average of approximately 1 in 167. The most current estimate was 1 in 88 children" (Sullivan, 2013, p. 299). The prevalence and rate of ASD growth is astonishing to many researchers. It is important to consider the diversity amongst individuals with ASD. As Poon, Watson, Baranek and Poe (2012) echo, "The course of development varies considerably among individuals with ASD" (p. 1064). With vast varieties in characteristics and developmental progression, ASD is a particularly challenging population to study

ASD is a neurodevelopmental disorder characterized by impairment in social interaction, verbal and non-verbal communication, as well as a restricted repertoire of activities and interests (Kaale, Smith, & Sponheim, 2012; Sullivan, 2013). Swanson, Serlin, and Siller (2013) reported this disorder likely involves multiple genes interacting with one another versus a chromosomal abnormality of a single gene (p. 707). Swanson et al. (2013) discussed common traits in individuals with ASD which include the following characteristics: increased brain volume, language delay or impairment, impaired facial expression identification, deficits in executive function (problem solving, regulation, etc.), and deficits in social cognitive skills (understanding the thoughts of others) (p. 707). These

characteristics, and the lack of social communication and interaction knowledge, severely affect the quality of a person's life with ASD.

Joint Attention

Joint attention (JA) is the "simultaneous engagement of two or more individuals in mental focus on the same external thing" (Murray et al., 2008, p5). Murray et al. also described JA as being more complex than just two people attending to the same object. During a JA episode, there is knowledge that another person is concurrently attending to the same object as you. JA has been divided into initiation and responding components. Initiation is the initiation of a communication act, like eye contact, or declarative pointing. The responding component of JA occurs when the communication partner responds to the initiation bid while attending to the entity. Both of these components need to be observed during JA (Murray et al., 2008). Joint Attention Intervention (JAI), is an intervention used to teach children how to initiate and respond to JA (Johnston, 2007).

Joint Attention in Children with ASD

Children with ASD demonstrate a lack in use of JA. This lack in JA use can be used as one of the first indicators of ASD in children under one year of age. Murray et al., (2008) found the following:

Children with ASD produce fewer gaze switches of visual attention than do children with other types of developmental delays and children who are typically developing. Some of these differences between children with

autism and other children with developmental delays were clear by the

end of infancy. (p. 6)

The goal of JA is to gain social attention. Taylor and Hoch (2008) discussed how

JA is less about receiving a desired item, but rather about sharing a social

experience with another individual. Children with ASD are less motivated by

social experiences than typically developing peers; therefore, the reward for

successful JA is less or even non-existent for children with ASD. Without any

reward or motivation, children with ASD rarely participate in this social

experience.

Additionally, Watson, Crais, Baranek, Dykstra, and Wilson (2013)

studied home videos. Results revealed that children with ASD use JA less than

children with other developmental delays (e.g., Down's Syndrome) as well as

typically developing children at ages 9-12 months and 15-18 months in home

environments (Watson et al., 2013). Children with ASD seem to be content

without being "jointly engaged" which can be worrisome for many parents

(Kasari, et al., 2010, p. 1045).

Joint Attention and Language Development

According to Poon, et al. (2012), early JA, imitation, and object play lead

to later language and cognitive development. JA is thought to be a precursor for

language. In longitudinal research, Schertz, Reichow, Tan, Vaiouli, and Yildirim

(2012) found two factors which predicted rates of later language growth:

toddlers' ability to respond to others' bids for JA and parents' responsiveness to

children (p. 168). Kasari, et al. (2010), stated, "Studies of both typically

developing children and children with autism find that children who engage the caregiver in sharing communication [JA] acquire language faster" (p. 1046). Murray et al. (2008) stated a relationship between JA and language is evident in both children with ASD and typically developing children. "Early eye gaze behavior (visual coordination, visual joint attention) is theorized to have an early primal role in social language" (Murray et al., 2008, p. 7). With research supporting the notion that gestures, including JA, are a precursor to language, many researchers have also studied the idea of focusing their interventions on gestures to increase language.

Kasari, et al. (2008) added to this concept by stating, "When children follow a speaker's line of vision, the speaker often labels an object or event that is the focus of attention" (p. 125). When a typically developing child follows their guardian's line of vision or point, and subsequently hears the label for the object or event, they are taught the word's relationship to the object. Children with ASD are missing an enormous amount of language and labels when they fail to respond to JA bids.

Futhermore, Kwisthout, Vogt, Haselager, and Dijkstra (2008) researched JA and language evolution. The study looked at using advanced JA techniques with simultaneous language games to assess the relationship. Advanced JA differs from the previously defined "joint attention" in that it contains three components rather than two (initiating and responding). These three components are labeled checking, following attention, and directing attention. The operational definitions are as follows, "Checking attention involves a natural

sharing of attention without a clear initiator, following attention involves the caregiver directing the attention of the infant to an object, and directing attention involves the infant directing the attention of the caregiver to an object" (Kwisthout, et al., 2008, p. 155).

To begin their argument that JA is "coevolutionary" to language, Kwisthout, et al. (2008) stated that the first JA act normally occurs in close temporal relation to the child's first word. Additionally, studies have shown a strong correlation between the use of JA between 9 and 18 months of age and the children's performance on language development tests at 24 months. Kwisthout et al., (2008) explained that individuals use associative learning to learn a specific word or label. When first taught a label or a word, children have to hypothesize what the word is associated with in order to accurately identify an object or activity. For example, if a mother points to an airplane in the sky and states "plane" for the first time, the child will need to hypothesize whether she is talking about the sky, how high the plane is, a cloud, or an actual plane. Kwisthout et al. (2008) discussed that this accurate association is achieved by applying the previously learned label to the same specific item/activity over varying situations, multiple times. They state, "A word's meaning tends to co-occur with that word, and the learning mechanism eventually boils out all competing hypotheses" (Kwisthout et al., 2008, p. 160).

Kwisthout et al. (2008) tested this theory by using a computer program containing a "speaker" and a "hearer" to identify if a shared lexicon was stimulated through the JA process (a vocabulary both parties understand). The

researchers used "various joint attentional mechanisms to construct the context from which the hearers acquire the word-meaning mappings" (p. 161). The authors wanted to identify what particular aspects of JA are the most useful in developing accurate associations, and therefore the aspect(s) which is/are most crucial in language development. The results revealed that the "checking" aspect of JA was the most crucial in developing accurate language associations. Checking is described as "a natural sharing of attention without a clear initiator" (p. 155), as well as an interaction occurring without any verbal output, lending both individuals to share the experience simultaneously (Kwisthout et al., 2008). Additionally, checking attention allows children to hypothesize less after the adult labels the object. The following attention component of JA was also deemed as important in learning associations. In contrast to checking attention, following attention occurs when agent A looks at an object and labels it prior to agent B looking. Therefore, agent B is following agent A's attention.   Overall, checking attention is the most effective and efficient way for children to accurately learn labels, while using the least amount of guessing. In conclusion, the "hearer" learns words and language best when the JA components checking and following attention are used.

The findings of Kwisthout et al. (2008) are consistent with additional studies in identifying a strong link between JA and language development (Colonnesi, Staams, Koster, & Noom, 2010; Kasari, et al., 2008). This link is further supported when researchers look at the "word-spurt," between 18-24 months, which concurrently corresponds with developmentally mastering all

three components of JA.   Overall, this study shows the strong relationship between the development of JA skills and language (Kwisthout, et al., 2008).

An additional component of JA is the pointing gesture. Colonnesi et al.,(2010) discussed the pointing gesture and its relationship to language development in a systematic review comprised of 25 studies. All 25 studies looked at the pointing gesture and its relation to language acquisition. Colonnesi et al. (2010) stated that although the word infancy, in its literal definition, means "unable to speak" (p. 353), we now know infants learn to communicate by gesturing, and specifically pointing. For purposes of this systematic review, the operational definition of pointing is "the extension of the hand and the index finger toward a specific object or event" (p. 353). Ultimately, the authors were interested to see if the pointing gesture not only precedes language, but whether it contributes to it.

Colonnesi et al. (2010) described how communicative pointing gestures occur at approximately 12 months of age. Additionally, it is argued that children who are more attentive and sensitive to others' communicative gestures, like pointing, the quicker the acquisition of vocabulary (p. 354).   The socio-cognitive approach views the pointing gesture as intentional communication for the purpose of directing the attention of the recipient toward a specific object or event. Colonnesi et al. (2010) explain the two main motives for the use of gestures: imperative and declarative. The imperative motive is to control the behavior of the listener, which could be to obtain a desired object. Alternatively,

the declarative motive is used to obtain the listener's attention (Colonnesi et al., 2010).

In the systematic review Colonnesi et al. (2010), investigated the relationship between pointing as a gesture and language within the last thirty years of research. Their goal was to "examine how strong the relationship is between pointing and language, and to examine which factors moderate this relation" (p. 355). Included in the systematic review were studies which looked at both a concurrent and a longitudinal relationship between pointing and language development at the same time. This search, amongst other defining factors, yielded 25 studies between the years of 1978 and 2009 involving 734 children.

Colonnesi et al. (2010) separated their results into two sections: "the concurrent relation between pointing and language" and "the longitudinal relation between pointing and language" (p. 258). There were 12 concurrent studies including 319 children. Results showed a combined effect size of $r = .52$ ($p < .001$) which indicates pointing was strongly related to language development. There were 18 longitudinal studies including 580 children.   Alternatively, results revealed a combined effect size of $r = .35$ ($p < .001$) which is medium-to-large. This indicated that pointing was also strongly related to language development. ANOVA analysis (statistic tool for comparing two sets of independent data sets) revealed declarative and general pointing were significantly and strongly related to language development ($r = .39$), whereas imperative pointing was not significantly related to language development ($r = .04$).

