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The Effects of Movie Time Social Learning on Emotion Recognition, Perspective Taking and Empathy in Children with Autism

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By

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DISSERTATION

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Dedication

I would like to dedicate this study to all of the many wonderful children with autism and their families who have inspired me to become a better interventionist throughout the years.

This dissertation is also dedicated to my grandparents, Tommie and Florence Keepers, who believed in the value of a good education and instilled those values in me from a very young age. As I was growing up, I always looked forward to visiting them in the summers at the school they developed, Cypress Creek Private School, in Cypress, Texas.

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Abstract

Autism is the fastest growing developmental disability in the world, with the latest estimates showing that 1 in 68 children will be diagnosed with the condition. One of the core deficits associated with autism is social communication. Theory of mind (Baron-Cohen, 1985) posits that children with autism do not have the ability to understand that others have thoughts different from their own. This has been suggested as one of the main reasons that social communication deficits exist in children with autism.

Motivation is likely the main component in effectively teaching many children with autism. Interventions that incorporate movies would seem to be promising. Movie Time Social Learning (Vagin, 2012) is one such intervention based on the principles of Cognitive Behavioral Therapy (CBT) and Social Thinking (Garcia-Winner, 2005).

Children with autism often have specific deficits in the areas of emotion recognition, perspective taking and empathy. This study utilized Movie Time Social Learning intervention tools to target skills in these areas with three children with autism. The three participants were two males and one female, ages 8, 9 and 9 respectively, from a variety of cultural and socioeconomic backgrounds. All were verbal and had a diagnosis of autism.

All three participants demonstrated considerable growth over baseline in the areas of emotion recognition and beginning perspective taking over the course of the twelve week study (mean increases of 73%, 35% and 31% respectively in emotion recognition and 68%, 35% and 22% in beginning perspective taking skills). All participants demonstrated some degree of generalization of skills outside of the clinic setting.

Movie Time Social Learning would appear to be a great tool to teach social communication skills to children with autism. Parents remarked that they enjoyed using the strategies at home with their children. Interestingly, all participants performed with better accuracy while answering questions during previously unseen movies. Future research in this area should focus on utilization of parents and peers as mediators in multiple settings for maximum generalization.

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Chapter 1

Introduction

Autism spectrum disorder (ASD) is the fastest growing developmental disability in the world (Centers for Disease Control and Prevention [CDC], 2014). It is present at similar rates across countries, regardless of race, socioeconomic status or living conditions (Autism Speaks, 2013). ASD is characterized by core deficits and differences in the areas of social interaction and reciprocity, verbal and nonverbal communication, and restricted and repetitive patterns of behavior (American Psychological Association [APA], 2013). Autism can be reliably diagnosed by age 2 and it is considered to be a lifelong, severe disability (American Academy of Pediatrics, 2012). *Theory of mind* (ToM) is a term that is widely used in the field of autism to describe the ability of the child to view another person as having a different perspective or different thoughts than their own (Baron-Cohen, Leslie, & Frith, 1985). The lack of a theory of mind has major implications in terms of social communication development in children with autism.

Prevalence and Statistics

The number of children diagnosed with ASD has risen exponentially over the past two decades (CDC, 2014). The latest estimates suggest that 1 in 68 children has been identified with ASD in the United States across multiple communities. This figure is a 30 percent increase over 2012 data which cited 1 in 88 children (CDC, 2012). Since 2002, the number of children diagnosed with an ASD has increased from 1 in 150 to 1 in 68. These figures have been reported at similar levels in various countries around the world (CDC, 2014).

The ratio of boys to girls having autism has remained fairly stable across time, with boys nearly five times more likely to have an autism spectrum disorder (CDC, 2014). The latest estimates are that 1 in 42 boys and 1 in 189 girls have ASD. Research studies from North America, Europe, and Asia have identified individuals with autism with an average prevalence of about 1 percent. A study from South Korea reported a prevalence of 2.6 percent (CDC, 2014). Due to increased prevalence of ASD, educational systems are in need of more practitioners who can deliver effective interventions to support children with ASD.

Risk Factors for Developing Autism

In studies of identical twins, if one child has autism, the other child will be affected between 36 to 95 percent of the time, whereas, in studies of nonidentical twins, if one child has ASD, then the other child is affected between 0 and 31 percent of the time (CDC, 2014). Parents who have one child with autism have an increased risk of 2 to 18 percent of having another child with ASD (CDC, 2014). ASD tends to develop more often in people who have other genetic or chromosomal conditions. Ten percent of children with autism are also diagnosed with Down Syndrome, Fragile X syndrome, Tuberous Sclerosis, or some other genetic or chromosomal disorder (CDC, 2014).

Children who are born to older parents are also at a higher risk for having autism (CDC, 2014). It also appears that children born prematurely or with low birth weight are at greater risk for developing ASD. Autism occurs in conjunction with a plethora of other developmental, psychiatric and neurological issues. The comorbidity of autism with another developmental diagnosis is 83 percent, while 10

percent of people with autism are also identified as having a psychiatric diagnosis (CDC, 2014).

Financial Impact of Autism

In terms of overall care, there are estimates that raising a child with autism costs at least $17,000 more per year than raising a child without ASD (CDC, 2014). These costs are related to health care, education, therapies and caregiver time. Regarding medical expenses, children with autism had costs between four and six thousand dollars more per year than children without autism (CDC, 2014). Average annual costs for a child enrolled in Medicaid with autism were about $10,000, as compared to a child without autism, on average nearly six times less, at $1,800 (CDC, 2014). For families seeking intensive behavioral interventions, the range of cost varies between $40,000 to $60,000 per year (Amendah, Grosse, Peacock, & Mandell, 2011). The lifetime cost of autism has been estimated at 3.2 million dollars for each person affected (Ganz, 2007).

Social Deficits

Regardless of where a child falls on the autism spectrum, the core deficits in social interaction persist throughout the lifespan (Schopler, Mesibov, & Kunce, 1998). Nonverbal behaviors, such as eye contact and gestures, tend to be used at much lower rates in children with autism, if at all. In terms of social interaction, children with autism tend to have limited abilities, ranging from lack of awareness of others through perseveration on topics of special interest. Social interaction tends to be needs-based, in that children with autism may interact to have basic needs met,

or to impart knowledge to others about areas of expertise, but rarely for the purpose of shared enjoyment (Wetherby & Prizant, 2000).

Children with autism often have significant difficulty initiating and maintaining friendships with peers (APA, 2013). Adolescents with autism rarely develop friendships, and when they do, they often still have a difficult time defining what makes a person a friend (Koegel & LaZebnik, 2004). For those with verbal abilities, they often report increased feeling of loneliness when compared to typically developing children (Bauminger & Kasari, 2000). For higher functioning children with autism, their friendships are often focused on areas of specific interest, with limited social interaction (Church, Alisanski, & Amanullah, 2000).

Orsmond, Krauss, and Seltzer (2004) reported that adolescents and adults with autism typically engage in taking a walk, getting exercise and working on a hobby as their most common social activities. These are activities that can be commonly done individually, rather than with others (Orsmond et al., 2004). Participation in social activities, such as going to religious services, meeting with school or work friends outside of those respective contexts, or attending social events, all occurred less than several times per year. In nearly half of a sample of 407 individuals with autism, no peer relationships were reported outside of work or school (Orsmond et al., 2004).

Biological Motion

Biological motion was defined by Johansson (1973) as visual perception of motion patterns characteristic of living organisms in locomotion. These patterns are thought to be highly specific and relate to adaptive social behavior and nonverbal

communication, often deficient in children with autism (Pavlova, 2012). Typically developing infants preferentially attend to biological motion within their first few days of life (Simion, Regolin, & Bulf, 2008). This ability is thought to be highly preserved and critical to attachment to parents, however, it is not present in young children with autism (Klin, Lin, Gorrindo, Ramsay, & Jones, 2009). Children with autism as young as fifteen months have been shown to prefer physical, object-based stimuli, whereas their typically developing counterparts disregard these same stimuli (Klin & Jones, 2008). This kind of atypical visual processing is thought to contribute to social impairments in young children with autism (Kroeger et al., 2014). In addition, Falck-Ytter, Rehnberg, & Bolte (2013) described impaired audiovisual synchrony in three-year-olds with autism. These elements could contribute to an affinity for nonsocial stimuli, as in electronic media, as well as a lack of experience in recognizing and processing faces. Klin and Jones (2008) stated that this kind of "looking would suggest seeing the world, and even people, as a collection of physical contingencies, unmoored from their social context" (p. 44).

Communication Difficulties

Communication difficulties for children with autism have primarily been categorized into two major areas, joint attention and symbol use (Mundy, Sigman, & Kasari, 1990). Joint attention is the ability to coordinate attention between people and objects through the use of gesture and verbal language. Joint attention has been shown to be a major predictor of language outcome. A failure to show or point to direct attention was an indicator of delayed language development in preschool children (Mundy et al., 1990). Children with autism frequently do not orient and

attend to a communication partner, shift gaze between objects and people or share affect or emotional states with others (Sigman & Ruskin, 1999). Additionally, children with autism often fail to follow the gaze or point of another person (Stone, Ousley, Yoder, Hogan, & Hepburn, 1997).

In terms of verbal communication, the range of children's abilities on the autism spectrum varies greatly. Children with autism often use echolalia, an imitation of the speech and prosodic characteristics of others (Prizant, Schuler, Wetherby, & Rydell, 1997) when first developing speech. Over time, this may lead to functional use of the echolalia by breaking down chunked utterances into meaningful units (Prizant & Rydell, 1993).

Symbol use deficits are evident through difficulty in learning conventional or shared meanings for symbols, including words, as well as problems in using objects functionally and in symbolic play (Mundy, Sigman, Ungerer, & Sherman, 1987). The lack of conventional gestural use, both in rate and number, is nearly universally present in children with autism. They often fail to show, wave, point, nod their head or use descriptive gestures to demonstrate actions (Stone & Caro-Martinez, 1990). In addition, they use more unconventional, motoric-based gestures, such as leading or pulling another person's hand, for the purpose of gaining access to desired items (Wetherby, Prizant, & Hutchinson, 1998).

In concert with symbol use, play is often limited in children with autism. They often show major deficits in the ability to use pretend actions with objects as well as in more fundamental, functional play (Dawson & Adams, 1984). As play skills are

highly correlated with receptive and expressive language development, these deficits are not surprising (Mundy et al., 1987).

Impact on Quality of Life for Children with Autism and their Families

Several studies have demonstrated that stress levels in families of children with autism are significantly higher than those for families with typically developing children, as well as families with children having other developmental conditions (Allik, Larsson, & Smedje, 2006; Bouma & Schweitzer, 1990; Donenberg & Baker, 1993). Stress levels are often correlated with perceptions of quality of life (QOL). Although defining QOL is difficult due to the fact that there are both subjective and objective aspects of it, the basic foundation of the QOL concept has similarity across families, regardless of socioeconomic status, race or ethnicity (Cummins, 2005).

Lee, Harrington, Louie, and Newschaffer (2007) examined QOL for children with autism and their families through analysis of data for over 100,000 families who participated in the National Survey of Children's Health (NSCH). They compared answers to questions from three different groups: those families affected by autism, by attention deficit and hyperactivity disorder (ADHD), and families of typically developing children. Parental concerns about their child's development were separated into five domains: achievement, self-esteem, stress and coping, learning difficulty and being bullied. Results indicated that parents of children with autism reported significantly greater levels of concern about their child's well-being and QOL, both when compared to children with ADHD and typically developing children. Parents of children with autism acknowledged a higher level of burden in terms of taking care of their child, less frequent attendance at religious activities, and less

involvement in community services or other social activities outside of the home. In addition, they reported a greater likelihood of having to quit their job, either to be available for their child with autism or because of inadequate day care resources. Parents of children with autism reported that their children had more missed days of school than the other two groups, had to repeat grade levels more often, and were more likely to be bullied than other children. Parents of children with autism also experienced more overall financial stress than either families of children with ADHD or those with typically developing children (Lee et al., 2007).

Motivation

Motivation lies at the core of society and is generally highly valued because of its consequences, namely, production. It is a central issue in the field of psychology, because it greatly influences biological, cognitive and social regulation (Ryan & Deci, 2000). Humans are generally motivated in some manner, primarily externally (i.e., money, accumulation of property) or internally (i.e., altruistic reasons, for the sake of learning, or to express creativity), although most often some combination of the two. As humans biologically evolved, they often acted together for the greater good, thus advancing knowledge, production and society as a whole (Ryan & Deci, 2000). The condition of autism presents some interesting dilemmas for the assumptions proposed in basic human motivation; namely, what is the result when a person is not motivated in a manner that is valued by society, either extrinsically or intrinsically? These differences in motivation for children with autism have critical implications in the way they learn social and communication skills. In addition, recent evidence has suggested that children with autism demonstrate poor connectivity between brain

regions that respond to the human voice and those associated with providing pleasure (Abrams et al., 2013). Identifying areas of motivation for a child with autism is likely one of the keys to reaching them in order to teach them more meaningfully (Koegel & Koegel, 2006).

Social Motivation Theory of Autism

The social motivation theory of autism posits that autism is characterized by disruptions in the motivational and executive processes that give priority towards orienting to social stimuli in the environment (Dawson, Meltzoff, Osterling, Rinaldi & Brown, 1998; Klin, Jones, Schultz, & Volkmar, 2003). Whereas young infants show preference to speech sounds rather than noise (Gliga & Csibra, 2007), four year olds with autism prefer nonspeech sounds (Kuhl, Coffey-Corina, Padden, & Dawson, 2005). Chevallier, Kohls, Troiani, Brodkin and Schultz concluded in their 2012 study that ASD “can be construed as an extreme case of diminished social motivation” (p. 231). This is in direct contrast to those who propose the “theory of mind” (ToM) (Baron-Cohen et al., 1985) construct that views autism as a social cognitive rather than a social motivational disorder (see Chapter 2 for an in-depth review of the ToM studies). In the only study that directly asked participants with autism about their pleasure related to social and nonsocial activities, Chevallier, Grezes, Molesworth, Berthoz, and Happé (2011) found that although physical and intellectual pursuits were rated similarly across both ASD and non-ASD groups, children with autism selectively rated social situations as less desirable.

Motivation in Autism as a Pivotal Skill

Using motivating items or interests has been noted in the literature to increase the child with autism's intrinsic motivation to participate in social interactions with others . As it relates to development in children with autism, motivation has been referred to as a pivotal skill area (Koegel & Koegel, 2006). A pivotal area is one in which collateral, concomitant gains are demonstrated in behaviors related to the target, but not specifically targeted. Vismara and Lyons (2007) explored the use of perseverative interests in young children with autism to influence the acquisition of joint attention. They hypothesized that children with autism would increase joint attention and quality of their interactions with adults, not only when using perseverative interests, but also when generalization probes were taken with less highly desirable items (i.e., nonperseverative based items). Results indicated that all three preschool children did generalize some joint attention behaviors (i.e., eye gaze shifting, pointing, showing, giving and commenting) to those activities not specifically targeted during the intervention phase of the study.

Baker (2000) looked at increasing social play interactions with siblings by incorporating thematic ritualistic behaviors of children with autism into simple games. Three children with autism, ranging in age from 5 years, 5 months to 6 years, 8 months, were given structured play opportunities to engage with their siblings using a modified version of the classic game, Bingo, and including their particular areas of interest. The areas of interest for the three children were number lines and map locations, crashing toy cars, and watching and rewinding particular movie clips. Results indicated that using these interests in a Bingo game greatly increased joint

attention behaviors in all three children, not only during intervention, but also during maintenance and follow-up study phases. In addition, all three children showed marked decreases in problem behaviors related to their particular thematic, ritualistic interests when given a socially appropriate outlet, such as playing a game. Increases in prosocial behaviors with siblings were also noted during other structured games which were not targeted and did not include thematic or ritualistic areas of interest (Baker, 2000).

Electronic Media Motivation in Autism

With the advent of the Internet, iPhones and iPads, electronic media has established a firm place in the core of society. Children and adults often spend free time engaging in texting, emailing, and playing video games on their iPhones, laptop computers and tablets. Because of their portable nature, electronic media devices are being used as a means of leisure time enjoyment. As such, they have replaced many activities that previously were engaged in by children around the world, such as reading and playing sports. For children with autism, electronic media often provide an outlet for entertainment that does not require engagement with others. In addition, because of its visual format, it appeals to many children on the autism spectrum (Shane & Albert, 2008).

Shane and Albert (2008) requested questionnaires from 250 parents of children with autism examining their use of electronic media. Of the 90 returned, 89 were analyzed. Ninety percent of families owned a working television, 93% owned a working DVD or VCR player, while 80% owned a working computer. Parents were also asked about weekend time spent with leisure activities, such as books, listening

to music, indoor and outdoor play and electronic screen media (ESM). The highest level of participation was for video/DVD and television usage (24 and 23 percent of time, respectively). Outdoor play was the third most participated in leisure activity at 16%. The least represented leisure time activities were educational software usage and books at 1%.

In terms of heavily rated weekday leisure activities, parents in Shane and Albert's study (2008) reported that the greatest length of time spent was also on television and video/DVD usage, at 16 and 9 percent respectively. Outdoor play again was the third highest represented leisure time activity. Books and educational software were less than one percent.

Regarding the type of television programming viewed, animated programs were far and away the highest preferred, with two thirds of families endorsing it (Shane & Albert, 2008). While some children with autism were noted to enjoy a variety of characters, many demonstrated a strong preference for specific characters. These characters included Winnie the Pooh, Rugrats, and Spongebob Squarepants.

Ninety three percent of respondents in Shane and Albert's study (2008) owned a library of children's movies, and nearly 350 movie titles and collections were mentioned in open-ended questioning. The most popular movie titles and collections were Barney and Sesame Street, at 33 and 25 percent respectively. The most popular viewed production companies were Disney and Disney/Pixar collaborations, with their films totaling five of the top eleven collections. The three

most popular websites were www.PBSkids.com, www.nickjr.com, and www.Disney.com, at 39, 36 and 27 percent respectively.

Behaviors observed while watching or interacting with ESM (television, movies and computers) were also queried (Shane & Albert, 2008). When discounting the frequency for *tolerates a device being turned off* and *physically approaches the screen,* results indicated that across all ESM, the most frequently observed behavior was repetitive viewing and playing of specific shows and/or scenes (73 and 80 percent for television and movies respectively). The next two most frequently rated behaviors were *tuning out environmental distractors or over-focus on ESM,* and *imitates movements on screen* (at 67 percent during television viewing and 73 for movie viewing). The three least rated behaviors for all three media were *recreating scene with props*, *acting out the scene*, and *verbal imitation*.

In terms of behaviors parents observed in their children with autism after exposure to ESM, repeating dialogue was the highest rated across all ESM (nearly 50% of the time with television and movies, although only 28% of the time after computer use), while singing or humming songs was the second most reported behavior at nearly similar rates (Shane & Albert, 2008). Reproduction of written language on the screen after exposure to ESM was reported nearly one third of the time after television and movie viewings, but not at all after computer usage. Imitation and reenactment of scenes with props were not occasionally or frequently observed to a significant degree with any ESM (Shane & Albert, 2008).

Movie Time Social Learning

Whether social deficits in children with autism are related to social cognitive difficulties, motivational issues, or some combination of the two, the accuracy of these disparate theories is still under debate. What does seem clear is that children with autism do not attend to social stimuli as readily or as often as typically developing children. As motivation is a key component of learning, it appears that a vast majority of children with autism are motivated by visual stimuli, particularly in the form of electronic screen media.

Teaching social concepts through the use of a motivating, visually based format would seem to have learning benefits for children with autism. *Movie Time Social Learning* (MTSL) (Vagin, 2012), a commercially available intervention program for children with social cognitive differences, uses the highly motivating format of movies to teach complex social communication behaviors. MTSL uses motivating movies and scripted lesson plans to target complex social behaviors that are generally not able to be processed or understood by children with autism in real time. For example, showing the Lightning McQueen character from the movie Cars with a smiling face may help the child with autism make the link between the feeling and the label because of the child's motivation to watch Lightning McQueen. Because movies can be paused and rewound, the MTSL format gives the child with autism additional processing time and increased opportunities to view the targeted behavior. Several primary targets of MTSL include emotion recognition, perspective taking, and empathy. Because of the frequency and ease with which movies are accessed and attended to by children with autism, MTSL would appear to be a

valuable intervention tool to explore in terms of enhancing the social communication skills of children with autism.

Social Thinking®

MTSL techniques are aligned with the ideas that people have thoughts and that we can try to figure out what they are by using our eyes and following others' eye gaze to find out what they may be thinking. Along with ToM, MTSL would seem to be a good fit with Social Thinking®. Social Thinking® (Garcia-Winner, 2005), is an intervention model for children with social cognitive differences that is based on the principles of cognitive behavior therapy (CBT). CBT is a type of psychotherapy developed in the 1960s that continues to evolve and change over time (Dobson & Dozois, 2001). It is based on the premise that our thoughts cause our feelings and behaviors, not things or people in the environment, and that by changing the way that we think, we can alter the way we view our life. For children with autism, aspects of Social Thinking can be used to determine what other people are thinking about us, which in turn, can lead us to change our behaviors to meet what is acceptable in any given situation. At the core of Social Thinking is the idea that everyone generally expects people to socially communicate in a particular way and that by monitoring our own behaviors, we can increase our ability to function successfully in the world. The Social Thinking approach is not a curriculum per se, but rather a way of thinking socially about one's self and others.

Key Terms

Cognitive Empathy – The ability to mentally take perspective and comprehend how another person is feeling based on contextual information as well as their expressions, words and/or actions (Smith, 2006).

Emotion Recognition – The ability to discern how a person is feeling based on nonverbal information, such as gestures, body position and facial expression (Klin et al., 2003).

Motivation – A pivotal skill area that influences both targeted and nontargeted behaviors in children with autism (Koegel & Koegel, 1995). Motivation can be described as a person's internal state that drives an interaction with the environment in some manner. For the purposes of this study, it refers to the motivation of the child with autism.

Perspective – Referring to the facts known to oneself in having a meaningful interrelationship with another person or situation (Dictionary.com, 2014)

Perspective Taking – The ability to take on another's perspective, and more specifically, understand that a person's thoughts lead to feelings and then to behaviors (Garcia-Winner, 2005).

Theory of Mind – Idea proposed by Baron-Cohen et al. (1985) and others that social cognitive deficits (i.e.,the inability to understand that others have different thoughts and beliefs than your own) are the primary reason for social communication difficulties for children with autism.

Problem Statement

How can core deficits in social communication skills such as emotion recognition, perspective taking, and empathy in children with autism be targeted in a motivating, meaningful format that increases attention and focus and, in turn, generalizes to real world settings?

Pivotal areas are targets that lead to many collateral changes in other nontargeted behaviors (Koegel & Frea, 1993). Koegel and Koegel (2006) have described five pivotal areas in terms of children with autism: motivation, responsivity to multiple cues, self-management, self-initiations, and empathy. The MTSL intervention program would appear to employ two of these pivotal areas directly: empathy and motivation.

By utilizing a motivating format (i.e., preferred movies) that ensures the attention and focus of children with autism, as well as targeting skills which may lead to a demonstration of empathy (i.e., Have you ever felt like _____ did?), MTSL would appear to be a promising intervention program for many children with autism who find the social world extremely difficult to navigate.

Purpose of the Study

The purpose of the current study was to determine whether the use of a highly motivating format (ESM, and more specifically, DVD movies) can be effectively used to teach aspects of social understanding to children with autism. *Movie Time Social Learning* (MTSL) (Vagin, 2012), based on the principles of Social Thinking® (Winner, 2005), is a commercially available intervention that uses movies

to improve social understanding. This study utilized MTSL to target emotion recognition, perspective taking, and empathy in children with autism.

Chapter 2

Review of Related Literature

Introduction

To examine how the core social communication deficits such as emotion recognition, perspective taking and empathy in children with autism can be targeted in a motivating and meaningful manner, I will first review and discuss the research literature on ToM and children with autism. Next I will briefly describe social cognition in relation to children with autism and summarize findings related to video modeling due to its link to techniques used in the proposed study. Finally, I will describe how ToM research relates to Social Thinking™ and MTSL and review the scant research on Social Thinking®.

Theory of Mind

Broadly speaking, social abilities contribute greatly to one's ability to function successfully in the world. Part of social success is related to one's ability to predict what others may be thinking. Based on our ability to interpret others' thoughts, we often adjust our own actions in order to facilitate positive social interactions. This is something that humans do every day in order to successfully navigate the social world at large.

For most people, social interactions occur relatively seamlessly throughout the course of the day, whether going to school, working at a job, or purchasing items at a grocery store. These social exchanges happen almost automatically as part of our daily routine. When one does not have the ability to figure out what others may be thinking and therefore, what they may do next, the world can become a

confusing, frustrating place. For children with autism, the innate social abilities that most people have do not surface easily. In fact, many researchers believe that children with autism generally do not have a “theory of mind” (ToM) as it relates to thinking socially about others.

The phrase “theory of mind” was originally coined by Premack and Woodruff (1978) through their work with chimpanzees. In that context, the authors used theory of mind as the ability to infer mental states about oneself and others. Premack and Woodruff evaluated chimpanzees to determine if the chimps indeed could determine the problems from various videotaped scenarios, understand the purpose of the actor in the video, and then choose from a field of four possible options to solve the “problem”. The problems ranged from rather simple ones, such as how to access unattainable food, to interpreting shivering by a person related to an unplugged heater or being unable to play a record player because it was unplugged. Chimpanzees repeatedly and consistently “solved” the problem by choosing an appropriate photograph; a stick to reach the bananas, a key for the person in the locked cage, a lit wick for the malfunctioning heater, and a plug for the unplugged record player.

If a child does not have theory of mind skills, they do not understand how to modify their own behavior in response to other’s needs. For instance, two children on a playground are playing near each other. One swing becomes available. For the child with autism without theory of mind abilities, the fact that there might be another child who also wants the swing does not factor into any of his or her behaviors. If the child without autism reaches the swing first makes no difference to the child with

autism. For the child with autism, he or she believes that the other child “should have known” that he or she wanted the swing because they are having the same thoughts. The child with autism tantrums and/or acts negatively towards the child without autism partly as a result of a deficit in ToM skills.

ToM may also partly explain why initiation of social communication for children with autism is so difficult. For instance, if a child with autism walks toward a ball that is on a shelf out of reach but realizes that there are adults in the room who can reach it for him, he or she may not feel the need to indicate that they want the ball. As a result, the child stands by the shelf and waits for an adult to get them the ball.

Baron-Cohen et al. (1985) used the “theory of mind” (ToM) concept to represent deficits that children with autism demonstrated in the social environment, namely the inability to determine the beliefs of others and predict their behavior. The authors used puppets to demonstrate that this ToM deficit occurs only in children with autism, separate from children with intellectual disability or other conditions, such as Down syndrome. Twenty children with autism, as well as 14 with Down syndrome and 27 typically developing preschoolers were tested using a paradigm with dolls originally developed by Wimmer and Permer (1983). The dolls were named Sally and Anne. Children were shown Sally placing a marble into her basket, followed by her leaving the room. Then Anne took the marble from Sally’s basket and transferred it to her own basket at which point Sally reentered the room. Children were then asked where Sally would look for the marble. If the child pointed to the previous location of the marble (i.e., Sally’s basket), then the child could be

said to pass the belief test (i.e., the child realized that Sally had the false belief that the marble would still be in her own basket).

Much has been presented in the ToM literature suggesting significant early milestones occur as early as 4 to 6 months of age through four years of age. Language plays a significant role in the child's ability to formulate and express thought about others' thoughts. At four years of age in typical development, children began to understand that others have a different perspective than their own that originates in thought (i.e., different people can think about things in different ways based on their perspective). In atypical child development, particularly in the case of autism spectrum disorder, ToM does not occur according to these developmental milestones. When and if it does occur for a child on the autism spectrum, it is often much later and seems to be interpreted in a different manner unique to children with ASD (Happé, 1995).

Frith, Happé, and Siddons (1994) suggested that some children with autism may be able to cognitively systemize and comprehend that others may have the ability to think differently, albeit separately from a "true" ToM perspective. At a concrete level, children with autism may be able to intuit that a person thinks a different thought than their own based on simple visual perspective (i.e., a person views something from a different angle than their own, thus "seeing" it differently, then having a different thought about it). This especially may be evident in the case of children with higher functioning autism and what was previously termed Asperger Syndrome.

Literature Review

In order to locate literature on the topics of ToM and autism, an Internet search using various search engines was undertaken. Particular attention was paid to the fields of psychology, medicine, and education.

