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**USING SOCIAL STORIES AND TRAINED PEER PARTNERS TO TEACH  
PERSPECTIVE TAKING**

by

Tziona R. Twersky

A Thesis

Submitted to the

Department of Special Education Services/Instruction

College of Education

In partial fulfillment of the requirement

For the degree of

Masters of Arts

At

Rowan University

May 10 2014

Thesis Chair: Dr. S Jay Kuder



**Abstract**  
**Tziona R. Twersky**  
**USING SOCIAL STORIES AND TRAINED PEER PARTNERS TO TEACH**  
**PERSPECTIVE TAKING**  
**2014**  
**Dr. S Jay Kuder**  
**Masters of Arts in Special Education**

The purpose of this study was to examine whether, by developing skill in understanding theory of mind skills as well as understanding how perspectives are formed, students would be able to identify more than one possible perspective in a variety of situations. The goal was for them to accept that other peoples' intent may be different from their interpretation of intent. Students were guided through a thorough understanding of the skills involved and the many ways in which the concepts impact interaction. They were taught how the neurotypical population interprets interactions. Skills were instructed individually and then combined with other skills to form the broader understanding of what comprises socialization. Social stories with thought bubbles, role-playing, peer partners and coaching were utilized to help students acquire understanding and the ability to apply skills. These structures helped this researcher's students to make progress in learning the thinking process behind social interaction.

Students were evaluated and parents assessed their children's abilities prior to and after therapy. Students demonstrated understanding of concepts by identifying multiple possible intents for each individual in the same scenario when presented with five videos to evaluate. The study utilized a single subject AB design.

The results of this research suggest that by utilizing these methods students increased their theory of mind and perspective taking skills. The results demonstrate that these skills can be instructed. Thinking of these deficits as skills that can be instructed instead of considering them acting out, rudeness, unreasonableness, or deliberate acts of carelessness of others' feeling can change how responses occur to these behaviors and empower teachers, parents, and therapists to work on helping the student acquire skills.

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## **Chapter 1**

### **Introduction**

Individuals with Asperger's Syndrome frequently experience difficulty developing and maintaining social relationships. They often do not have a good understanding of theory of mind nor the ability to understand another individual's perspective and intent. This leads to difficulties for them and those with whom they engage.

Harwood, Farrar, 2006 reference Cutting and Dunn (1999) in their explanation of the difference between theory of mind and perspective taking abilities. According to Cutting and Dunn (1999), theory of mind and perspective taking are two different forms of social cognition and are not indistinguishable skills. Successful perspective taking necessitates understanding the cause of emotions. Theory of mind performance requires a grasp of the influence of belief on a person's thoughts or behavior. Even though they are not the same thing, they each "require an understanding of diverse or conflicting perspectives." (Harwood, Farrar, 2006)

Perspective taking is a complicated skill that requires noting and evaluating a great deal of information from multiple sources and combining this information into a complete picture. There are many separate skills that need to be learned in order to have a picture of another person's perspective. Individuals must learn to take both the environment in which an event is occurring and their history with the person into consideration at the same time as they apply theory of mind skills to understanding how someone else physically and cognitively views a situation. According to McHugh, Barnes-Holmes, and Barnes-Holmes (2004), part of theory of mind is the ability of an individual to understand the relationship between beliefs and behavior.

A variety of skills need to be developed in order for people with Asperger's Syndrome to be able to accomplish perspective-taking tasks and to attempt to determine the intent of another individual. Teachers or therapists need to work on developing the skills associated with assessing the environment. They need to know what information from engagements in the past with a particular individual is relevant to current situations and which ones need to be dismissed.

The skills associated with theory of mind and the understanding of others' emotions need to be instructed individually and then can be paired with each other when teaching skill application. Instruction should occur with a variety of people and across settings to develop generalization. It is good to pair skills such as looking at facial expressions and body language or evaluating the environment and eye gaze. These are necessary precursors before teaching students to merge concepts into a complete picture that involve understanding the perspective of another individual.

Once students have mastered these skills in pairs, they can begin to learn how the skills come together to form the factors that influence a person's perspective. They can begin to grasp that two people can look at the same situation and see it differently and neither be wrong. They can be taught to see how a person's perspective impacts that person's responses. Perspective-taking is a task that requires using theory of mind and incorporating an understanding of the environment and past history. It requires the ability to apply this understanding in order to comprehend how another individual is looking at a situation or event. Once these skills are assimilated, the person can then adjust her/his response to her/his new understanding.

Students on the autism spectrum tend to take the literal meaning when they interpret social input whether in language or a situation. To accurately interpret the intent of an individual requires understanding subtleties. The same words can be said to someone and mean completely different things depending upon one's body language, tone of voice, posture, the situation, the personal history that the individual has with that person, others present, and the personality of the individual. How people with Asperger's Syndrome interpret situations, actions, word usage, and language choice is very black-and-white. It is without the subtleties that are present when people have a clear picture of how others feel or can understand the possibility of a variety of possible intents.

Neurotypical people assign intent to individuals based upon their knowledge of the individual, their general understanding of what is the most likely possible cause for an action, their understanding of theory of mind, and the physical responses that inform about an individual's feelings. People on the autism spectrum do not see the complexities that intent brings to interpretation and have a lack the ability to see the connectivity between other people's behavioral choices, their emotions, and beliefs. They often misinterpret the reason for an occurrence. Their evaluation of what has occurred and the reasons it occurred are often atypical. They see deliberate intent where most individuals would not feel the behaviors were directed towards them. When they evaluate a person's engagement with them they fail to connect other's emotions and intent with their behavioral choices. This pattern of interpretation often leads people with Asperger's to assign unpleasant reasons for occurrences. This develops negative past history and a negative pattern of interpretation that leads to further incorrect interpretations. Due to their negative evaluation of past history, lack of connectivity, and surface interpretation

of interactions, their view of social engagements tend to be negative. They do not seek clarification for these negative interpretations. They do not understand that there are other possibilities. Some students internalize negativity and others externalize their reactions to their interpretations. Either way, it is harmful to the individual's success.

When neurotypical individuals express themselves, they take it for granted that others will take into consideration their past history with that individual, what is happening in the immediate environment, the other person's emotions, tone of voice, facial expression, body language, the understanding of theory of mind, and their own input into the situation. They grasp that the other people involved have an impact on the situation as well, by their own responses with their body language, expression, and tone of voice. The responses of neurotypical people are typically more predictable to other neurotypical people. Although they may not see the same situation in exactly the same way and there may be misunderstandings, they tend to be within a range of accuracy. The extent to which the misunderstanding extends is usually not anywhere near the same extent of misinterpretation that occurs with students on the spectrum. People with Asperger's Syndrome often drastically misinterpret the intent of the individual with whom they have engaged. In addition, people with Asperger's Syndrome have a lack of self-awareness of what they are projecting and how that impacts other peoples' response to them. These factors lead to extreme social difficulties. For many people with Asperger's Syndrome, it leads to isolation, feelings of anger, depression, feeling like they cannot succeed with peers, and even suicide. These feelings lead them to give up trying. This works out poorly for the individual and for society.