From this, Colonnesi et al. (2010) concluded both longitudinal and concurrent relations exist between joint-attentional pointing and language. The authors stated, "The concurrent relation provides evidence that the pointing gesture is a way to communicate that integrates and supports language" (p. 361). In addition, the results indicated that the more children use and understand the point gesture at a younger age, the higher their language ability will be later in life (Colonnesi et al., 2010). There also seemed to be an association between age and pointing. Colonnesi et al. 2010 found the strongest association between pointing and language to be between 15 and 20 months, but specified that associations were found at ages as young as 10-11 months. Another area the authors researched were the comprehension and production of pointing. The authors found that both comprehending and producing the pointing gesture yielded similar strong relations with language development (Colonnesi et al., 2010, p. 361).

Researchers have revealed JA and language development have both longitudinal and concurrent relationships. The results from multiple studies indicate JA and language development have a causal relationship and may develop concurrently. This led researchers to question how JAI can be utilized to improve children's language abilities.

Intervention Strategies

Many studies reported intervention strategies to aid in the language development of children with ASD (Kasari, et al., 2010; Schertz et al., 2012; Jones & Carr, 2004). Considering gestures and JA are a precursor to language,

many have theorized gesture intervention will aid in the development of language (Colonnesi et al., 2010; Jones & Carr, 2004). These interventions would be suspected to lend to language acquisition in the long-term and reduce frustration in children with ASD by giving them gestures as another form of communication in the short-term. Schertz et al. (2012) reminded us that gesture intervention is a prelinguistic intervention and therefore may not be appropriate for adolescents with ASD.

Parent-implemented intervention has been found to be successful for young children with ASD. Kasari, et al., (2010) looked at intervention strategies involving caregivers and found success. Teaching parents to use JA with their children is a naturalistic approach to teaching how gestures are used in everyday situations. Kasari, et al. (2010) hypothesized that when JA is taught to children in a behaviorist, clinician directed method, JA may not generalize to everyday life due to the unnaturalness of the intervention. Rather, they pointed out that teaching parents how to use JA interventions in natural play routines may have a better and more natural outcome. Kasari, et al. (2010) reported that random control trial studies with parent-implemented JA intervention conducted in the UK showed positive results in the treatment group. The control group, using parent-implemented JA intervention, exhibited significant outcomes in social communication (Aldred, Green & Adams, 2004; Drew, et al., 2002). Kasari, et al. (2010), conducted their own study on parent-implemented JA intervention. Findings indicated that children participating in the intervention increased their

JA skills and maintained those skills through the 1-year follow-up, while the control group made little change in their JA behaviors (Kasari, et al., 2010).

Schertz et al. (2012), conducted a systematic review on many different interventions for toddlers with ASD and found that JA interventions were a popular area of study. The JA interventions varied in settings and personnel providing intervention. Schertz et al. (2012) stated that multiple intervention strategies were used simultaneously. Many of the studies focused on parent-implementation at home, while others looked at professional implementation in a clinic. The interventions also ranged in time per week, 1.5 hours-10 hours, and duration of intervention, two weeks-one year. The following intervention strategies were used: discrete trial training, child directed strategies, pivotal response training, visual supports, prompting, and routines based interventions. After reviewing these studies, Schertz et al. (2012) concluded that JA interventions revealed positive outcomes for toddlers with ASD. The studies reviewed showed improvement in the language for children at high risk or diagnosed with ASD; however, the authors agreed that more studies are needed to analyze the benefits of specific intervention styles. Additionally, Schertz et al. (2012) state, "…the actual effects of joint attention intervention on language and social outcomes has not been adequately tested" (p. 182).

Jones and Carr (2004), identified many types of interventions used to engage and encourage JA in children with ASD. They discussed the specifics of JA and reiterated the unique deficits children with ASD have with JA behavior. The authors echoed other researchers in stating how children with ASD show

deficits in both initiating and responding components of JA (p. 15). Additionally, they added that as children with ASD age into middle childhood, their ability to *respond* to JA increases, but *initiating* JA is still a challenge. Jones and Carr (2004) stated that JAI should be studied as an early intervention option.

In using JA as an intervention for children with ASD, Jones and Carr (2004), highlighted the importance of motivation. Considering children with ASD are less motivated by social interactions than other children, motivation can be a challenge. The authors suggested using "motivation enhancing variables in intervention" to decrease unwanted behaviors and encourage faster skill acquisition along with generalization (p. 17). More specifically, they discussed how important it is for children to be motivated by the adult teaching JA. In order for this to occur, the adult first needs to be paired with "a variety of the child's most preferred reinforcers, such as foods and activities" (p. 21). In doing this, the child will associate the adult with positive ideas and therefore the adult, without other reinforcers, becomes reinforcing.

Jones and Carr (2004) discussed past studies in order to find the most effective and efficient way to teach children with ASD to use and respond to JA. They explored a study by Landry and Loveland (1989), which investigated how three different social contexts influenced JA in children with ASD. The first social context was *adult-directed* and involved the adult controlling interactions as well as making specific responses from the child obligatory. Next, Landry and Loveland (1989) studied the second social context, *request,* in which the adult withheld a motivating object until the child made a request using language or

gesture. The third social context studied was, *spontaneous*, where the interactions were child directed. After studying these three social contexts, Landry and Loveland (1989), found only modest increases in JA from these children. From this study, amongst many other studies which only slight and simple manipulations were made to the child's environment, Jones and Carr concluded that JA abilities in the children were only "modestly improved" (2004, p. 17).

In recent years, research has focused on specific JAIs (Jones & Carr, 2004). The first specific technique discussed was Prelinguistic Mileu Teaching (PMT). This strategy "employs naturalistic teaching procedures" and "is characterized by arranging the environment to elicit desired responses, teaching within social routines, and ongoing interactions, following the child's lead, and using specific prompts and models" (p. 19). In using PMT, intervention was focused on child directed strategies; therefore adding natural motivation. PMT is a general teaching strategy rather than a specific intervention or technique and can be modified while implementing JAI. Within this technique, modeling and commenting are used to elicit the desired responses from children. PMT studies, which focused on the adults commenting and initiating JA, have shown significant improvement in this area for children with ASD. However, the authors stated that using this method to teach responding to JA has not been studied.

The use of Pivotal Skills Procedures (PSP), including providing the child choice or preference, using natural consequences, and interspersing maintenance

activities, has been shown to increase the child's motivation (Jones & Carr, 2004). Additionally, when PSP is utilized child engagement is reinforced (p. 21).

Jones and Carr (2004) suggested using items in therapy that are naturally motivating to the child. This could include favorite toys, activities, and/or foods.

Furthermore, allowing the child to choose the toys or activities they desire can increase motivation and their attention span. Using novel objects and objects with salience (include sensory stimulation) appear to be beneficial strategies.

Jones and Carr (2004) explained how using natural consequences increases a child's motivation. For example, if the child points to a book on a shelf, the natural consequence would be to take the book off the shelf, label the item "book" and hand the book to the child. Here, the motivation for the child could be simply holding the book, looking at the pictures or flipping through the pages.

Lastly, the Jones and Carr (2004) stated that interspersing easy activities within the harder activities encourages success for the child, and in turn is motivating.

Overall, the authors found that when teaching JA, the child's motivation level is crucial to success. There are many diverse and unique ways to accomplish this motivation for each unique child (Jones & Carr, 2004).

Taylor and Hoch (2008) used a multiple baseline design to study whether prompting and social reinforcement affects the participant's ability to respond to and initiate bids for JA (p. 377). They worked with three young children with ASD who all displayed language and socialization deficits. These children did not initiate JA bids and inconsistently responded to an adult's bid for JA.

Strategies used during the sessions included novel items, sabotage, and items

placed in unusual locations to encourage the children's interest and motivation.

One instructor consistently worked one-on-one with three children. Once in the

therapy room, the instructor would wait for the child to make a JA bid. This

process continued throughout the session. If the child did not make a bid toward

any of the six items displayed, the instructor would initiate JA with an item not

yet referenced by herself or the child. To instruct responding to JA, the instructor

would point at an item, label it, and then use a hierarchy of prompting to

encourage the child's appropriate response. Taylor and Hoch (2008), described

this process in the following quote:

> The instructor initiated a bid for joint attention…then used least-to-most
>
> prompting to prompt the participant to look in the direction of the point,
>
> to make a comment about the item, and to look back at the instructor. If
>
> the participant did not respond to the bid within 5 [seconds], the instructor
>
> first provided a gestural prompt (i.e., pointed in an exaggerated manner
>
> from the participant's visual orientation to the item). If the participant still
>
> did not look in the direction of the item within 2 [seconds], the instructor
>
> physically guided the participant to turn his or her head toward the item.
>
> (p. 381)

The instructor continued therapy by teaching the child how to look back at the

instructor's eyes after looking towards the intended item. The prompting

hierarchy was used for this target as well. Following corrected JA, the children

were rewarded with verbal praise and natural consequences. There were many

activities and techniques used throughout a session to encourage the children's

use of initiation and response components of JA. These included using close

proximity of item and child to encourage initiation of JA, index cards with

prompts for the older child (age 8) who did not respond to initial prompts, novel

setting, least-to-most and most-to-least prompting, as well as hand-over-hand

prompting (Taylor & Hoch, 2008).

      Results revealed that all participants increased their responding

components of JA from 62%, 88%, and 72% of the time to 100% of the time

(Taylor & Hoch, 2008). All participants increased their commenting about the

target item from 38%, 35%, and 3% of the time to 100% of the time.

Additionally, all participants increased their percentage of looking back at the

instructor, following JA bid, from 4%, 15%, and 11% to 100% of the time during

at least one session.   All participants increased their initiation of JA bids from

the baseline of 0, 1, and 0 to 6, 5, and 4 respectively during post-testing (p. 383).

Taylor and Hoch (2008) discussed how their research echoes others studies which

show that some JA components emerge in children without intervention, but

more complex or socially governed responses may need direct intervention (p.