A search of the scholarly literature through PsycINFO, ERIC and PubMed databases with limiters of the last ten years (2004-present) with the keywords “theory of mind”, “autism” and “children” resulted in a return of 603 records. A ten year period was selected in order to identify the most recent autism research intervention studies. From these 603 records, abstracts were reviewed for relevancy according to ToM specifically as it relates to autism and cognitive and language development in children. After elimination of records for relevancy and duplication across databases, a total of 18 studies were selected for review. The 18 studies that were chosen ranged from seminal studies to follow-up studies after several decades of theorizing, as well as several limited intervention studies in which strategies were used to attempt to teach concepts associated with ToM. Intervention studies have been few and are complicated somewhat by the lack of effective control of conditions and overall methodological confounds.

Studies Included for Review

The eighteen articles located can be divided into four categories focusing on (a) intervention studies that attempted to teach or train children with autism to acquire aspects of ToM, (b) intervention studies using thought bubbles to help children with autism acquire aspects of ToM, (c) descriptive studies examining performance of children with autism on varying levels of ToM tasks, and (d) research

studies examining the relationship between teaching ToM and how this translates to real world success in social situations for children with autism.

Studies attempting to teach or train aspects of Theory of Mind. Although the conceptual underpinnings of ToM are sufficiently defined, the areas of development affected by and related to ToM are not clearly agreed upon nor understood. Researchers have attempted to narrow down ToM as it relates to child development by focusing on a “litmus test” of sorts related to an understanding of false beliefs. False beliefs is the understanding that based on what people see and think, their thoughts and actions may vary. However, it is now posited that predicting what a person desires or wants may indeed be a precursor to the understanding that others may have true or false beliefs (Wellman et al., 2002).

Ozonoff and Miller (1995) conducted one of the first social skills training programs for children with autism directly aimed at teaching ToM concepts. Five adolescent boys, matched on IQ and severity of autism symptoms, received treatment for 14 sessions of 90 minutes each over a 17 week period that included a holiday break. Four adolescent boys matched for IQ and autism severity were placed in the no treatment control group. Pretreatment measures included administration of the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990) by parents and teachers separately.

The training program for Ozonoff and Miller’s (1995) study was divided into two sections. The first seven week period focused on basic conversational and interactional skills, such as how to initiate, maintain, and end conversations; how to choose topics that would interest others; how to read, interpret and express non-

verbal communication; how to share; how to listen; give compliments, and show interest in others. The second seven week sessions focused on teaching perspective taking and learning ToM skills. Participants were asked to lead a blindfolded trainer through a maze, shown how to take the physical perspective of the blindfolded person and provide information about potential obstacles and routes to the person, all without assuming that the blindfolded person could see what they could see. After teaching how visual and physical perspectives differ, teaching then focused on how cognitive points of view could be different for others. Teaching targeted the concept that perception influences knowledge, so what one sees and/or hears will influence what they know. Role plays were conducted similar to the first order, Sally Anne tasks (Baron-Cohen et al., 1985), as well as second order false belief tasks (i.e.,what one person thinks another person thinks; Baron-Cohen, 1989).

Results indicated that four of the five adolescents improved on the ToM composite score, more specifically on several false belief tasks, while only one in the control group improved. Ozonoff and Miller (1995) noted that despite improvements on answers to questions related to ToM, the adolescents perhaps improved only in their ability to figure out solutions based on rules and strategies, rather than truly improving on their ability to take others' perspective. The authors noted, however, that the study demonstrated that solutions to false belief tasks can be taught. No changes were noted on parent and teacher follow-up regarding social interaction improvements in home or school settings.

Fisher and Happé (2005) investigated the effects of two separate intervention programs that compared ToM to executive function performance in ten children with

autism in each condition. Training occurred for 25 minutes each day for 5 to 10 days total. Ages of participants ranged from 6 years, 5 months of age to 15 years, 3 months. A total of 27 children participated in the study; twenty with a diagnosis of autism, one with a diagnosis of Asperger Syndrome, and six who were described as having significant social and communicative disorders. Children were randomly assigned to either the ToM or executive function intervention group. Baseline measures of understanding and performance on various ToM tasks, executive function abilities, and overall functioning levels were recorded. Results indicated that children in the ToM group learned how to pass ToM tasks and that these results continued to be demonstrated 6 to 12 weeks post intervention. Conversely, participants from the executive function group did not demonstrate an increased ability to solve executive function tasks post intervention. Interestingly, the executive function group improved on theory of mind tasks, perhaps due to the fact that there are common cognitive structures which form pathways similar to those that affect the ability to interpret ToM tasks. In conclusion, the authors remarked that children with autism demonstrated some generalization of theory of mind tasks to untrained scenarios and that this learning was continued at follow-up.

Gevers, Clifford, Mager, and Boer (2006) implemented a training program based on theory of mind and social cognitive skills for eighteen children with Pervasive Developmental Disorder, Not Otherwise Specified (PDD/NOS), ranging in age from 8 to 11 years. All children had an IQ above 85. Treatment involved 21 weekly sessions for one hour each provided to a small group of children simultaneously. In addition, parents received simultaneous psychoeducational

sessions for 5 months. Results indicated that the participants had significant success on perception and imitation tasks, first order belief, pretense and understanding of humor. Their parents rated them significantly higher on adaptive behavior, interpersonal relationships, play and leisure and social skills on the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) after the intervention ended.

No progress was noted by participants in Gevers et al.'s study (2006) on recognition of emotions, distinguishing between a physical and a mental act, false belief understanding and second order belief. However, when these results were considered in light of the participants' relatively high scores on these skills pre-treatment, there was little room for improvement. None of the children demonstrated a pre-treatment difficulty with emotion recognition on the ToM test. In conclusion, these results demonstrated that children with PDD-NOS benefited from social cognitive training focusing on ToM tasks when provided together with a parent training component.

Feng, Lo, Tsai, and Cartledge (2008) looked at the effects of an eight week social skills training program that addressed ToM concepts with a sixth grade high functioning student with autism. The student was given the *Test of Theory of Mind* (Feng, 2001) both pre- and post- intervention. The program contained one ToM section and one social skills section. The ToM section of the intervention program involved identifying basic emotions in self and others, controlling anger, identifying basic beliefs, understanding first order false belief, second order false belief, and expressing needs appropriately. Targeted social skills included expressing feelings

appropriately, greeting and initiating conversation, explaining thoughts and maintaining conversation. Other targeted skills involved decreasing the number of inappropriate social interactions, mostly notably inappropriate use of language, physical aggression and threatening, nonresponding and interrupting.

Results of Feng et al.'s study (2008) indicated that the eight week training program at the student's school produced benefit, not only in terms of skill gain and better performance on the *Test of Theory of Mind* (Feng, 2001), but in maintenance of the skills in the three weeks post study. In addition, the student generalized skills from the teaching context to multiple other classrooms in the school and outside of school. His appropriate social initiations increased dramatically, along with a decrease in inappropriate social overtures. The authors noted that a significant limitation to the study was the lack of a clear functional relationship between the intervention and the targeted skills taught during the study.

Peterson, Garnett, Kelly, and Attwood (2009) conducted two studies that examined whether or not students applied ToM skills in everyday social and conversational interactions with others. In the first study, parents of 85 children with autism, 230 with Asperger Syndrome, and 24 typically developing children were surveyed using a ten item questionnaire, Everyday Mindreading Skills and Difficulties (EMSD). This questionnaire was designed to test the links between performance on false belief tasks and social interactions in everyday contexts. Test results indicated that the measure was psychometrically sound, differentiated between typically developing children and those with autism spectrum disorder, and resulted in a slightly modified version of the EMSD for Study 2 participants.

For study two (Peterson et al., 2009), fifteen children with autism and 10 typically developing children, ages 5 through 12 were the participants along with 8 of their classroom teachers. All children were given a standard battery of false belief tasks, followed by their teachers filling out a shortened, eight item version of the EMSD. Seven children with autism and seven typically developing children passed at least three of the four false belief test questions. Children who passed the false belief tasks were rated as having fewer everyday social problems on the EMSD rated by their teachers. The authors suggested that the necessary components of successful social interactions with others by children are, at least in part, due to the understanding of broad concepts associated with ToM.

To date, one of the only randomized, controlled trials of children with autism and ToM concepts was conducted by Begeer et al. (2011). In their study, forty Dutch children with high functioning autism (IQ within normal range), ranging in age from 8 to 13, participated in a 16 week treatment group for 90 minutes each week. While the initial sessions focused on conversational skills, learning to assess certain social situations and recognizing emotions in others, the latter sessions focused on first and second order false belief tasks. Although children improved on their ability to cognitively understand ToM concepts, this did not translate to improved social functioning, as described by their parents or on self reports of empathy.

Gould, Tarbox, O'Hora, Noone, and Bergstrom (2011) explored teaching what another person could see by following the position of their face and gaze to three children with autism, ranging in age from 3 years, 10 months to 5 years, 1 month. Intervention was conducted in the home setting using a table top format in which the

children with autism would sit and attend, match items, and follow visual prompts. The children were shown pictures in a field of five, with a person's face facing a particular item. Lines were drawn by the teacher from the person's eyes to the item that they were looking at, and gradually faded after success had been demonstrated. The children were asked "What does he/she see?" All participants demonstrated significant gains over baseline in number of correct responses. However, generalization probes were less impressive, ranging from 44 to 66 percent accuracy. The authors noted that perhaps teaching in the natural setting (not the contrived table-top setting) to begin with may improve generalization of skills.

Studies using thought bubbles to teach Theory of Mind concepts. Wellman et al. (2002) examined whether the addition of thought bubbles in teaching ToM concepts allowed children with autism to acquire a ToM alternative. Two studies were conducted, the first with seven children and the second with ten children. Children with autism in the first study ranged in age from eight to eighteen and were tested for verbal mental age using the *Test of Reception of Grammar* (Bishop, 1983). Verbal mental age for all participants ranged between four years to six years, six months.

In both the first and second studies by Wellman et al. (2002), cardboard figures were presented in a series of six stages involving the Sally Anne (Baron-Cohen et al., 1985) false belief task as pre-test evaluations without thought bubbles, as well as the Smarties test. Post-test evaluations involved stuffed bears in a change of location false belief task. During stage one teaching, a cardboard figure was presented with a thought bubble above. The teacher instructed the children that

because Sally is looking at a ball, she is thinking about a ball and then added the thought bubble with written information “Sally is thinking about the ball”. The children were then given the conceptual information that when people looked at things, they were thinking about them. Comprehension of the task was evaluated with further questioning involving different scenarios.

Stage two teaching related to thinking about objects not visible that remain the same. During this stage, children were given the information that Sally can think about things that they are not presently viewing. Examples were given of Sally looking at an object, then getting a thought bubble with the object inside it, and finally leaving the room with the same thought bubble. This represented that her thoughts stay with her even though she can’t see the object.

Stage three involved thinking about objects that are not visible that have changed. In this stage, children were told that Sally’s perception of the environment is based on what she has seen. If she looks at an object and then leaves the room with her thought bubble, when she reenters the room, she will think that nothing has changed because she has not seen anything change. Demonstrations involved Sally looking at the room after she reenters it and subsequently having to change what is in her thought bubble because the room has changed.

In stage four, children were taught about how to predict location of objects in the future. For instance, Sally was shown putting a ball in a basket next to a box. Sally then takes her thought bubble, stating that the ball is in the basket and leaves the room. When she thinks about the ball, she believes that it is still in the basket. So

when she comes back in the room, she will look for the ball in the basket where she put it.

In stage five, children were shown how to predict the location of hidden objects that had been moved. Sally was shown placing a preferred toy in a box prior to leaving the room. The teacher then moved the object to a new location and demonstrated that when Sally reenters the room, she will believe and look for the toy in the box even though it is not there anymore. The children were then told that she was wrong to look in the box and explained the humor involved in looking for something in the wrong location.

In stage six, the Sally Anne task was presented as in the Baron-Cohen et al. (1985) study, without thought bubbles as aids, as in the original pre-test for the study. The children were given the information to think about the thought bubbles, even though they weren't there, because in real life, one can't see thought bubbles.

Results for both Wellman et al. (2002) studies, confirming outcomes from other picture-in-the-head research, demonstrated that children with autism significantly improved in false belief understanding to progress through some of the six stages of teaching. Although the stage reached for each child varied on examination, all children demonstrated improvement. The authors noted that in post-test tasks, results were generalized to novel contexts effectively, demonstrating that the children were likely using taught strategies to solve new problems.

Kerr and Durkin (2004) also explored the use of thought bubbles with children with autism as it relates to ToM concepts. Twelve typically developing preschool children and eleven children with autism were tested on a widely used false belief

task. Mental age for the children with autism ranged from 3 to 4 years, while their chronological age ranged from 3 to 6 years. The *Peabody Picture Vocabulary Test* – 3 (PPVT) (Dunn & Dunn, 1997) was used to estimate mental ages. The Sally Anne false belief task was administered, followed by a task using thought bubbles to familiarize the children with the materials and the concept. There were several stages within the thought bubble tasks, including actions, actions on objects, thinking about objects, and thinking and acting about two different things. Finally, a thought bubble false belief task was given to all participants.

A comparison of participant groups on the standard false belief task followed by the thought bubble false belief task was not possible due to the fact that all of the twelve typically developing children failed the standard false belief task (Kerr & Durkin, 2004). Interestingly, although nine children with autism failed the standard false belief task, two others passed. When a comparison was made excluding the children who failed the standard false belief task, the results demonstrated that five out of five typically developing children fared better than those who failed the thought bubble false belief task, whereas six out of seven children with autism performed similarly to the typically developing children.

Paynter and Peterson (2013) demonstrated further benefits for twenty-four children with autism using thought bubbles to solve ToM tasks. These authors used a five task battery developed by Wellman and Liu (2004) that involved initial training on the purpose of thought bubbles, followed by thinking about things that can't be seen; when objects change; thoughts remain the same unless they are seen

changing; thoughts can direct people's searches for hidden things; and incorrect thought bubbles will direct a person's actions futilely.

In addition to the Wellman and Liu tasks, Paynter and Peterson (2013) added a sixth stage, which involved the concept that different people have different thoughts about the same object depending on what they last saw. In further contrast to the Wellman et al. (2002) study, participants were not post tested until it was determined that they had met criteria to pass all six stages. Results indicated significant improvements on false belief tasks when thought bubbles were used, further replicating the findings of Wellman and Liu (2002). Extending those findings, Paynter and Peterson (2013) demonstrated that study participants passed a generalization false belief task with an incorrectly labeled container. Perhaps most surprisingly, they generalized to a nontrained false belief task that involved hiding emotion. A three week post study follow-up demonstrated continued improvements in these areas.

Studies describing performance on Theory of Mind tasks. Peterson, Wellman, and Liu (2005) explored steps in ToM development as it relates to children with autism and children with deafness. The authors sampled 145 children ranging in age from 3 to 13 and categorized participants into four groups. The four groups were composed of 11 children who were judged to be either severely or profoundly deaf and from early native signing families, 36 children who were also either severely or profoundly deaf from late signing homes, 36 children with autism, and 62 typically developing preschoolers. Children in the early signing home category lived with one or more parents who were native signers and proficient in sign language, whereas a

late signing home was defined as containing hearing family members and no deaf family members. Native and late signing children were classmates in Total Communication classes where Signed English was augmented by lipreading, fingerspelling and Auslan (Australian Sign Language). There were no comorbid or confounding conditions in either group containing children who were deaf.

The thirty-six children with autism in Peterson et al.'s study (2005) ranged from six to fourteen years of age. All thirty-six children were deemed to be "high functioning", defined as achieving at least an age equivalent score of four years of age on the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 1981). The mean VMA (verbal mental age) was calculated to be 7 years, 10 months of age. Most of the VMAs were below chronological age of the participants. None of the thirty-six children with autism had additional disability diagnoses such as intellectual disability or deafness, for example. The typically developing children group was comprised of three and a half to five and a half year olds attending a government-funded preschool facility adjacent to the children in the other three groups.

Children in all four categories were given five tasks, related to differing beliefs, desires, access of knowledge, false belief and hidden emotions (Peterson et al., 2005). All children were given control questions (i.e., What is in the box?, Did he look in the box?) to demonstrate accurate understanding of the tasks given to them. To be scored as correct, the child's answer did not have to be identified as the correct emotion, instead only validated as such by responding to the follow up question in a manner that demonstrated comprehension of the labeled emotion (i.e., He was sad because the children were teasing him.)

On the diverse desires task, a correct answer was judged to be so if the child said or signed that the food that an adult would choose was based on the adult's preference rather than his or her own (Peterson et al., 2005). On the diverse belief task, the child needed to respond that the child in the scenario would look in a different place for their cat than the one they would look for it. For the knowledge access task, children were shown a drawer with a toy dog in it. They were then asked to answer whether or not a doll who has just entered the room would know where to look for the toy dog. On the false belief task, children were asked to identify what was in a standard Band-Aid box. When they were given the answer that was contrary to their own belief (i.e.,a toy figurine pig), this was followed up with what they believed a doll would think was in the box given that the doll had not previously seen what was there. Finally, on the hidden emotion task, a scenario was given that demonstrated that a girl had teased a boy and other children had laughed in response. Children were told that the boy did not laugh nor did he think it was funny, but if the other children saw that he felt sad, they would tease him and call him a baby. The examiner then asked the participants how the boy really and truly felt when everyone laughed and teased him. Pictures with varying emotional states were provided for respondents. A follow-up question was posited that had to do with why the boy tried to look a particular way based on the child's initial response to the question.

Results on the false belief task indicated that the native signing children in the Peterson et al. (2005) study outperformed every other nontypical group. Although the typical preschooler group younger than 4 years of age failed false belief, that

group was younger on average than other groups' participants. As expected, typical preschoolers of four and a half years of age significantly outperformed every other group as in previous research in this area.

Peterson, Slaughter, and Paynter (2007) conducted two studies that compared ToM development as it relates to social maturity in typically developing children and children with autism. Thirty seven preschool children with autism served as subjects in the first study, who were all given the *Peabody Picture Vocabulary Test* – 3 to establish a verbal mental age. Three false belief tasks were also given to each participant, one that involved a change in location, a second that involved a box that contained something contrary to what had been labeled on the outside, and finally, a third task that asked the children how a puppet would feel based on looking at the contents of a box. Teachers provided social maturity ratings using the Social Maturity Scale for all children.

In the second study, Peterson et al. (2007) examined development of ToM abilities in forty-three children with autism ranging in age from 4 to 12 years. Two typically developing control groups consisted of eight primary school children and eight typically developing preschoolers. All participants undertook false belief tasks similar to those in the first study. The seven item Social Maturity Scale was also given to participants by their teachers. Results from both studies indicated that typically developing preschoolers demonstrated a connection between ToM and social maturity irrespective of age and verbal ability, whereas children with ASD demonstrating ToM skills did not necessarily have similar social maturity ratings by teachers.

As suggested by Frith et al. (1994), Peterson et al. (2007) contended that there are likely a subset of children with autism, particularly those with Asperger Syndrome, that use a “hacking” procedure that enables them to figure out the overall concept versus a true understanding of social situations. Instead of being able to use an internalized ability to determine how others think in real time, children with autism “hack” the concept being taught in a controlled situation by following a rote set of rules. These “rules” may be ideas that seeing leads to knowing (i.e., if I follow a person’s eyes, I can figure out what they are thinking about). Although this may be generally true, this may not allow for any flexibility in the real world, thus leading the child with autism to make incorrect assumptions that are not based in the present context. Although “hacking” would theoretically lead to higher scores on ToM tasks, as was demonstrated in these studies, it would not indicate a similarly high degree of social maturity or use of social strategies in real world contexts. The authors also noted that children with autism may need additional motivation and sensitivity to peers’ approval or disapproval in order to use social understanding skills in natural contexts.

Studies examining the relationship between teaching Theory of Mind and real world situations. Brent, Rios, Happé, and Charman (2004) looked at the performance of higher level ToM tasks by twenty high functioning children with autism (IQ >70), ranging in age from six to twelve. Participants were given a revised Strange Stories test (Happé, 1994), an adaptation of the Cartoons task (Happé, Brownell, & Winner, 1999), and the Eyes task for children (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). In the revised Strange Stories test,

children had to complete five mentalizing and five physical control stories. For the mentalizing tasks, children were asked to identify the underlying meanings behind messages, lies and white lies, double bluffs, persuasion and misunderstandings. For the physical control tasks, participants had to give a practical or physical reason for a character's utterances or actions. Regarding the Cartoons task, children were asked to explain why a series of black and white pictorial scenes were funny. On the adapted Eyes task for children, twenty-seven photographs of faces were shown and participants were asked to choose from one of four possible words what the people were thinking or feeling.

Results demonstrated that higher functioning children with ASD performed worse than controls on the mentalizing portion of the Strange Stories task and the Eyes task (Brent et al., 2004). Children with ASD and controls performed similarly on the physical and mentalizing aspects of the Cartoon tasks, as well as the physical portion of the Strange Stories. The authors noted that the "hacking" strategy proposed in other ToM research as a possible reason for improved ToM was not indicated, although participants were not directly asked what strategy they had used to determine answers. The researchers suggested that different mentalizing abilities were used to correctly identify emotions on the Eyes task versus those on the Strange Stories and Cartoon tasks.

Kaland, Callesen, Moller-Nielsen, Mortensen, and Smith (2008) also examined performance of children with high functioning autism or Asperger Syndrome on advanced ToM tasks. Twenty-one participants were given the Eyes task (Baron-Cohen et al., 2001), the Strange Stories task, and the Stories from

Everyday Life (Kaland, Moller-Nielsen, Callesen, Mortensen, Gotlieb, & Smith, 2002). Nineteen of the twenty-one participants passed commonly given first and second order ToM tasks (i.e., What is the girl thinking (First Order ToM Task), What does the boy think the girl is thinking (Second Order ToM Task) before proceeding on to the tasks in which data was collected.

Child and adult versions of the Eyes task (Baron-Cohen et al., 2001) were given to all of the participants, which differ in simple (i.e.,happy, sad, angry, scared) versus complex (i.e.,hateful, insulting, jealous, joking) mental state representations, respectively (Kaland et al., 2008). The Strange Stories task focused on understanding the underlying meanings behind statements that did not correspond to the actual words that were uttered. The Stories from Everyday Life (Kaland et al., 2002) is slightly more contextually difficult than the Strange Stories scenarios, however, there is considerable overlap in exploring understanding of lying, bluffing and misinterpretations.

Results from Kaland et al.'s study (2007) indicated that children with Asperger Syndrome did not perform as well on the Eyes task, the Strange Stories task or the Stories from Everyday Life when compared to controls. There were no correlations between aspects of performance on the Eyes task when compared to the mentalizing portion of the Strange Stories task. As mentioned above in Brent et al. (2004), there may be different abilities that are tapped in figuring out Eyes tasks versus story tasks, however, that was not borne out in the current study results.

Philpott, Rinehart, Gray, Howlin, and Cornish (2013) examined mental state understanding in later childhood by comparing performance on a standard,

established ToM task (Baron-Cohen et al., 2001) versus that on a newly developed Comic Strip Task (CST) (Cornish, Rinehart, Gray, & Howlin, 2010). Twelve children with high functioning autism spectrum disorder (IQ > 70), ranging in age from nine to thirteen years, comprised the experimental group, while twelve control subjects were matched across verbal and mental age, as well as verbal and performance IQ on the WASI (Wechsler Abbreviated Scales of Intelligence) (Wechsler, 1999) or other similar test from records in the past two years.

Tasks on both the Reading the Mind in the Eyes Test (RMET) (Baron-Cohen et al., 2001) and the novel Comic Strip Test (CST) (Cornish et al., 2010) involved control items, along with emotion recognition, beliefs and intentions. Results from Philpott et al. (2013) indicated that performance on the CST was not associated with the RMET either in the combined sample or when groups were examined separately. This would seem to suggest that the CST reveals different abilities than the RMET. In addition, neither verbal nor performance IQ was correlated with total scores on the CST. Somewhat surprisingly, results did not differ between the control and ASD groups on either ToM test. The authors suggested that this result indicates that the deficits that occur in children and adolescents with ASD in the real world do not necessarily carry over to the contrived laboratory setting, where context and extraneous stimuli are not factors that affect performance.

Matthews et al. (2012) examined ToM abilities in children with autism, comparing those diagnosed with early onset and those with regressive type. Sixty-five participants were enrolled in the study, including fifteen children with early-onset autism, seventeen with regressive type, and thirty-three who were typically

developing. The Peabody Picture Vocabulary Test – III (PPVT III) (Dunn & Dunn, 1997) was used to determine approximate verbal abilities in all subjects, while performance IQ was measured using either the Stanford-Binet or the Mullen Scales of Early Learning.

Participants in Matthews et al. (2012) were all selected from a larger, national study on autism or from community-based autism events. The authors noted huge discrepancies in the range of verbal and nonverbal intelligence across experimental and control groups. On nonverbal tests of intelligence, children with early onset autism received scores between 54-106, while those in the regressive autism group varied from 62-114. Regarding verbal intelligence, children with early-onset autism ranged from 40-114, children with regressive autism between 42-109, and typically developing children between 87-145.

Four widely-used ToM tasks were used in Matthews et al.'s (2012) study, including the change of location task, the altered contents task, as well as verbal and nonverbal versions of the appearance-reality task (Flavell, Flavell, & Green, 1983; Sapp, Lee, & Muir, 2000). The names of the characters and the objects involved were changed between the first and the second sessions in order to provide similar but not identical scenarios. Results indicated statistically significant differences across all four ToM tasks and all groups using Fisher's exact tests. Full pass scores were significantly higher for the typically developing group when compared to both the early-onset and regressive autism groups of children. Data also indicated significant differences between the early onset and regressive groups on three of the four ToM tasks, with the early onset group performing less well. The two autism

groups performed similarly on the change of contents ToM task. These results would suggest that the typical early development experienced by children with regressive autism allowed them to develop at least some compensatory ToM abilities, resulting in higher scores on these measures.

Peterson and Slaughter (2009) explored the possible links between eye-reading and false belief understanding in twenty-two children with autism ranging in age from six to thirteen, and sixty-five typically developing people in three control groups (11 matched elementary school age, 37 ToM matched preschoolers and 17 adults). All four groups were given a novel test, the Simplified Eye Reading Test (SERT). The SERT was designed to present age and developmentally appropriate eye reading tasks for children who were preliterate, regardless of whether autism was present or not.

Peterson and Slaughter (2009) adapted the SERT based on the majority of items developed by Baron-Cohen et al. (2001) on the Reading the Mind in the Eyes Test (RMET). Instead of four possible answers as in the RMET, two were presented on the SERT, one correct and one incorrect. This was done in part, to control for issues related to vocabulary development in the younger children. Test scores were examined for potential correlations between performance on the SERT and results from a longstanding battery that included the Sally Anne task and a false belief emotion task.

Results indicated that the SERT demonstrated test-retest reliability, was not vulnerable to guessing and had internal consistency, all indicators of psychometrically sound measurements. In regards to eye reading, one striking

finding was that children did as well as adults on 44% (four of the nine) of items, particularly in terms of the state of being “upset”, which the three groups of children scored equally well as adults. In addition, children with autism and typically developing peers not only matched adults, but scored close to ceiling levels (75% or more) on about half of the test items. In terms of total test scores on the SERT, there was a significant difference among all four groups. Ten of the children with autism failed at least one of the two false belief tasks, while none of the typically developing children did so. Peterson et al. (2009) suggested that results on the eye reading tasks “firmly establish” the correlation with false belief tasks, though many other authors in this review are less convinced of this correlation.

Hamilton, Brindley, and Frith (2009) examined level 2 visual perspective taking on a group of twenty-three children with autism, all chronologically about 8 years old. Mental age of these children was established to be around four years, correlating with the same time that ToM in terms of false belief tasks should be established. A control group of sixty typically developing children ranging in age from four to eight was used in this study.

Level 2 visual perspective taking involves the concept that different people may see the same thing differently at the same time, depending on their point of view. This has been classified as a mentalizing task, and thus Hamilton et al. (2009) expected the children with autism to perform poorly on this, as it is similar to false belief tasks. To date, the data had been inconclusive in reports from other studies.

All participants in Hamilton et al.’s study (2009) were given the British Picture Vocabulary Scale (Dunn, Dunn, Whetton, & Burley, 1997) to establish verbal mental

age. Most of the participants were also given a standard battery of false belief tasks, such as those that elucidate responses related to desires, knowledge access, false contents and explicit false belief (Wellman & Liu, 2004), as well as the Sally Anne task (Baron-Cohen et al., 1985). The ToM battery was not given to 22 older typically developing children, as the tasks would have been considered too simple.

Regarding the visual perspective taking task, participants in the Hamilton et al. study (2009) were asked to determine whether a toy panda was presented at a 0 degree, 90 degree clockwise, 180 degree, or 90 degree counter clockwise position. The toy panda was then covered. Based on the viewpoint of a doll, children were asked to then determine in which of these four positions the doll would see the panda. For the mental rotation task, brightly colored tape was placed on each of the four positions to represent the degree of rotation. Children were then asked to determine what position the panda was presently in, using the cues provided by the colored tape.