Individuals communicate their internal feelings and intent with outward manifestations of their internal states through the use of gestures, body positioning, eye gaze, facial expressions, tone of voice, and overall demeanor. Often, people with Asperger's Syndrome do not know what these individual messages mean and can not assimilate the information to determine the intent of another individual. To make matters more difficult, repeated misinterpretation of intent leads to the inability to pick out the likely cause of what occurred. Their ascribing negative intent impacts their future understanding of the intent of an individual. They ascribe intent to every action and do not see actions that involve them only peripherally as undirected towards themselves. Autistic students have perspectives about situations that are atypical. Therefore, it is not enough to teach them to put themselves in the other person's place. They need to be taught how the neurotypical population looks at and interprets situations and others' intent. They need to learn what different possible intents individuals may have.

Individuals with autism need to be taught as many facets of one scenario as possible so that they can eventually deal with the unpredictability or novelty of peoples' perspectives and intent. Students can use this information to make sense of other people's behavior and how it relates or fails to relate to them. They can use their understanding to think about their own social behavior.

Teaching perspective taking is a different process for each child. Factors that affect what approach to take are age, ability to attend to a variety of input, how the child learns, and his needs. Interpretation skills need to be taught simultaneously with behavioral responses. When working with younger children, it is important to make the social thinking simple and focus upon behavioral output. The behavior is reinforced

socially and sometimes with external reinforcers depending upon the student. All the subtleties can't be taught when students are young due to cognitive maturation levels and exposure to life experiences. As students mature, therapists need to revisit concepts on a deeper level, building their understanding as they are exposed to a larger variety of situations.

Older students present a therapeutic challenge since they won't apply skills until they understand and accept the thinking process that is being instructed. Teaching the overall procedures of putting together all the sub-skills tends to be more difficult. There is a longer process involved in teaching the thinking skills behind the process. Students tend to resist accepting what they're being taught to do, due to the number of atypical evaluations of interaction that have occurred over the years. They resist seeing other possibilities in interpretation of situations and changing how they look they look at the world

Usually, the thinking process of perspective taking is introduced in pieces at the same time as sub skills are being taught. In this manner, understanding is slowly being built. Once all of the sub skills are taught, students already grasp a great deal of the thinking processes involved in perspective taking. After teaching the sub-skills in this manner, therapists need to bring the concepts together into a cohesive whole.

For the purpose of this study, I will be building the thought process and teaching the application of perspective taking together in order to measure how the training impacts understanding. For general instruction of these skills, it is better to build the understanding over time.

The purpose of this study is to examine whether, by using theory of mind skills as well as developing the understanding of how perspectives are formed, students will be able to identify more than one possible perspective in a variety of situations. The goal is for them to accept that other peoples' intent may be different than their interpretation of intent. They will demonstrate understanding of this concept of multiple perspectives by identifying multiple possible intents for each individual in the same scenario during an exchange. This will help them to develop the ability to recognize and identify the possibility of multiple perspectives in real life situations. They will be given scenarios to teach them to discern what can impact how people express themselves both verbally and through nonverbal means. This will lead to the ability to recognize that people can't always completely interpret others' intent. Once this understanding is developed, it will lead to a willingness to learn how and when to use questioning before forming negative impressions.

The tools that will be utilized in this study are social stories, trained peer partners, and videos. Social stories with thought bubbles provide a student with a greater understanding of what individuals may be feeling or thinking in a situation. Social stories are a great tool to use to teach concepts in conjunction with either coaching or role playing paired with coaching. It is useful to show thoughts and feelings in a concrete manner. Social stories provide a greater sense of predictability to situations that will be acted out or experienced. They are set up to tell the student how to respond and this allows them to focus upon performing the behavior in the situation instead of having to formulate a response on the spot. After the understanding has been established, practicing responses to a multitude of similar possibilities cements the concept with the support of

the social story as a frame of reference. The students can refer to the social story and use it as a starting point when they need to respond to a situation.

**Hypothesis:**

Teaching students to integrate the skills involved in perspective taking improves the students' ability to recognize and identify the possibility of multiple perspectives relating to the same situation. The understanding that there are multiple perspectives will help students to discern that there may be more than one possible interpretation of intent to consider when interpreting the actions and comments of other people.

I predict that, by the end of this study, students will be able to understand and be able to explain how perspectives are formed from multiple sources of input. They will be able to identify what influenced a particular perspective or specific interpretation. They will be better able to determine why people are interpreting a behavior, situation, or action in a particular way. Explanations they can give can range from body language to past history with the individual. They will identify multiple perspectives when considering the same scenario. They will accept the idea that the intent of the individual may not be the same as how the action was perceived. They will be able to state more than one possible intent of the people in a scenario.

An important goal in teaching perspective taking is to help the students gain an understanding that perceiving others' perspectives and knowing their intent is a complicated multileveled skill. They need to recognize that others' perspectives and intent can be easily misinterpreted. Once their understanding of and their skill in perspective taking is developed, they can be taught that in a social situation they should



not jump to conclusions about the intent of another individual. Due to the complexity of determining intent, they need to learn to ask questions to confirm their assessments. Students need to be taught how to ask those questions and when to apply the skill of asking questions. Students need to accept that people can choose words or take actions without giving enough thought to how it will be received. They need to understand and accept that those actions and words are not necessarily meant to upset them. It is essential for them to learn that people can have a variety of feelings and thoughts at one time, some of which conflict and cause confusion in their verbal and nonverbal signals and therefore how they are interpreted. This project will not extend to the questioning level of instruction. The questioning will help the students to learn to give individuals the benefit of the doubt and ask questions before deciding that other individuals' intent is unpleasant. Another skill that is beyond the scope of this research is using their new knowledge to adjust their behavior or response to others' behaviors, utilizing their new understanding. These are essential extensions of this research that should be explored.

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**Definitions:**

**Neurotypical-** It is used to describe individuals who are not developmentally disabled. In other words, they are not autistic and do not have intellectual or developmental differences. The term was not defined as a medical or psychological term. It came into use to avoid using words to describe individuals with autism in a possibly demeaning way. Neurotypical people are assumed to have traits such as strong social and communication skills and the capacity to navigate new or socially complex situations.

**Intent-** Some action or thing that an individual plans to do or achieve: An aim, purpose, or design.

**True belief** is the awareness that an individual can only know what they have seen and that they will act on this understanding.