388).   They concluded that some children respond to certain techniques better

than others; this shows the need for personalization of therapy for each child

depending on their specific needs. The authors discussed how teaching children

to respond to JA bids does not result in them learning how to initiate bids; this

may have to be explicitly taught.   Additionally, knowing whether the children's

JA bids were reinforced and maintained by social attention or the tangible

reinforcer is unknown. Taylor and Hoch (2008) asked future researchers to

explore this phenomenon. Overall, this study, along with a growing body of

literature, found that teaching JA to children with ASD is possible and can be

successful (Jones and Carr, 2004; Schertz et al., 2012). Taylor and Hoch (2008)

stated JAI could open the door to "interactive communication and shared social

experience" (p. 390).

Chapter 3

Methodology

Purpose

The purpose of this single-case study was to determine whether a Joint Attention Intervention (JAI) conducted by both a graduate researcher, parent, and caregiver, would change the use of joint attention (JA) by a three-year-old suspected of having Autism Spectrum Disorder (ASD).

Research Question

Will the use of a JAI parent-mediated intervention model increase the JA of a three-year-old suspected of having ASD over a bi-weekly 5 week intervention period?

Hypothesis

The use of a JAI parent-mediated model will increase the JA of a three-year-old suspected of having ASD.

Definitions

Joint attention (JA) is the "simultaneous engagement of two or more individuals in mental focus on the same external thing" (Murray et al., 2008, p. 5).

Joint Attention Intervention (JAI) is an intervention used by clinicians to stimulate children to initiate and respond to JA.

Internal Review Board (IRB) Procedures and Compliance with Ethical Standards

Prior to the study, the proposal was submitted to the Minnesota State University-Mankato (MNSU) IRB where it received approval. From here, the

researchers carefully examined any ethical concerns which arose before conducting any part of the study, as well as throughout the research process.

Participant

This single-case study involved a three year five month old Caucasian female suspected of having ASD. The mother noted concerns about her child's development, and stated her child's language and behaviors developed much differently than her other children. The mother also stated the child started to display characteristics typically seen in children with ASD during her first year. These characteristics included: lack of eye contact, lack of spontaneous language, fascinations with limited toys and activities, lack of interest in playing with others, and behaviors which show general frustration when unable to communicate. The mother added her child's daycare provider shared in these concerns. Although the child presented with many of these characteristics, the child was never formally diagnosed. The graduate researcher recognized the child's lack of eye contact, lack of spontaneous language, and lack of interest in playing with others during the first day of intervention.

The child's communicative environment includes her mother, older and younger sister, and caregiver. The child is closest in age with her youngest sister (2) and spends most of her time playing with her or by herself. The family's caregiver is a female in her early twenties and has been with them for over a year. The caregiver involves the children in many indoor and outdoor activities, and enjoys playing with them. Communication between the mother, caregiver and children was described by the researcher as positive and engaging. The child's

mother stated she encourages her child (3) to use her words when requesting a desired item or activity, but sometimes gives up due to the child's frustration.

Per parent report, prenatal and birth history were within normal limits. Mom reported multiple cases of otitis media which led to the child receiving P.E. tubes in February of 2012. The audiological screening revealed her hearing was within normal limits.

The participant attended therapy at a speech-language pathology clinic for two consecutive semesters prior to the study. Goals for the child during previous therapy involved increasing child's natural eye contact, spontaneous consonant-vowel (cv) and vowel-consonant (vc) utterances, and imitative one-word utterances. Her therapy thus far had not involved JAI. Background information revealed she produced a minimal amount of verbal speech which consisted of babbling or vocal approximations, such as "ba" for baby or "Uh" for cup.

Research Design

A single-case pre-test/post-test design was used. Baseline information (formal and informal data) was collected prior to therapy which served as the pre-test data. Second, the participant received (JAI) at the clinic and the parent mediated model at home. Following the five week intervention, the participant was tested a second time to collect post-test data.

Independent variable

The independent variable was the JAI provided by both the graduate researcher and parent(s)/ guardian.

Dependent variable

There were three dependent variables: (1) the amount of words the child used (2) the initiation of JA behaviors the child/caregiver used, and (3) the response of JA behaviors the child/caregiver used.

Procedures

Intervention was conducted at a speech-language pathology clinic, twice per week for approximately 30-45 minute duration. Parent-mediated intervention was concurrently conducted in the child's home daily. Intervention occurred for 5 weeks. The participant was a three-year-old child suspected of having ASD. Intervention was conducted by a graduate researcher under the supervision of a seasoned, doctorally trained SLP, twice per week, for 30-45 minute sessions.

Prior to the study, the researchers (graduate researcher and supervisor) met with the child's mother to discuss research details, fill out essential forms, and complete a case history. After receiving consent, the research team met with the child and members of the child's family to discuss all the details of the study. This time was allocated to instruct the mother and caregiver how to use JAI in their home. Training included role play, video examples, flow charts, and question/answer time. Flow charts and role play ideas were adapted from the Early Social Communication Scales (ESCS) manual (Mundy, Delgado, Block, Venezia, Hogan, & Seibert, 2003). (See Appendix A.) Role play was included to show the mother and caregiver how to initiate JA and respond to the JA bids of the child. Video examples were used to illustrate what JA looks like and how typically developing children use it. Flow charts were sent home with the

caregiver and mother to further demonstrate the initiation and response components of JA. The parent and caregiver were given blank calendars to collect their data daily. They were instructed to tally the number of times they attempted to use JA, in any capacity, with the child that day. The family and caregiver were encouraged to voice any concerns and questions with the research and process at any time.

       The first day of the study was used to achieve a baseline and is labeled pretest session 1. During pretest session 1 the caregiver and child were videotaped during child directed play in an intervention room in the speech and language clinic. The video tape was later analyzed for child and adult's use of JA. During pretest session 1 the participant was assessed using the Early Social-Communication Scales (ESCS) (Mundy et al., 2003). The ESCS included videotaped structured observation protocols designed to provide measures of individual differences in nonverbal communication skills that typically emerge in children between 8 and 30 months of age. This assessment is to be used as a research instrument as well as a clinical tool. It allows clinicians and researchers to classify children's behaviors into one of three mutually exclusive categories: joint attention behaviors, behavioral requests, and social interaction behaviors. Additionally, the behaviors are classified into initiating and responding components in each of the three behaviors categories. Toys used during assessment are: three small wind-up mechanical toys, three hand-operated toys, a balloon, a small car, comb, glasses, hat, and colorful posters. These materials were obtained from a nearby childcare center. The following behaviors were

assessed: following commands, object spectacle (toy presentation to elicit JA and behavioral requests), turn-taking, social interaction, gaze following, response to invitation, book presentation, plastic jar task (to elicit JA and social behaviors), and social imitation. Additionally, the child's parent was asked to fill out a parent questionnaire, "Ages & Stages Questionnaires®: Social-Emotional" (ASQ: SE) (Squires, Twombly, Bricker, & Potter, 2009). The ASQ: SE is described as a highly reliable, parent-completed tool with a deep, exclusive focus on children's social and emotional development. It allows clinicians and researchers to quickly pinpoint behaviors of concern and identify any need for further assessment or ongoing monitoring. In total, pretest session 1 measurements included ESCS, and a videotaped child directed play session between child and caregiver.

Pretest session 2 and intervention session 1 occurred simultaneously and included the first JAI session, while serving as the baseline, pretest session 2, for the child's JA behaviors with the graduate researcher. The ASQ: SE was an additional baseline measure. Each therapy session following the assessment used a Prelinguistic Milieu Teaching (PMT). PMT is a specific type of Milieu teaching first described by Hart and Rogers-Warren (1975). The umbrella term Milieu describes incidental and naturalistic teaching. PMT uses Milieu teaching specifically designed for children who are in the prelinguistic language period, or pre language. PMT involved techniques such as sabotage (e.g. taping dry erase markers shut, taping photos and puzzle pieces on the walls, putting interesting and novel objects out of the child's reach), following the child's lead, and using the child's current focus of interest.

To begin every intervention session the graduate researcher was positioned close to the participant at eye level to encourage interaction. Throughout the session, the graduate researcher employed aspects of JAI. This included encouraging the client to initiate JA and respond to JA bids. As Taylor and Hoch (2008) mentioned in their study, the graduate researcher used both least-to-most and most-to-least prompting depending upon the activity, child's mood, and past successes. Least-to-most prompting is described as using a minimal amount of prompting, and increasing the prompts depending on the child's success. Alternatively, most-to-least prompting is described as using a maximal amount of prompting, and decreasing the prompts depending on the child's success.

The therapy process was a learning experience for the graduate researcher. She found that teaching a child to respond to JA bids was an easier task than teaching the child to initiate JA bids. Therefore, the researcher focused on building the child's response to JA before attempting to teach the initiation component. Most-to-least prompting was used at the beginning of the therapy to encourage success. The researcher pointed at objects and named them while saying the child's name "(Name), look, ball." This process continued throughout the session with varied activities and prompting levels. The researcher also responded promptly to any type of JA the participant displayed. Any eye gaze, pointing gesture, or gesture/vocalization to direct the attention to an object or idea was recorded as a JA attempt. The researcher reinforced this behavior by vocalizing and/or gesturing to appropriately respond to the child's JA attempt.

The researcher kept data throughout the session regarding types of JA used and verbal output from the child. All data was documented to show level of prompting by the researcher. To maintain consistency, each session was video recorded and later analyzed. Specific protocols for types of JA were used to record data (See Appendix B).