As expected, the results on the false belief tasks demonstrated that the children with autism in Hamilton et al.'s study (2009) performed significantly poorer than controls. For typically developing children, performance levels on the mental rotation tasks were significantly better than those on the level 2 visual perspective taking tasks. Children with autism performed better than controls on the mental rotation task and worse on the level 2 visual perspective taking tasks.

Social Cognition

Preverbal infants, apes, and monkeys share many of the basic capacities of human social cognition (Saxe, 2006). They understand goal related connectedness

in response to real world problems, such as how to access food. Furthermore, these groups understand that they often must connect with one another to achieve these goals, predict others' behaviors and determine their intentions (Saxe, 2006).

Tomasello, Carpenter, Call, Behne, and Moll (2005) examined the origins of understanding and sharing intentions as it relates to apes, children with autism, and typically developing children. The authors suggested that although apes and some children with autism demonstrate an understanding of the foundations of intentional actions, they do not generally engage in activities that form shared intentionality, also called joint attention. The authors describe how during the first 14 months of human life, two pathways connect in the brain. The first pathway, which is shared with apes, relates to the recognition that others are goal-directed, intentional agents who can act on the world to produce desired outcomes. The second pathway, which is arguably uniquely human, is the motivation to share emotions, experiences and activities with others. As a result of children developing these two pathways, cognitive sets are formed, allowing them to participate successfully with others in the world.

In a broad sense, social cognition involves how one thinks about social interactions, how we interpret other people's actions and how we adjust our own actions based on the reactions of others (Buron, 2007). Obviously, for children with autism, the ability to take perspective of others and then adjust their own actions accordingly, often proves to be challenging. Although they may acquire the first pathway described by Tomasello et al. (2005), the second pathway often proves to

be more challenging, both in terms of the underlying motivation and the understanding of why one needs to engage with others.

Empathy

A definition of empathy is at best, difficult, when trying to describe what one person is feeling in response to another's demonstration of emotion. It has been suggested that there is a differentiation between cognitive and emotional empathy (Smith, 2006). Cognitive empathy can be defined as "mental perspective taking" (Smith, 2006, p. 3), while emotional empathy can be defined as "vicarious sharing of emotion" (Smith, 2006, p.3). Others have suggested that empathy can be divided into three categories: cognitive, emotional, and compassionate (www.danielgoleman.info). For the purposes of this study, it can best be described in terms of cognitive empathy, the ability to take perspective mentally.

Video Modeling

Video modeling has been represented in the scholarly literature for several decades, first through the use of VHS videotapes, to currently used handheld technologies, such as the Ipad. It is grounded in social learning theory (Bandura, 1969) suggesting that learning occurs through observation. It is a behavioral strategy that presents video recorded images rather than live action to teach concepts. This allows for the child to observe and focus on the videotape as the teaching stimulus. In video modeling intervention, the goal is primarily to help the learner memorize, imitate, generalize or adapt targeted behaviors from video presentation (Buggey, 2005).

Children with autism have been categorized primarily as visual learners, rather than auditory or kinesthetic (Janzen, 1996). As a result, many of the more successful intervention programs for children with autism have focused on presenting material in the visual modality. These include activity schedules, picture communication systems, and Social Stories (Bondy & Frost, 1994; Gray & Garand, 1993; Schopler, Mesibov, & Hearsey, 1995). Because the focus of video modeling is on the video format and not a live person, it is suggested that it may be a particularly useful tool to teach children with autism, who often do not attend to or become significantly stressed by face-to-face, real time interactions with others.

There are several types of video modeling that include those that employ adults or peers as models, video self-modeling (VSM), point-of-view models, and mixed models. In the adult model format, either familiar or unfamiliar adults model the targeted behavior for the learner. Peer video modeling can also involve familiar or unfamiliar peers, but generally uses a peer who is close in age to the targeted learner. Video self-modeling is a technique that involves videotape of the learner performing appropriate behaviors in context and is shown in an effort to increase the rate or number of occurrences of the targeted behavior(s). Point-of-view video modeling involves the focus of the video on the hands of the person doing the actions, thus the learner watches the video and perceives him or herself engaging in the targeted action (Hitchcock, Dowrick, & Prater, 2003).

In a review of the different types of video modeling and their effects on children with autism, McCoy and Hermansen (2007) examined research studies using video modeling over the past thirty years. Studies included for review had to

be peer-reviewed, research studies that included at least one participant diagnosed with autism spectrum disorder. A total of 34 studies from 30 research articles were selected, published between 1987 and 2006. Overall data from these 34 studies indicated that adult, peer, self, and visual point-of-view as models have all been used successfully with children with autism. The authors stated that “the models with the most significant impact seem to be self and peers” (p. 208).

Shukla-Mehta, Miller, and Callahan (2010) reviewed the video modeling literature for the purpose of evaluating the effectiveness of video instruction on social and communication skills training for children with autism spectrum disorder. They confirmed McCoy and Hermansen’s (2007) findings that indeed, all types of video models could be effective with children with autism. They concluded that the type of model (i.e.,adult, peer, self, or point-of-view) did not impact the learning process for children with autism.

Theory of Mind Discussion in Scholarly Literature

Hutchins and Prelock (2008) discussed considerations and gave recommendations to support ToM development for interventionists providing services to individuals with autism spectrum disorders. They described a case vignette of a young child with autism who had positive results in terms of social understanding and behavior based on the use of Social Stories and Comic Strip Conversations (Gray, 1998). The authors stated that although their findings were speculative in terms of assuming causality between the intervention and ToM, there are other potential factors that may influence social cognitive awareness in children

with autism. Chief among them would be strategies that engage learners in motivating, meaningful activities that involve opportunities for joint attention.

To date, there have been few studies which directly attempted to investigate whether the core symptoms of autism (i.e., social reciprocity and communication deficits) are directly related to ToM impairment. Early studies reported significant correlations between social communicative functioning and ToM performance, but those correlations were no longer significant when age and language level were included as controls (Tager-Flusberg, 2007). Another factor that appears to have negatively influenced ToM as the source of social communication difficulties in autism is that false belief tasks have been used as the sole indicators of ToM performance. Tager-Flusberg (2007) argued that social and communication development begins in typically developing children long before ToM appears at about age four.

In recent years, a faulty mirror neuron system (Oberman & Ramachandran, 2007) has been suggested as responsible for core deficits in children with autism. It has been suggested that the mirror neuron system is responsible for a much wider range of skills than false belief tasks, namely facial recognition, imitation and empathy (Williams et al., 2006). Tager-Flusberg (2007) suggested that future directions around the ToM hypothesis and the mirror neuron system involve longitudinal behavioral studies beginning in infancy before core autism symptoms surface, along with systematic neuroimaging studies. In short, no single hypothesis appears to be able to explain the full range of symptoms present in children with autism.

Many social cognitive strategies receive extensive use in clinics and school communities prior to or instead of being researched for effectiveness in controlled conditions. One of the more widely used today is Social Thinking® (Winner, 2005). In comparison to social skills intervention which target the skills themselves and which typically demonstrate little benefit or generalization (Belllini, Peters, Benner, & Hopf, 2007) in real world situations, Social Thinking® attempts to address the underlying mechanisms associated with social deficits by getting to "why" we need to use social skills with others. To date, there has only been one study, a brief report, specifically evaluating the effectiveness of teaching social thinking concepts to children with Asperger Syndrome (AS) and High Functioning Autism (HFA) (Crooke, Hendrix, & Rachman, 2008).

Crooke et al. (2008) taught six students with HFA or AS, ranging in age from 9 to 11, several concepts related to Social Thinking, including (a) Looking = Thinking, (b) Expected vs. Unexpected Behaviors, (c) Whole Body Listening, (d) Social Files, and (e) Filtering Verbal Behavior. All of these concepts were taught in the context that others have thoughts about us all of the time, and that our actions result in consequences in terms of how others think about us. These concepts are certainly aligned with perspective taking and the ToM hypothesis espoused by Baron-Cohen and others. Results from this brief report indicated that five of the six students decreased unexpected behaviors, while all six students increased expected verbal behaviors to either a moderate or very significant level. Significant increases for all students were also reported in terms of initiations, whole body listening and thinking with their eyes. In contrast to the majority of social cognitive interventions,

performance was not measured on the basis of false belief task performance, instead it was measured based on videotaped review of the children interacting in a nontreatment site, which allowed the evaluators to track not only number of occurrences of targeted behaviors, but also generalization of the concepts.

Discussion

From the available research, it appears that successful social cognitive interventions with children with autism need to (a) use technology in the context of viewing another person or themselves engaged in targeted behaviors, (b) provide social communication opportunities for joint attention and shared meaningful experiences with others in a motivating way, and (c) build on the strengths of children with autism by incorporating visually rich teaching environments. *Movie Time Social Learning* (MTSL) (Vagin, 2012) incorporates these components. However, there is little or no guidance from the scholarly literature on this intervention as no research studies have examined its use. MTSL is based on the social cognitive framework provided by Social Thinking® (Winner, 2005). To date, this study is the first intervention research to examine the effects of using Movie Time Social Learning on emotion recognition, perspective taking and empathy in children with autism.

What has been gleaned from the review of literature on ToM, a delineation of concepts and developmental levels is presented below (see Table 1). These concepts represent developmental progress in sequential order for typically developing children; however, for children with autism, the level of functioning may not cleanly fit into one particular level. For example, a child with autism may have

the ability to “hack” out that a child is thinking about something based on following the child’s eyes toward a target but not be able to identify an emotion on the child’s face.

Chapter 3 – Methods

Introduction

Children with autism spectrum disorder typically have difficulty developing effective social communication skills, partly due to underlying social cognitive deficits that are at the core of ASD. In addition, children with ASD do not typically respond well to interventions that are based on traditional models of social learning and human motivation. As a result, effective interventions for children with ASD tend to be individualized based on motivational factors for each child. One area that tends to be positively motivating for many children with ASD is movie viewing.

I used a social cognitive framework based on the research of Baron-Cohen et al. (1985) and others as a framework for my dissertation study. This framework suggests that the underlying social cognitive deficits in children with ASD, particularly in the ability to decode emotional states, take perspective, and demonstrate empathy, are the critical factors in the lack of development of effective social communicative expression and understanding. Incorporating a motivating, visually-based intervention to address social cognitive deficits may be a valuable tool in furthering the development of social communication skills in children with autism.

Purpose of the Study

The purpose of the current study was to explore the effectiveness of a social cognitive intervention, Movie Time Social Learning (MTSL), on recognizing emotion, taking perspective, and demonstrating empathy, of children with autism. MTSL incorporates the use of movies to teach children with autism about emotional understanding, perspective taking and empathy. MTSL is based on the principles of

Social Thinking® (Garcia-Winner, 2005), namely that others have thoughts and we can try to figure them out.

Selection of Participants

Participants were selected from individuals served by the principal investigator's private clinical therapy agency. Approval from IRB was secured and followed by the principal investigator. Enrollment in other therapy services at the principal investigator's clinic was not adversely affected by parents either choosing to enroll or not enroll their child in the study. This was clearly explained by the principal investigator to the parents prior to them giving consent for their children to participate and was stated in writing on the consent form (see Appendix A).

Criteria for enrollment in the research study were based on (a) the child's verified autism spectrum disorder diagnosis, (b) the child's perceived lack of progress in traditional intervention approaches, (c) the child's perceived motivation to attend to movie formats, and (d) information from the family that this intervention would be beneficial in terms of learning how to engage and teach their child in other settings.

Selection of participants was based on the determination that the child indeed lacked the skills targeted by this intervention. In order to target participants who were more likely categorized as Moving Up Mindreaders (Vagin, 2012) (see pp. 66-68), a review of skills associated with Moving Up Mindreaders was informally discussed with parents during intake to determine if the potential participant was demonstrating those skills. An upper age cutoff of ten years was used in order to

keep participants as close in age as possible to the ages of the children shown on the baseline video clips (see p. 58), thus representing their potential peer group.

Each parent of a potential participant was given a consent form (see Appendix A) that clearly explained the research that the principal investigator was proposing. The principal investigator verbally explained the proposed research study to the parents before they were asked whether or not they were interested in their child participating in the study. Verbal assent from children was asked for by the principal investigator after the parents had given consent. Only children whose parents provided informed consent were selected for participation.

Based on the above criteria, three children with autism were chosen for participation in this intervention. Participant 1 was an Asian-American, eight year old male with a medical diagnosis of autism. He was being homeschooled in the third grade during this study. Participant 2 was an Hispanic, nine year old male with a medical diagnosis of autism, who was in the third grade in a local Albuquerque public elementary school. Participant 3 was an Hispanic, nine year old female with a medical diagnosis of autism, who was in the third grade in a local Albuquerque public school.

Prior to the beginning of the study, the principal investigator discussed issues regarding Participant 2 and Participant 3 with the second clinician. The second clinician was seeing Participants 2 and 3 for one-to-one speech and language therapy at the principal investigator's clinic. The principal investigator made sure that the second clinician did not work on the targets for this study during one-to-one

therapy sessions so as not to raise a potential confounding issue regarding the results.

Verification of Autism Diagnosis

A records review was conducted on all participants' charts prior to the start of the prebaseline sessions in order to confirm the presence of an autism spectrum diagnosis. While completing this review, the principal investigator located either (a) an educational evaluation that documented the participant's educational exceptionality of autism spectrum disorder or (b) a medical diagnostic evaluation that documented a medical diagnosis of autism spectrum disorder. In addition to these documents, the principal investigator and the second clinician's clinical judgment as to whether or not the potential participant had an autism spectrum disorder was used in the overall decision process.

Social Language Development Test – Elementary. In addition to the records review, all participants' charts were reviewed for any testing that might be helpful in determining current level of social functioning. All three participants had been evaluated with the *Social Language Development Test – Elementary* (Bowers, Huisingh, & LoGiudice, 2008) (SLDT) within two months prior to the initiation of this study. The SLDT is designed to assess the social language skills of children ages 6.0 through 11.11. The tasks on this measure focus on taking someone else's perspective, making correct inferences as to emotional state, negotiating conflict with peers, being flexible in interpreting social situations, and supporting friends.

Participant 1 received standard scores of <60 on the following subtests of the SLDT: making inferences, interpersonal negotiation, multiple interpretations, and

total test results, while he received a standard score of 73 on supporting peers. Participant 2 received standard scores of <60 on the following subtests: making inferences, interpersonal negotiation, supporting peers and total test results, which he received a standard score of <69 on the multiple interpretations subtest. Participant 3 received a standard score of <60 on the following subtests: making inferences, interpersonal negotiation, supporting peers and total test results, while she received a standard score of <69 on the multiple interpretations subtest. (See Table 2 for complete results for each participant)**.**

Social Skills Improvement System Rating Scales. After the procedures described above, we asked participants' parents to complete the Social Skills Improvement System Rating Scale (SSIS) (Gresham & Elliott, 2008) as a means for determining each child's current social developmental functioning level. The SSIS is used for children between the ages of 3 and 18 years of age to determine social functioning levels. This instrument assesses four broad areas of learned behaviors that promote positive interactions: communication, cooperation, assertion, and responsibility. In addition, the SSIS provides a brief assessment of problem behaviors that may interfere with a student's ability to acquire or perform social skills. It was scored by the principal investigator and was used in the overall social functioning determination level. Table 3 includes the participants' scores on the SSIS.

All participants scored below age level in all social communication areas assessed by the SLDT. For Participant 1, subtest results on the SSIS were considered below average for communication, cooperation, assertion, empathy, and

engagement, while the subtest of self-control was scored as average, and the responsibility subtest was rated as above average. For Participant 2, the assertion, responsibility, and engagement subtests were rated as below average, while the communication, cooperation, self-control and empathy subtests were judged as average. For Participant 3, the communication subtest was rated as below average, while the cooperation, assertion, responsibility, empathy, engagement and self-control subtests were rated as average.

In terms of the social skills subscales total standard scores, Participant 3 received a standard score of 100 (average), while Participants 1 and 2 received a standard score of 77 and 76 respectively (below average range). All three participants were in the average or above average range in terms of the problem behavior subscales, with standard scores ranging from 109-123. Finally, all three participants were rated as above average on the Autism Spectrum Quotient, receiving scores of 24, 20 and 23 respectively. See Table 3 for detailed results for all participants.

Dependent Variables

The effect of MTSL on three dependent variables was examined in this study: emotion recognition, perspective taking, and empathy. The complexity levels of the dependent variables for children enrolled in the study were slightly variable based on each child's individual developmental levels. For example, Participant 1 was working on lower level emotion recognition (i.e., recognizing sad and scared), while the other two participants were working on more abstract, subtle emotions (i.e., confused,

frustrated, embarrassed and disappointed). The procedures for how these individual targets were determined are described on pp. 57-66.

Emotion recognition. This variable was operationally defined as any verbal response by the participant to label the targeted emotion. For example, a person smiling could indicate “happy”, but also include “excited”, “satisfied” or “relieved” depending on the context in which the facial expression is shown. Any of the above responses could be judged as accurate based on context and will be scored by the principal investigator and the second clinician. An imitation of the facial expression of the person or character on the video did not indicate comprehension of the emotion and was scored as an incorrect response.

Perspective taking. This was operationally defined as any verbal response by the participant that demonstrated an understanding that a person or character on the video had a thought or plan. Accuracy of the type of thought or plausibility of the type of plan expressed by the participant was determined by the context of the video and scored accordingly by the principal investigator and the second clinician. A response by the participant that revealed a thought that was not reasonable based on the context was scored as an incorrect response.

Empathy. This was operationally defined as any verbal response by the participant that demonstrated an understanding that a person or character on the video was experiencing a feeling similar to one the participant had. The empathic response necessitated that the participant had identified the emotion of the person or character in the video accurately. Any feeling described by the participant that was not similar to the dependent variable was scored as incorrect. The participant

had to express the context in which they had felt a similar emotion to the person or character on the video. Simply responding that they had felt a certain way before, or a response of yes or no, was not judged as a correct response.

Study Design

This study employed a single case design using a multiple baseline across skills: emotion recognition, perspective taking, and empathy. There were three phases: (a) prebaseline, (b) baseline, and (c) intervention. A generalization probe was initiated approximately three weeks after the end of the intervention.

Prebaseline

The purpose of the prebaseline phase was to determine specific emotion intervention targets for each participant. This process consisted of several steps: (a) assessing the participants' ability to recognize, take perspective, and show empathy related to four emotions (i.e. happy, sad, mad, and scared); (b) determining participants' social developmental functioning levels; and (c) interviewing parents regarding their priorities for their children's intervention targets.

Prebaseline setting and materials. All prebaseline sessions were conducted in a therapy room at the principal investigator's clinic. The therapy room was approximately 8 feet by 18 feet. All sessions were individually (1:1) held during hours that were available and appropriate for the participants and their families. A 42 inch Spectre plasma TV was used to view the video clips. A Sony DVD player with accompanying speakers was positioned so that the participants saw and heard the video clips easily from a seated position in the therapy room. A Canon Vixia HD Video Camera was used to record all sessions. The participant and the principal

investigator were present in the room at the time of the baseline sessions. Parent(s) of the participants were offered a space in an adjoining room to view the baseline and intervention sessions in real time outside of the view of the participants.

Video models for prebaseline sessions. Four randomly chosen video model presentations, representing each targeted skill (i.e. emotion recognition, perspective taking, and empathy), were viewed by all participants during each thirty minute prebaseline session. During these prebaseline sessions, participants viewed three, one to two minute video clips of typically developing girls of approximately the same age engaged in various behaviors to elicit the participants' ability to: (a**)** label emotions or feelings of happy, sad, mad, or scared**,** and the potential reasons for the feelings (i.e., what do you think _____ is feeling?, why do you think she feels this way?); (b) identify what the child's plan (i.e., What do you think _____ will do next?) in the video clip might be; and (c) express if there has ever been a time when the participant had felt similar to a child in the video clip (i.e., have you ever felt like _____? or can you tell me about a time when you felt _____?).

After the review of records was conducted and indeed confirmed diagnoses of autism spectrum disorder for all participants, prebaseline sessions were initiated to determine the individual participants' emotion targets. We first assessed the participants' ability to recognize "happy", "sad", "mad" and "scared", as well as take perspective and empathize with the child actors in the short live action videoclips. Below are examples of content for each of the emotions represented by the child actors on the short videoclips.

Videoclip for emotional recognition of happy. A one to two minute videoclip of two girls of similar age as the participants was recorded. Child video models introduced themselves by name and said hi to each other. The videoclip then showed the first girl receiving a gift from the second girl.

Example 1. Two girls entered a therapy room at the clinic of the principal investigator. The girls introduced themselves by name and said hi to each other. One girl gave the other girl a “present” located in a bag. One girl opened the bag and took out the “present” (a favorite Hello Kitty stuffed animal). The girl who opened the bag then looked at the other girl, smiled and said “thanks”. Then both girls walked out of the therapy room. At the end of the video clip, the DVD was stopped and the principal investigator asked each participant how s/he thought the girl who received the “present” felt, followed by a question about why s/he thought she felt that way. This question was then followed up by asking the participant what s/he thought the girl in the video would do next. Finally, each participant was asked if s/he had ever felt the same way as the girl in the video.

Videoclip for emotional recognition of sad. A one to two minute videoclip involving two girls of similar age as the participants was recorded. Child video models introduced themselves by name and said hi to each other. In this videoclip, a short play scenario involved one girl dropping her ice cream cone was introduced.

Example 1. Two girls entered a therapy room at the clinic of the principal investigator. Each girl introduced themselves and said hi to each other. Both girls were shown seated at a table eating ice cream cones. There was some small talk and conversation between the two girls. After the short conversation, one of the girls

accidentally licked her ice cream cone and it fell onto the floor. The video clip then showed the fallen ice cream on the floor, followed by the girl's face with a sad expression. At the end of the video clip, the DVD was stopped and the principal investigator asked each participant how s/he thought the girl who dropped her ice cream cone felt, followed by asking why s/he thought the girl felt that way. The participant then asked what s/he thought the girl might do next. Finally, each participant was asked if s/he had ever felt the same way as the girl who dropped her ice cream cone.

Videoclip for emotional recognition of mad. *A* one to two minute videoclip involving two girls of similar age as the participants was recorded. Child video models were presented in a short play scenario. This videoclip showed one girl taking the favorite toy of the other girl.

Example 1. Two girls entered a therapy room at the clinic of the principal investigator. Each girl introduced themselves and then said hi to each other. They each sat down on the floor and played with a different favorite toy. The video clip showed each girl smiling and playing with her favorite toy for a short time. The next portion of the video clip showed one of the girls getting up and taking the favorite toy from the other girl without asking. The girl's face whose toy was taken was then shown on the video. After stopping the DVD, the participant was asked by the principal investigator how s/he thinks the girl whose toy was taken felt, followed by asking why s/he thought the girl felt that way. The principal investigator then asked the participant what s/he thought the girl whose toy was taken would do next. Finally,

the participant was asked if s/he had ever felt the same as the girl whose toy was taken.

Videoclip for emotional recognition of scared. A one to two minute videoclip of two girls of similar age as the participants was recorded. One girl entered the room, not knowing that the second girl was hiding. The videoclip then showed the first girl "scaring" the second girl.

Example 1. One girl entered the room. The second girl was hiding under a blanket on a bean bag waiting to scare the other girl. One girl played on the floor with a preferred object. After a short time, the second girl came out from under the beanbag and scared the other girl by coming up behind her, grabbing her shoulders and making a scary noise. The first girl turned and exhibited a scared look on her face. The video was stopped at this point. After stopping the DVD, the participant was asked by the principal investigator how s/he thinks the girl who was scared felt, followed by asking why s/he thought that the girl felt that way. The principal investigator then asked the participant what s/he thought the girl who was scared would do next. Finally, the participant was asked if s/he had ever felt the same as the girl who was scared

Prebaseline procedures. Each participant participated in a minimum of three, 30 minute prebaseline sessions. Before entering the therapy room, the participant was met in the waiting room. The participant was allowed to play with the waiting room toys for several minutes. Before transitioning to the therapy room, the participant was told by the principal investigator that s/he was going to go to a therapy room and watch some short videos. The participant accompanied the

principal investigator to the therapy room. The participant was asked to sit at a table and chair appropriate for his/her age and size. A remote control was used by the principal investigator to start and stop the video clip. The therapy room environment was as free from visual and auditory distractions as possible to ensure participants' attention.

Prebaseline sessions were videotaped for each participant. General instructions were given by the principal investigator to each participant as follows:

> I will show you a series of short video clips of children doing, thinking and feeling different things. At the end of each video clip, I will stop the video and ask you some questions about what you have seen. If you don't understand or don't hear the question, I will repeat it once. Here is the first clip.

Four prebaseline clips, as described above, were shown in random order, one for each emotion; happy, sad, mad, and scared. When the participant responded with an answer, the principal investigator responded with either another question related to perspective taking and/or empathy (see p. 64 for specific questions) or "OK, let's watch the next clip." This occurred in the same manner, regardless of whether the child responded correctly, incorrectly, or gave no response. If the participant did not respond within 30 seconds, the next question was asked or the next clip was shown and no response was recorded. If the participant did not initially respond to the question, it was repeated once, after which the principal investigator moved on to the next question or the next clip.

Videotapes of prebaseline sessions were scored for verbal production of emotional labels (i.e., emotional recognition), as well as accuracy about why the girl

in the video was feeling a particular way (i.e., perspective), what the girl in the video might have been thinking about doing or planning to do (i.e., perspective), and if the participant had ever felt the same as the girl in the videoclip (i.e., empathy). The videotapes were scored by the principal investigator as well as a clinically experienced therapist familiar with children with autism. See Appendices B and C for Prebaseline and Intervention Scoring Forms, respectively. See Figures 1-3 for detailed results for all participants.

Scoring of videotaped response from participants. Following the conclusion of each prebaseline session, each participant's videotaped responses were labeled by the principal investigator with the participant's first and last initials. Each videotape was independently scored by the principal investigator and a clinician with expertise in working with children with autism. The videotapes were rated with a 0 or 1 score for each targeted behavior (see Appendix B for Prebaseline Scoring Form). A 0 was given if the child did not respond or responded incorrectly. A 1 was given if the response was correct. The data were reported as a percentage of correct responses for each dependent variable.

After independent scoring, the principal investigator and the second clinician compared their scoring for all participants' responses to assess reliability. A 90% agreement rate for all responses was achieved. There was 90% agreement across all participants (mean = 98%; range = 95%-100%).

Prebaseline Results

Participant 1. As shown in Figure 1, Participant 1 was able to correctly recognize "mad" on one occasion; however, he could not identify "happy", "sad" or

“scared” on any of the prebaseline opportunities. Regarding perspective taking, he was able to accurately answer “why mad?” on two occasions, but was unable to accurately identify why___? in conjunction with happy, sad or scared on any opportunities. Participant 1 was unable to take perspective accurately for if___, what next? on any opportunities for any of the four emotions. He was unable to express any empathic responses during any prebaseline opportunities for either the “have you ever felt ___ like___? or “when have you felt___like___?” questions.

Participant 2. As shown in Figure 2, Participant 2 was able to correctly identify “happy”, “sad” and “mad” on multiple occasions, but did not correctly identify “scared” on any prebaseline opportunities. For perspective taking, Participant 2 was able to correct identify “why happy”, “why sad”, “why mad”, and “why scared” on multiple occasions for each condition. Participant 2 was unable to take perspective for “if ___, what next? for any emotions during any prebaseline opportunities. Participant 2 was unable to express any empathic responses during any prebaseline opportunities for either the “have you ever felt ___ like___? or “when have you felt___like___?” questions.

Participant 3. As shown in Figure 3, Participant 3 was able to correctly identify “happy”, “sad”, “mad” and “scared” on all prebaseline opportunities. For perspective taking “why sad?” and “why scared?”, she was able to answer accurately on one occasion each. For perspective taking, if ___, what next?”, Participant 3 was unable to accurately answer any questions with empathic responses during any prebaseline opportunities for either the “have you ever felt ___ like___? or “when have you felt___like___?” questions.

Parent interviews. After completing the prebaseline sessions, we next interviewed parents of all three participants regarding intervention targets for this study. The parent of Participant 1 stated that she felt that her child knew how to identify happy, but wanted him to work on the differences between happy and excited because she felt that he did not understand the difference nor did he respond appropriately to others when they were in an excited state. The data showed, though that he couldn't recognize happy.

The parent of Participant 2 stated that she wanted her son to work on identification of nervous and frustrated because she felt that those were two emotional states that she often observed in him but that he did not express to her. Finally, the parent of Participant 3 stated that she wished to have her daughter work on understanding the feeling of being embarrassed, because her daughter often laughed at others when they were embarrassed rather than consoling them.

Final determination of intervention targets. After gathering the prebaseline data for all participants, the principal investigator and the second clinician discussed possible final intervention targets. Through triangulation of data from prebaseline testing results (i.e., *Social Language Development Test; Social Skills Improvement System Rating Scales*), prebaseline session results, and parent interviews, we selected final intervention targets for all three participants. Prebaseline testing results on the *Social Language Development Test-Elementary* confirmed no correct answers for "excited" (targets for Participants 1 and 2),"nervous" and "frustrated" (Participant 2), and "embarrassed", "confused" and "disappointed" for Participant 3.