**Perspective taking** – reflects the ability to recognize the emotional state of someone else, even when it differs from that person's own emotional state. It takes the information presented by the outward expression of internal states (body language, facial expressions, eye gaze, gestures, tone of voice, emotions) understanding of theory of mind, past experience, the environment, and interpreting and applying that knowledge in order to understand another individual's interpretation of a situation. In order to be able to have skill in perspective taking, a person must be aware that people may express those beliefs and emotions in a variety of ways that may differ from expectations. The knowledge that these outward expressions of an internal state may vary and the understanding that one's own past experience may impact how one is interpreting an attitude or situation provides a person with the information they need to attempt to understand other peoples' perspectives. One also needs to try and be aware of the environment and that the other person's experiences may affect how he/she forms his/her perspective.

**Perspective-** A point of view, a particular attitude towards a situation, or a way of looking at a situation, or event.

**Theory of Mind --** Theory of mind is the ability to understand another person's state of mind. That understanding includes being aware that an individual's state of mind is affected by having different experiences which make up what a person knows, different beliefs systems, empathy, visual perception, motivations or goals, as well as moods. It is

the understanding of how these factors influence the actions and behavior of an individual that make up theory of mind. It includes the ability of an individual to understand his or her own actions and behavior.

### **Impact**

The ability to take another's perspective and to understand theory of mind is imperative in functioning well within school and the world at large. Dysfunction in these areas seriously impedes an individual's ability to negotiate social interaction. This can impact one's overall ability to function successfully in society. It impacts relationships with teachers/superiors, peers, and affects how one views oneself. Lack of skill in this area can lead to troubled relationships within a family. It can affect self-esteem and anger management. It can lead to depression and even suicide. According to Gehlbach, Brinkworth,& Wang 2012, people who have good perspective taking skills communicate more effectively, have a better ability to negotiate, show altruistic behavior, stereotyped others less, and respond less aggressively when provoked. They tend to have better skill in supporting others in social and academic matters. Individuals who are good perspective takers tend to choose more effective approaches for resolving conflicts. They have greater belief in their own ability to complete tasks and reach social goals and have healthier attachment profiles. Lacking the skills, students struggle to negotiate the social world. It is essential that these deficits be addressed as early in life as possible in order to mitigate the deficits and assist the child in being able to understand and determine how others view events and relationships

The ability to understand another person's perspective and the possible intent of other individuals is an important aspect of social interaction. That understanding impacts the classroom, school, and all environments in numerous ways. Peer interaction, group

work, engaging with teachers, and being in a crowd are all affected by the ability to understand intent and other individuals' perspectives.

One example of how lack of understanding can impact even the most indirect engagement is that difficulties can arise walking in the hallway. Somebody capable of effective perspective taking would understand and recognize that when they are in the hallway and someone bumps into them and does not say anything they are not deliberately bumping them and are not being unpleasant by not saying sorry. They are just focused on getting to class. Students who have difficulty with taking the environment in which an event occurs into account may not recognize this. In a school, there are many such opportunities for misunderstandings, especially in unstructured environments such as the hallway, the lunchroom, the bathrooms, and the gym.

Facility in discerning the emotional and mental states of other people is an essential aspect of positive social interaction. It involves the grasping of the connection between a range of situations and the emotions they elicit. There is a wide range of opportunities for misunderstanding. Classroom discussions and debates can be unpleasant if a student cannot acknowledge the possibility that others have equally valid points of view. The black and white thinking of those on the spectrum can cause them to intervene in others' behaviors and make comments about people's conversations that don't involve them. They would not realize that peers would perceive it as being aggravating. Students on the spectrum may feel the need to correct the teacher if they feel that the teacher is in the wrong without realizing that the teacher would perceive them as rude.

Studies show that students on the autism spectrum have substantial deficits in the areas of understanding and applying the skills involved in theory of mind, perspective

taking, and determining the intent of others. They evaluate past history negatively and their surface interpretation of interactions leads them to view social engagements in a negative fashion.

The goal of this project is to teach students how to use theory of mind skills and help them develop an understanding of the elements of perspectives. They will learn to adjust their interpretation of events based upon the information they will be taught to interpret. By developing the understanding of how perspectives are formed, students will be able to identify more than one possible perspective in a variety of situations. They will demonstrate their understanding by identifying multiple perspectives in the same scenario and at least two possible intents for each person during an exchange. These skills will increase their ability to allow for the possibility of positive intent and thus they would be less likely to interpret events in a negative manner.

## **Chapter 2**

### **Past Research on Concepts, Population and Teaching Techniques**

The purpose of this review of research is to examine what has been tried by others in working to develop skills in theory of mind and an understanding of how perspectives are formed in order to expand the understanding of people's intent. The research explored in chapter two of this thesis discusses information gleaned from studies in theory of mind, perspective taking, and effective methods and techniques to use with individuals with autism.

### **What is Theory of Mind?**

Theory of mind (ToM) is the ability to think and extrapolate thoughts, desires, beliefs, morals, ideas, feelings, perceptions, as well as our intentions and those of other individuals. It is a complex multifaceted construct and people's ability to incorporate ToM understanding lies on a continuum of proficiency, Hutchins & Prelock (2008). Part of ToM is being aware that the behavior of others is goal directed. Another aspect of ToM is the understanding that others may have goals, thoughts, desires, and beliefs that are dissimilar from ours. Their own thoughts, goals, beliefs, and desires may even conflict with each other. These internal mental states have an impact on behavior, understanding, and development according to Allen & Kinsey (2013). Theory of mind is the ability to postulate about internal mental states and use the understanding to conceive of one's own mental state and that of others. It necessitates the understanding that an individual cannot know what another person is thinking or seeing. The knowledge that others may be exposed to different visual information concerning the same situation is part of understanding ToM. One aspect of theory of mind is understanding and accepting

that other people's feelings might be similar or dissimilar from what we ourselves would feel in the same situation. It also involves the understanding that people can have a variety of feelings and thoughts at one time, some of which conflict. Theory of mind involves the understanding of people's desires and intentions, causes of emotions, representational pretence, differences in the way people think, the ability to deceive, and to know the difference between deception, a joke, or the use of imagination, a grasp of non-literal and metaphorical language, employment of moral reasoning, empathy, connection between traits and behavior, distinction between appearance and reality, as well as the understanding that other's actions or words do not always reflect true intent or feelings.

Joint attention is necessary for most social interactions. Theory of mind is the foundation of joint attention because joint attention indicates that the children are aware of what the other individual is attending to at the same time as they are aware of what they themselves are attending to. Theory of mind involves grasping intentionality and the ability to interpret others' goals and motives as well as grasping how others will pursue their own agenda. It is also an understanding of what drives behavior.