One of the first sessions will be described in length to describe activities, prompting levels, and data collection methods. Prior to this session the participant had met the graduate researcher multiple times to establish rapport. The researcher determined highly motivating and preferential toys for the child by talking to the child's mother, and by trial and error during the intervention sessions. These toys were used in each intervention session. The researcher had prepared the therapy room by taping puzzle pieces, foam animals, coloring pictures, and princess characters on the wall. Additionally, the researcher placed novel and familiar items out of the child's reach. When the child walked into the therapy room, she was immediately interested in the items on the wall and pointed to a jar of foam animals. This was the first JA bid of the session. The researcher reinforced the JA initiation through using a natural consequence by labeling the item "Animals!" and handing her the jar. The researcher continued using the PMT method and followed the child's lead. The child was very interested in the foam animals, so the researcher used this interest to teach JA. The child handed the foam animal to the researcher and motioned for her to tape the animals on the wall with the other items. Prior to taping each animal, the researcher used least-to-most prompting by waiting for the child to gesture or

vocalize before taping the animal on the wall. During this process, the researcher documented each JA bid from the participant. Additionally, the researcher encouraged the child to imitate labels for each item presented. Each imitation approximation was documented as a tally. After the child imitated the label for an item, the item would be presented to the child as reinforcement. Any imitation approximation was accepted. For example, the child stated "ah ah" for "apple" and the apple was presented. The purpose of this therapy was not to encourage accurate speech, but to use a form of language to label items along with JA use. This same process continued throughout the session. To end, the researcher put animal crackers out of the child's reach. Here, the researcher encouraged the child to initiate JA by using eye gaze in order to obtain the treat. Least-to-most prompting was used for this activity. The researcher demonstrated eye gaze by looking at the child, then looking at the crackers, labeling them "cracker" and looking back. Wait-time, or allowing the child time to process the directive, was used as a strategy as well. The researcher waited after each prompt, giving the child enough time to process the instruction. If the child looked in the researcher's direction, then at the crackers, or pointed to the crackers, the child would be rewarded with a cracker.

Many techniques were used by the graduate researcher in the session. The researcher used least-to-most prompting, most-to-least prompting, PMT, positive reinforcement, sabotage, and natural consequences. Both verbal output from the child, and initiation and response components of JA were encouraged in all sessions. In the previously described session, the play area was controlled by

the researcher, lending to multiple practice opportunities. In a later session a less controlled environment to encourage a more natural experience was utilized.

A session was conducted four weeks into the program to show how therapy changed throughout the study to reflect the growth of the child's JA and language skills. In previous sessions, the researcher sang a snack song while the child ate her crackers. During this session, the child started singing the song after starting to eat her snack. The researcher followed the child's lead and sang the song with her, while encouraging social eye contact. Some toys were put out of reach, while others were left at the child's level. An activity during this session was playing with a child's medical kit. The child looked at the researcher or verbalized the need for assistance when she wanted the researcher to help with a toy or play with her. While playing with a puzzle, the researcher withheld the puzzle pieces while the child used eye gaze and/or verbalization to obtain possession of the desired object. Throughout the session, the researcher kept data on verbal imitation and JA behaviors.

Differences in the methods were evident between one of the first therapy session and one of the last. Although PMT was used throughout both, the environment was less contrived during the later session. It should be noted that the intervention was systematically changed during the later intervention sessions to best meet the child's needs. Least-to-most prompting was used more prominently during the end of the study to suit the development of the participant and to encourage continued growth.

Pretest sessions 1 and 2 were duplicated at the end of the study and are labeled posttest sessions 1 and 2. Posttest session 1 and intervention session 10 occurred simultaneously and included the last JAI session, while serving as posttest session 2, for the videotaped researcher-child JA interaction. An additional posttest measure included posttest administration of ASQ: SE (Squires et al., 2009). Posttest session 2 included the ESCS (Mundy et al., 2003), and videotaped typical play session between child and caregiver. Post-test data was taken during the last two sessions. To maintain validity of results, the researcher used the same toys for both the pre and posttest. As previously described, the ECSC is a videotaped structured observation designed to provide measures of individual differences in nonverbal communication skills that typically emerge in children between 8 and 30 months of age. The posttest for the ESCS followed the exact protocol as the pre-test. The researcher wrote the script of the pretest and used identical speech, gestures, and prompts during the post-test. The procedures for all posttest sessions 1 and 2 mirrored the procedures for pretest sessions 1 and 2. Pretest session 1 and posttest session 2 included the videoptaped typical play sessions between child and caregiver. Pretest session 2 and posttest session 1 included the videotaped researcher-child JA interaction. The information gathered from this will be discussed in the results section.

Coding

An important part of the study and data collection was coding JA behaviors. Pre and posttest informal play sessions between the caregiver and child, pre and posttest JAI sessions between the researcher and client, and one

session per week, were coded for JA behaviors. All were coded based on a rubric adapted from the ESCS manual. (See Appendix B). Joint attention behaviors were coded in both response and initiative categories. Initiating joint attention (IJA) had three sub categories organized numerically: 1. alternative eye gaze (e.g. individual looks at object, then other person or vice versa), 2. point (e.g. individual points at object), 3. show (e.g., presenting an individual with an object). Responding to joint attention (RJA) had five sub categories organized numerically: 0. no response, 1. following proximal point or eye gaze with eye gaze, 2. pointing or gesturing, 3. vocalization, 4. acknowledging object (e.g., playing with or adverting eye gaze to object). The coding took place in a quiet observation room in the speech and language clinic.

Pretest session 1 and posttest session, typical play session between child and caregiver, both the graduate researcher and an undergraduate research assistant viewed the videotape simultaneously. The undergraduate researcher helped code the data collected from all the videotaped sessions. The researchers coded the behaviors for a random 10 minute sample of the 15 minute play session. This was to avoid the introduction and closure minutes of the session. The researchers watched and listened to the interactions between the child and caregiver. When one or both of the researchers observed a JA initiation or response, the videotape would be rewound, analyzed, and an agreement of the accurate code was determined. This data collection process was determined to be the most effective and efficient through graduate and undergraduate researcher trial and error. This process throughout the entire sample. Both the pretest

session 1and posttest session 2 data for the caregiver and child were coded in the same fashion. Data will be discussed in the results section.

Pretest session 2/intervention session 1 and posttest session 1/intervention session 10 were coded the same as intervention sessions 2, 4, 6, and 8. Each week, the graduate researcher and undergraduate research assistant viewed the videotaped session simultaneously. The therapy sessions ranged from 30-45 minutes in length, and a random sample length of 6-8 minutes was used for coding.   A random sample length of 6-8 minutes was decided through trial and error. The undergraduate and graduate clinician chose to avoid the first and last 5 minutes of the sessions due to introduction and dismissal activities differing slightly from typical JAI. The researchers fast-forwarded the videotape approximately 5-15 minutes into the session and begin coding behaviors for the next 6-8 minutes. The coding would end between 6-8 minutes when an activity ended. The same coding procedure was used throughout each videotaped session. The undergraduate and graduate researchers would watch and listen to the interactions between the child and graduate researcher When one or both of the researchers observed a JA initiation or response, the videotape would be rewound, analyzed, and an agreement of the accurate code would be decided. This process would continue throughout the entire sample. Data will be discussed in the results section.

Chapter 4

Results

Definitions

Joint attention (JA) is the "simultaneous engagement of two or more individuals in mental focus on the same external thing" (Murray et al., 2008, p. 5).

Joint Attention Intervention (JAI), is an intervention used by clinicians to stimulate children to initiate and respond to JA.

Participant Background Information

The participant was a three-year-old female suspected of having ASD. Per parent report, prenatal and birth history were within normal limits. Mom reported multiple cases of otitis media which led to the child receiving P.E. tubes in February of 2012. The audiological screening revealed her hearing was within normal limits. The child lives with her mother, an older sister and younger sister. Further information regarding the child's language development is described later in the section titled the "Ages & Stages Questionnaires®: Social-Emotional" (ASQ: SE) (Squires et al., 2009). The mother noted her child started to display characteristics typically seen in children with ASD during her first year. These characteristics included: lack of eye contact, lack of spontaneous language, fascinations with limited toys and activities, lack of interest in playing with others, and behaviors which show general frustration when unable to communicate. Although the child presented with many of these characteristics, the child was never formally diagnosed. The graduate researcher recognized the

child's lack of eye contact, lack of spontaneous language, and lack of interest in playing with others during the first day of intervention.

Data

The purpose of this single-case study was to determine whether JAI conducted by both a graduate researcher, parent, and caregiver, would change the use of JA by a three-year-old suspected of having Autism Spectrum Disorder (ASD). Formal data were collected using videotaped caregiver-child pre and posttest sessions, videotaped researcher-child pre and posttest JAI sessions, and weekly videotaped child-caregiver JAI sessions. Caregiver-child, and researcher-child initiation of joint attention (IJA) and responding to joint attention (RJA) behaviors were measured and analyzed for changes in the pre and post test data, and for weekly changes. IJA and RJA components were coded and analyzed based upon a numerical scale adapted from the Early Social Communication Scales (ESCS) (Mundy et al., 2003). There are three IJA sub categories organized numerically: 1. alternative eye gaze (e.g., individual looks at object, then other person or vice versa), 2. point (e.g. individual points at object), 3. show (e.g., presenting an individual with an object) and five RJA sub categories organized numerically: 0. no response, 1. following proximal point or eye gaze with eye gaze, 2. pointing or gesturing, 3. vocalization, 4. acknowledging object (See Appendix B). Results from the caregiver-child pre and posttest interaction sessions, and researcher-child weekly sessions and pre and posttest sessions were coded to determine amount and type of JA use from the child and caregiver.

Pretest session 1 and posttest session 2 include the child and caregiver child typical play session. These sessions were coded for both IJA and RJA components. Results from the pretest session 1 and posttest session 2 revealed inconsistent results in both the child and caregivers' IJA use. The child increased her pointing IJA gesture from 0 to 9 and decreased her showing IJA behavior from 9 to 4, and her alternate eye gaze from 1 to 0. The caregiver showed no change in her alternate eye gaze IJA behavior, but increased her pointing IJA behavior from 0 to 24, and her showing IJA behavior from 11 to 18 times. Both the caregiver and child showed the most gains in pointing to initiate joint attention. The results for IJA are summarized in Figures 1 and 2.