After discussing the results and possibilities with each participant's parent, a decision was reached on what was felt to be the next appropriate steps in terms of developmental understanding, along with consideration for what the parents wished to see as intervention targets. The final intervention targets for each participant represented a blending of developmental perspective and parent priorities.

For Participant 1 we selected "sad", "scared", and "excited". Participant 2's targets were "excited", "nervous", and "frustrated". Finally, we selected "embarrassed", "confused", and "disappointed" for Participant 3. Parents confirmed that they had never heard their children use any of these emotion words nor had their children demonstrated an understanding of them when displayed by others. (See Table 4 for Emotion Intervention Targets).

Determination of Broad Groupings for Participants

Following the receipt of a signed consent form by the parents of the participants, review of records, completion of the SSIS by parents, and collection of initial prebaseline data, the principal investigator determined the general language and social development levels of each participant from the criteria set forth by Vagin (2012). These guidelines were used in order to place participants into groups with other children with autism (who were not participants but who did receive services at the clinic) at similar developmental levels. In this way, the types of questions that were asked of participants were appropriate for children in the groups who were not participants, but are nonetheless involved in intervention.

Junior mindreaders. Vagin (2012) included the following characteristics of junior mindreaders in terms of language, perspective taking and understanding of emotions.

1) Language: (a) generally have language delay, (b) have no functional use of conjunctions, and (c) have a very difficult time telling a story; poor narrative skills
2) Perspective Taking: beginning to recognize that thoughts, feelings and plans of others can be different from their own
3) Understanding of Emotions: (a) have difficulty identifying emotions in themselves and others, (b) are beginning to use labels such as happy, sad, and angry, and (c) require high support to consider reasons behind emotions.

Moving up mindreaders. Vagin (2012) included the following characteristics of moving up mindreaders in terms of language, perspective taking and understanding of emotions.

1) Language: (a) often have language delay, (b) demonstrate emerging but infrequent use of conjunctions, and (c) tell very basic stories, sometimes with no clear sequence; limited narrative skills
2) Perspective Taking: (a) with moderate support can identify others' perspectives, but require a lot of processing time and (b) with high support can work to understand and keep multiple perspectives in mind
3) Understanding of Emotions: (a) require significant processing time to identify emotions in most situations, (b) identify happy, sad, and angry with

relative accuracy, but have difficulty with gradations of emotions and (c) struggle to explain the reasons behind emotions

Varsity mindreaders. Vagin (2012) included the following characteristics of varsity mindreaders in terms of language, perspective taking and understanding of emotions.

1) Language: (a) may or may not have language delay, (b) use some basic conjunctions, and (c) can describe events, but with limited details and few emotional or relational connections
2) Perspective Taking: with support, can identify contrasting perspectives and make predictions about behavior, but often still make mistakes or disregard information when considering their own actions
3) Understanding of Emotions: (a) demonstrate emerging ability to read emotions of others in real time, (b) are learning how to code emotions accurately in real time and are learning more complicated emotional terms (i.e., frustrated, depressive, explosive)

All three participants were judged by the principal investigator to be functioning approximately at the Moving Up Mindreader level outlined above.

Small Group Composition

Each participant received one hour of intervention per week within the context of a small group of two children. Participant 1's group partner was another eight year old boy with ASD who had previously been involved in social group with the principal investigator using *Movie Time Social Learning* concepts. Participant 2's group partner was his younger brother, a seven year old, who was also diagnosed

with ASD, but had no previous experience with *Movie Time Social Learning* groups with the principal investigator. For Participant 3, the principal investigator's daughter, aged 10 and not diagnosed with ASD, was selected due to Participant 3 being female and close in age.

Baseline

Baseline data were taken for Participant 1 for all perspective taking and empathy targets. Baseline data were taken for Participants 2 and 3 on perspective taking and empathy during the first session, followed by intervention data on perspective taking and baseline data for empathy during the second session (see Figures 4-12).

During the first baseline session for each participant regarding perspective taking and empathy, the principal investigator read a book based on Social Thinking™ principles, *Thinking Thoughts and Feeling Feelings* (Hendrix, Palmer, Tarshis & Winner, 2013a), to the participants and discussed it with them prior to viewing any video clips. This book includes basic information about how everyone has different feelings whether they are alone or with other people. The book states that everyone has thoughts in their brain (i.e., your "thought maker") even though we can't "see" them, and then introduces a thought bubble as a visual aid in the pictures to show what the kids are thinking. The book also introduces the role of the heart, which is in the chest, as a "feelings keeper". After reading this book, the principal investigator introduced laminated thought and talk bubbles. When movies were paused, the principal investigator placed these on the TV screen and wrote on them to illustrate what the characters might be thinking. This was done to help the

participants make the connection between what the characters were saying and thinking in the most concrete way possible.

During the second session, another book based on Social Thinking™ principles, *Thinking With Your Eyes* (Hendrix et al., 2013b), was read and discussed with participants prior to viewing any video clips. This book involves several children making a trip to outer space and visiting aliens. Since they are not able to verbally communicate with the aliens because they speak a different language, the book illustrates how one can "think with your eyes". The book makes the connection for the reader that "when we look at something, we are thinking about it". There are also pictures in the book that show dotted lines from the characters' eyes to the thing or person that they are looking at, as a means for determining what they are thinking. After reading this book, the principal investigator used a pointer during paused video clips, so that participants and group members could see the process for determining where someone was looking, and subsequently, what they were thinking. These two books were read to ensure that each participant understood basic information about thoughts, feelings, and the importance of the eyes in determining thoughts of others. After the initial two sessions, it was determined that none of the participants needed further additional visual aids taught during the first two sessions. Intervention data for all participants were taken during these first two sessions for all emotion recognition targets.

The same procedures for prebaseline data collection were used during these baseline sessions except that targeted clips from the *LEGO Movie* and then the entire *Peter and the Wolf* movie were shown after the reading of the *Thinking*

Thoughts and Feeling Feelings book and the *Thinking With Your Eyes* books, respectively.

Intervention Setting

The setting for the intervention was the principal investigator's therapy agency. A therapy room of approximately 8 feet by 18 feet was used for the study intervention. This is the same room that was used during the baseline sessions. The therapy room was equipped with 42 inch Spectre Plasma television, a Sony DVD player with remote, and a Canon Vixia video camera.

Intervention Procedures

The principal investigator conducted all intervention sessions. Based on Participant 1's lower levels of spontaneous language, as well as responses during prebaseline that were judged to be disproportionately inaccurate (i.e., "I don't know" or single word responses) when compared to utterances from Participants 2 and 3 (i.e., they used multi-word, contextually appropriate responses, even if incorrect), Participant 1 was selected to proceed first with intervention. During each one-hour intervention session, presentation of the independent variable, Movie Time Social Learning techniques, was used during movie viewing with participants.

During all intervention sessions, the principal investigator used the following techniques: (a) pausing of movies during scenes in which characters demonstrated targeted emotions, plans, or thoughts, followed by labeling those emotions verbally and with text as needed and appropriate; and (b) rewinding and replaying of specific scenes in order to show participants the character's expression (e.g., head down, eyes squinting, furrowed brow) when a character's feelings changed and why. The

frequency of use of each technique varied slightly, depending on the particular movie used during each session. (See Figures 1-3 for samples of intervention session procedures.) In addition, the principal investigator previewed each movie shown to each participant prior to each session and made notations of the elapsed time when the targets appeared (i.e., 20:57 on *Room on the Broom*). The principal investigator was then able to predict and prepare for pausing of the movie during each intervention session for each targeted opportunity.

Movies selected for use were predetermined by the principal investigator based on motivational factors (e.g., movies with participants' favorite characters), frequency of modeling of targeted behaviors (e.g., a movie that contains frequent scenes in which characters demonstrated emotions that are being targeted for each participant), as well as past results from using the same movies with other clients judged to be at the Moving Up Mindreader stage. All participants viewed the same movies across all sessions.

The principal investigator began the twelve-week intervention with the *LEGO Movie*, followed by an animated short, *Peter and the Wolf*, and then *Monsters, INC*. (See Table 5 for a complete listing of movies shown during this intervention study.) This order was selected because all three participants showed a high preference for animated movies, particularly the *LEGO Movie* and *Monsters, INC*, which each had seen previously on many occasions. Selected video clips from the *LEGO Movie* and *Monsters, INC* were used during sessions rather than the whole movie, as all participants had seen both movies many times, according to their own responses, as well as those of their parents. The next seven movies used during intervention were

shown in their entirety to preserve as much contextually relevant information for participants as possible. Four animated movies followed for each participant: *The Gruffalo*, *The Gruffalo's Child*, *Room on the Broom*, and *Lost and Found*.

At Week 8 of the intervention, the principal investigator made the choice to begin working toward live action movies, for the purpose of facilitating generalization outside of the therapy clinic. For Weeks 8-10, the *Indian in the Cupboard*, a combination of animation and live action movie, was used during intervention with all participants. (See Table 10 for a sample lesson plan for Indian in the Cupboard [Vagin, 2012]). For the final two weeks of the intervention study, Weeks 11 and 12, the principal investigator chose a movie with a same age protagonist, Willie, from the movie, *My Dog Skip*. This movie was solely live action. For a complete listing of intervention movies and format, see Table 5.

During each session, the principal investigator paused the video at an appropriate point and asked the participant to label: (a) each targeted emotion three times for a total of nine responses per session; (b) targeted examples of perspective taking on "why___?" for each emotion on one occasion, for a total of three responses per session; (c) targeted examples of perspective taking related to "if ___, what next?" on one occasion for each emotion, for a total of three responses per session; (d) targeted examples of empathy related to "have you ever felt___?" on one occasion for each emotion, for a total of three responses per session; and (e) targeted examples of empathy related to "when did you feel___?" on one occasion for each emotion, for a total of three responses per session. The first three opportunities to respond were scored for accuracy on emotion recognition, both

perspective taking questions, and both empathy questions, for a total of 21 questions per participant per session.

Responses made by other children in the group were not scored. Sessions were broadly structured as to contain video clips followed by a gross motor, structured play, and a snack activity over the course of the approximately hour long session.

Sample of Emotion Recognition Intervention

A short video clip from a preferred animated or live action movie was shown to each participant within the MTSL group session. After the targeted emotion was introduced in the scene, the DVD was paused and the principal investigator posed a question to the group or the individual participant. The question was “How does _____ feel?” or some variation. Following a response from the participant or other group member, the principal investigator facilitated a short discussion with the group about why a character felt that way. The principal investigator used visual aids when needed to facilitate understanding of emotion, such as the use of gesture to determine where to focus attention on the paused screen. Before each opportunity to respond, the DVD was paused so that the participants could see the targeted emotion on the face of the character. If a group member who was not a study participant responded with an answer, followed by the participant in the study, the response was not scored unless the emotion given by the participant was different than the other group member and logical to the context of the scene. Percentage of correct responses was determined based on independent videotaped review by the principal investigator and the second clinician.

Sample of Perspective Taking Interventions

The "Why" behind a character's feelings. A short video clip from a preferred animated or live action movie was shown to each participant. After a logical response to what the character was feeling had been expressed (see above), the principal investigator followed up with a question such as "Why do you think that _____feels_____?" or some variation. Sometimes, the group was asked to answer, while on other occasions, a specific participant in the study was asked by name. If members of the group who were not involved in the research study responded with a logical answer, then a similar response by a participant was not scored. If a participant in the study responded with a logical answer that was considerably different from the other group member and demonstrated a different perspective, the response was scored.

The "Next action" or "plan" behind a character's feelings. A short video clip from a preferred animated or live action movie was shown to each participant in the group. After a logical response to what the character was feeling was expressed, the principal investigator followed up with a question such as "What do you think _____(name of character) is going to do next? or "What do you think _____(name of character's) plan is?" or some similar variation. If a response was given by a group member but not a participant in the study, followed by a response by a participant in the study, the response by the participant in the study was judged in terms of a logical response and how it differed from the response given by the group member. If the response was logical and significantly different from the group member's response, it was scored.

Sample of Empathy Intervention

A short video clip from a preferred animated or live action movie was shown to each participant in the group. After a scene was shown that outlined an emotional reaction by a character, followed by a short discussion of why the character felt a particular way, the principal investigator was asked a question that sought to elicit an empathic response from each participant. The question was “Has there ever been a time when you felt similar to_____based on something that happened to you?” or some variation. At this point, a member of the group or a participant in the research study may or may not have responded. Possible responses included “No, I’ve never felt that way” or “Yes, I have felt that way”. After the “yes” response, the principal investigator asked a follow-up question, such as “When did you feel like _____?” or some variation. If a group member who was not a participant in the research study responded with a logical event that illustrated a similar feeling to the character, the principal investigator followed up again with “Has anyone else felt similar to how the _____(character in the movie) felt or _____(group member) felt? At this point, if a participant in the research study responded with a logical event that demonstrated a similar feeling to the group member and/or the character in the movie, AND was not a repetition of the group member’s response, then the participant’s response was scored.

Length of Intervention

The length of the intervention phase was approximately one hour-long session per week for twelve consecutive weeks. Children involved in the intervention

study were monitored for presence or absence from weekly sessions. None of the participants missed any sessions.

Data Collection

Data were collected in the form of videotaped recordings of each intervention session. The principal investigator scored the session data for the presence or absence of the targeted dependent variables (See Appendix C for Intervention Scoring Form). Sessions were scored by an additional clinician familiar with autism spectrum disorder for the presence or absence of the same targeted dependent variables to determine interobserver reliability.

A correct response was recorded when both the principal investigator and the second clinician independently concluded that the participant's response was accurate or logical within the context of the scene. An incorrect response was recorded when (a) both the principal investigator and the second clinician independently agreed that the response was inaccurate or not logical based on the context of the scene, or (b) the participant gave no response. The total number of correct responses for each dependent variable divided by the total number of opportunities to respond determined the overall percentage of correct responses. The percentage of correct responses was graphed for each dependent variable for all intervention session based on the principal investigator's data.

Generalization Probes

Within three weeks following the conclusion of the intervention phase of the study, parents of the children enrolled in the study were given an index card with the four questions used during the intervention phase of this study (see Tables 18 and

19). Parents were asked to view a YouTube short movie entitled '*Ormie*' (Silvestri, 2010) with their child. This short movie is approximately four minutes in length and is judged to have wide appeal across a wide spectrum of age and developmental levels. Parents were asked to video themselves and their child as they watched the video. Parents were asked to have their video recording show a broad view of themselves and their child in order to capture verbal and nonverbal communication. After viewing the movie together, parents queried their child at least once on each of the four questions on the index card. Parents were asked to send the completed videotape to the principal investigator by email or mail. Following receipt of the videotapes from the participants' families, the principal investigator and the second clinician independently scored 100% of the opportunities related to the dependent variables as set forth in the intervention phase of the study.

In addition, parents of children enrolled in the study, along with therapists from the principal investigator's clinic who were seeing the participants in one-to-one speech/language therapy, were periodically asked if the participants had displayed any of the targeted behaviors in other settings. Participant results for generalization probes can be found in anecdotal references in Chapter 4.

Reliability

Interrater reliability was established by the principal investigator and the second clinician familiar with interventions for children with autism. The principal investigator and the second clinician independently scored 100% of the total number of videotapes for each child in each condition (See Appendix E). The total number of agreements was divided by the total number of agreements plus disagreements in

order to reach a percentage of agreement for each participant and for each dependent variable.

Fidelity of Intervention

Intervention fidelity was established based on the second clinician reviewing 80% of all videotaped baseline and intervention sessions conducted by the principal investigator. Fidelity was determined by the second clinician rating the principal investigator on (a) giving consistent instructions across participants, and (b) not giving additional cueing to participants when asking them to respond to a question (through facial expression or language which could potentially confound results of the intervention) (See Appendix F).

Data Analysis

Data were graphed for each dependent variable and each participant for each session attended by the participant. Data were analyzed according to visual inspection of graphs associated with baseline and intervention sessions. Each baseline and intervention session data point was viewed to determine if the targeted dependent variables showed changes in trend, level, and/or variability once intervention was implemented. Visual inspection of graphs located any potential trends or overlap in dependent variable performance for each participant. The percentage of change in the dependent variables was then compared to the percentage at baseline to determine overall mean increase in correct responding.

Social Validity

Social validity was assessed by asking participants' parents, teachers and the participants themselves about their perceptions of the intervention. Following the

conclusion of the intervention, parents were asked to fill out a form designed to gauge their degree of satisfaction with the intervention as well as how they perceived their child felt about the intervention. In addition, they were asked how likely they were to carry over the types of strategies used in this intervention with their child at home while watching movies (See Appendix F).

Approximately three weeks after the conclusion of the study, parents were asked to give their child's teacher(s) a form asking several questions related to the study's outcomes, such as if they had seen the participant use any of the targeted emotions in the study to describe their own emotional state, or that of a classmate. Teachers were also asked if they would consider using MTSL in the classroom based on what they had seen from the participant. For a complete list of questions, see Appendix G.

Participants were asked by the principal investigator what they had liked and disliked about the MTSL group sessions and their responses were noted by the principal investigator. For a listing of all questions asked of participants by the principal investigator, see Appendix H.

Chapter 4 – Results

The purpose of the current study was to explore the effectiveness of a social cognitive intervention, Movie Time Social Learning (MTSL), on recognizing emotion, taking perspective, and demonstrating empathy of children with autism. MTSL incorporates the use of movies to teach children with autism about emotional understanding, perspective taking and empathy. MTSL is based on the principles of Social Thinking® (Garcia-Winner, 2005), namely that others have thoughts and we can try to figure them out. The effect of the intervention on each dependent variable for each participant is described below.

Participant 1

Emotion recognition. Participant 1 was unable to identify any of the three selected emotion targets during prebaseline. When intervention began, he demonstrated an immediate increase in his ability to independently correctly identify "sad" (0% to 67%) (See Figure 4). Although his data for this target were variable (range = 0% - 100%), there was an upward trend that stabilized across intervention with the majority of sessions showing 100% correct responding (7 sessions at 100%). Visual inspection of the data showed overlap of only one data point (session 12) between baseline and intervention. This drop in performance was possibly due to the movie format for that session switching from animation only to a combination of animation and live action.

In terms of "scared", as shown in Figure 5, Participant 1 demonstrated a positive change in level when intervention began, from 0% at prebaseline to 33% during the first intervention session. This level was maintained across most of the

intervention condition (8 sessions at 100%). Data showed limited variability with six consecutive data points at 100%. Visual inspection of the data determined no overlap between baseline and intervention.

Regarding “excited”, Participant 1’s data demonstrated a slow upward trend with variable data. However, all data points stayed above 0% after the second intervention session (session 5) (See Figure 6).

Summary of performance on emotion recognition. Participant 1’s percentages for correctly identifying “sad” during intervention generally ranged between 67% and 100% accuracy, while his percentages for “scared” were most often at 100% accuracy. Participant 1’s accuracy in identifying “excited”, while still a considerable improvement over prebaseline level, generally was more variable, but remained at 33% or above accuracy after the second intervention session. Overall, Participant 1’s accuracy for “sad” improved 78% over baseline, “scared” improved 86% over baseline, while “excited” improved 56% over prebaseline level.

Perspective taking – “why _____?”. Participant 1 demonstrated an immediate improvement in performance after intervention began for “why sad?” (From 0% during session 5 of baseline to 67% accuracy during the first intervention session (session 6) (See Figure 4). Data trended upward throughout intervention and remained between 67% and 100% accuracy from sessions 8 through 15. There was no overlap of data points between baseline and intervention sessions.

For “why scared?”, Participant 1’s results demonstrated an immediate effect after intervention began, with an upward trend across the intervention condition (See Figure 5). There was moderate variability, ranging between 33% and 100% during

intervention sessions. The level stayed between 66% and 100% from sessions 10-15. There was no overlap between baseline and intervention sessions.

For “why excited?”, as shown in Figure 6, Participant 1’s results demonstrated an immediate effect after implementation of the intervention, with an upward trend which stabilized in Session 9. There was minimal variability, with all intervention sessions ranging between 33% and 67% accuracy. There was no overlap between prebaseline and intervention levels.

Summary of performance on perspective taking-“why?”. Overall, Participant 1’s performance for “why sad?” improved 60.2% over baseline, “why scared?” performance improved 30.1% over baseline, while “why excited?” improved 56.8% over prebaseline level.

Perspective taking – “if_____, what next?”. For “if sad, what next?”, there was no immediate change in performance after intervention. The data show a gradual upward trend beginning in session 12 (See Figure 4). The level remained relatively constant, between 33% and 67% accuracy, with only one session reaching 67% correct. There was overlap of five data points between baseline and intervention.

For “if scared, what next?”, results were variable before stabilizing in session 13 (see Figure 5). All intervention sessions ranged between 0% and 33% accuracy. There was overlap of five data points between baseline and intervention.

As shown in Figure 6, for “if excited, what next?”, results indicated an overall gradual trend upward with moderate variability that stabilized in session 12. Intervention sessions ranged between 0% and 67% accuracy, with a consistent

performance level of 33% accuracy from sessions 12-15. There was no immediacy of effect, and an overlap of five sessions between prebaseline and intervention levels.

Summary of performance on perspective taking – "next"?. Overall, Participant 1's performance on "if sad, what next?" improved 19.9% over baseline, performance on "If scared, what next?" improved 16.5% over baseline, while performance on "if excited, what next?" improved 23.2% over prebaseline level.

Empathy – "have you ever felt____ like____?". For "have you ever felt sad like___?", there was no immediate change in performance after intervention began. (See Figure 4). In session 11 Participant 1's performance increased to 33% accuracy but his performance went back to 0% accurate in the next session and remained at 0% for the remaining sessions of the intervention. There was an overlap of eight data points between baseline and intervention.

Similarly, for "have you ever felt scared like___?", results indicated no change in performance after intervention began (See Figure 5). The level remained constant at 0% accuracy. There was an overlap of all nine data points between baseline and intervention.

For "have you ever felt excited like___?", results indicated no change in performance after intervention until session 11 (see Figure 6). Session 11 was scored as 33% accurate with the remaining eight sessions of intervention returning to 0%. There was an overlap of eight data points between prebaseline and intervention levels.

Summary of performance for empathy – "have you ever felt __ like __?. Overall, Participant 1's performance on "have you ever felt sad like___?" improved 33.3% over baseline, performance on "have you ever felt scared like___?" did not improve over baseline, while performance on "have you ever felt excited like___?" improved 33.3% over prebaseline level.

Empathy – "when did you feel____like___?". As shown in Figure 4**,** Participant 1's data regarding "when did you feel sad like___?" showed no immediate effect after intervention was implemented. Session 11 was scored as 33% accurate with the remaining eight data pointss of intervention stable at 0%. There was an overlap of eight data points between baseline and intervention.

For "when did you feel scared like___?", results showed no change in performance over baseline (see Figure 5). The level remained constant at 0% accuracy. There was an overlap of all nine data points between baseline and intervention.

Figure 6 shows that for "when did you feel excited like___?", there was no immediate effect after implementation of the intervention. Session 11 was scored as 33% accurate with the remaining eight sessions of intervention stable at 0%. There was an overlap of eight data points between prebaseline and intervention levels.

Summary of performance for empathy – "when did you feel___like___?". Overall, Participant 1's performance on "when did you feel sad like___?" improved 33.3% over baseline, performance on "when did you feel scared like___?" did not improve over baseline, while performance on "when did you feel excited like___?" improved 33.3% over prebaseline level.

Participant 2

Emotion recognition. Participant 2's identification of "excited" demonstrated high variability throughout intervention (ranging from 0% to 100%). There was an upward trend toward the end of the intervention (See Figure 7.) Five data points overlapped with prebaseline performance and there was no change in performance until the third intervention session (session 6). Although the data showed an upward trend between sessions 9 and 15, (ranging between 33% and 100%), there was considerable variability.

For emotion recognition of "nervous", Participant 2's results demonstrated immediacy of effect (sessions 4 and 5 at 33% accuracy from 0% at prebaseline) with high variability (ranging from 0% to 100% during intervention) (see Figure 8). There was a slow upward trend, with little variability from sessions 10 through 15 (range of 33% to 67%). There was overlap of three data points between prebaseline and intervention.

For emotion recognition of "frustrated", results for Participant 2 demonstrated a positive change in the second intervention session (from 0% at prebaseline to 33% at session 5 to 67% at session 7). The trend was generally upward with dips during sessions 8, 12 and 13. The decrease in accurately identifying "frustrated" during sessions 12 and 13 may have been due to change in movie format from animation only to a combination of live action and animation. There was overlap of four data points between prebaseline and intervention.

Summary of performance for emotion recognition. Participant 2's accuracy for "nervous" was generally steady at 67% during the majority of

intervention sessions, with an average improvement of 36% over prebaseline level. Participant 2's accuracy for "frustrated" and "excited" was highly variable during intervention, and averaged 39% and 31% over prebaseline levels respectively.

Perspective taking – "why _____?. For "why excited?", there was high variability across intervention sessions. No immediacy of effect was demonstrated between prebaseline and intervention. The level fluctuated throughout intervention, ranging between 0% and 67% across sessions. The trend was highly variable, with a relative downward sloping trend between sessions 9 and 14. There was overlap between prebaseline and intervention for two data points. (See Figure 7.)

For "why nervous?", there was high variability across intervention sessions. (See Figure 8.) No immediacy of effect was demonstrated between prebaseline and intervention levels. The level fluctuated between 0% and 67% throughout intervention. The overall trend sloped upward and there was overlap of four data points between prebaseline and intervention.

For "why frustrated?", there was immediacy of effect, with a general upward trend between sessions 5-7, and drastic variability throughout intervention (ranging between 0% and 100%). (See Figure 9.) Level was unstable throughout intervention and there was overlap of four data points between prebaseline and intervention levels.

Summary of performance for perspective taking - "why___?". Overall, Participant 2's performance on "why excited?" improved 33.2% over prebaseline, performance on "why nervous?" improved 33.3% over prebaseline, while performance on "why frustrated?" improved 39.4% over prebaseline level.

Perspective taking – "if_____, what next?. For "if excited, what next?", results indicated a very low and relatively stable level throughout intervention, with no discernable trends. (See Figure 7.) There was little variability, except for sessions 11 and 14 where performance improved. This was followed by a drop back to 0%. There was no immediacy of effect and there was an overlap of nine sessions between prebaseline and intervention levels.

For "if nervous, what next?", results indicated a very low (0%) relatively stable level throughout intervention, with no discernable trends. There was little variability, except for sessions 12 and 14. There was no immediacy of effect and there was an overlap of nine data points between prebaseline and intervention levels. (See Figure 8.)

For "if frustrated, what next?", results indicated a very low (0%) relatively stable level throughout intervention. (See Figure 9.) There was little variability, except for sessions 10 and 14. There was an immediate effect of 33% accuracy during the first intervention session, with an equally immediate return to 0% accuracy. There was an overlap of eight data pointss between prebaseline and intervention levels.

Summary of performance for perspective taking – "if___, then what next?". Overall, Participant 2's performance on "if excited, what next?" improved 9.0% over prebaseline, performance on "if nervous, what next?" improved 9.0% over prebaseline, while performance on "if frustrated, what next?" improved 12.0% over prebaseline level.

Empathy – “have you ever felt____ like____? For “have you ever felt excited like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 7.)

For “have you ever felt nervous like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 8.)

For “have you ever felt frustrated like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 9.)

Summary of performance for empathy – “have you ever felt___like___?”. Overall, Participant 2’s performance on “have you ever felt excited like___?”, “have you ever felt nervous like___?”, and “have you ever felt frustrated like___?” did not improve over prebaseline level.

Empathy – “when did you feel ___like___?”. For “when did you feel excited like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 7.)

For “when did you feel nervous like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an

overlap of all ten data points between prebaseline and intervention levels. (See Figure 8.)

For “when did you feel frustrated like___?”, results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 9.)

Summary of performance for empathy – “when did you feel___like___”?. Overall, Participant 2’s performance on “when did you feel excited like___?”, “when did you feel nervous like___?” and “when did you feel frustrated like___?” did not improve over prebaseline levels.

Participant 3

Emotion recognition. Data on correct identification of “embarrassed” for Participant 3 were highly variable, fluctuating between 0% and 33% throughout intervention. (See Figure 10.) Immediacy of effect was not demonstrated. There was overlap of six data points between prebaseline and intervention.

For identification of “confused”, Participant 3’s results demonstrated a positive upward trend beginning in the fourth intervention session (session 7). Data remained stable at 67% from sessions 7-11. In session 12 there was a slight dip to 33% followed by an upward trend. There was overlap of three data points between prebaseline and intervention. (See Figure 11.)

Finally, similarly to performance of ‘embarrassed”, Participant 3’s identification of “disappointed” demonstrated no immediacy of effect and high variability across the intervention condition. (See Figure 12.) Trend was noticeably

downward between sessions 9 and 11 (from 67% to 0%). Level fluctuated greatly during intervention. There was overlap of seven data points between prebaseline and intervention. There was a positive upward trend after session 13 with the final two data points at 67% accuracy.