According to McHugh, Barnes-Holmes, & Barnes-Holmes (2004), theory of mind is organized into five levels of understanding. Level I focuses upon the skill of visual perspective taking. It encompasses the understanding that two people can see different objects, events, or people. Level II is focused upon complex visual perspective taking. This allows a person to grasp the concept that the same objects, event, or person may be viewed differently. Autistic individuals often think that the other individual with whom they are engaging is aware of what they have observed or that the individual has the same

knowledge they have. Level III involves comprehending that seeing leads to knowing. It is the understanding of informational states. Level IV is the ability to predict actions on the basis of one's awareness that an individual can only know what they have seen and that they will act on this understanding, which is known as true belief. The development of informational states involves the understanding that knowing something directs actions. This understanding of what an individual knows can be difficult for people with autism. When people with Asperger's Syndrome attempt to predict based upon this information, they come up with atypical predictions. Level V is utilizing the knowledge of false belief concepts as a foundation to predicting actions. Simple false belief is what someone thinks they know about something based upon what they have seen or heard. It is not necessarily the reality of the current situation. The understanding that individuals will act on their beliefs, be they true or false, is part of understanding theory of mind. Understanding false belief requires perceiving that a person's mental point of view has an impact upon his/her actions and choices even when that perspective is in opposition to reality. The understanding that a person can act on the basis of previously held beliefs that may be true or false, as well as on current beliefs which may be accurate or inaccurate, is a complex concept that is hard for many to apply. A multifaceted level of the understanding of true and false beliefs is the understanding that people can see, both physically and cognitively, the same situation in different ways. Autistic individuals have trouble conceptualizing different points of view of the same situation.

Perspective taking and theory of mind are related. Typically developing children start developing these skills at a young age and build upon these understandings throughout their development. Children with autism spectrum disorders gain an



understanding of theory of mind and perspective taking depending upon skill sets that develop over time, rather than on a developmental timetable. They may not develop more complex understanding of theory of mind and perspective taking. This lack impacts their responses to situations and people since being able to assess others' reactions and emotions and recognizing one's own responses and perspectives is integral to interpersonal relationships. Motivation also plays a part in one's willingness to apply the skills one does acquire. People with ASD need direct instruction that incorporates generalization of those skills. Hutchins & Prelock (2008) stated that perspective taking ability and theory of mind understanding are intertwined and that they should not be treated as competing hypotheses, but complementary skills sets. Harwood & Farrar (2006 study) note that theory of mind and perspective taking are affiliated aspects of social development.

In their study, Steele, Joseph, & Tager-Flusberg (2003) showed that people with autism continued to grow and change in their ability to comprehend theory of mind. Testing indicated that there was more change in the early basic theory of mind skills and less in the advanced skills. There was a clear connection between language ability and theory of mind. The study indicated that vocabulary predicted gains in ability to understand ToM. They found that there was no evidence of a plateau in the development of theory of mind in early adolescence. This indicates that programs aimed at increasing skills in understanding theory of mind should include language training.

Clements, Rustin, & McCallum (2000) found that is essential to provide explanations concerning the underlying principles of theory of mind tasks. Providing

these explanations allows for the possibility of improved performance and acquisition of skills. It is more effective to explain underlying principles to individuals than to inform them whether their answers to a question is correct or incorrect.

## **Neurotypical Development**

It is important to understand norms of development in order to have a good grasp of deficits exhibited by autistic individuals. Knowing when these skills are developed helps educators to know when to begin to look for and work on necessary skills. In their article, David Aumann, Bewernick, Santos, Lehnhardt, Vogeley (2009) said that neurotypical individuals develop an understanding of simple desires by age two. Charlop-Christy asserts that neurotypical people can comprehend that other people have desires dissimilar to their own and that desires influence their behavior. According to Harwood and Farrar, effective perspective taking begins to develop in neurotypical individuals during their preschool years. Two and a half year olds are able to determine if an individual received a desired object or an undesired object. They were able to recognize whether someone else liked the object they received, even if they did not like it themselves. According to Harwood and Farrar, children three to five years of age were able to identify emotional responses in given scenarios. They were able to do this even when it differed from their own reaction to the scenario. Charlop-Christy (2003), says that beginning around age three, children understand that beliefs result in actions and that even if those beliefs are false, individuals will make decisions based upon their beliefs. She referenced Baron Cohen (1985) who stated that the ability to determine mental states of others in order to explain or predict behavior begins around age four. Aumann, Bewernick, Santos, Lehnhardt, Vogeley (2009) said that understanding of false belief

develops between the ages of three and a half and four years of age and that more complex beliefs seem to develop at age six. Examples of more complex understanding include the understanding of deception. According to Gould, Tarbox, O'Hara, Noone, & Bergstrom (2011), children begin to show signs of the ability to take another person's perspective around the age of five. Many perspective-taking tasks require that individuals have the ability to consider conflicting representations, either in their beliefs or their emotions, between themselves and another individual. Language development and executive function are contributing factors to the development of these understandings. According to Hutchins & Prelock (2008), between the ages of five and eight, people see other individuals as being able to interpret situations. They comprehend that experience and bias can impact the interpretation but they cannot explain what may be impacting others' interpretation until the age of seven or eight. More complex social understandings develop in the later years of childhood and beginning of adolescence and lead to the knowledge that two people who experience the same event may arrive at different interpretations of the event Hutchins & Prelock (2008).

### **Autism**

According to the DSM-V Autism is characterized by significant deficits in social understanding and interaction. Individuals with autism experience continuing struggles with social interaction, emotional relatedness, and understanding of circumstances, which have an impact on behavior. They have specific deficits in theory of mind, pragmatic language, and abstract conceptualization. They tend to be rigid, inflexible, and have difficulty grasping the complexity of other people's behaviors and responses. They tend to fail in generalizing concepts or they over-generalize concepts and ideas. This leads to a

failure to connect important social information. It can also lead them to connect social information that is unrelated to the situation or event. These characteristics combine to impede the development of social relationships.

According to Hutchins & Prelock (2008), when individuals with autism are developing theory of mind, it is not connected strongly to a developmental timetable, but rather to a series of basic skills that develop slowly over time. The development of these skills can be delayed. The more advanced skills of theory of mind tend to be deficit. Competency in theory of mind impacts social and emotional development and leads to a multidimensional social/emotional comprehension across a range of situations.