Figure 1. Instances of IJA behaviors exhibited by both the caregiver and
child during pretest session 1 measurements as calculated by numerical
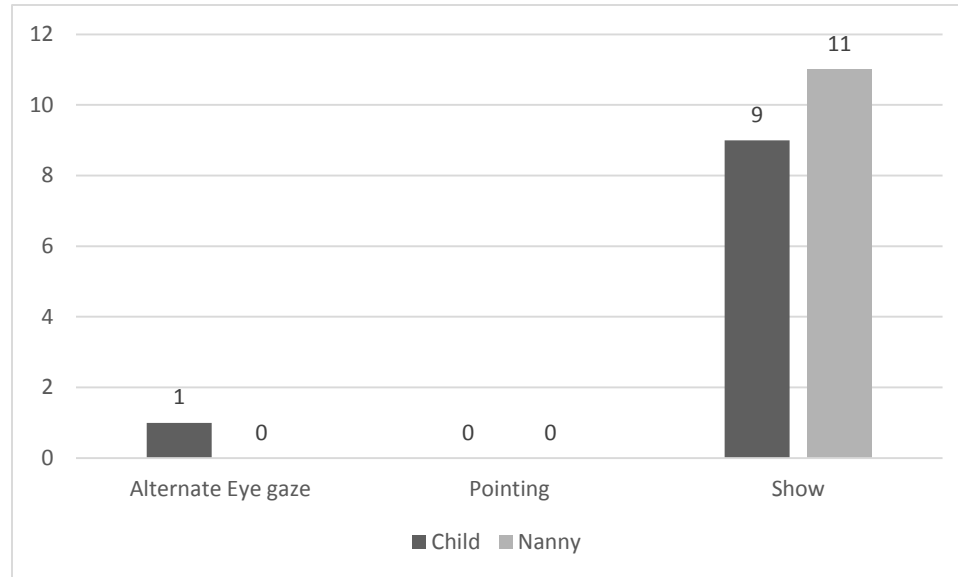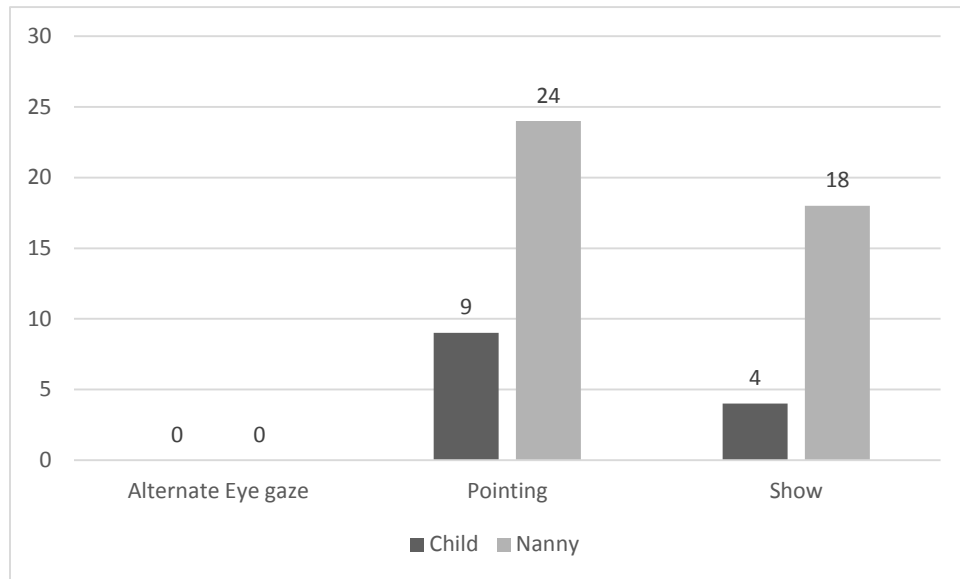coding previously described.

Figure 2. Instances of IJA behaviors exhibited by both the caregiver and child during posttest session 2 measurements as calculated by numerical coding previously described

The child and caregiver child directed play session was coded for both

IJA and RJA components. Results from the caregiver and child pre and posttests

revealed increases in both the child and caregivers' RJA use. The child

decreased her "no response" behavior from 4 to 3. She increased all other RJA

behaviors except when vocalizing to RJA which stayed consistent from pretest to

posttest. The child's greatest gains were shown in acknowledging the object and

acknowledging the object with vocalization, where each increased by 11

instances. During the pretest session 1, the only RJA behavior displayed by the

caregiver was vocalizing. The caregiver showed no response zero times in the

pretest but one time during the posttest. The caregiver displayed increases or no

change in in 5/7 RJA behaviors. The caregiver's greatest gains were found in

acknowledging the object where she increased from 0 to 7 instances. The results

for RJA are summarized in Figures 3 and 4.

Figure 3. Instances of RJA behaviors exhibited by both the caregiver and child during pretest session 1 measurements as calculated by numerical coding previously described.
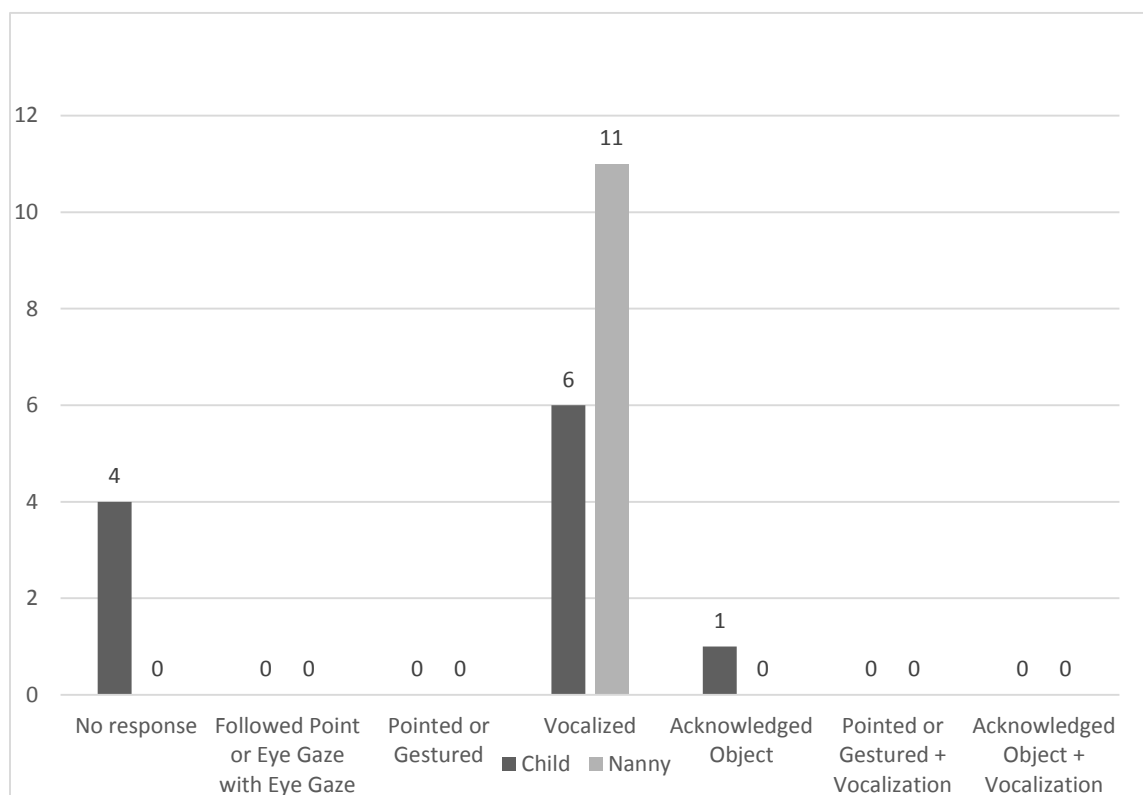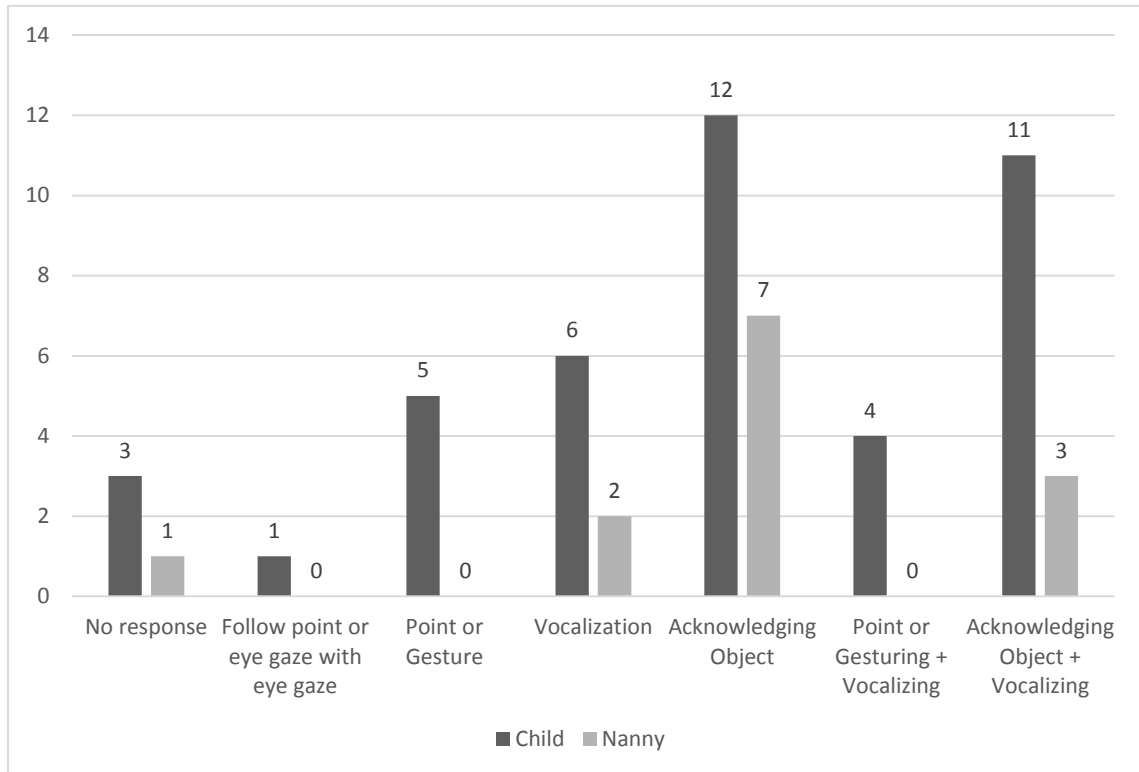
Figure 4. Instances of RJA behaviors exhibited by both the caregiver and
child during posttest session 2 measurements as calculated by numerical
coding previously described.