Summary of performance for emotion recognition. For Participant 3, there were spontaneous expressions of feeling "confused", both during intervention sessions and in generalized contexts. This was also supported by intervention data, demonstrating an average increase of 50% for "confused" over prebaseline level, while results for "disappointed" and "embarrassed" improved slightly to 22% and 19% respectively from 0% prebaseline level..

Perspective taking – "why?". For "why embarrassed?", results showed no immediacy of effect. (See Figure 10.) There was minimal variability throughout intervention, with the majority of sessions ranging between 0% and 33% accuracy. There was a downward trend between sessions 10 and 12, and the overall level remained between 0 and 33% for the final five intervention sessions. There was overlap of seven data points between prebaseline and intervention.

For "why confused?", results demonstrated no immediacy of effect. (See Figure 11.) There was minimal variability throughout intervention, with the majority of sessions ranging between 33% and 67% accuracy. The trend sloped upward and the overall level remained stable, between 33% and 67% during the final seven sessions of intervention. There was overlap of four data points between prebaseline and intervention levels.

For “why disappointed?”, results demonstrated no immediacy of effect. (See Figure 12.) There was high variability throughout intervention, ranging between 0 and 67%. There was one downward sloping trend between sessions 9 and 11, with an upward trend between sessions 13 and 15. The level fluctuated greatly throughout intervention. There was an overlap of seven data points between prebaseline and intervention levels.

Summary of performance for perspective taking – “why?”. Overall, Participant 3’s performance on “why embarrassed?” increased 15% over prebaseline, performance of “why confused?” improved 33.3% over prebaseline, while performance on “why disappointed?” increased 18.1% over prebaseline level.

Perspective taking – “If___, then what next?”. For “if embarrassed, what next?”, results indicated a very low relatively stable level throughout intervention. (See Figure 10.) There was little variability, except for sessions 10 and 15. There was no discernable trend in either direction. There was no immediacy of effect and there was an overlap of nine data points between prebaseline and intervention levels.

For “if confused, what next?”, results indicated no discernable trends, no immediacy of effect and minimal variability. (See Figure 11.) Level was mostly constant, with only two sessions over 0%, during sessions 10 and 12 (67% and 33%, respectively). There was an overlap of nine data points between prebaseline and intervention levels.

For “if disappointed, what next?”, results indicated no trends, immediacy of effect or variability. (See Figure 12.) All sessions remained level at 0% accuracy.

There was an overlap of all data pointss between prebaseline and intervention levels.

Summary of performance for perspective taking – "if___, then what next?". Overall, Participant 3's performance on "if embarrassed, what next?" improved 9.0% over prebaseline, performance on "if confused, what next?" improved 9.0% over prebaseline, while performance on "if disappointed, what next?" did not improve over prebaseline level.

Empathy – have you ever felt___like___?". For "have you ever felt embarrassed like___?", results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels. (See Figure 10.)

For "have you ever felt confused like___?", results indicated no trend, variability, or immediacy of effect. (See Figure 11.) Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels.

For "have you ever felt disappointed like___?", results indicated no trend, variability, or immediacy of effect. (See Figure 12.) Level remained constant at 0%. There was an overlap of all ten data points between prebaseline and intervention levels.

Summary of performance for empathy – "have you ever felt___like___?". Overall, Participant 3's performance on "have you ever felt embarrassed like___?", "have you ever felt confused like___?", and "have you ever felt disappointed like___?" did not improve over prebaseline level.

Empathy – "when did you feel___like___?". For "when did you feel embarrassed like___?", results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. (See Figure 10.) There was an overlap of all ten data points between prebaseline and intervention levels.

For "when did you feel confused like___?", results indicated no trend, variability, or immediacy of effect. Level remained constant at 0%. (See Figure 11.) There was an overlap of all ten data points between prebaseline and intervention levels.

For "when did you feel disappointed like___?", results indicated no trend, variability, or immediacy of effect. (See Figure 11.) Level remained constant at 0%. (See Figure 12.) There was an overlap of all ten data points between prebaseline and intervention levels.

Summary of performance for empathy – "when did you feel___like___?". Overall, Participant 3's performance on "when did you feel embarrassed like___?", "when did you feel confused like___?" and "when did you feel disappointed like___?" did not improve over prebaseline levels.

Generalization

Participant 1. There were multiple anecdotal instances of potential generalization demonstrated during this intervention study. Participant 1's parents noted that they felt that he was able to communicate his feelings more effectively and specifically identify "sad" in others more than before this intervention. In addition, Participant 1's parent completed the generalization probe for "*Ormie*". (See Table 18.) For Participant 1, the generalization probe would certainly seem to

support the idea that motivation is a pivotal skill, in that it leads to generalization to nontargeted, but related areas (Koegel & Koegel, 2006). Participant 1 labeled Ormie the Pig as “frustrated”, despite the fact that this emotion had not been targeted during intervention, and he had not accurately identified this emotion in prebaseline testing. In addition, Participant 1 answered a “what next ?” question containing this same nontargeted emotion during the generalization probe. When asked what he thought Ormie the Pig would do in response to feeling frustrated, he stated "try again, use a chair.” Participant 1 was also able to answer an empathy question related to the feeling of sad expressed by Ormie. When his mother asked when he had felt sad like Ormie, Participant 1 stated “when Cinderella was on the previews…..but I couldn’t watch it. I couldn’t watch the other trailers.”

Participant 2. There were multiple anecdotal occurrences of generalization of targeted emotions. For Participant 2, there were more spontaneous expressions of feeling “nervous” and “frustrated” both during intervention sessions and in generalized contexts, than feeling “excited” (although those occurred occasionally as well). During one-to-one Speech/Language Therapy sessions delivered by the second clinician, the participant described himself being “nervous” and “frustrated” on several occasions. Participant 2’s mother reported that he has used all three targeted emotions, “excited”, “nervous” and “frustrated” in contextually appropriate situations to describe his own internal state. For instance, he told her in the car that he was “excited” to go to social group at the principal investigator’s clinic on several occasions. He stated that he was “frustrated” several times when his younger

brother interrupted his play with a favorite Lego set. Finally, he stated that he was "nervous" when having to travel to a new destination.

Furthermore, Participant 2 described himself as "feeling nervous" on multiple occasions during this intervention study due to anticipation of an event while watching intervention movies. He would ask his group partner (his younger brother who has also been diagnosed with autism) to turn off the volume on the movie so he couldn't hear what was happening. On multiple occasions, either his brother or the principal investigator would try to console him, saying that it was OK. If his brother failed to turn off the sound on those occasions, participant 2 would then say "OK, now I'm *frustrated*" with emphasis, demonstrating clear understanding of when to use the term. On multiple occasions, the brother of the participant would remark "now *I'm* frustrated, I can't hear the movie!" This provided multiple naturally occurring opportunities for the brothers to practice expressing how they were feeling, as well as to take perspective of each others' needs and wants. Participant 2 also described himself to the principal investigator as feeling "nervous" and "excited" when he had been getting ready to perform with a choral group at school earlier in the week. When asked initially, he stated that he had felt nervous and when a follow-up question was asked regarding any other emotions, he stated "yes, I was excited!"

Participant 3. There were multiple anecdotal reports of instances of Participant 3 generalizing of one of the targeted emotions, "confused". During several one-to-one Speech/Language Therapy sessions delivered by the second clinician, Participant 3 described herself as being "confused" in contextually

appropriate situations. During one of the one-to-one sessions with the second clinician, Participant 3 was presented with a choice for snack that was not part of the routine that had been established by the principal investigator during the study. She spontaneously "I'm confused, Mr. Fletcher doesn't give us fruit snacks!" In addition, her parent stated that Participant 3 said "I'm confused" at home when she was unable to put together a new Lego set that she had received for Christmas.

Social Validity

Participants, parents and the participants' teachers were asked how they felt about MTSL intervention. The results indicated a high acceptance of the intervention across parents and participants, with parents also indicating a willingness and desire to both try MTSL at home and have it implemented at school (see Tables 6 and 7). All participants and parents indicated that they wanted to continue MTSL at the principal investigator's clinical facility as well. To date, no data have yet been returned from the teachers of two of the participants. The third participant is currently being homeschooled, and thus no teacher data were available.

Parents remarked that their children were always "happy" and "excited" to come to the intervention group, while participants said that they loved the movies, specifically "*Room On The Broom*" and "*Peter and the Wolf*".

Interobserver Agreement

Reliability. Reliability was established by review of 100% of the total number of videotapes for baseline and intervention sessions by the second clinician and the student investigator. Reliability percentages were determined by the total number of agreements divided by the sum of total agreements and total disagreements.

Agreement ranged from 95%-100% across behaviors and participants. (See Table 8 for complete reliability data by behavior across participants).

Fidelity. Intervention fidelity was established by the second clinician by review of 80% of all videotaped baseline and intervention sessions. The second clinician rated the delivery of the intervention protocol by the principal investigator in terms of two aspects; a) clear instructions were given to participants; and b) no additional facial expressions and/or language were used by the principal investigator to cue participants' responses other than the intervention protocol questions. The intervention protocol questions were "How do you think___feels?", "Why do you think___feels___?", "If___feels___, what do you think he/she will do next?", "Have you ever felt___like___?", and "When did you feel___like___?". The results of fidelity measures are shown in Table 8.

Overall Participant Performance by Dependent Variable

From visual inspection of data across participants and dependent variables, the most significant gains over prebaseline and baseline levels occurred for Emotion Recognition across all three participants (average of 73%, 35%, and 31% respectively). This is not surprising in terms of developmental progression, as it would be highly unlikely (if not, impossible) that one could incorrectly label an emotion, but then go on to correctly label why a particular character or indeed, the participant, would feel that way, unless it were by chance, rather than true understanding. In addition, it would be highly unlikely that one could similarly generate an accurate empathic response without first correctly identifying the emotion that went along with a feeling of empathy.

Furthermore, visual inspection of data across participants and dependent variables showed that the next most significant gains occurred during Perspective Taking – “Why___?”. Again, this would also appear to follow the next stage of developmental progression after emotion recognition. Participants demonstrated 68%, 35%, and 22% increase over prebaseline and baseline levels respectively.

An area that warrants in-depth analysis is the format of the movies used during intervention (animation, live action or some combination thereof) in terms of performance. Recent research indicates that there is an animation bias of sorts regarding children with autism’s ability to decode emotional states (Brosnan, Johnson, Grawmeyer, Chapman, & Benton, 2015). The authors found that typically developing children demonstrated a significant advantage over children with autism in terms of emotion recognition for human stimuli. However, children with autism significantly outperformed typically developing children in accurate detection of static animated images. The data from this study would seem to support the research in this area in terms of acquisition of skills. See Figures 13-15 for detailed results by participant performance and movie. This will be discussed further in Chapter 5.

Chapter 5 – Discussion

The purpose of the current study was to assess whether the use of a highly motivating format (ESM, and more specifically, DVD movies) can be effectively used to teach aspects of social understanding to children with autism. Movie Time Social Learning (MTSL) (Vagin, 2012), based on the principles of Social Thinking® (Winner, 2005) is a commercially available intervention that uses movies to improve social understanding. This study utilized MTSL to target emotion recognition, perspective taking, and empathy in children with autism. The study utilized a single case design (multiple baseline across skills) to examine the effect of MTSL on these three skills.

Major Findings

There are three primary findings from this study. First, MTSL appears to be an effective intervention strategy to teach emotion recognition and beginning perspective taking skills (“why does___feel ___?”) to young children with autism. All participants acquired their individual emotion targets and most showed an improved ability to take perspective. There was also evidence that suggested that increased accuracy for emotion recognition targets was associated with the emotion words that the participants used to describe their own feelings, both within the intervention context and in generalized situations. For example, Participant 1 was able to identify feeling “sad” and “scared” like one of the characters in a movie, based on events that happened during Christmas (high, novel saliency of cue [i.e., Christmas holiday] that precipitated the expression of empathy). Participant 2 was able to generalize the use of all three emotion targets, excited, nervous, and frustrated, to describe

situations in which he had those feelings outside of the clinic. Finally, Participant 3 was able to generalize the feeling of confused to describe feelings that she had both in one-to-one therapy and at home.

Second, gains on more advanced perspective taking skills and prediction of behavior (i.e., “if ____, what do you think___ will do next?”) and empathy, although demonstrating some improvement, did not appear to be as positive overall for the participants after implementation of the MTSL intervention. The participants did show some gains, ranging from 6%-20% improvement. However, these gains were much smaller than the gains they made for emotion recognition. Furthermore, their performance within perspective taking varied. They were more accurate in explaining why a character was experiencing a particular feeling than being able to state what the character might do next as a result of that feeling. From the research around emotional development in children with autism, empathy is believed to be a huge developmental undertaking, and in fact, for many, a lifelong pursuit (Chevallier et al., 2012). As such, it is not particularly surprising that there were only glimmers of empathic responses from Participant 1, and none at all for Participants 2 and 3.

This difference in performance between Participant 1 and Participants 2 and 3 may be due, in part, to several factors. The developmental leap from decoding emotion to prediction of behavior based on that emotion may have been too difficult within the context of a twelve week intervention. In addition, the cognitive and language demands associated with generating responses to higher level perspective taking and empathy may have been too great of a demand. Theory of mind skills are difficult to acquire for children with autism in the best of circumstances, and even

more so, when the cognitive and/or language demands exceed developmental capacity.

Finally, the contextually rich, motivating medium of movies may have contributed to the participants' internalization of the emotional concepts, which in turn, may have led to self-awareness of their emotional state. This was evidenced in their generalization of the emotional vocabulary to describe their feelings in multiple contexts outside of the intervention environment. In alignment with general developmental progression, it would appear that the participants acquired the skill of emotion recognition for their respective targets ("sad", "scared" and "excited" for Participant 1, "excited", "nervous" and "frustrated" for Participant 2, and "embarrassed", "confused" and "disappointed" for Participant 3) by mapping the vocabulary onto the feelings displayed by motivating movie characters. This initial acquisition of the targeted skills may have led participants to internalize those emotional states (because the context was motivating and meaningful), which was then followed by accurate expression of their own feelings using the targeted vocabulary.

In the context of findings from Shane and Albert (2008) and their exploration of electronic media motivation in autism, the results from this study would appear to concur. That is, for all participants, attention and motivation appeared to be consistently present, even as movies moved toward live action and away from animation. What is less clear, however, in light of Shane and Albert (2008), is whether highly preferred, animated movies lead to better performance. Indeed, all three participants in this study scored significantly lower on overall accuracy

percentages for movies that they had seen previously and rated as highly preferred (i.e., LEGO Movie and Monsters, INC.). It is possible that because the participants had seen these movies on multiple occasions, they were less focused on the emotional aspects of the characters and more focused on the anticipation of a favorite action scene or humorous dialogue exchange. However, it is also possible that the relatively fast pace and rapid speech associated with these two movies make them enjoyable from a sensory stimulation perspective, but not particularly conducive to learning. Indeed, if the participants were going to learn emotion recognition, perspective taking, and/or empathy from these two movies, they likely would have already done so before this intervention. It seems as if, based on the findings of this initial study, that some children with autism may need more specific instruction to focus on movie characters' emotional states and resulting actions.

Another interesting finding for all participants in this study is that, generally speaking, performance accuracy on emotion recognition increased for animated movies that contained either repetitive or no language, as opposed to those movies, animated or not, that contained higher levels of novel language. One possibility for this finding may be related to the sheer sensory load produced by a movie with high language frequency. It may be that the participants did not have to spend energy trying to focus on character expression because the language did not "interfere", thus resulting in more accurate identification of emotional state of the characters.

Movie Format

Perhaps the most interesting finding from this study appears to be that although animation was clearly preferred for all participants, it did not necessarily

lead to improved performance when compared to other formats (i.e., movies that contained both animated sequences as well as live action and live action only movies). This could partly be due to practice effects (i.e., live action movies were shown toward the end of the intervention, after participants had had time to practice decoding specific emotions), although that would not appear to be a sufficient explanation for all of the results for all participants.

Brosnan et al. (2015) describe the preference demonstrated for animated faces as compared to live action faces by the children with autism in their study. Results indicated a significant advantage for control groups over the ASD group for emotion recognition in human stimuli. However, there was no advantage for animated stimuli. For static animated images, participants with ASD significantly outperformed control group participants. Although this study contained dynamic images as well as static ones, the dynamic images were devoid of context (i.e., a 5 second video clip of a close up human face with a particular emotion). In contrast to the Brosnan et al. study and others that attempted to teach emotion recognition with static or dynamic images, movies provide the ultimate dynamic presentation.

Another interesting finding from this study relates to the contrast in performance from movies that were seen previously, as opposed to those which had not been seen prior to this intervention. Indeed, all three participants scored significantly better across emotion recognition and perspective taking – why? targets while watching movies that had previously not been seen, regardless of format. This may be due partly to the novelty associated with seeing new images on the screen.

Multiple Exemplars/Generalization

Research has shown that using multiple examples of a stimulus, varied across the range of possible examples, facilitates generalization (Stokes & Baer, 1977). One of the strengths of Movie Time Social Learning and this intervention study is that by design, participants were shown multiple examples of varying degrees of intensity of emotion. This may have significantly aided participants in this study significantly to generalize the emotion, which in turn, led to expressing the emotion verbally to describe their own feeling states outside of the clinic. Increasing the saliency of a stimulus is another way that learning can be enhanced (Cooper, Heron, & Heward, 2007). As animation tends to produce more exaggerated examples of emotional state, this may have initially helped participants in acquiring the emotion vocabulary. As the intervention continued, the examples, although still variable, became less intense, partly due to the changes in format (i.e., animation to live and animated action to live action only). It may be that at that point, participants had sufficient practice with more salient expressions so they were able to identify more subtle emotional expressions.

The generalization probe for Participant 1 would certainly seem to support the idea that motivation is a pivotal area, in that it leads to generalization to nontargeted, but related areas (Koegel & Koegel, 2006). When a particular area is targeted, such as emotion vocabulary, the pivotal nature of motivation often results in improvement in nontargeted, but related areas. This was the case with Participant 1, who labeled Ormie the Pig as “frustrated”, despite the fact that this emotion had not been targeted during intervention, and he had not accurately identified it in prebaseline

testing. Although Participant 1 had the least spontaneous expressive vocabulary of the three participants, he was in fact the only one to generate empathic responses to questions. Perhaps his particular learning style is suggestive of a child who internalizes information for long periods of time, finally emerging with an expression that demonstrates an understanding of a complex concept, such as empathy. It would also fit with Participant 1's perfectionist tendencies, in that he is reluctant to try and do something or say something until he knows that it is accurate, for fear of making a mistake.

Along similar lines, all three participants used the emotions that they had learned to identify in others to describe their own feelings in multiple contexts outside the intervention group setting. This could also be characterized as the result of the pivotal area of motivation, as participants had not been taught, explicitly or otherwise, to use the emotions that they had learned to describe others' states for themselves. This is in part, also due to the natural developmental progression of learning. For most cognitive and language based skills, a child first learns to identify a particular item or label in a receptive manner (i.e., understanding), before then using it expressively in the environment.

Limitations

There were certain limitations associated with interpretations that derived from this intervention. First, there was no control group, nor were the participants randomly chosen from the population at large. The three participants, although diverse in cultural and racial backgrounds, were not representative of the autism spectrum as a whole. They were all able to use language to express themselves

adequately and certainly appeared to have adequate nonverbal and verbal cognitive abilities. In addition, there was no direct observation evidence that any of the participants had used the newly acquired emotional vocabulary to describe others' feeling states (although generalization probes from Participant 3 were not received prior to writing up the study).

Regarding the study's design, prebaseline testing and discussion with parents demonstrated that participants had not yet acquired accurate identification of the emotion targets for this intervention. However, specific baseline sessions to directly assess the potential presence of these skills for Participants 2 and 3 was not undertaken immediately prior to intervention. This weakens our ability to determine the presence of a functional relationship between MTSL and changes in the dependent variables. There were several reasons that direct baseline data were not collected for the final intervention targets. First, after completion of the prebaseline testing, the principal investigator decided that it would not be fair to the participants or their families to wait any longer to begin intervention. The participants' families had given consent for them to be enrolled in the study but were anticipating that their children would be receiving therapy as soon as possible. The participants' parents had confirmed that they had not heard the participants ever use the targeted vocabulary, and testing results from the Social Language Development Test confirmed that the participants did not understand or express the targeted emotions. Therefore, the principal investigator decided to begin intervention after prebaseline testing rather than doing additional direct assessment of the final targets.

In addition, although every effort was made to control for recency effects by interspersing targeted emotions with either a different target or a nontarget, there were occasions where this did occur. This could potentially account for at least some of the correct independent responses associated with the results.

Considerations for Future Research

Accurately assessing emotion recognition, perspective taking, and empathy is not a simple task. Selecting targets for future research needs to be done in multiple naturalistic environments in order to assure that participants do not understand and/or express any of the targets for intervention. Specific situations will likely need to be set up to elicit responses associated with emotion recognition and perspective taking. For example, this could involve a potential conflict among peers on the playground, where only one toy is available, thus leaving one peer feeling angry or frustrated. The child with autism could then be asked “How does___feel?”, “Why do you think s/he feels ____?” or something similar.

Another difficulty encountered in research attempting to examine emotion recognition, perspective taking, and empathy involves the similarities and semantic overlap among various emotion words. For instance, in a study examining advanced targets of excited and frustrated, a child may answer with happy rather than excited, or mad rather than frustrated, and yet truly understand that there is a difference between the two emotions. However, this would potentially be counted as incorrect if the advanced targets of excited and frustrated were being used in a study.

Furthermore, using video or examples portraying gradations of emotions, while necessary to facilitate as much as possible the “real world” and enhance potential generalization, make the semantic overlap even more troublesome. For example, a child labeling a character on the screen as feeling sad, when they were unable to play in a game they believed they could play in (i.e., disappointed), is not missing the overall feeling, but is missing the subtleties associated with being disappointed. These subtle differences can be extremely difficult to tease out, even among experienced clinicians attempting to design interventions.

Using a multiple baseline across behaviors design resulted in some design issues because the behaviors (emotion recognition, perspective taking, and empathy) were not equal in difficulty. A multiple baseline across participants design might have reduced some of these design concerns, although this design would have resulted in participants not entering intervention for several weeks, which presents its own ethical dilemma. Another option would have been to utilize a group design but a group design in many ways would be very difficult to control. Because of the developmental differences and heterogeneity across the autism spectrum, coming up with individualized, motivating movies and targets for multiple children with autism at the same time would be quite challenging. In addition, in a larger group setting, the possibilities for others to respond with an answer meant for one particular child not having acquired the target as yet would also be problematic. Due to the widely varying abilities of children across the autism spectrum, being able to generalize any findings from a group designed intervention would be difficult at best.

Another consideration for future research is utilizing the categories Vagin (2012) describes in the MTSL approach. As Vagin (2012) has explained in detail, there are three broadly based categories for children with autism as it relates to language, perspective taking, and empathy in the Movie Time Social Learning approach to intervention. It would be interesting to utilize the intervention with small groups of children with autism at each of these stages of development, Junior Mindreaders, Moving Up Mindreaders, and Varsity Mindreaders. Focusing on small groups at different levels, it might be possible to determine what outcomes might be more likely for which groups of children. For instance, a small group at the Junior Mindreaders stage may be working on answering simple “wh” questions, as in the Animated Language Learning scenarios above. In addition, teenagers on the autism spectrum at the Varsity Mindreader stage, may be working on more complex relationship issues, such as tracking a relationship over time and seeing different emotions in characters that lead to friendship, romantic interests, or other more age appropriate concepts.

Conclusions

I used a social cognitive framework based on the research of Baron-Cohen et al. (1985) and others for this intervention study. In summary, this theory espouses that an underlying social cognitive deficit is present in children with autism that undermines their ability to develop effective social communication expression and understanding. More specifically, this greatly impacts their ability in areas such as decoding emotional states, taking perspective and demonstrating empathy. Although this theory may account for some of the supposed deficits, it is unlikely to be the sole

factor in determining whether or not children with autism acquire these skills and learn to use them effectively.

Motivation undoubtedly plays an integral part in learning. Like anyone else, children with autism are motivated to learn about things which interest them. Using a visually-based, comforting medium to teach social understanding would appear to be well suited for children with autism and indeed, the results from this intervention would appear to support this premise. It is likely that the predictable, visually-based, structured format of Movie Time Social Learning significantly positively impacted the participants' abilities to acquire and generalize skills in the areas of emotion recognition and beginning perspective taking. If children with autism were going to learn about social aspects solely from watching movies, there would be many children with autism who would have already acquired these skills through observation. The combination of the motivating format, along with the predictable, structured questions, and the pausing and rewinding at critical junctures in the movies where characters displayed targeted emotional states appeared to be the perfect confluence of factors that led to the successes associated with this intervention study.

Future studies in the area of using movies to teach social understanding may involve the use of parents and peers as mediators, rather than clinicians or teachers. This may indeed, strengthen the generalization of skills even more than what was demonstrated in this study. As many parents and typically developing peers also enjoy movie watching, the motivation for everyone would be present.

Parents could be taught to use the intervention by modeling how to intersperse scene watching with questions related to emotions, perspective taking and empathy. This could be followed by a combined “coaching” session(s), in which the interventionist would coach the parent on how to recognize when their child with autism needed to have a movie paused or rewound to help him/her process a particular scene, emotion change or the language contained within it. The interventionist would then fade out support when it appeared that the parent was confidently implementing the procedures and asking the questions.

For peers, a similar coaching sequence would likely be helpful, with more preteaching beforehand. Giving peers some background information on why emotions, perspective taking and empathy are difficult concepts for children with autism would be helpful. Helping peers to remember that they would be in the role of “teacher/mediator” might be challenging (as they would get involved with the movies as well). However, with practice and support, it would be doable Peers may need to be given specific instructions on how to elicit a response without giving away too much information or not prompting too much, according to the developmental levels of the child with autism. Peers would need to be very familiar with the content of the movie, not just from a what happens perspective, but what are the emotions of the characters and how are they linked to thoughts and subsequent actions. This may take considerable work prior to having peers lead a session. It would probably be beneficial for peers to observe a clinician lead several sessions with familiar movies first, before taking over a lead facilitator role.

Another possible area of exploration would be interspersing movie scenes with questions on the screen related to content. This is beginning to be explored by interventionists and researchers involved with Animated Language Learning (Animated Language Learning, 2015). On their website, a cloud based system is available for a monthly fee, that has built-in questions and answers related to movie content. On their website, animatedlanguagelearning.com, under the heading of Our Language Learning, there is a brief video demonstration of the movie, *Toy Story*, shown in paused mode with a text based question appearing on the screen next to the character, Woody. It asks "What is Woody saying?" When the website visitor clicks on the screen, the answer appears next to the question, "Hello." Another example from the website shows toys hiding in a closet with the question on the screen "What are Andy's toys doing?", followed by a response of "Hiding" when the mouse is clicked on the screen. This opens up visually based language learning opportunities for children across the autism spectrum, from those who may be saying their first words, as well as those working on more subtle social concepts.

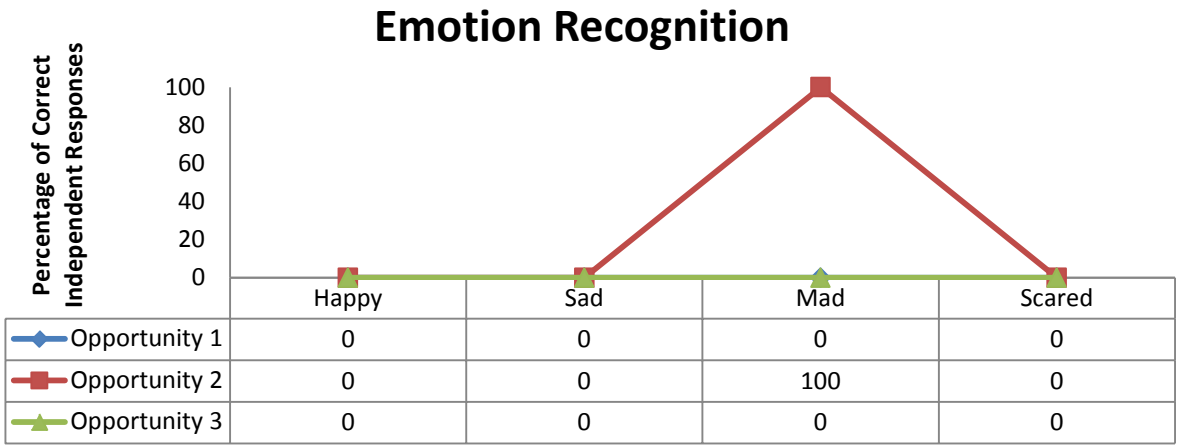
Another currently available family opportunity that capitalizes on the movie motivation for children with autism, is the themed "Scene It" board games (Screenlife, LLC, 2005). Familiar, popular movie series such as Harry Potter and Disney/Pixar collaborations, Toy Story and Cars, are featured with DVD video clips from the movies in a trivia based DVD game format. This would certainly appeal to children with autism, while at the same time making it a fun activity for siblings and parents.