The nature of social stimuli is very difficult to predict because it is fleeting and complex. This is what makes it difficult for autistic students to be able to perform perspective-taking tasks. In a study by Shulman, Guberman, Shiling & Bauminger (2012), the authors researched the ability of adolescent students with ASD to make a distinction between moral and social rules. This affects their ability to understand other's viewpoints or interpretation of events. It influences their perspective about events taking place. Subjects in the study described and evaluated behaviors. Explanations of behavior that students with ASD gave were more concrete, less flexible or elaborate, and included more extraneous information. They responded with more nonspecific condemnation of behavior. Despite the finding that the understanding of social norms was more context bound than moral offenses, participants with ASD tended to see social conventionality as more universally applicable than neurotypical individuals. Although they understand that social norms are situationally bound, they apply those norms to more situations than neurotypical people. The study found that individuals with ASD have a tendency to judge

violations of social norms to the same degree as they would have judged moral transgression. Individuals with Asperger's Syndrome judge people and situations as right or wrong, black or white. In addition, they found that there were times that individuals with ASD did not understand the reasons behind social prohibitions. These factors lead to a tendency for people with ASD to become inflexible about rules instead of conceptualizing them as situation specific. Shulman, Guberman, Shiling & Bauminger (2012), postulate that the focus of individuals with ASD is centered upon different features of the situation than neurotypical individuals. Determining the applicable factors in a situation is difficult for people with ASD. The study found that more irrelevant, unsubstantiated details were present in the descriptions presented by participants with ASD. Experience plays an important role in grasping theory of mind. If individuals interpret their experiences with the aforementioned factors in play, they do not develop an accurate frame from which to evaluate situations and people.

Reed (1994) suggested that autistic individuals have extreme difficulty combining complex information and applying the information to infer another individual's perspective. Since individuals with autism have deficits in their executive functioning skills, many researchers have hypothesized that this may impact their understanding of theory of mind.. It impacts their ability to inhibit response enough to be able to consider what the intent of another individual may be.

The more predictable the response, the better an individual with autism is able to understand another's perspective. According to Rehfeldt, Dillen, Ziomek & Kowalchuk (2007), individuals with autism spectrum disorder struggle to form and maintain

reciprocal social relationships. They do not tacitly understand the relevant metacognitive aspects of social situations. They struggle to interpret situations and intent. When they interpret, they use atypical methods and means of assigning intent. This easily leads to negative interpretations of situations. Reed (1994) says that when teaching perspective taking skills, it is important to begin by teaching students how to understand stimuli and thus make it more predictable. Extreme emotion tends to be more predictable. Anger and intense happiness are easier to interpret than emotions that have more subtlety. In general, individuals with Asperger's Syndrome can interpret extremes.

In addition to their difficulty with interpretation, their expression of internal states is atypical. Individuals with Asperger's Syndrome frequently do not recognize or produce expressive gestures. The gestures some produce may be atypical. Nonverbal communication is one part of communication that is deficit and verbal language is another.

Language development in individuals with ASD has been connected to theory of mind development. "Language provides a vehicle for thinking about mental states." (Flavell 2004) Takeda, Kasai & Kato (2007) discovered that there were significant correlations between verbal capacity and moral reasoning in the ASD population. Rules of behavior were adhered to in a rigid and strong manner. Takeda theorized that when his subjects took an assessment to determine their ability to determine moral reasoning, they chose their responses based upon concepts closest to what they had been taught. They chose their answers by ignoring theory of mind and sticking to the rules that had been previously instructed.

Language development and theory of mind have been connected in individuals with ASD. "...students with HFPDD may compensate for their difficulties in internal moral reasoning by making full use of their language abilities" (Takeda, Kasai & Kato 2007). The ability to understand and utilize complex thought language and specific language abilities need to be present in order to understand how others think. Thought related language is necessary to conceptualize the advanced skills of theory of mind. According to Hutchins & Prelock (2008), children internalize ToM concepts, which are developed during language- mediated social interaction. Advanced theory of mind is contingent upon the development of the language concepts needed to solidify understanding. "Language provides the means by which children become aware of unobservable mental states, and successful communication requires an understanding of others' minds." (Hutchins & Prelock 2008)

### **Perspective Taking**

The ability to discern mental and emotional states of other individuals is essential for engaging in positive social relationships. Emotions and interpretations are impacted by previous interpretations and emotional experiences. When we take another individual's perspective, we respond according to the thoughts or emotions that person might characteristically experience in a particular situation. When an individual has a history of atypical interpretation, they cannot accurately evaluate past history and they assign motives and intent to the other individual that is influenced by this lack. Even when the individual has gained the skills that they lacked in judging the perspectives of others, his/her past history of negative interpretations of intent can negatively impact his/her current efforts at perspective taking.

We judge other's emotions by our previous experience with the individual; reading their body language, facial expressions, and using other physical indicators of internal feelings. Gehlbach & Brinkworth (2012) used people in various professions that require perspective taking and some individuals with ASD in their study. They tried to determine what information helps people make decisions about others' perspectives. They explored how people make decisions about others' perspective to determine what to teach. They looked into what people attend to in order to determine others' mental states. They explored effective strategies used to take others' perspectives and what strategies and evidence are needed to determine those perspectives. Participants in the study employed perspective-taking strategies such as analogies and comparing and contrasting. They looked at the context of the situation, drew on background information, projected themselves into the situation while adjusting for differences, reflected afterward about the event, and used stereotyping. Participants looked at the content being discussed, conversation patterns, word choice, the changes in the substance of the conversation, facial expressions, eye movement, body language, their own feelings, and the absence of expected reaction to judge others' perspectives. They relied upon several different sources of evidence to determine other's emotions. They used information cultivating strategies to gather information such as attention regulation, emotional regulation, increasing the number of modalities used in communication, open-mindedness, and they assessed the probability of another's motivation. Gehlbach & Brinkworth (2012) found that people use their own perspectives as evidence when determining another's perspective. This shows how individuals can see things from completely different standpoints when looking at the same situation. There are many interpersonal



misunderstandings between people. Part of this could be due to the evidence used to determine the perspective of others. People use multiple strategies combined to form an understanding of another's perspective. Perceivers could use each strategy independently but they tend to use them in conjunction with other strategies when making determinations.

Gehlbach, Brinkworth, & Wang (2012) claim that social perspective taking (SPT) is necessary for positive social engagement. The motivation to take another individual's perspective is necessary to the employment of the skill. First, an individual must be motivated to try and understand another individual and then they must have the skill set to accurately determine the other individual's perspective. They used high school students and adults with a range of SPT ability to determine what motivates or inhibits motivation in people to take another's perspective. Factors that were shown to influence participants to take another individual's perspective were when the individual cared about the target, when there was a potential threat, when the individual had a goal, when the individual desired to gain knowledge in an uncertain situation, when they had relationship goals, when they wanted to exert social influence, and when they were looking to see how they were perceived by others. When one or more of those motivators were in place, the people were more motivated to engage in social perspective taking. There were also other factors that could influence the motivation of an individual to consider or refrain from attempting to understand another person's perspective. Some of those factors were emotional regulation of oneself or others, the perceiver's role in a given situation, and familiarity. Hubris negatively impacted motivation to take another's perspective because the perceiver believes that he/she is correct or he/she desires to

believe that he/she is correct. Time and the cognitive load can both positively and negatively impact the ability to take another's perspective. The authors found that different individuals are motivated by different goals to perform social perspective taking. In addition, they found that motivation from different sources often intersect with each other.