Next, pretest session 2 and posttest session 1 data were collected to display the child's IJA and RJA behavior changes throughout the study. Data represented in Figure 5 displays growth in all IJA components from pretest session 2 to posttest session 1. Data represented in Figure 6 shows a decrease in 4/7 categories. During pretest session 2, the child was less likely to produce IJA behaviors; therefore, the researcher had to initiate more JA behaviors. This allowed the child more opportunities to respond during the pretest versus the posttest. Results for IJA and RJA behaviors during pretest session 2 and posttest session 1 are summarized in Figures 5 and 6.

Figure 5. Instances of IJA behaviors displayed by the child during JAI

pretest session 2 and posttest session 1.
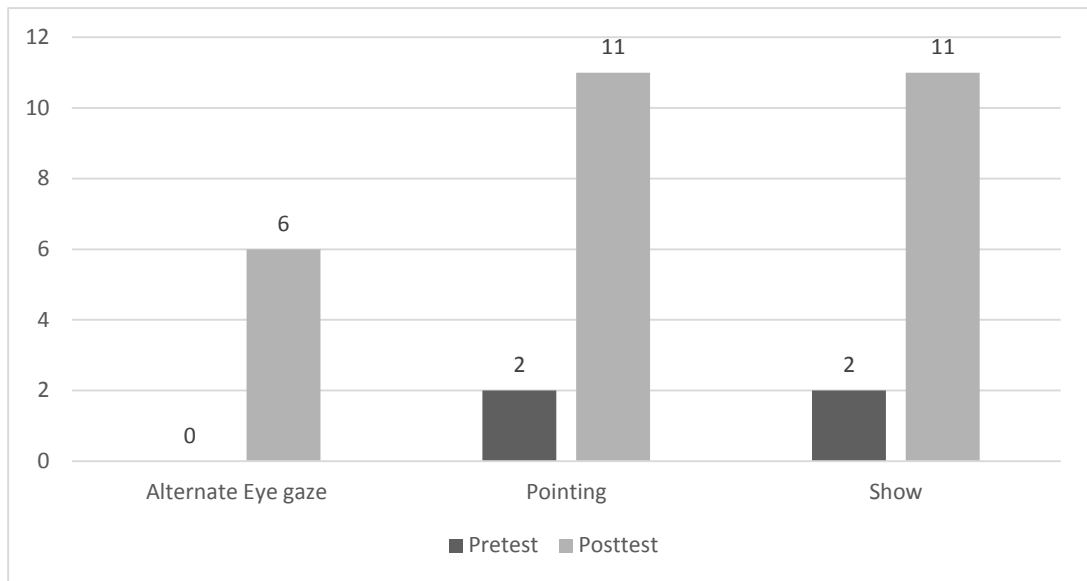
Figure 6. Instances of RJA behaviors displayed by the child during JAI

pretest session 2 and posttest session 1.
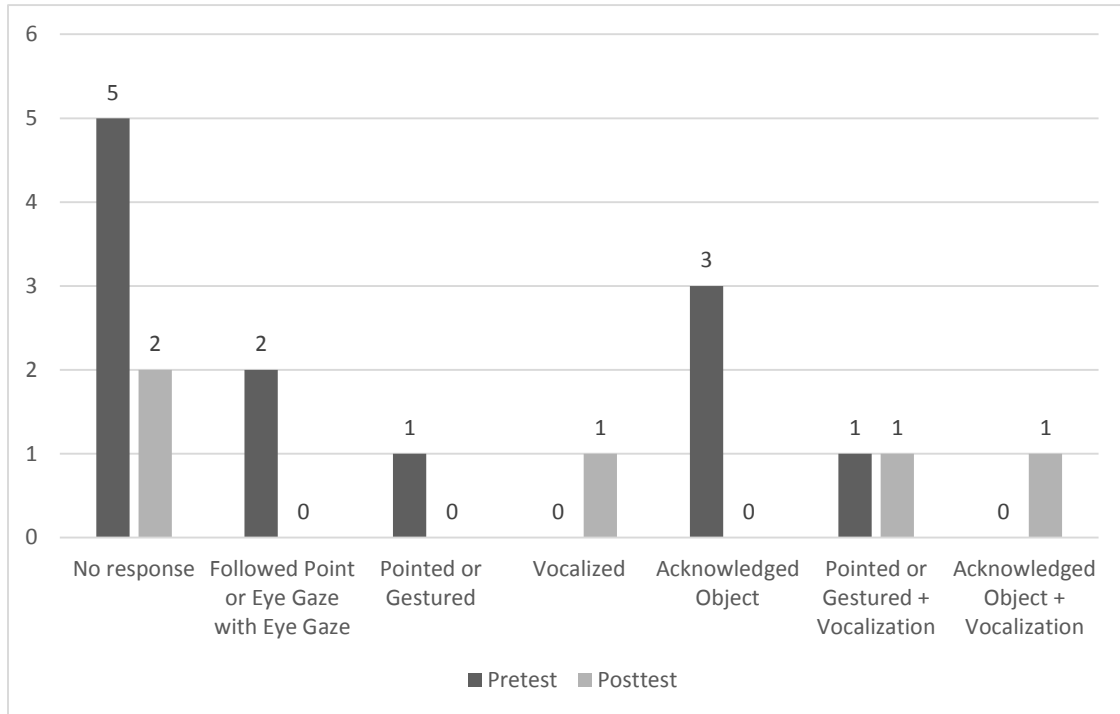
       The RJA and IJA behaviors were gathered weekly during intervention

sessions (IS) 1, 2, 4, 6, 8, and 10 and are summarized in Tables 1 and 2. Prestest

session 2 (PrT 2) and posttest session 1 (PoT 1) were also included as they

occurred simultaneously with the first and last intervention sessions. Data from

Table 1 was gathered from coded video samples. As with Figures 5 and 6, the

child showed consistent improvement in IJA throughout the duration of the study.

Alternatively, the child had no consistent pattern in RJA. In order for the child to

respond to joint attention, the researcher would first have to initiate. The

researcher focused more on encouraging the IJA behaviors from the child, hence,

the lack of growth in RJA components.

Table 1. Amount of RJA behaviors displayed by the child throughout the study.

Type of RJA	PrT 2/ IS 1	IS 2	IS 4	IS 6	IS 8	PoT 1/ IS 10
No response	5	3	1	5	2	2
Followed Point or Eye Gaze with Eye Gaze	2	0	1	0	0	0
Pointed or Gestured	1	0	0	0	0	0
Vocalized	0	7	0	2	0	1
Acknowledged Object	3	0	0	0	0	0
Pointed or Gestured + Vocalization	1	1	1	0	1	1
Acknowledged Object + Vocalization	0	0	2	1	0	1

Table 2. Amount of IJA behaviors displayed by the child throughout the study.

Type of IJA	PrT/ IS 1	IS 2	IS 4	IS 6	IS 8	PoT 1/ IS 10
Alternate-Eye gaze	0	1	1	0	0	6
Pointing	2	6	4	3	6	11
Show	2	0	4	7	10	11

Ages & Stages Questionnaires: Social-Emotional (ASQ: SE)

The ASQ: SE is described as a highly reliable, parent-completed tool with a deep, exclusive focus on children's social and emotional development. It allows clinicians and researchers to quickly pinpoint behaviors of concern and identify any need for further assessment or ongoing monitoring (Squires et al., 2009). This assessment was filled out by the parents prior to JAI and following JAI. Only changes in parent responses were included in Table 3. Per parent report, data from Table 3 revealed a positive change in five social emotional areas, while no negative changes were indicated.

Table 3. Parent responses to questions from the ASQ: SE prior to JAI and after
JAI.

Questions from ASQ: SE	Parent Response Pre JAI	Parent Response Post JAI
How does your child usually communication?	"Gestures." "Single words."	"Pointing, sounds gestures, single words."
Have your child's communication skills changed in any way?	"Starting to get more verbal."	"A LOT more pointing and single word labeling."
How does your child greet someone/react when they leave?	"If prompted will say hi and bye."	"Ignores unless prompted. If it's someone she knows: is happy to say hi…and bye"
How does your child let you know she is frustrated?	Yells.	Says "help".
What happens if you can't figure out what your child is asking for? What does your child do?	Frustrated – sometimes. Cries.	If pointing doesn't work she tries to say words.

Early Social Communication Scales (ESCS)

Data collected from the ESCS (Mundy et al., 2003) was broken into six

sections: initiating and responding to joint attention, initiating and responding to

behavioral requests, and initiating and responding to social interaction. Formal

ESCS analysis was not conducted due lack of researcher experience. Rather, data

was tallied within the six groups to show any change from pretest to posttest.

Only subtests which changed from pretest to posttest are represented in Figures 7

and 8. The IJA and RJA behavior results gathered from pre and posttest are

represented in Figures 7 and 8.