In addition, it appeared in this study that the sequence of animated movies first resulted in rapid acquisition, then generalization was enhanced due to the fading of animated movies toward a more real-life presentation, such as is seen in live action movies. This finding suggests that future research should more carefully examine this type of sequencing to facilitate generalization of skills from intervention to applied contexts.

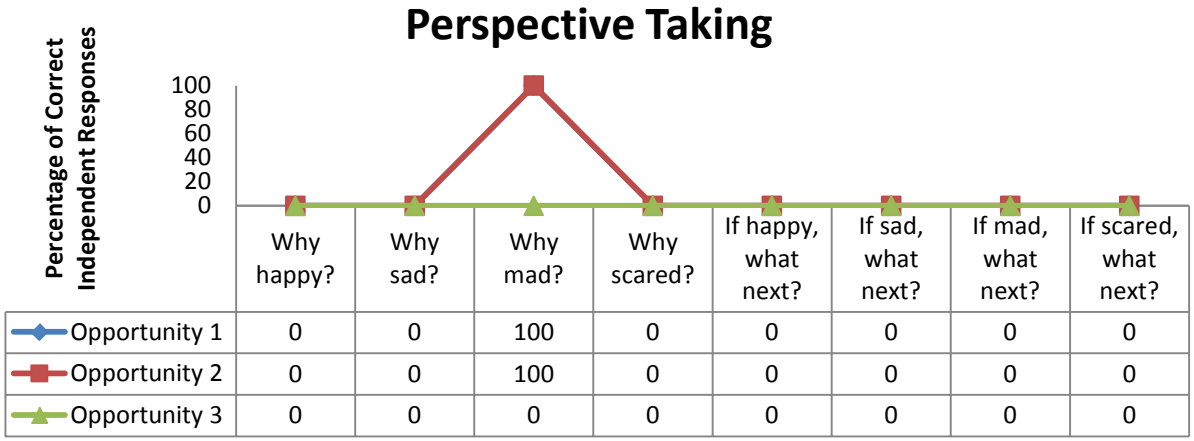
Finally, as autism treatment shifts more towards using the interests of children with autism in developing new skills, it will likely be beneficial to combine interventions such as Movie Time Social Learning, with other new interventions, such as Affinity Therapy (Suskind, 2014), which involves using a child with autism's particular interest area to develop social communication understanding and expression. Affinity Therapy proposes to go deeply with the child into his or her preferred areas of interest, particularly in the area of movies. Strategies include acting out specific preferred scenes of movies with the child with autism taking on their preferred role as a way to connect and engage. In addition, the adult may use dialogue from a preferred movie scene to initiate an interaction, with the child with autism then adding the favorite characters' dialogue for enhanced reciprocal language opportunities. Research using Affinity Therapy with young children with autism is currently being studied at Yale, MIT and Cambridge as part of a multisite research study. Interestingly, Baron-Cohen is one of the primary investigators on the study, which directly ties in theory of mind to Affinity Therapy. A combined treatment of Movie Time Social Learning and Affinity Therapy would likely involve a combination of question asking and role playing for older, more able children with

autism, while for younger children, the focus may be primarily on the role playing of preferred movie scenes. What is clear is that movies and following the interests of children with autism have clearly gotten recent attention of both researchers and interventionists. This can only lead to further, quicker expansion of our understanding of how children with autism learn most effectively and how we can teach them skills which have the greatest chance to generalize in real life.

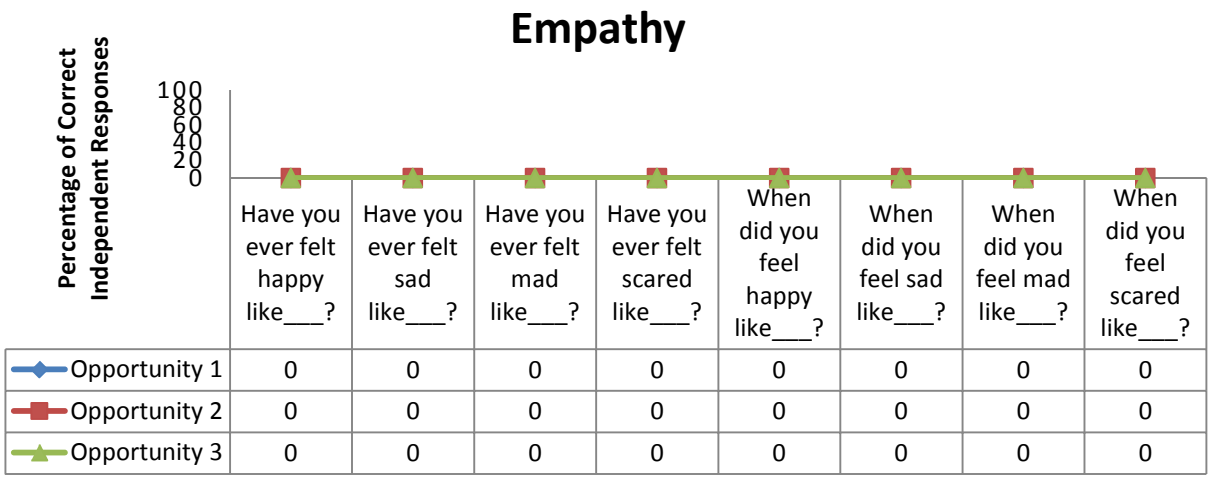
Figures



	Happy	Sad	Mad	Scared
Opportunity 1	0	0	0	0
Opportunity 2	0	0	100	0
Opportunity 3	0	0	0	0

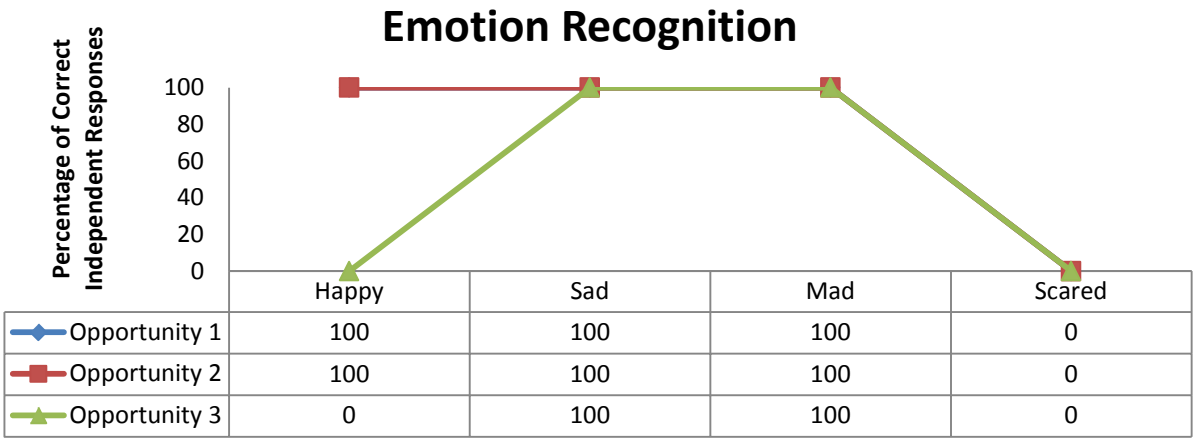


	Why happy?	Why sad?	Why mad?	Why scared?	If happy, what next?	If sad, what next?	If mad, what next?	If scared, what next?
Opportunity 1	0	0	100	0	0	0	0	0
Opportunity 2	0	0	100	0	0	0	0	0
Opportunity 3	0	0	0	0	0	0	0	0

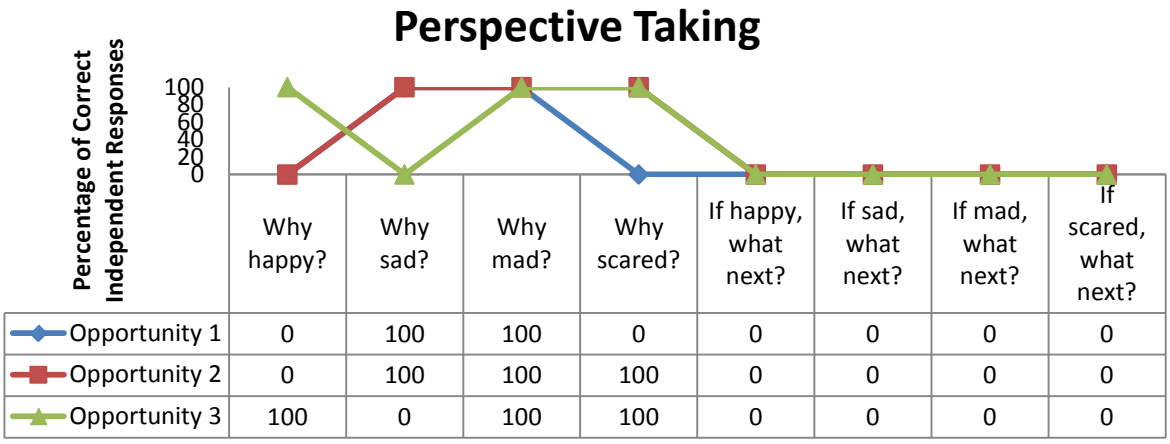


	Have you ever felt happy like___?	Have you ever felt sad like___?	Have you ever felt mad like___?	Have you ever felt scared like___?	When did you feel happy like___?	When did you feel sad like___?	When did you feel mad like___?	When did you feel scared like___?
Opportunity 1	0	0	0	0	0	0	0	0
Opportunity 2	0	0	0	0	0	0	0	0
Opportunity 3	0	0	0	0	0	0	0	0

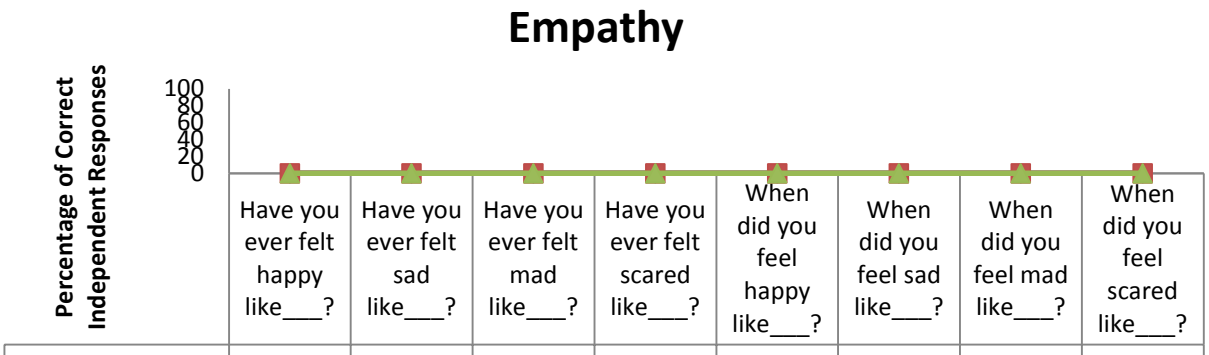
Figure 1. Prebaseline results for Participant 1.



	Happy	Sad	Mad	Scared
Opportunity 1	100	100	100	0
Opportunity 2	100	100	100	0
Opportunity 3	0	100	100	0

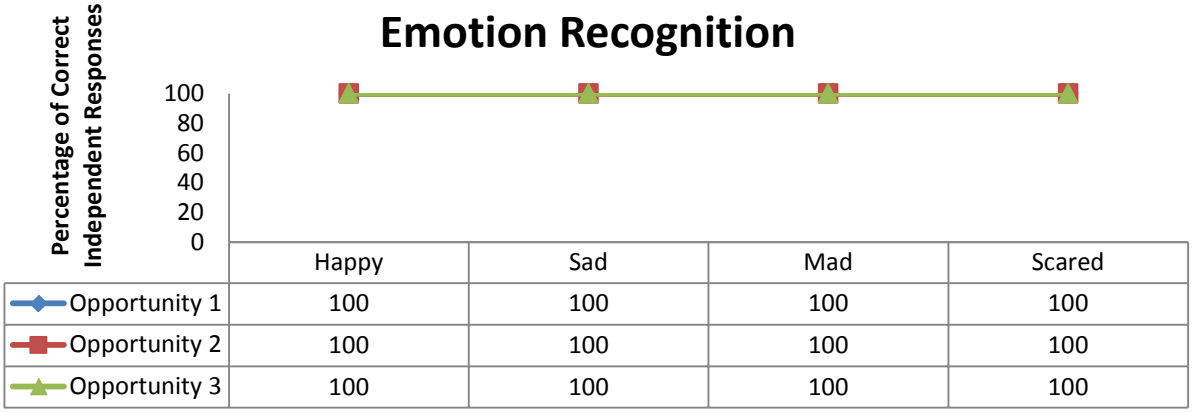


	Why happy?	Why sad?	Why mad?	Why scared?	If happy, what next?	If sad, what next?	If mad, what next?	If scared, what next?
Opportunity 1	0	100	100	0	0	0	0	0
Opportunity 2	0	100	100	100	0	0	0	0
Opportunity 3	100	0	100	100	0	0	0	0



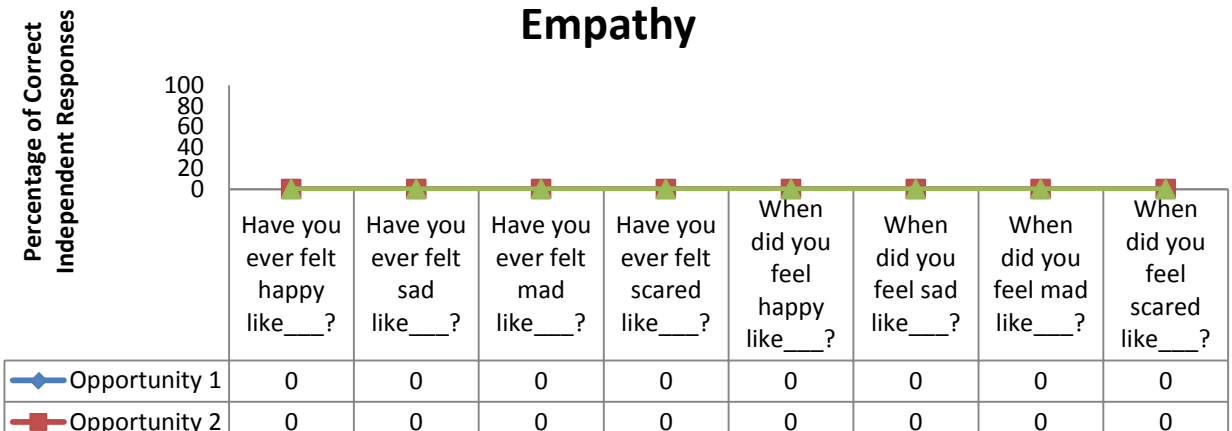
	Have you ever felt happy like___?	Have you ever felt sad like___?	Have you ever felt mad like___?	Have you ever felt scared like___?	When did you feel happy like___?	When did you feel sad like___?	When did you feel mad like___?	When did you feel scared like___?
Opportunity 1	0	0	0	0	0	0	0	0
Opportunity 2	0	0	0	0	0	0	0	0
Opportunity 3	0	0	0	0	0	0	0	0

Figure 2. Prebaseline results for Participant 2.



	Happy	Sad	Mad	Scared
Opportunity 1	100	100	100	100
Opportunity 2	100	100	100	100
Opportunity 3	100	100	100	100

	Why happy?	Why sad?	Why mad?	Why scared?	If happy, what next?	If sad, what next?	If mad, what next?	If scared, what next?
Opportunity 1	0	0	0	0	0	0	0	0
Opportunity 2	0	0	0	0	0	0	0	0
Opportunity 3	0	100	0	0	0	0	0	0



	Have you ever felt happy like___?	Have you ever felt sad like___?	Have you ever felt mad like___?	Have you ever felt scared like___?	When did you feel happy like___?	When did you feel sad like___?	When did you feel mad like___?	When did you feel scared like___?
Opportunity 1	0	0	0	0	0	0	0	0
Opportunity 2	0	0	0	0	0	0	0	0
Opportunity 3	0	0	0	0	0	0	0	0

Figure 3. Prebaseline results for Participant 3.

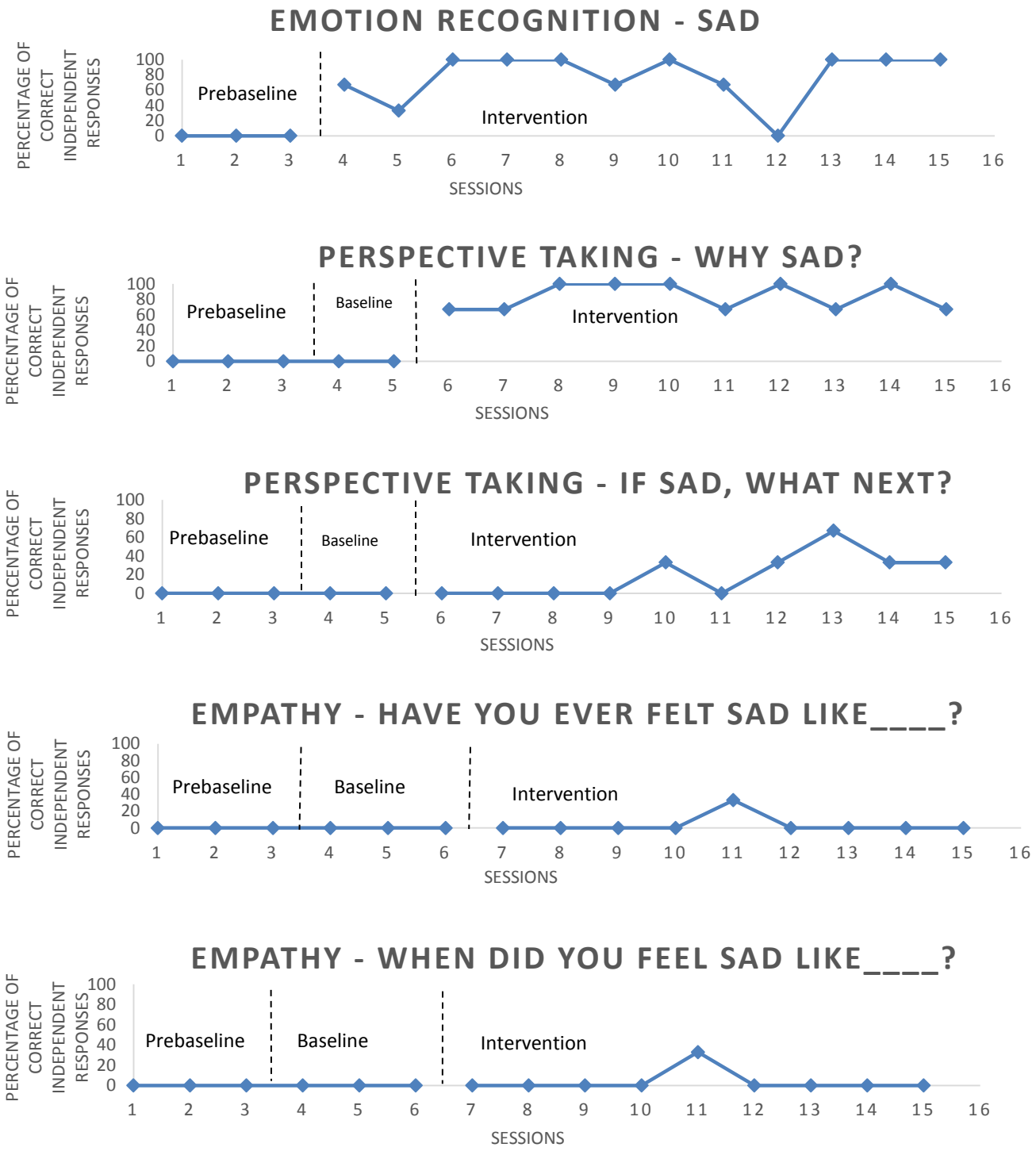


Figure 4. Emotion recognition, perspective taking, and empathy results for “sad”, prebaseline, baseline and intervention phases, Participant 1.

Figure 5. Emotion recognition, perspective taking, and empathy results for “scared”, baseline and intervention phases, Participant 1.

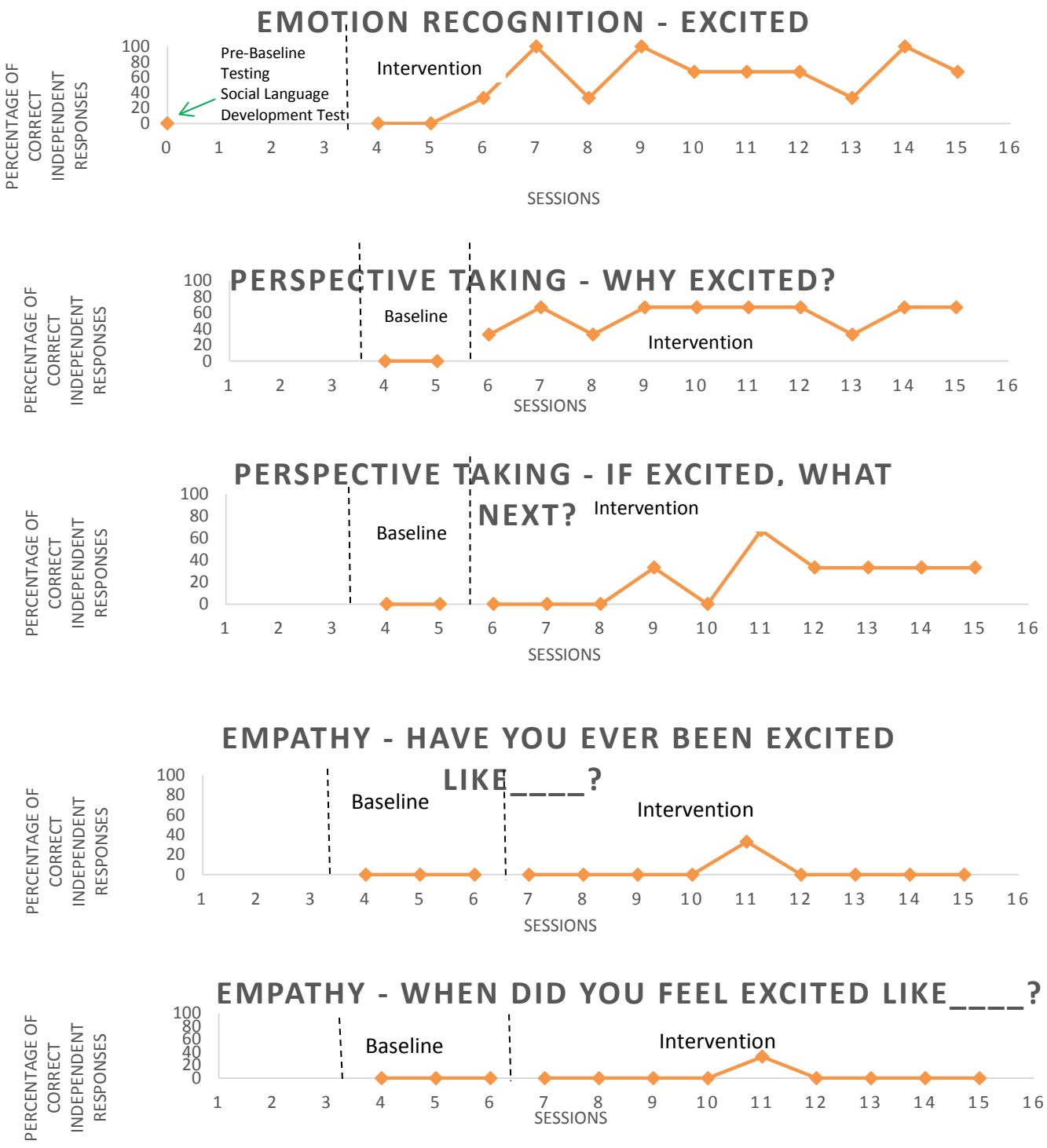


Figure 6. Emotion recognition, perspective taking, and empathy results for “excited”, pre-baseline testing and intervention phases, Participant 1.

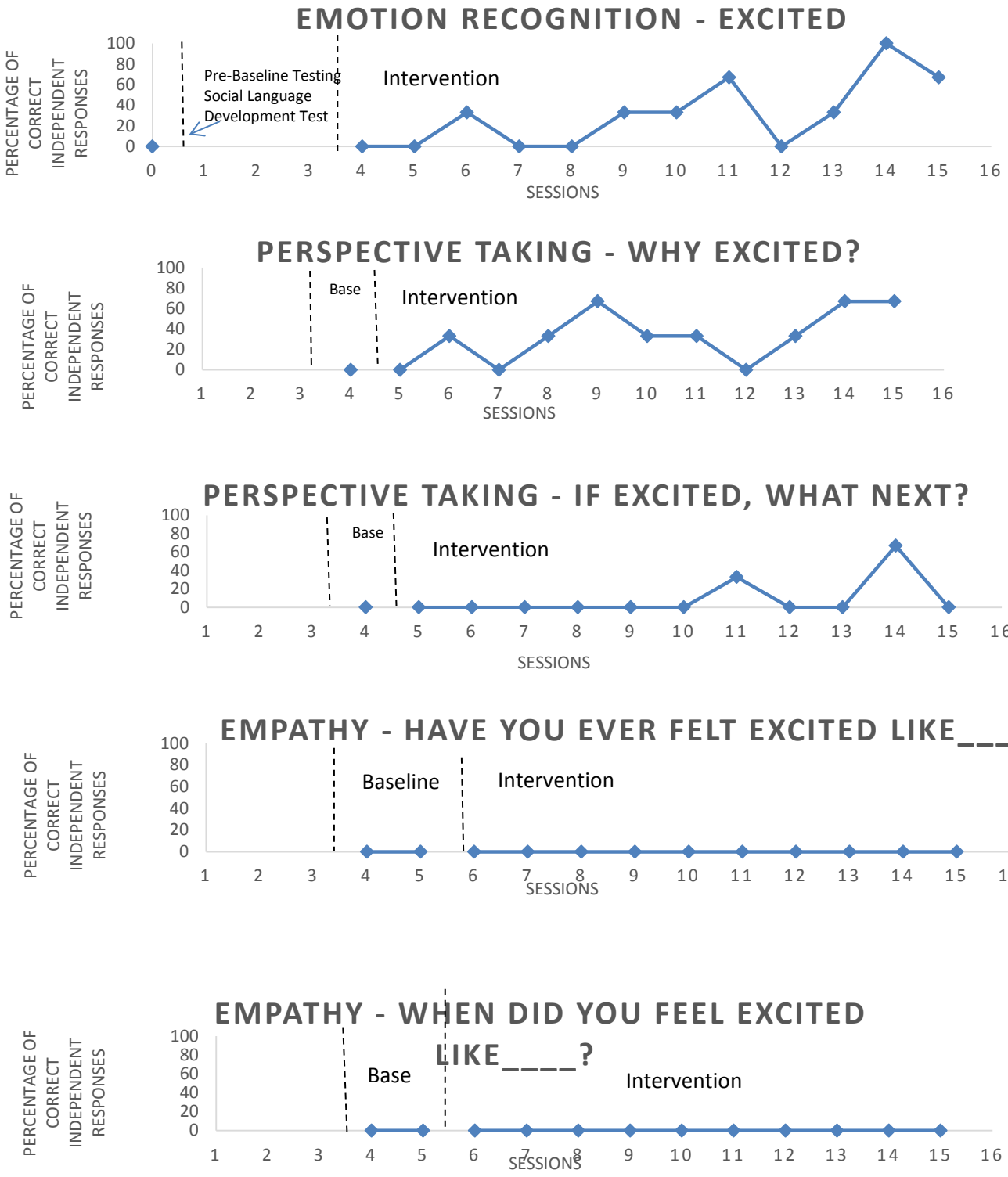


Figure 7. Emotion recognition, perspective taking and empathy results for "excited", pre-baseline and intervention phases, Participant 2.