Mason & Macrae (2008) stated that are three factors that make perspective takers inaccurate. When individuals use their own perspective as a way of judging other's perspectives and they do not account for what is different between themselves and the other person, they overestimate the extent to which the other individual's viewpoint matches their own point of view. According to Mason & Macrae (2008), people often have difficulty understanding other's perspectives when they attribute behaviors to the other individual's disposition rather than situational factors. People can also start off with a faulty assumption of motive. Mason & Macrae (2008) believe that a faulty assumption of motive comes from erroneously assigning motives to their own actions. The other way that Mason & Macrae (2008) say perceivers can misperceive situations is when they decide that the other individual is completely different from himself or herself and therefore they can't use their own perspectives and instead utilize rule-based generalization strategy.

The ability to understand others' perspectives is necessary for positive social interaction. Rehfeldt, Dillen, Ziomek & Kowalchuk (2007), conducted a study which investigated whether children on the autism spectrum demonstrate the ability to perform perspective taking tasks on the same level as typically developing peers. They also investigated if levels of perspective taking correlated with scores on standardized tests

used in the assessment of autism spectrum disorder. They state that underlying many of the social deficits that are observed in people with autism is the inability to understand another's perspective. They also found that this inability impacts adaptive behavior. Teaching students the language and the steps in the thinking process and having them learn to alter their reference point is necessary in order for them to understand another's perspective. Learning to talk about one's own perspective in relation to the perspective of another individual helps people with autism to grasp the range of possible perspectives. The findings of their study suggest that perspective taking is a skill that can be reinforced and taught. Both of their experiments established that derived rational responding could play a role in teaching perspective taking. Hutchins & Prelock (2008) used comic strips and CSCs along with talking and thinking bubbles to teach theory of mind and perspective taking skills to a five-year-old boy with autism. After the training procedure, the student in the study was better able to engage verbally about his thoughts and feelings across settings and with a variety of people. The authors determined that language development supported by the development of theory of mind understanding seemed to precede the increasing perspective taking ability. Perspective taking is a behavior that people perform and because it is a behavior it can be broken down and systematically taught.

Social perspective taking is the method a perceiver uses to divine the thoughts, feelings, and motivations of other people. It includes figuring out how people with different values, beliefs, and experiences perceive a situation. It involves visually reading the signals other people project that indicates their emotions. Signals such as body language, posture, gestures, and facial expressions indicate emotions. Michael, Spezio,

Adolphs, Hurley, & Piven (2007) found that adult individuals with autism use information from around the eyes a great deal less than neurotypical people when evaluating facial expression and focused chiefly on the mouth to determine emotions. They found that participants reacted in the same amount of time to the information provided despite the difference in focus. This focus on the mouth is problematic because when individuals are interested in masking their responses, they have more control over their mouths than other features. Where one focuses one's attention affects how one interprets another's feelings. The authors postulate that even when visual input is the same "that the brains of people with autism treat facial information differently." (Michael, Spezio, Adolphs, Hurley, & Piven 2007) This difference in visuospatial interpretation impacts perspective taking and socialization.

Another study concerning facial expressions, by David, Aumann, Bewernick, Santos, Lehnhardt & Vogeley (2009), used animation to display facial expressions, gestures, and head/body orientation in order to evaluate how individuals with autism determine which object a virtual character prefers. Adults with Asperger's Syndrome inferred the virtual characters' preferences by using nonverbal body cues. Virtual characters expressed preferences for an object in different ways. It was varied to avoid simplistic behavioral strategies such as paying attention to just one feature to determine preference. They found that adults with autism spectrum disorder were significantly slower in inferring the virtual characters' preferences as well as determining their own preferences. People with autism were less accurate than typical peers in using nonverbal behaviors to determine preferences. David, Aumann, Bewernick, Santos, Lehnhardt & Vogeley (2009) found that the rate in determining visuospatial perspectives was equal to

the control groups. The study revealed difficulties in interpreting nonverbal socially relevant information about another individual using space, gestures, and body position. Another component of taking another person's perspective is to know where the other person's attention is focused or has been focused. Things like gaze following and an understanding of body positioning are skills that need to be taught. This leads to the theory of mind understanding that seeing leads to knowing. Without this understanding and instruction in how to apply that understanding, individuals on the spectrum can easily misconstrue what another person is speaking about or their intent.

Perspective taking involves being cognizant of the context in which a situation is occurring, evaluating past history, and using theory of mind in order to interpret another individual's behavior and predict what they will do next. Another complication in knowing how to interpret others' perspectives is the need to be aware that individuals do not always feel what they visually represent they are feeling.

According to Allen & Kinsey (2013), an essential skill in understanding other people's point of view is the ability to distinguish between the mental states of self and others. Being able to hold two constructs of the same object or idea at the same time is essential for being able to predict other individuals' reactions to situations. Harwood, Farrar (2006) state that many perspective taking tasks require that individuals have the ability to consider conflicting representations, either in their beliefs or their emotions between themselves and another individual. Being able to consider someone else's beliefs and emotions while keeping in mind one's own beliefs and emotions necessitates an understanding of theory of mind.

Applying theory of mind is more difficult when conflicting representations are involved. Harwood & Farrar (2006) looked into the relationship between theory of mind and effective perspective taking. There were forty-two three to five year old students in the study. It focused upon conflicting representations and how handling conflicting representations is related to effective perspective taking. They evaluated the relationship between theory of mind understanding and conflicting emotions of opposite valence. The tasks required the individual to simultaneously judge the other individual's emotions and their own differing emotion. The theory of mind tasks that were performed assessed the understanding of simple false belief about what the subject viewed. There was a significant positive correlation between understanding false beliefs and emotional understanding. The study found that understanding theory of mind significantly impacted the students' perspective taking ability. In addition, the authors felt that the study showed the necessity of being able to comprehend conflicting mental states in order to be competent in perspective taking and theory of mind skills. Situations in which points of view or emotional states differ among individuals requires a good grasp of theory of mind in order to be able to evaluate them.