Figure 7. Instances of IJA behaviors displayed by the child during pretest session 1 and posttest session 2 throughout ESCS (Mundy et al., 2003) measurements.
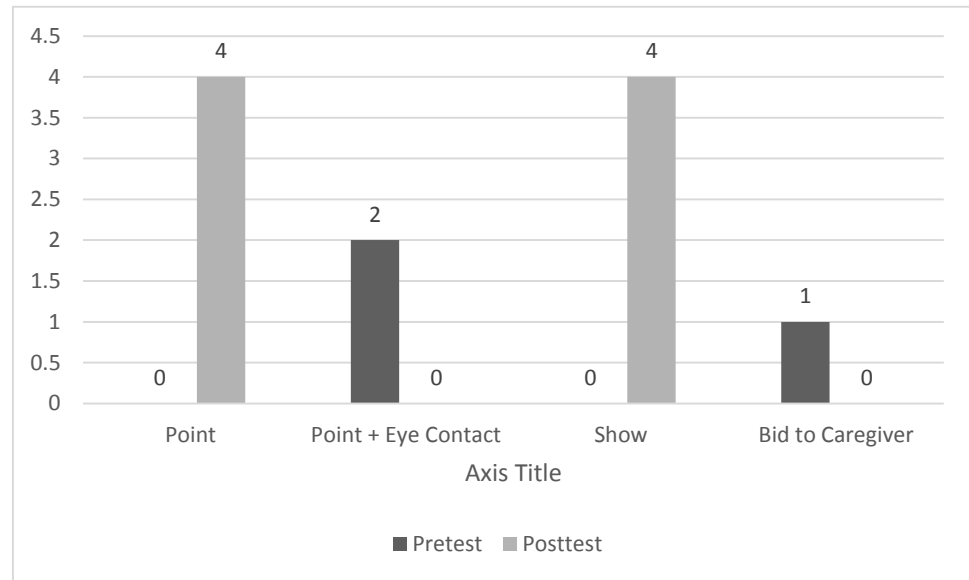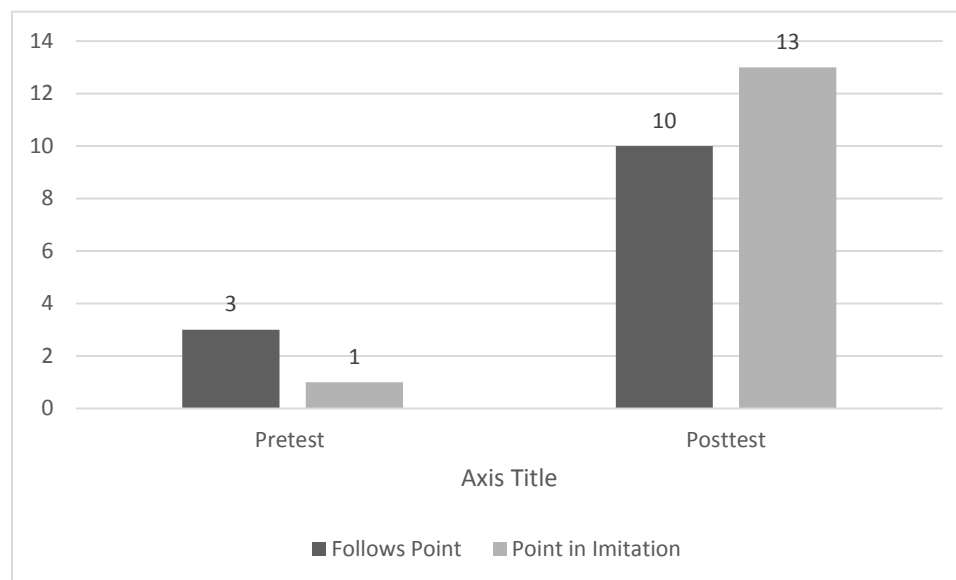
Figure 8. Instances of RJA behaviors displayed by the child during pretest session 1 and posttest session 2 ESCS (Mundy et al., 2003) measurements.

Figures 7 and 8 display information gathered from the ESCS. All numerical values signify a total amount of IJA or RJA behaviors during pretest and posttest. As shown in Figure 7, data revealed an increase in the child's use of pointing and showing IJA behaviors; both increased from 0 to 4 instances. Additionally, the child decreased her use of point plus eye contact and a bid to the caregiver IJA behaviors; they decreased from 2 to 0 and 1 to 0 instances, respectfully. As shown in Figure 8, data revealed an increase in both following a point and pointing in imitation RJA behaviors; they increased from 3 to 10 and 1 to 13, respectively.

Parent-mediated JAI Data

The parents and caregiver of the participant kept a tally documenting the amount of times they attempted to use JAI at home. According to parent and caregiver charts, JAI was used an average of 4.6 times per day throughout the intervention process. The median and mode were both 5.

Expressive Language

Phrases and word imitation used during intervention session 2 included word imitations for the words orange, apple, banana, help, flower, and more. Most of these imitations included consonant vowel or vowel consonant production (e.g. "heh" for help and "moe" for more). As the child's language complexity evolved, the targets also became more complex. This can be noted in the smooth progression of spontaneous one-word phrases such as apple, orange, fries, flower, more, pink, purple, etc., to three and four-word phrases during the

last two weeks of therapy (e.g. this is a ball). Overall, the complexity of

language used by the child increased throughout the study.

Figure 9. Data from this graph were collected by the researcher throughout the JAI session. Each colored line corresponds to a specific complexity of language produced by the child.

	IS 2	IS 4	IS 5	IS 6	IS 7	IS 8	IS 9	IS 10
One-word Imitation Approximation	19	22	7	33	8	19	23	6
Two-word Imitation Approximation	0	0	0	0	0	4	2	0
Spontaneous One-Word Utterance	0	11	2	11	17	22	33	36
Spontaneous Two-Word Utterance	0	0	0	4	7	7	3	5
Spontaneous Three-Word Phrase	0	1	0	1	0	4	6	7
Spontaneous Four-Word Phrase	0	0	0	0	0	0	1	1

Chapter 5

Discussion

The purpose of this study was to determine whether a child suspected of having ASD would increase her initiating and responding components of JA following JAI. Additionally, the researcher attempted to determine whether gains in JA consequently lead to increased expressive language use. The researcher used a Prelinguistic Milieu Teaching (PMT) method and taught caregivers JAI via a parent-mediated model implemented during daily living activities in the home. Both pretest and posttest data were collected to determine the amount of JA used prior to and following JAI. JAI was also conducted through a parent-mediated model to provide supplementary learning opportunities and to encourage generalization.

Formal data were collected by applying the coding system to videotaped caregiver-child pre and post interaction sessions, videotaped researcher-child pre and posttest JAI sessions, and weekly videotaped researcher-child JAI sessions. Caregiver-child, and researcher-child initiation of joint attention (IJA) and responding to joint attention (RJA) behaviors were measured and analyzed for changes in the pre and post test data, and for weekly changes. Coding from the caregiver-child pretest and posttest interaction sessions, researcher-child weekly sessions, and researcher -child pre and posttest sessions was used to determine amount and type of JA use from the child and caregiver.

The caregiver and child pre and posttests revealed increases and decreases in both the child and caregivers' IJA and RJA use. The child's greatest gains in

RJA were shown in acknowledging an object and acknowledging an object with vocalization. The caregiver's greatest gains in RJA were found in acknowledging the object where she increased from 0 to 7 instances. Both the caregiver and child showed the most gains in pointing to initiate joint attention.

The caregiver made gains throughout many components of IJA and RJA. Prior to intervention the caregiver had never been formally educated about JA. Following training and weekly meetings, the caregiver gained confidence in using specific areas of JA. This was evident in her significant improvement when pointing to IJA. Although the caregiver made significant improvements in some components of JA, it was evident she lacked confidence and/or training in using other areas of RJA and IJA. The caregiver's improved education and abilities in using JA were important in the child's generalization of skills.

The child improved in many IJA and RJA components, but like her caregiver, showed more improvement in certain components. Data revealed that both the caregiver and child showed most improvement in the same IJA and RJA. The caregiver's education and confidence in specific components of JA caused her to model and use those components more often. In turn, the child exhibited larger growth in those same JA components. As other studies have suggested, children with autism acquire certain IJA and RJA skills easier than others, which may be dependent on the complexity of the skill (Jones, Carr, & Feeley, 2006, p. 824).

The results collected from the ASQ: SE (Squires et al., 2009) show positive changes in the child's expressive language and behaviors in her home

environment. The mother of the participant relayed positive messages regarding her child's progress throughout the questionnaire as well as in informal meetings. Multiple questions inquired about the child's level of frustration or negative behaviors. Following JAI, the mother indicated her child exhibited less frustration. The questionnaire represented the child's behavior in her home environment and confirmed generalization of the new skills to multiple environments. It is unknown whether the parent-mediated model directly contributed to this success in multiple environments. However, it is likely considering the parents and caregiver taught JA consistently throughout the study, which is represented in parent data charts

Differing parent and caregiver factors such as level of education, motivation, and time availability could affect treatment outcomes. Therefore, it is important to consider each family individually when deciding to use a parent-mediated model. The mother and caregiver in this study were both engaged and motivated. This commitment to the intervention led to strong relationships and communication. A lack of motivation, commitment, or education about the intervention could hinder the child's progress and maintenance. The importance of caregiver and parent factors is echoed by Kasari et al. (2010).

Researcher-Child JAI

Data from the child's pre and posttest JAI sessions show significant progress in IJA. IJA behaviors were encouraged and reinforced consistently throughout the study. To obtain a desired item or activity, the child was

encouraged to initiate joint attention. Reinforcement, clinician modeling, and repeated exposure may have led to the significant improvement of the child's IJA skills. Growth in IJA is not always seen in children with autism following JAI. Kasari et al. (2010) stated that initiating joint attention skills "… may be particularly difficult for children with autism to learn" (p. 1054). Kasari et al. (2010) suggest highly trained clinicians using a more direct approach may be able to teach IJA more successfully than caregivers.