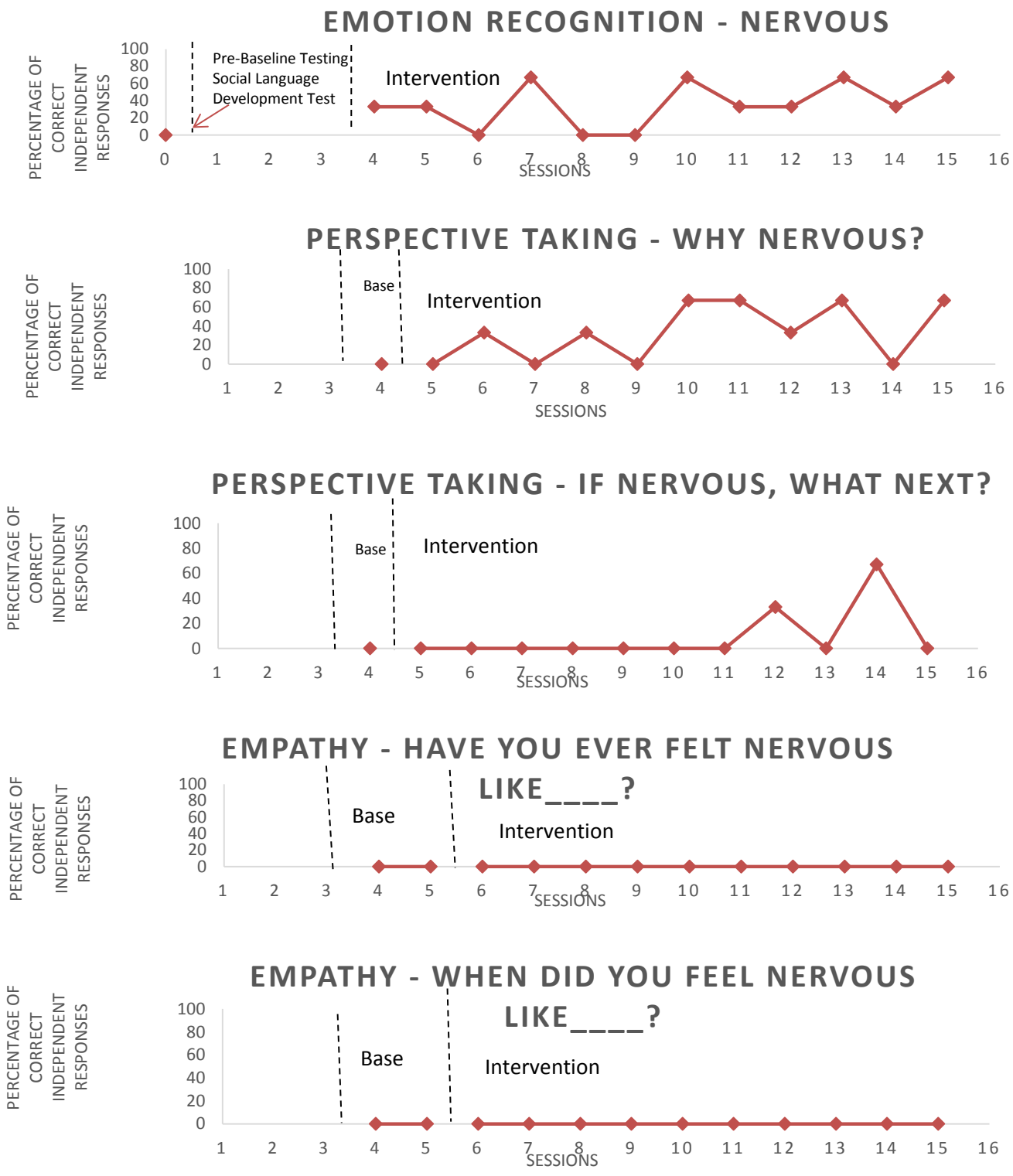


Figure 8. Emotion recognition, perspective taking and empathy results for "nervous", pre-baseline and intervention phases, Participant 2.

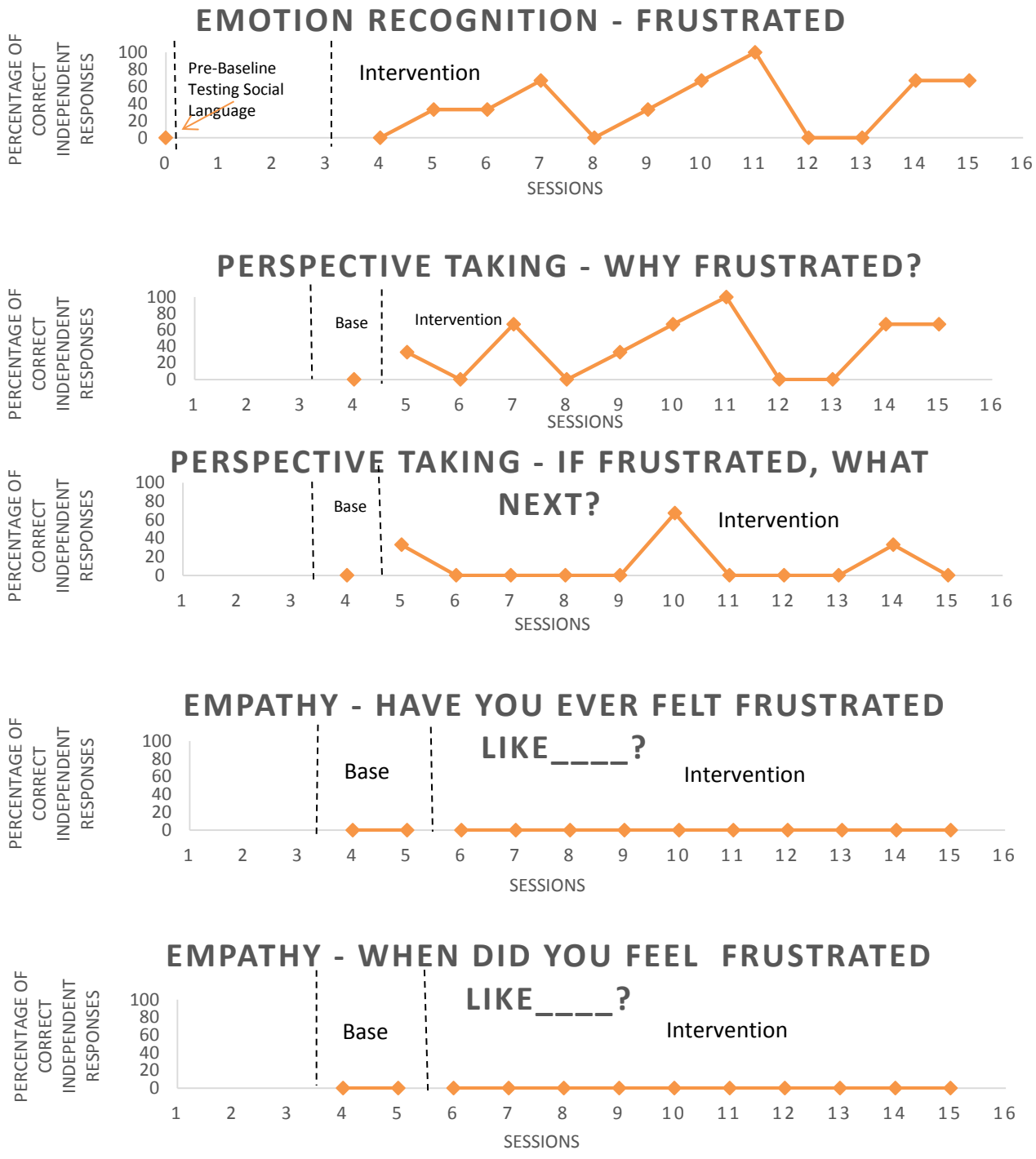


Figure 9. Emotion recognition, perspective taking and empathy results for "frustrated", pre-baseline and intervention phases, Participant 2.

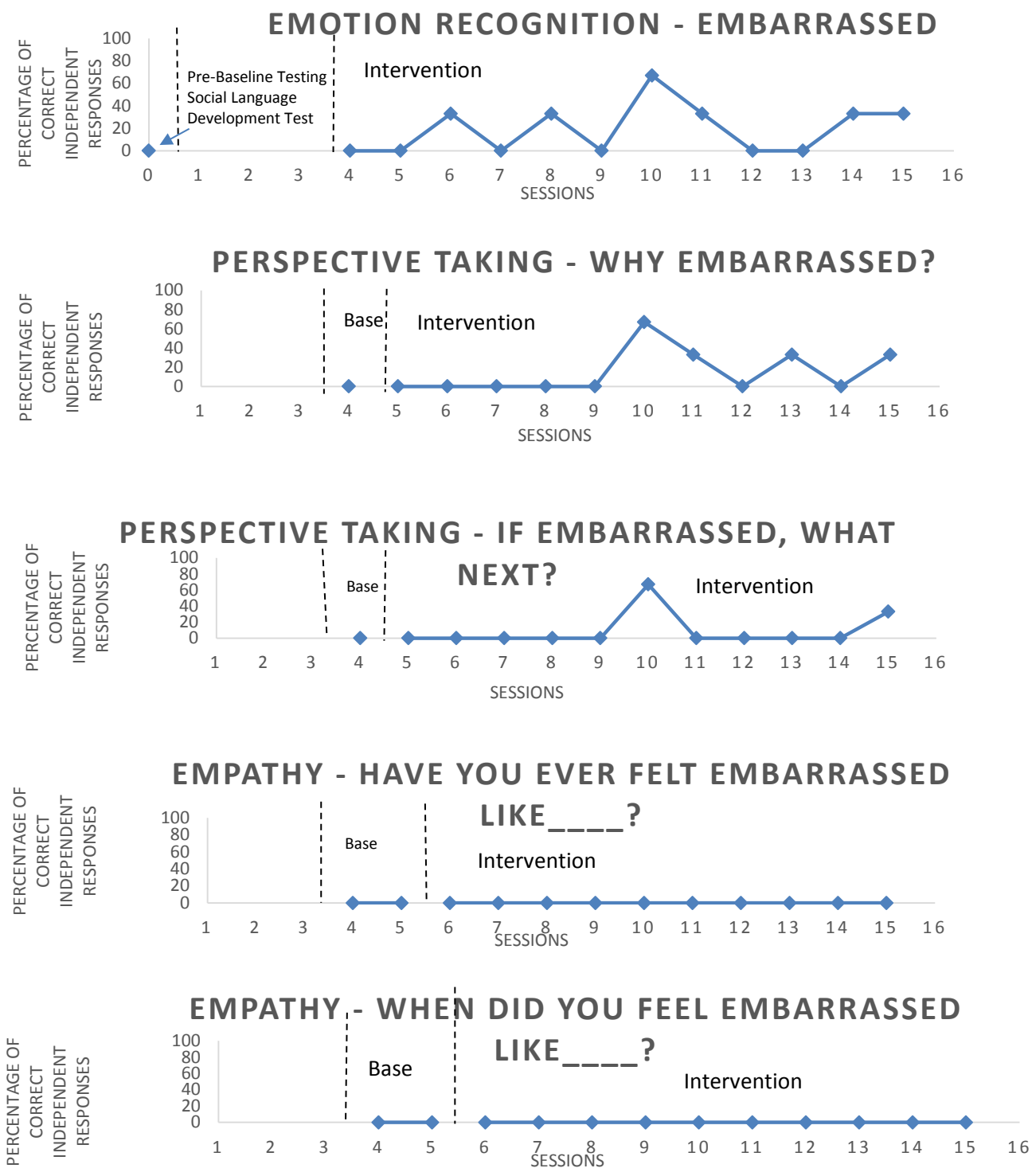


Figure 10. Emotion recognition, perspective taking and empathy results for "embarrassed", pre-baseline and intervention phases, Participant 3.

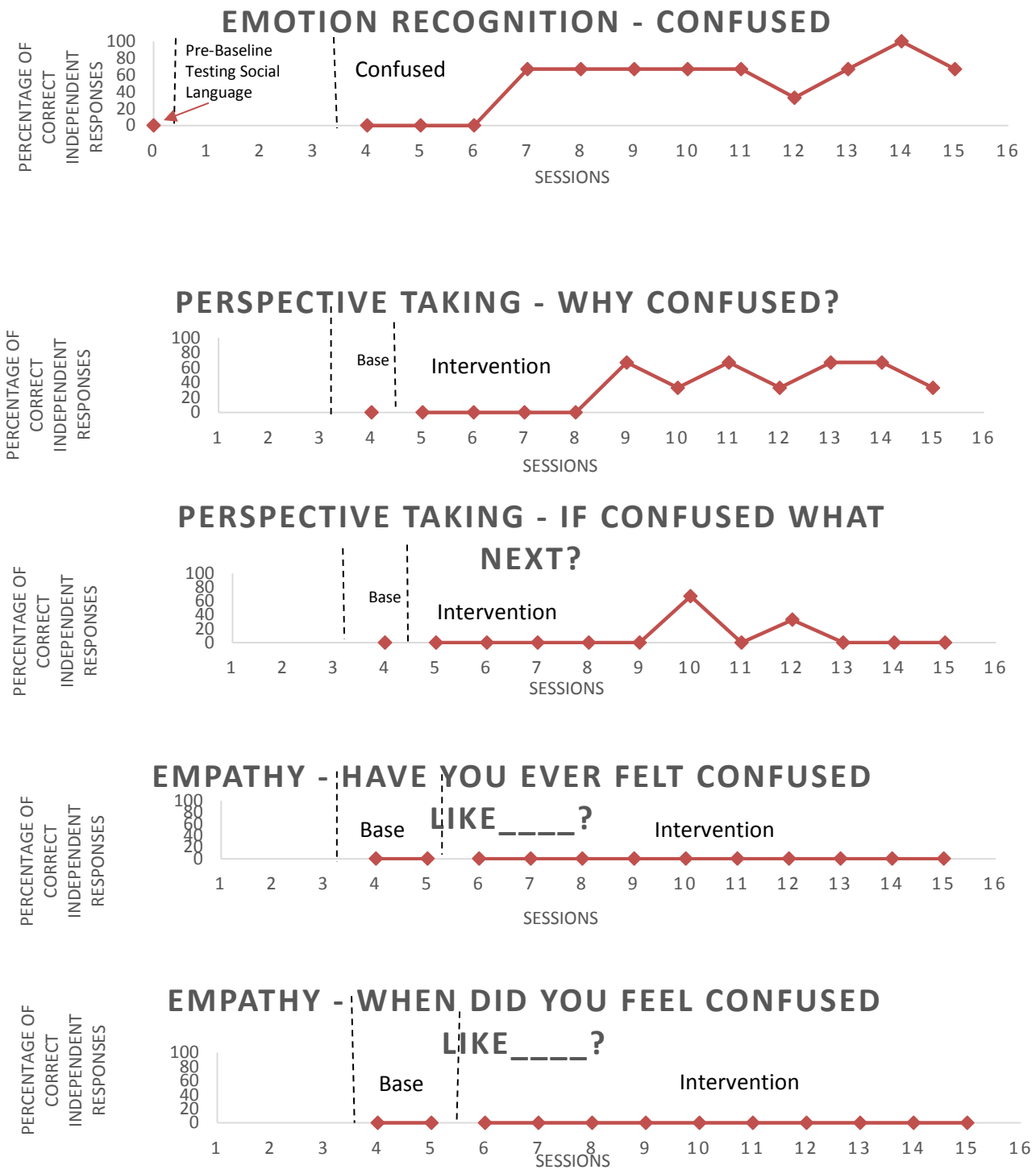


Figure 11. Emotion recognition, perspective taking and empathy results for "confused", pre-baseline and intervention phases, Participant 3.

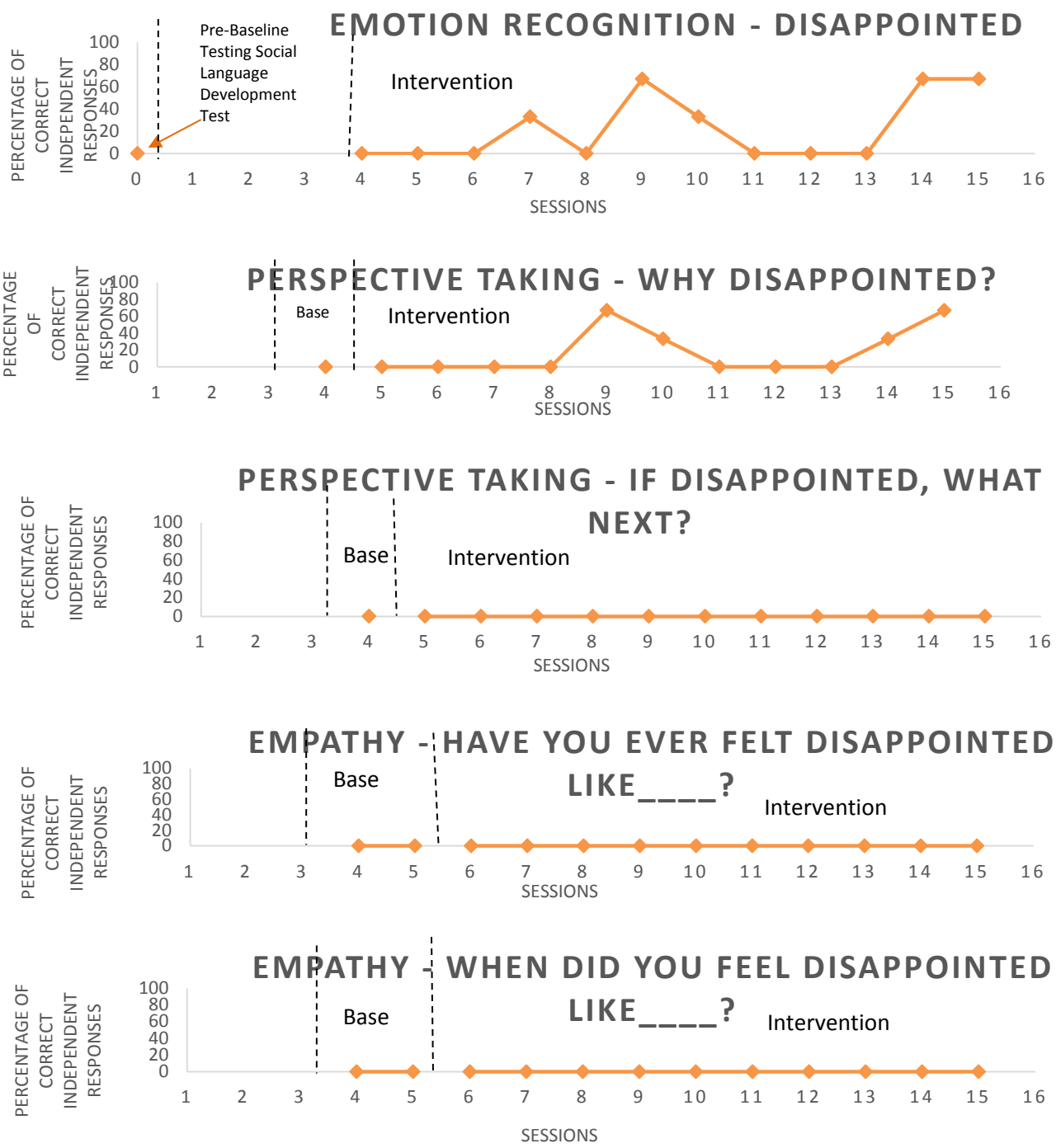


Figure 12. Emotion recognition, perspective taking and empathy results for "disappointed", pre-baseline and intervention phases, Participant 3.

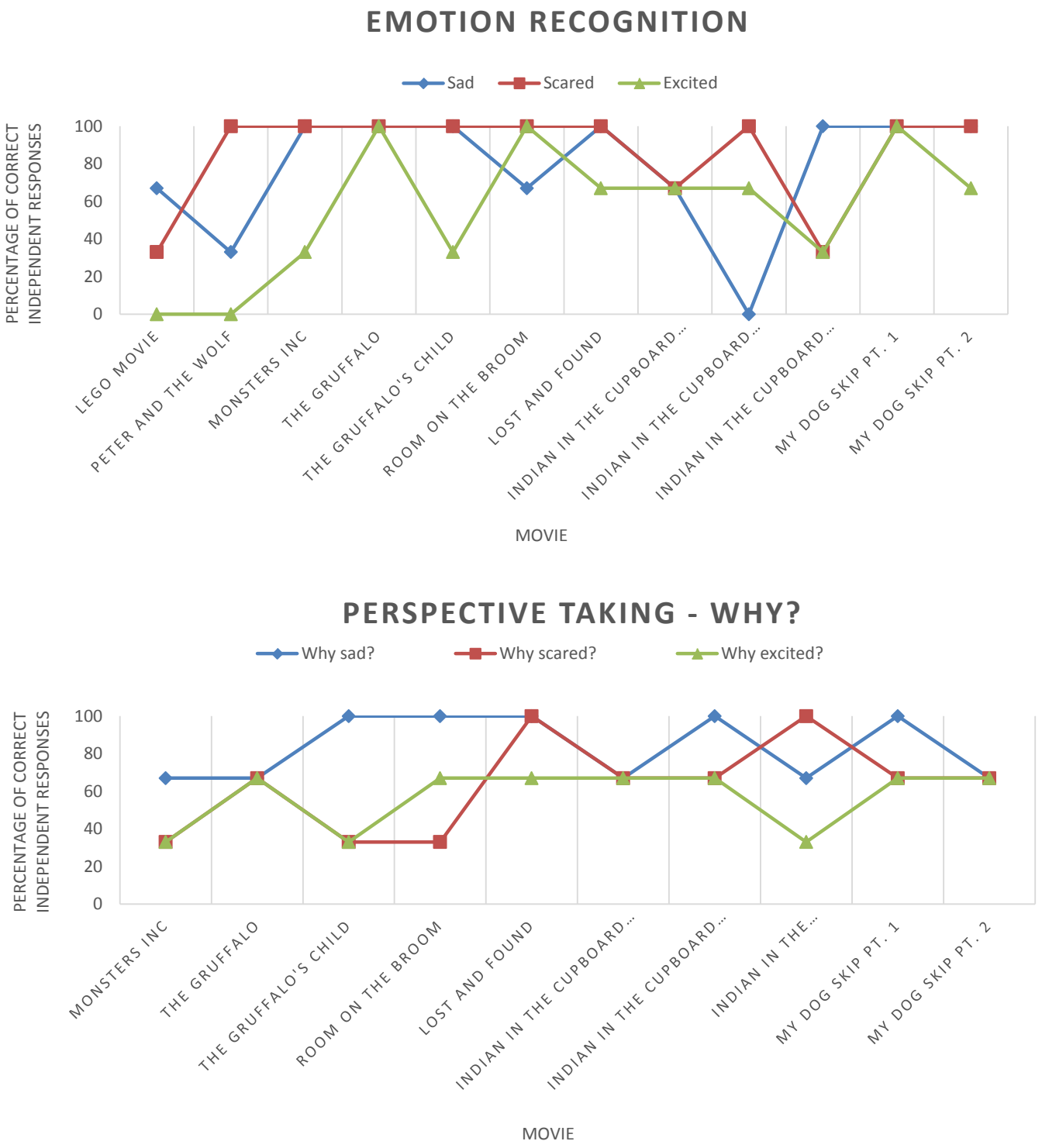


Figure 13. Emotion recognition and perspective taking "Why?" intervention results by movie, Participant 1.

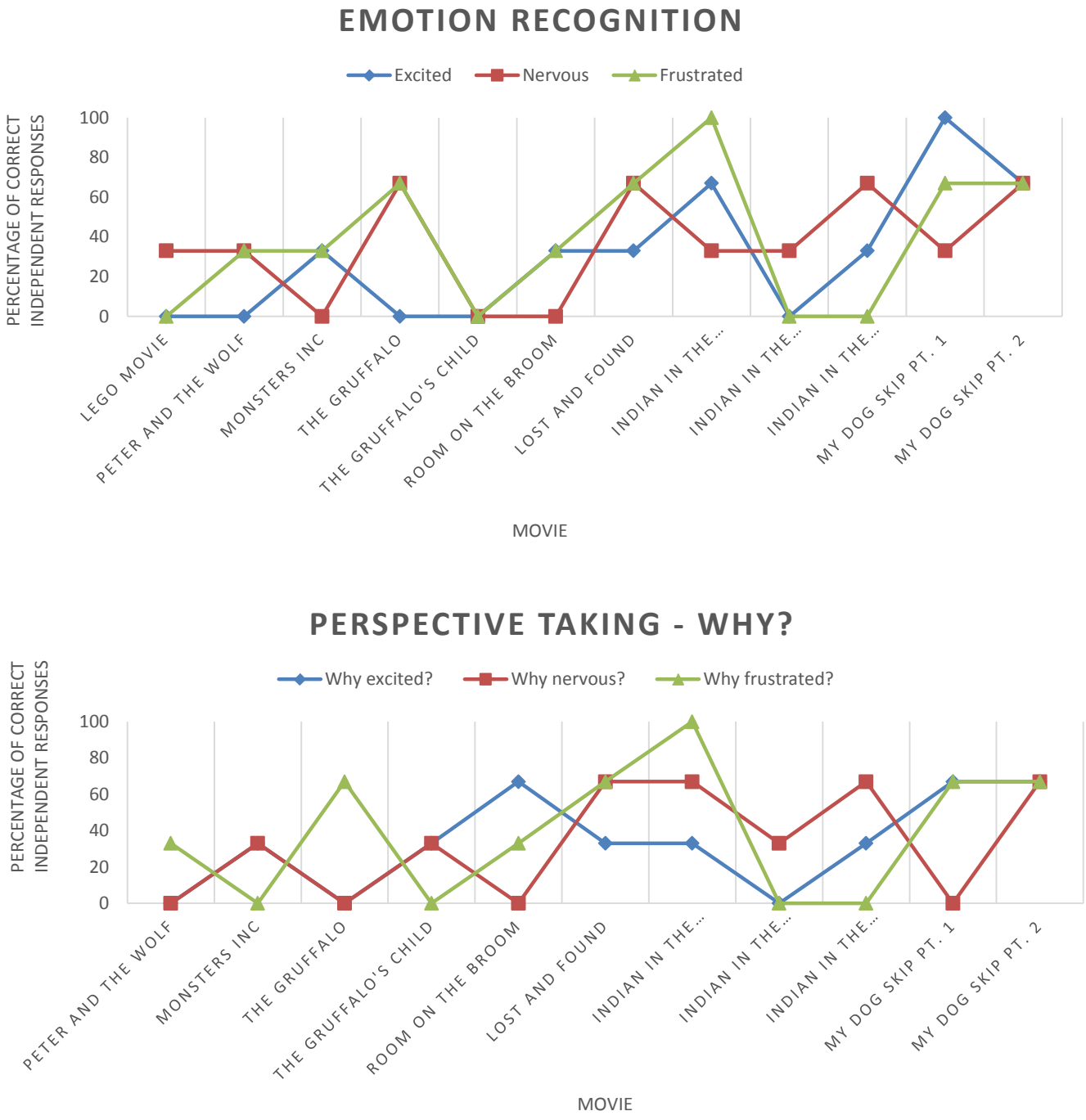


Figure 14. Emotion recognition and perspective taking "Why?" intervention results by movie, Participant 2.

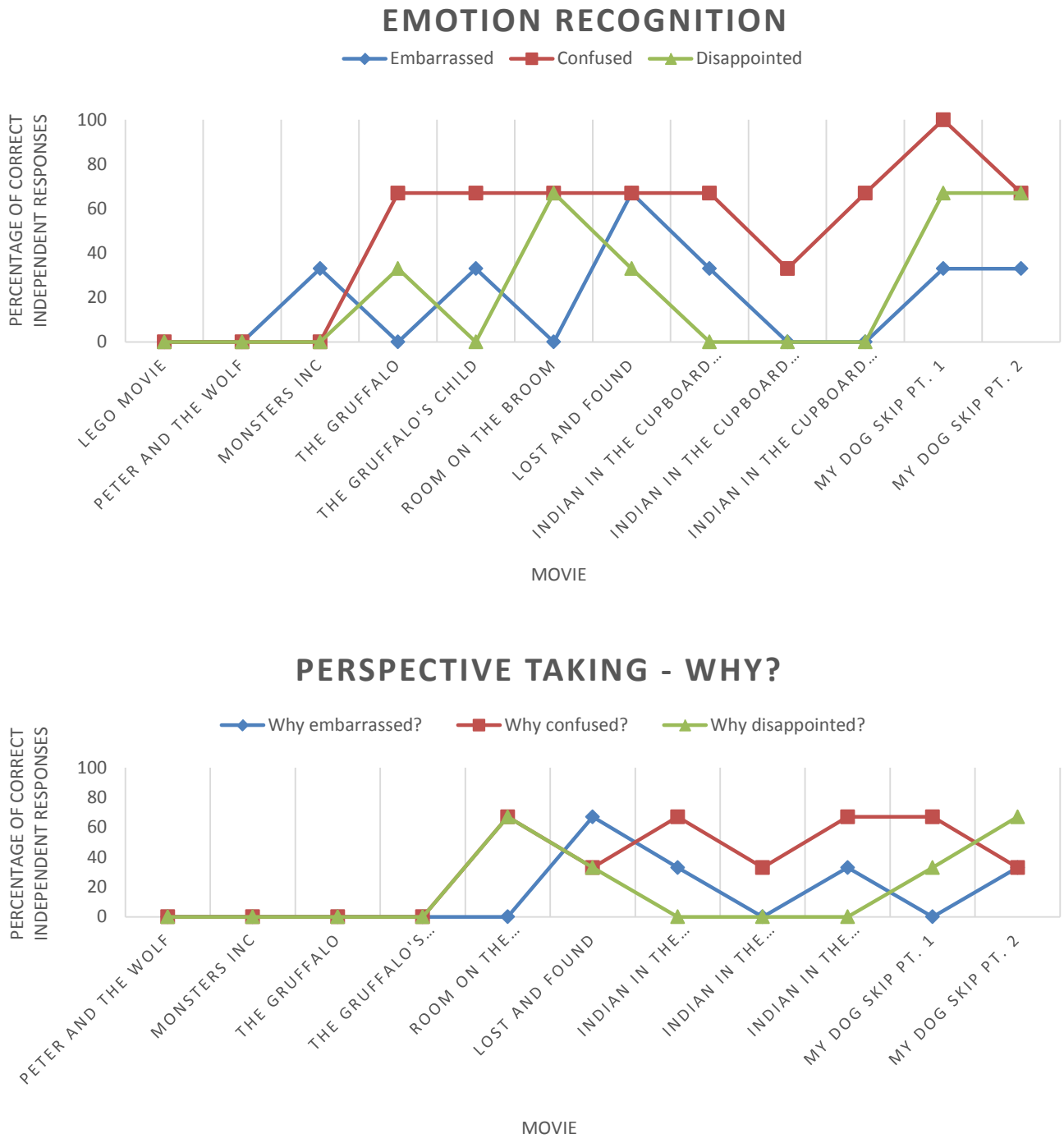


Figure 15. Emotion recognition and perspective taking "Why?" intervention results by movie, Participant 3.