### **Methods for Effectively Teaching Skills to Individuals on the Spectrum**

Research indicates that when creating a program one should make sure to use multiple examples of each situation type that is being taught. Including social stories with thought bubbles, peer partners, and clear explanations of how and why interactions work as part of a comprehensive program will encourage acquisition, generalization, and the ability to maintain the skills. The use of techniques such as modeling, prompting, and external motivators helps acquisition of skills. These techniques and methods are

effective when applied to social skills, acquisition of theory of mind, and perspective taking.

It is important to differentiate between teaching individual skills in order to pass an assessment and having individuals truly gain a more meaningful understanding and be able to utilize that understanding in real-life situations. Individuals with autism are often taught to pass false belief tasks on assessments but generalization is not often insured through these methods. Many individuals with autism have difficulty generalizing skills. This should be taken into consideration when working with this population. Many teaching methods have not focused upon making the teaching process relevant, motivating, and meaningful for the students. When designing these types of programs they need to be tailored for the individual child. Their individuality must be taken into account when teaching these types of skills in order for the individual to truly acquire the skill.

There is a weakness in many studies and training programs relating to generalization and true acquisition of skills. Studies and certain training procedures have resulted in teaching the children the tasks rather than the ability to understand and apply the skill in the classroom and community. ToM and perspective taking are complex constructs that require a more comprehensive training program, which incorporates proven methods of generalizing skills. Hutchins & Prelock (2008) felt that prior to designing a program for developing theory of mind in students with ASD, one needs to assess their level of functioning, skill sets, strengths, and challenges in perspective taking and theory of mind. Remediating deficits in theory of mind for students with ASD should be tailored to the student. Teaching needs to be adjusted based upon the child's

skills and how he/she is motivated. They pointed out the importance of receiving information from the parents in functionally assessing issues.

Programs need to use multiple ways of presenting and reinforcing application of skills in order to successfully teach ToM and perspective taking. Practices that are useful in all types of instruction are the use of multiple examples, prompting, reinforcing application of skill, and practice with multiple people across settings.

Multiple exemplar training (use of multiple examples) is important in developing generalization and application of skills. Gould, Tarbox, O'Hora, Noone, & Bergstrom (2011) successfully used multiple exemplar training to evaluate the effectiveness of teaching students with autism to identify where people are directing their gaze and what they are seeing. Systematic prompting with progressive fading helped the students acquire the skills being taught.

There are benefits to including peers in social skills training to promote social interaction with autistic individuals. It improves generalization in a natural way. Placing disabled peers into classes or in proximity with non-disabled peers is not sufficient to produce acquisition of skills. Students with ASD remain isolated when not provided with instruction in socialization. People need to be able to observe significant features of the environment and exchanges in interaction, accurately decipher situations, and imitate social behavior in order to benefit from simply being placed in proximity to their peers. Training peers to support communication and interaction is an effective method of putting supports in place and can have long-term affects. Pierce & Schreibman 1997 found that the use of multiple peer trainers produce positive impact on interactions, initiating conversation, and initiating play. The use of multiple peers enhanced



generalization. Kamps, Royer & Dugan 2002 conducted two studies looking into multiple peer groups for each participant. They found that students in corporative learning groups generalized their ability to share materials, helped each other, and had conversations more than the students who participated in social groups. Both the social skills group and the cooperative learning group produced positive changes in skills. They found that students responded and generalized more efficiently when trained peers were utilized. The second study utilized game playing skills and conversation in three different peer buddy groups. They found that over time with trained peers, students increased their reciprocal interactions and the duration time of the interaction. Although there was an increase in interaction with familiar untrained peers, trained peers continued to elicit significantly more interactions. The authors assert that multiple exposures to many interventions increase generalization. Peer training strategies that utilize modeling, prompting, and reinforcing, and include multiple peers over time are the most successful.

Weiner (2005) investigated the difference between formally trained peers, informed peers, and naïve peers in soliciting repairs in conversation. The trained peers requested repairs in conversation when the peer did not understand what was being said. The untrained peers were informed of the desired target with no training and naïve peers were provided with no information. All of them were placed in the play situation with the student at different times. Trained peers demonstrated an increase in engagement and persistence in grasping what disabled peers were saying. This engagement was naturally reinforcing for both the typical peers and the disabled peers and resulted in an increase of engagement. When the trained peers increased their persistence and level of engagement, the target students increased their responses and initiations. Untrained peers provided a

very low rate of repair requests and established a lower rate of engagement with their disabled peers. The trained peer mediated intervention produced uninstructed and unintended long reaching positive social consequences resulting from the study. The trained typical peers who engaged with the disabled peers continued to seek out the disabled peers for engagement outside of the study. They facilitated integration into general education activities for their disabled peers and even pursued friendships outside of school with these students. The study demonstrated the positive impact that can occur with peer training.

Laushey & Heflin (2000) trained two kindergarten classes that had a child with autism included in their rosters. All the children in the classes were trained to engage in social interaction in a specific manner. All of the students were trained in socialization procedures. Students were reinforced during their training. The social skills that were targeted were: asking for an object, responding to requests, gaining attention, and waiting for a turn. Laushey & Heflin (2008) found that the class wide social skills program enhanced students appropriate social skills interactions. Since the structure of the program was class wide, generalization was built into the design of the intervention. Students maintained their level of performance. When all the students were trained in pro-social interactions and provided structure to promote appropriate interactions, the students with autism made gains in those areas and maintained their social skills.

Utilizing peers is an excellent way to work on application of skill and generalization in a natural setting. In conjunction with peer strategies, teaching the thought processes behind the actions needs to take place. Good methods of teaching the

thought process in theory of mind and perspective taking include social stories, thought bubbles, video modeled social stories, and role-playing situations.

Social stories explain social concepts in situations in simple words and give concrete social information about events, concepts, or people. They are used to teach skills and as a reminder just prior to entering the situation that is depicted. Social stories are intended for the use of improving social understanding. They can be presented with and without pictures and read by the student or the adult. Social stories are very useful for teaching theory of mind because they explain concepts in a simplistic form that can be easily conceptualized. Social stories have been used to address many different issues and to develop different concepts including behavior, social interaction, thought processes, perspective taking, theory of mind, and reducing anxiety before experiencing novel events. Kokina & Kern 2010 found that social stories are very effective when read directly prior to experiencing a similar situation. They found that studies of interventions that included more than one social story indicated that multiple social stories on a topic is more effective than only one social story. Social stories should be used in conjunction with other methods such as prompting, role-playing, and reinforcement in order to be effective. They found that social stories with illustrations were more effectual. There was a lack of data on the use of social stories presented in different formats. The only other form of social stories that has a good amount of data is video modeling. Social stories should not be used in isolation but need to be utilized in conjunction with other methods. According to Hutchins & Prelock (2008), they should be incorporated into a comprehensive program that addresses deficits in theory of mind, communication, social comprehension and interaction.