Alternatively, data from the child's pre and posttest JAI sessions showed inconsistent progress in RJA. During the pretest, the child showed very few IJA behaviors, and therefore the researcher used many more IJA behaviors, thus allowing the child more opportunities to respond to

JA. By definition, individuals use JA to gain social attention. Throughout JAI the researcher paired JA skills with items reinforcing to the child. The child in this study may have increased her IJA behaviors on a larger scale and more consistently due to the pairing of IJA with a reinforcing item. Given more opportunities to respond to JA, the child may have produced more responses.

Weekly data throughout the study also showed consistent increases in IJA components but inconsistent progress in RJA. This may be contributed to the lack of RJA opportunities provided to the child by the researcher. It is important to note that only a 6-8 minute random sample of each 30-45 minute session was used for pretest, posttest, and weekly data. Had each of the sessions been coded in entirety, the sample may have been more representative.

Although some components of the ESCS showed negative results or no change, others showed a positive change. The child exhibited an increase in the amount of pointing to IJA, as well as following the point and pointing in imitation to RJA. These behaviors show a strong increase in the child's ability and motivation to use the pointing gesture as initiation and response of JA. These behaviors were taught by the researcher throughout each JAI session, and were also the caregivers most used behaviors during posttest. These consistent models and reinforcement of the child's pointing behaviors are likely to have contributed to the increase in use from pretest to posttest using the ESCS.

The purpose of this study was to increase the participant's use of JA. JAI involved teaching RJA and IJA components along with expressive language intervention. The goal was to stimulate expressive language, specifically labeling, in conjunction with JAI. Multiple studies have concluded JA and language development have a significant relationship and may develop concurrently (Colonnesi et al., 2010; Kwisthout, et al., 2008). The participant's language gains during JAI are consistent with this theory.

An abounding growth in the use of spontaneous phrases is presented in Figure 9. During the baseline session, the child produced one-word imitations, but very little spontaneous speech. During the last few sessions, the child produced spontaneous one, two, three, and even four word phrases. The child's mother confirmed her daughter was using more language at home, typically one and two word spontaneous phrases. In this study there appears to be a relationship between JAI and expressive language development.

Conclusion

From pre to posttest measures, the child exhibited consistent growth in IJA and RJA pointing gestures. During pretest measures, it is significant that the child consistently used pointing gestures with her caregiver, researcher, and throughout the ESCS assessment. As research shows, the pointing gesture is crucial to language development (Colonnesi et al., 2010). The child exhibited knowledge regarding the use of pointing in order to initiate and respond to JA. This gesture allows the child to respond to another's JA bid as well as initiate a JA bid of her own. Along with the pointing gesture, the child learned how to follow the adult's pointing gesture, thus following the point and hearing the label an adult gives to an object. The child's expressive language growth throughout the study supports the idea that JA leads to language development.

These results have many clinical implications. Children identified or suspected of having ASD lack in JA use. This study suggests JAI can be used to increase the JA skills and expressive language of children identified or suspected of having ASD. Additionally, caregiver and parent involvement resulted in a collaborative effort to positively influence a child's language abilities and interactions. Research regarding the relationship among JA, language, parent-mediated models, and children with ASD is crucial in our continued education of language development and the most effective and efficient intervention practices.

Limitations

Single-case study designs, although relevant, limit the power the data holds due to limited participants. Time constraints restricted the number of sessions and length of overall intervention resulting in a small time sample. Additionally, time constraints prevented any follow-up session, and therefore no maintenance of the intervention was determined. Further assessments such as Mean Length of Utterance (MLU), Type Token Ratio (TTR), and other standardized expressive language assessments may have positively supplemented the existing data. The child in this study was suspected of having autism, but not diagnosed. This could have an impact when comparing results to similar studies where the children are diagnosed with ASD. Using a parent-mediated model and JAI in a clinical setting has been shown to be beneficial to children with ASD; however, using both interventions simultaneously prevented the authors from distinguishing which intervention, or a combination, could be attributed to the increase in JA and language use of the child.

Future Research

Further research to improve further test intervention techniques is needed. Results from this single-case study show promise for JAI with additional parent-mediated model for children diagnosed or suspected of having ASD. More research is needed to specify the success with the combination of JAI and a parent-mediated model. Studies including larger samples sizes are needed for better generalization of experimental techniques. Both RJA and IJA have been found difficult to teach simultaneously both during the duration of this study as

well as others (Jones et al., 2006). Future research should look into intervention

strategies to teach both RJA and IJA effectively at the same time. The benefits of

using JAI in a more natural environment (e.g. preschool) should be considered.

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Appendix A

Flow charts, as examples for parents and caregiver, adapted from the Early Social

Communication Scales (ESCS) manual (Mundy et al., 2003).
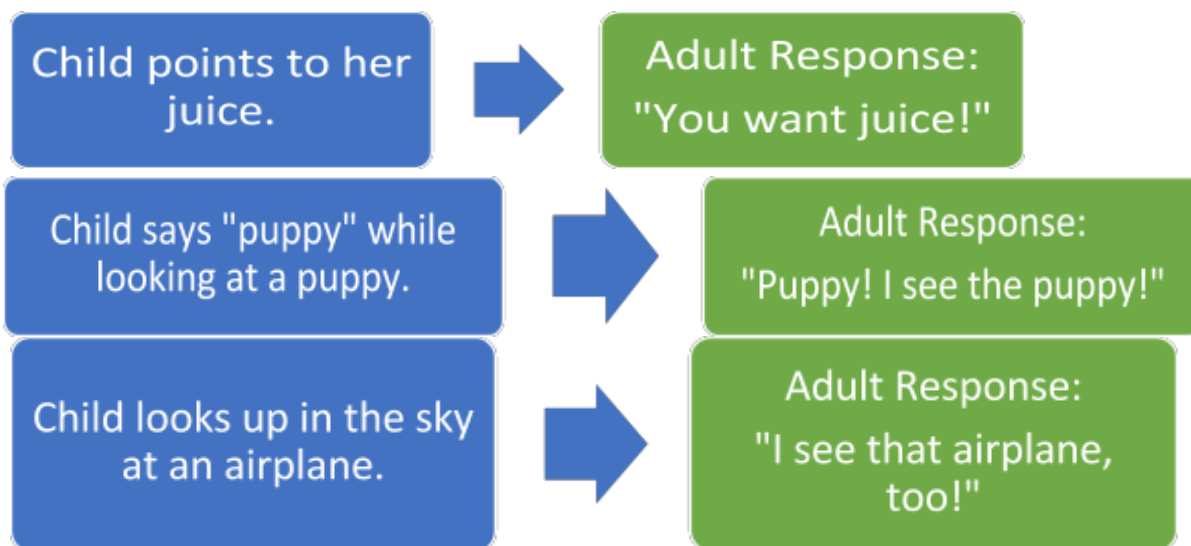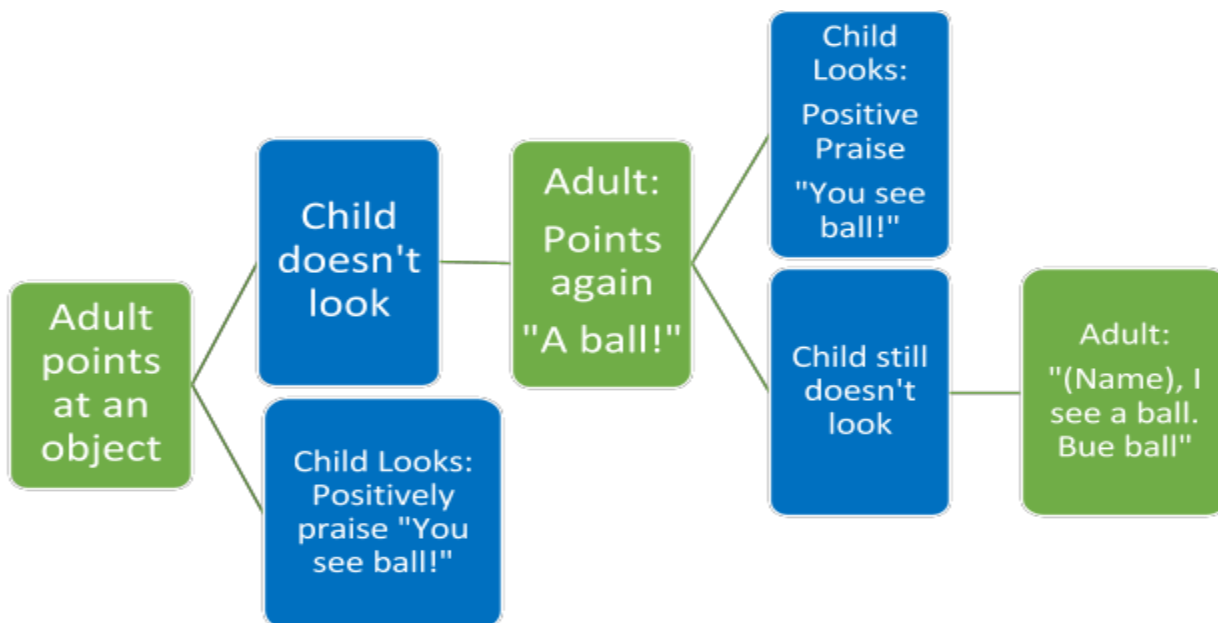
Appendix B

Specific protocols for types of JA were used to record data. These were adapted from the ESCS (Mundy et al., 2003).

Initiating Joint attention

1- Alternative Eye Gaze: Individual looks at object, then other person or visa versa
2- Point: Individual points at object
3- Show

Responding to Joint Attention

1- No response
2- Following proximal point or eye gaze with eye gaze
3- Pointing or gesturing
4- Vocalization
5- Acknowledging object