Tables

Table 1

Levels of theory of mind and sample scenarios

Theory of Mind Level	Conceptual Understanding	Scenario
Level One – Precursors to Theory of Mind Development	Perception and imitation, emotion recognition	Child can identify basic emotions in others (i.e., Child sees another child start to cry and says that the child feels “sad”).
Level Two – Emerging Theory of Mind	First order belief, false belief	Child can express that another person is thinking something based on what is seen, Child knows that if an item is moved out of the sight of another child, when the other child reenters the room, they will look for it in the “wrong” spot.
Level Three – Advanced Theory of Mind	Second order belief, humor	First child knows that a second child viewing an event of a third child at the same time that they are will believe the same thing because they are seeing the same things happen.

Table 2

Social Language Development Test –Eelementary, Results by Participant

Subtest	Participant 1 Percentile Rank (Standard Score)	Participant 2 Percentile Rank (Standard Score)	Participant 3 Percentile Rank (Standard Score)
Making Inferences	<1 (<60)	<1 (<60)	<1% (<60)
Interpersonal Negotiation	<1 (<60)	<1 (<60)	<1% (<60)
Multiple Interpretations	<1 (<60)	<2 (<69)	<2% (<69)
Supporting Peers	4 (73)	<1 (<60)	<1% (<60)
Total Test	<1 (<60)	<1 (<60)	<1% (<60)

Table 3

Social Skills Improvement System (SSIS) Rating Scales Summary Results by Participant

Social Skills Subscales	Participant 1 Raw Score (Behavior Level)	Participant 2 Raw Score (Behavior Level)	Participant 3 Raw Score (Behavior Level)
Communication	11 (Below Average)	14 (Average)	11 (Below Average)
Cooperation	9 (Below Average)	12 (Average)	10 (Average)
Assertion	6 (Below Average)	6 (Below Average)	18 (Average)
Responsibility	17 (Above Average)	7 (Below Average)	14 (Average)
Empathy	5 (Below Average)	12 (Average)	16 (Average)
Engagement	6 (Below Average)	8 (Below Average)	14 (Average)
Self-Control	16 (Average)	10 (Average)	15 (Average)
Social Skills Scale Standard Score	77	76	100

Problem Behaviors Subscales	Participant 1 Raw Score (Behavior Level)	Participant 2 Raw Score (Behavior Level)	Participant 3 Raw Score (Behavior Level)
Externalizing	11(Average)	8 (Average)	13 (Above Average)
Bullying	2 (Average)	0 (Average)	1 (Average)
Hyperactivity/ Inattention	8 (Average)	10 (Above Average)	13 (Above Average)
Internalizing	7 (Average)	5 (Average)	7 (Average)
Problem Behaviors Scale Standard Score	117	109	123

	Participant 1 Raw Score (Behavior Level)	Participant 2 Raw Score (Behavior Level)	Participant 3 Raw Score (Behavior Level)
Autism Spectrum	24 (Above Average)	20 (Above Average)	23 (Above Average)

Table 4

Emotion Recognition Intervention Targets

Emotion Recognition	Participant 1	Participant 2	Participant 3
Emotion Target 1	sad	excited	embarrassed
Emotion Target 2	scared	nervous	confused
Emotion Target 3	excited	frustrated	disappointed

Table 5

Description of Movies Used During Intervention Study

Session	Movie Title	Targeted Scenes or Whole Movie	Seen or Not Seen Previously by Participants	Description and Frequency of Language/Music in Movie	Animation or Live Action or Both
4	*LEGO Movie*	Targeted Scenes	Seen	High Novel Language, Low Music	Animation in Targeted Scenes
5	*Peter and the Wolf*	Whole Movie	Not Seen	No Language, High Music	Animation
6	*Monsters, INC.*	Targeted Scenes	Seen	High Novel Language, Low Music	Animation
7	*The Gruffalo*	Whole Movie	Not Seen	Repetitive, Moderate Language, High Music	Animation
8	*The Gruffalo's Child*	Whole Movie	Not Seen	Repetitive, Moderate Language, High Music	Animation
9	*Room on the Broom*	Whole Movie	Not Seen	Repetitive, Moderate Language, High Music	Animation
10	*Lost and Found*	Whole Movie	Not Seen	Low Novel Language from Narrator, High Music	Animation

Session	Movie Title	Targeted Scenes or Whole Movie	Seen or Not Seen Previously by Participants	Description and Frequency of Language/Music in Movie	Animation or Live Action or Both
11	*The Indian in the Cupboard – Part One*	Whole Movie	Not Seen	Moderate Novel Language, Low Music	Both
12	*The Indian in the Cupboard – Part Two*	Whole Movie	Not Seen	Moderate Novel Language, Low Music	Both
13	*The Indian in the Cupboard – Part Three*	Whole Movie	Not Seen	Moderate Novel Language, Low Music	Both
14	*My Dog Skip – Part One*	Whole Movie	Not Seen	Moderate Novel Language, Low Music	Live Action
15	*My Dog Skip – Part Two*	Whole Movie	Not Seen	Moderate Novel Language, Low Music	Live Action

Table 6

Social Validity Questionnaire Responses: Parents

Question	Parent of Participant 1	Parent of Participant 2	Parent of Participant 3
Do you feel that MTSL was an effective intervention tool for your child?	"Yes, I feel that he has been verbal retelling the movie and he was also very excited and motivated by watching new movies."	"Yes!"	"Yes, MTSL has been an effective intervention tool for our child."
Do you feel that your child liked attending MTSL group sessions?	"Yes. He is always happy to attend."	"Yes! That's all they talk about, is coming here!"	"Yes, she loves group sessions."
Do you feel that MTSL is something that you will try at home with your child?	"Yes. I've tried to get him to talk about what happens next and to talk about his feelings."	"Absolutely"	"Yes, we will try it at home with her."
Do you feel that MTSL would be an effective intervention technique at school for your child?	"Yes. I can see that this would be an effective tool to deal with feelings and situations that come up in the school setting."	"Yes – great tool"	"Yes, I think it will be an effective intervention technique at school for my child as well as others."
Would you allow your child to participate in another study involving MTSL?	"Yes. I would like him to continue to explore emotions as demonstrated in movies."	"Yes, yes, yes"	"Yes, we will allow our child to participate in another study involving MTSL."

Question	Parent of Participant 1	Parent of Participant 2	Parent of Participant 3
Has your child been able to express emotional state of others since MTSL intervention?	"I don't think he has been verbally able to express others' emotional state, but I do think it has made him more aware of his own."	"Yes, he started letting me know when he was scared or nervous."	"Yes, she has expressed her emotions."
Has your child demonstrated the ability to take the perspective of others since MTSL intervention?	"No. I think that this is something he still needs to develop. I do think that he has shown empathy when someone is sad, but not to the extent that he can take another's perspective."	"I see him study other children more to try and figure out the emotion before talking to them."	"Yes, we have noticed that she is starting to take the perspective of others."
Has your child demonstrated empathic responses towards others since MTSL intervention?	"Yes. He does show concern when others are sad, more so than he did before. I think that he still has a hard time getting excited when he is not excited over something that someone else is. He does require leading questions and lots of prompts for us to understand what he feels."	"Yes"	"Yes, we have noticed that she has been demonstrating empathy towards others."
Are there any other differences you have noticed in your child since beginning the MTSL intervention that you feel may be related?	"The greatest difference is in the level of confidence that ___has achieved by being a participant in this group. He is much more likely to spontaneously share	"Now, when we watch movies we talk about how they might be feeling. He's getting more engaged."	She has been able to express her feelings and thoughts more than before she started the MTSL program. She has been more

Question	Parent of Participant 1	Parent of Participant 2	Parent of Participant 3
	his thoughts and feelings about something he has seen or heard. He is eager to retell what happened during a session and will be able to give many more details about a movie than he ever has before."		attentive of what she is watching or reading."

Table 7

Social Validity Questionnaire Responses: Participants

Question	Participant 1 response	Participant 2 response	Participant 3 response
Did you like MTSL?	"Yes"	"Yes"	"Yes"
What did you like best?	"*Peter and the Wolf*"	"*Room On The Broom*"	"*Room On The Broom*"
Was there anything you didn't like?	"No"	"No"	"No"
What was it?	N/A	N/A	N/A
Did you like coming to group knowing we would use MTSL?	"Yes"	"Yes"	"Yes"
Would you attend another group using MTSL?	"Yes"	"Yes"	"Yes"

Table 8

Baseline: Interobserver Agreement Across Behaviors by Participant

Behavior	Participant 1 Mean(Range)	Participant 2 Mean (Range)	Participant 3 Mean (Range)
Happy	100% (100%)	100% (100%)	100% (100%)
Sad	100% (100%)	100% (100%)	100% (100%)
Mad	100% (100%)	100% (100%)	100% (100%)
Scared	100% (100%)	100% (100%)	100% (100%)
Why happy?	99% (95%-100%)	98% (96%-100%)	98% (98%-100%)
Why sad?	98% (96%-100%)	98% (95%-100%)	99% (98%-100%)
Why mad?	98% (96%-100%)	99% (98%-100%)	98% (98%-100%)
Why scared?	100% (100%)	98% (98%-100%)	99% (99%-100%)
If happy, what next?	100% (100%)	100% (100%)	100% (100%)
If sad, what next?	100% (100%)	100% (100%)	100% (100%)
If mad, what next?	100% (100%)	100% (100%)	100% (100%)
If scared, what next?	100% (100%)	100% (100%)	100% (100%)
Have you ever felt happy like___?	100% (100%)	100% (100%)	100% (100%)
When did you feel happy like___?	100% (100%)	100% (100%)	100% (100%)

Table 9

Fidelity of intervention

Assessed Areas	No additional language or facial expression	Instruction clear
Participant 1 – Emotion Recognition Mean (Range)	97% (95%-100%) Baseline 97% (94%-100%) Intervention	98% (97%-100%) Baseline 98% (97%-100%) Intervention
Participant 1 – Perspective Taking Mean (Range)	96% (94%-100%) Baseline 97% (93%-100%) Intervention	98% (95%-100%) Baseline 98% (97%-100%) Intervention
Participant 1 – Empathy Mean (Range)	100% (100%) Baseline 100% (100%) Intervention	100% (100%) Baseline 100% (100%) Intervention
Participant 2 – Emotion Recognition Mean (Range)	96% (90%-100%) Baseline 96% (90%-100%) Intervention	96% (92%-100%) Baseline 96% (92%-100%) Intervention
Participant 2 – Perspective Taking Mean (Range)	94% (88%-100%) Baseline 95% (89%-100%) Intervention	98% (97%-100%) Baseline 98% (96%-100%) Intervention
Participant 2 – Empathy Mean (Range)	100% (100%) Baseline 100% (100%) Intervention	100% (100%) Baseline 100% (100%) Intervention
Participant 3 – Emotion Recognition Mean (Range)	97% (90%-100%) Baseline 96% (91%-100%) Intervention	96% (92%-100%) Baseline 95% (93%-100%) Intervention
Participant 3 – Perspective Taking Mean (Range)	94% (86%-100%) Baseline 96% (88%-100%) Intervention	96% (91%-100%) Baseline 95% (90%-100%) Intervention

Participant 3 – Empathy Mean (Range)	100% (100%) Baseline 100% (100%) Intervention	100% (100%) Baseline 100% (100%) Intervention

Table 10

Lesson Plan for The Indian In The Cupboard (Vagin, 2012)

Movie Time Social Learning by Anna Vagin, PhD — The Indian in the Cupboard Lesson Plan

Scene 2: "Happy Birthday" (scene start: family singing)

Movie Time Social Learning task and goals	Questions to guide discussion	To keep in mind
Spy Eye • Identifying thoughts, feelings, and plans of the characters	• How can you try to figure out how old Omri is turning, using what you can see? • Who do you think the other guys at the table are? • As the boys leave the house, what's their plan? Why does the mom say someone has to go with them?	• Hint: Count the candles.
Detective Head • Perspective taking • Generating personal opinion	• What would you think about getting a cupboard like this for your birthday? • How does Omri's brother feel about going with them?	• Generate a list comparing opinions.
Me Too! • Making personal connections	• Is Omri's birthday celebration like the one you have at home with your family? How is it similar or different?	• Encourage cross talk about descriptions, emphasizing that different families often do the same things (e.g., birthdays, holidays) in slightly different ways.

Table 11

Mean Accuracy for Emotion Recognition and Perspective Taking "Why?" for Participant 1 by Movie Format

Emotion Recognition

Movie Format	Sad	Scared	Excited	Average
Animation	83%	90%	48%	75%
Both	56%	67%	56%	59%
Live Action	100%	100%	84%	95%

Perspective Taking – "Why?"

Movie Format	Why sad?	Why scared?	Why excited?	Average
Animation	87%	53%	53%	64%
Both	78%	78%	56%	71%
Live Action	84%	67%	67%	73%

Table 12

Mean Accuracy of Emotion Recognition for Participant 1 by Movie, Viewing History, and Preference

Viewing History/ Preference	LEGO Movie	Peter and the Wolf	Monsters, INC.	The Gruffalo	The Gruffalo's Child	Room on the Broom	Lost and Found	x
Seen	33%	N/A	78%	N/A	N/A	N/A	N/A	56%
Not Seen	N/A	44%	N/A	100%	78%	89%	89%	89%
Preferred	33%	44%	78%	N/A	N/A	N/A	N/A	52%

Table 13

Accuracy for Emotion Recognition and Perspective Taking "Why?" for Participant 2 by Movie Format

	Emotion Recognition			
Movie Format	Excited	Nervous	Frustrated	Average
Animated	14%	29%	33%	25%
Both	33%	44%	33%	37%
Live Action	84%	50%	67%	67%

	Perspective Taking – "Why?"			
Movie Format	Why excited?	"Why nervous?"	Why frustrated?	Average
Animated	22%	22%	33%	26%
Both	11%	56%	33%	33%
Live Action	67%	34%	67%	56%

Table 14

Animation Average Accuracy for Emotion Recognition by Participant 2 by Movie, Viewing History and Preference

Viewing History Preference	LEGO Movie	Peter and the Wolf	Monsters INC.	The Gruffalo	The Gruffalo's Child	Room on the Broom	Lost and Found	Average
Seen	11%	N/A	22%	N/A	N/A	N/A	N/A	17%
Not Seen	N/A	22%	N/A	45%	0%	22%	56%	29%
Preferred	11%	N/A	22%	N/A	N/A	22%	N/A	18%

Table 15

Accuracy for Emotion Recognition and Perspective Taking "Why?" for Participant 3 by Movie Format

	Emotion Recognition			
Movie Format	Embarrassed	Confused	Disappointed	Average
Animated	44%	38%	19%	34%
Both	11%	56%	0%	22%
Live Action	33%	84%	67%	61%

	Perspective Taking – Why?			
Movie Format	Why embarrassed?	Why confused?	Why disappointed?	Average
Animated	11%	17%	17%	15%
Both	22%	56%	0%	26%
Live Action	17%	50%	50%	39%

Table 16

Animation Average Accuracy for Emotion Recognition by Participant 2 by Movie, Viewing History and Preference

Viewing History/ Preference	LEGO Movie	Peter and the Wolf	Monsters, INC.	The Gruffalo	The Gruffalo's Child	Room on the Broom	Lost and Found	Average
Seen	0%	N/A	11%	N/A	N/A	N/A	N/A	6%
Not Seen	N/A	0%	N/A	33%	33%	45%	56%	33%
Preferred	0%	N/A	11%	N/A	N/A	45%	N/A	19%

Table 17

Summary of Performance on Emotion Recognition and Perspective Taking – Why? for Participants by Movie Format and Viewing History

Emotion Recognition

Movie Format/ Seen/Not Seen	Participant 1	Participant 2	Participant 3
Animated – Seen	56%	17%	6%
Animated – Not Seen	89%	29%	33%
Both - Seen	N/A	N/A	N/A
Both – Not Seen	59%	37%	22%
Live Action – Seen	N/A	N/A	N/A
Live Action – Not Seen	95%	67%	61%

Perspective Taking – Why?

Movie Format/ Seen/Not Seen	Participant 1	Participant 2	Participant 3
Animated – Seen	44%	11%	0%
Animated – Not Seen	70%	29%	18%
Both - Seen	N/A	N/A	N/A
Both – Not Seen	71%	37%	26%
Live Action – Seen	N/A	N/A	N/A
Live Action – Not Seen	78%	56%	33%

Table 18

Generalization Probe, "Ormie" - Independent Results for Participant 1

Emotion	Why?	What next?	Have you?	When?
sad	He couldn't reach the cookie jar	Make a staircase, out of blocks		
sad	He still couldn't reach the cookie jar			
sad	Couldn't get the jar out of his head			Wanted to watch Cinderella previews, other trailers and couldn't
excited	He got a cookie!		Got presents, toys	
frustrated	Because he couldn't reach the cookie jar	Try again, use a chair		

Table 19

Generalization Probe, "Ormie" - Independent Results for Participant 2

Emotion	Why?	What next?	Have you?	When?
"sad"	"because he can't reach the cookie jar	"I don't know"		
"angry"	"yeah, because he can't get the jar again"		"No, I'm not,…not at all."	"Uhh, kinda" (in response to Mom's question "do you feel angry or frustrated when you can't get your orange juice?"
"upset" – (in response to Mom's question "what do you feel when you can't get your orange juice?"				
"excited"			"Yeah, about getting my orange juice."	
"excited"				"When you got chips at the store."

Table 20

Social Validity Form – Teacher of Participant 2

Question	Response
Have you seen ____ label emotional states in other since MTSL intervention began in November, 2014?	“Haven’t noticed a dramatic change.”
Have you seen____ demonstrate an understanding or express why another child might be feeling a particular way since MTSL intervention?	“Haven’t noticed a dramatic change.”
Have you seen ____ demonstrate empathy towards another child since MTSL intervention?	“Haven’t noticed a dramatic change.”
Would you consider using MTSL intervention in your classroom based on what you have seen from ____?	“Not at this time.”

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Appendices

Appendix A – Parent Consent Form/Child Assent Form

The University of New Mexico

Consent to Participate in Research

[100114]

Introduction

You are being asked to participate in a research study that is being done by James Scott, Student Investigator under the guidance of Dr. Susan Copeland, who is the Principal Investigator and Associate Professor, from the Department of Educational Specialties. This research is studying the effects of an intervention program, Movie Time Social Learning, on emotion recognition, perspective taking, and empathy in children with autism.

You are being asked to participate in this study because you have sought out services for your child at Mr. Scott's clinical facility, Autism Communication Consultants, to address social communication needs. Four children with autism will take part in this study at the University of New Mexico.

This form will explain the research study, and will also explain the possible risks as well as the possible benefits to you. We encourage you to talk with your family and friends before you decide to take part in this research study. If you have any questions, please ask one of the study investigators.

What will happen if I decide to participate?

If you agree to participate, the following things will happen:

Your child will be a participant in a social group implementing the Movie Time Social Learning intervention. Two to four children (including your child) will be in each group. The intervention will last for twelve weeks, for one hour each week.

How long will I be in this study?

Your child will be asked to participate in this study for a total of 12 hours over a period of 12 weeks. You will be asked for information about your child after the intervention is completed over a period of three months.

What are the risks or side effects of being in this study?

Your child may feel nervous about answering questions.

You might feel that it is an inconvenience to be asked questions about your child after the intervention is completed.

You might feel that having to videotape your interactions with your child is uncomfortable and/or time consuming.

What are the benefits to being in this study?

You may enjoy reporting about your child's interest in Movie Time Social Learning strategies. Your child may show improved social communication interactions with you as a result of this intervention.

What other choices do I have if I do not want to be in this study?

If you or your child do not want to participate in this study, you don't have to. Participation in this study will not affect you or your child's participation in receiving services from Autism Communication Consultants.

How will my information be kept confidential?

We will take measures to protect the security of all your personal information, but we cannot guarantee confidentiality of all study data.

Information contained in your study records is used by Fletcher Scott and Dr. Susan Copeland, and, in some cases it will be shared with the sponsor of the study. The University of New Mexico Institutional Review Board (IRB) that oversees human subject research and/or other entities may be permitted to access your records. There may be times when we are required by law to share your information. Your name will not be used in any published reports about this study.

To make sure that your information is kept confidential , only the researchers will have access to any personal information that you give them – they will use a fake name for you and your child in all reports. All information related to the study will be kept in a locked secure cabinet and locked, password protected computer in a locked building with a security system. All information related to the study will be destroyed within 5 years after the study is complete.

What are the costs of taking part in this study?

There are no costs to participate in this study.

Will I be paid for taking part in this study?

You will not be paid for participating in this study.

How will I know if you learn something new that may change my mind about participating?

New information related to your child's participation and progress during the study will be reported to you.

Can I stop being in the study once I begin?

Your participation in this study is completely voluntary. You have the right to choose not to participate or to withdraw your participation at any point in this study without affecting your future health care or other services to which you are entitled.

You can decide to stop giving any information to the researchers at any point during this study and you do not have to answer any questions that you don't want to answer. You do not have to provide a reason, you just need to tell the researcher that you want to stop.

HIPAA Authorization for Use and Disclosure of Your Protected Health Information (HIPAA)

As part of this study, we will be collecting health information about you and sharing it with others. This information is "protected" because it is identifiable or "linked" to you.

Protected Health Information (PHI)

By signing this Consent Document, you are allowing the investigators and other authorized personnel to use your protected health information for the purposes of this study. This information may include: [list PHI, e.g. results of physical exams, medical history, body mass index, etc.]

In addition to researchers and staff at UNM and other groups listed in this form, there is a chance that your health information may be shared (re-disclosed) outside of the research study and no longer be protected by federal privacy laws. Examples of this include disclosures for law enforcement, judicial proceeding, health oversight activities and public health measures.

Right to Withdraw Your Authorization

Your authorization for the use and disclosure of your health information for this study shall not expire unless you cancel this authorization. Your health information will be used or disclosed as long as it is needed for this study. However, you may withdraw your authorization at any time provided you notify the UNM investigators in writing. To do this, please send letter notifying them of your withdrawal to:

Dr. Susan Copeland

MSC05 3040

1 University of New Mexico

Albuquerque New Mexico 87131

Please be aware that the research team will not be required to destroy or retrieve any of your health information that has already been used or shared before your withdrawal is received.

Refusal to Sign

If you choose not to sign this consent form and authorization for the use and disclosure of your PHI, you will not be allowed to take part in the research study.

Whom can I call with questions or complaints about this study?

If you have any questions, concerns or complaints at any time about the research study, contact Dr. Susan Copeland at (505) 272- 0628.

If you need to contact someone after business hours or on weekends, please call (505) 710-2453 and ask for Fletcher Scott.

If you would like to speak with someone other than the research team, you may call the UNM Office of the IRB at (505) 277-2644.

Whom can I call with questions about my rights as a research participant?

If you have questions regarding your rights as a research participant, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644. The OIRB is a group of people from UNM and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the OIRB website at http://research.unm.edu/irb/.

CONSENT AND AUTHORIZATION

You are making a decision whether to participate (or to have your child participate) in this study. Your signature below indicates that you/your child read the information provided (or the information was read to you/your child). By signing this consent form, you are not waiving any of your (your child's) legal rights as a research participant.

I have had an opportunity to ask questions and all questions have been answered to my satisfaction. By signing this consent form, I agree to participate (or let my child participate) in this study. A copy of this consent form will be provided to you.

_____

Name of Adult Subject (print)

or for Child enrollment, Name of Parent/Child's Legal Guardian

_____

_____

Signature of Adult Subject

or for Child enrollment, Signature of Parent/Child's Legal Guardian Date

INVESTIGATOR SIGNATURE

I have explained the research to the participant and answered all of his/her questions. I believe that he/she understands the information described in this consent form and freely consents to participate.

_____

Name of Student Investigator/ Study Team Member (print)

_____ _____

_ _

Signature of Student Investigator/ Study Team Member Date

Appendix B – Sample Baseline Scoring Form

Participant's Initials: _____

Date of Session: _____

Scorer: _____

Emotion Recognition

Opportunity	1	2	3	4	5	TOTAL
"happy"	0	1	0	1	1	3
"sad"	1	0	1	0	1	3
"mad"	1	1	1	1	0	4
"scared"	1	1	0	0	0	2

Perspective Taking

Opportunity	1	2	3	TOTAL
Why did ____ feel ____? What do you think ___might do next?				

Empathy

Opportunity	1	2	3
Have you ever felt like ____?			

Tell me what

happened when you

were_____.

Appendix C – Intervention Scoring Form

Participant Initials: _____

Date of Session: _____

Scorer:_____

Opportunity	1	2	3	4	5	TOTAL CORRECT	TOTAL # OF RESPONSES	% CORRECT RESPONSES
DV 1 – Emotion Recognition	0	1	1	1	1	4	5	80
DV 2 – Perspective Taking	0	0	0	1	0	1	5	20
DV 3 - Empathy	0	0	1	1	0	2	5	40

Appendix D – Fidelity of Intervention Form

Date of Videotape:_____

Participant:_____

Dependent Variables:_____

Circle Yes/No

Fidelity Measure	DV 1/Opportunity 1	DV 1/Opportunity 2	DV 1/Opportunity 3
No language or facial expression cue from P.I.	Yes No	Yes No	Yes No
Instruction clear	Yes No	Yes No	Yes No

Fidelity Measure	DV 2/Opportunity 1	DV 2/Opportunity 2	DV 3/Opportunity 3
No language or facial expression cue from P.I.	Yes No	Yes No	Yes No
Instruction clear	Yes No	Yes No	Yes No

Fidelity Measure	DV 3/Opportunity 1	DV 3/Opportunity 2	DV 3/Opportunity 3
No language or facial expression cue from P.I.	Yes No	Yes No	Yes No
Instruction clear	Yes No	Yes No	Yes No

Appendix E – Interrater Reliability Scoring Form

Date:_____

Participant:_____

Videotaped Reviewer:_____

DV 1 – Emotion Recognition

Opportunity	Child Response	Child Utterance
1	Correct/Incorrect/NR	" Child said…."
2		
3		

DV 2 – Perspective Taking

Opportunity	Child Response	Child Utterance
1	Correct/Incorrect/NR	" Child said…"
2		
3		

DV 3 – Empathy

Opportunity	Child Response	Child Utterance
1	Correct/Incorrect	"Child said…….

2

3

Appendix F – Social Validity Form - Parents

Questions for Parents

1) Do you feel that MTSL was an effective intervention tool for your child?
2) Do you feel that your child liked attending MTSL group sessions?
3) Do you feel that MTSL is something that you will try at home with your child?
4) Do you feel that MTSL would be an effective intervention technique at school for your child?
5) Would you allow your child to participate in another study involving MTSL intervention?
6) Has your child been able to express emotional state of others since MTSL intervention?
7) Has your child demonstrated the ability to take the perspective of others since MTSL intervention?
8) Has your child demonstrated empathic responses towards others since MTSL intervention?

Appendix G – Social Validity Form - Teachers

Questions for Teachers

1) Have you seen _____ label emotional states in others since MTSL intervention?
2) Have you seen_____ demonstrate an understanding or express why another child might be feeling a particular way since MTSL intervention?
3) Have you seen _____ demonstrate empathy towards another child since MTSL intervention?
4) Would you consider using MTSL intervention in your classroom based on what you have seen from _____?

Appendix H – Social Validity Form - Participants

Questions for Participants

1) Did you like MTSL? What did you like best? Was there anything you didn't like? What was it?
2) Did you like coming to group knowing we would use MTSL?
3) Would you attend another group using MTSL?