Thought bubbles in social stories are an effective means of teaching about thoughts according to Wellman, Baron- Cohen, Caswell, Carlosgomez, Swettenhm, Rtoye, & Lagattuta, (2002). Thought bubbles allow people to picture abstract thoughts. This guides them through the process of reasoning through social experiences. The use of visual stimuli, repetition, and making abstract concepts clear helps clarify relevant aspects of social situations. Thought bubbles can be sketched with pictures, writing, or a combination of both. Referenced by Wellman et al. (2002) Prior studies by Hulburt indicate that when individuals with autism are able to describe any perceptions and thoughts, they described them as pictures in their heads. They found that neurotypical individuals use much more complex and multilayered means of describing thought. Neurotypical individuals utilize inner speech, emotions, reaction descriptions, and mental images to describe thoughts. Thought bubbles are useful in developing a means of reasoning about another's thoughts. They provide a mechanism for thinking about mental representations. Thoughts are placed in a straightforward representational fashion and provide a visual representation of abstract concepts that allow for the elaboration of difficult concepts that can be shaped into greater understanding. They are a way of making inner speech, emotions, and thoughts understood. They are a concrete way of improving understanding of mental states.

Wellman, Baron- Cohen, Caswell, Carlosgomez, Swettenhm, Rtoye & Lagattuta, (2002) used pictorial representations inside of thought bubbles to improve theory of mind understanding. Individuals with autism were able to grasp the concept of a thought bubble and to understand that it depicted what another individual was thinking. They were rapidly able to utilize thought bubbles to answer questions about another

individual's thoughts. The teaching process required adapting the procedure to fit each individual's skill sets and needs. Students advanced at different rates with varying levels of success

A Wellman, Baron- Cohen, Caswell, Carlosgomez, Swettenhm, Rtoye & Lagattuta, (2002) study found that individuals with autism with a mental age of four or above found success in utilizing pictures with thought bubbles. This led to improvements in understanding mental states. Individuals improved in their ability to answer questions about thoughts, thinking processes, and behavior related to that thinking. Thought bubbles with pictures proved to be an effective means of teaching individuals with ASD about aspects of thinking and action.

Another way of presenting social stories and isolating skills is through video modeling. LeBlanc, Coates, Daneshvar, Charlop-Christy, Morris & Lancaster (2003) used video modeling and reinforcement for training individuals with autism in false belief tasks. They found that video modeling was an effective teaching procedure for perspective taking tasks. Another study by Charlop-Christy (2003) used video modeling to teach the concept of false belief to children with autism. Familiar adults were used as the models. The scenario was watched and afterwards the actors explained their problem-solving strategies and repeated the correct response. Multiple exemplars were used in order to help the students generalize concepts perspective taking. The use of multiple exemplars, explaining problem-solving strategies, and using familiar models assisted individuals with autism in acquiring understanding of false belief.

Bohlander, Orlich, & Varley 2012 found that video modeling should be used in conjunction with other interventions to teach social skills. Video modeling can assist in

generalization and improves individuals' ability to maintain skills over time. Role-playing used in conjunction with social stories or video modeling is very effective in practicing or transitioning the skills from theoretical to practical.

In their study, Allen & Kinsey 2013 show that theory of mind skills can be augmented through pretense training or role playing. Theory of mind is developed gradually through social experiences, language, and pretense. The study supports training in theory of mind through social exposure involving pretense.

Using a combination of methods to teach social skills and theory of mind is the best way to have students acquire skills. Cartledge, Tsai, Ya-yu Lo & Feng (2008) examined teaching social skills and ToM to a 6<sup>th</sup> grade student. The results suggest that the ToM and social training programs involving animation, situationally based scenarios, role-playing, verbal prompting, and highlighting main points substantially improved the acquisition of ToM and social skills. Improvement was generalized and maintained effects were transferred over time and across non-training sessions, possibly because of intense practice in the larger environment. The student greatly improved in the number of social interactions in which he participated and exhibited a higher percentage of appropriate social skills. He added a wide range of new behaviors that had not been observed during the baseline, including making empathic statements and accepting apologies, as well as explaining his thoughts. The author suggested that by using multiple exemplars and addressing real-life experiences, the skill was more easily generalized to the natural social environment.

## **Conclusion**

Studies conducted on applying or teaching perspective taking have mostly focused upon individual subsets of skills. These subsets have been researched in

isolation. Many of these skills have not been studied sufficiently or in combination with each other. There has been little research conducted about perspective taking as a whole. Most studies performed focus upon basic skills such as recognizing, understanding, and responding to facial expressions. There were only a few studies that looked into the process that individuals use when they are taking another's perspective. There are many studies about false belief and some on conflicting representations. There are not many studies about teaching body language interpretation or other facets of theory of mind and perspective taking. There is a dearth of research on the subject of taking the perspective others in order to understand others' intent. Throughout the literature, it is made clear that individuals on the autism spectrum have a great deal of difficulty with theory of mind and perspective taking. They have difficulty with the thinking processes involved in theory of mind and the application of those skills. Perspective taking utilizes theory of mind and understanding of the environment, as well as applying relevant past history. This is an underdeveloped area of research.

## **Chapter 3**

### **Methods**

#### **Participants:**

Student one is a 13 year- old male with high functioning Asperger's Syndrome. A psychiatrist diagnosed him as having Asperger's Syndrome, Anxiety Disorder (NOS), and ADHD (combined type) when he was in 3<sup>rd</sup> grade. His parents are highly educated. He is Caucasian and lives in a middle class suburban setting. He has one sibling who is three years younger. In kindergarten, it was recommended that he receive testing for motor issues because he could not cross the midline. He was tested for and received occupational therapy. His teacher reported persistent mild social issues with other children at school, transition issues, and difficulty on the playground. He was observed to be very active and distractible. He had difficulty with cleaning up materials and following directions. His mother noticed social difficulties when she took him to playgrounds. He held himself together at school but fell apart at home. In addition, he had executive functioning difficulties that continue to be an issue. He regularly loses the work that he does complete. He finds it difficult to begin writing when asked to answer short answer questions to which he knows the answer, and has difficulty organizing his thoughts in any open ended assignment. He leaves books and papers at school that he needs and cannot recall the significant features of assigned work. His parents were in contact with his teachers to try to help him better deal with the issues he faced. Things were not improving but getting worse on the social and academic front, so they had him privately evaluated. In third grade, his parents pushed to have him classified. They had the documentation from the psychiatrist and had an auditory processing evaluation that



showed delayed processing. The school did not accept the psychiatrist's evaluation and gave him a 504 plan with a listed issue of anxiety. The parents disagreed with the school and the school agreed to provide him with speech for pragmatic difficulties and accommodations in class. At that point, the child was still in a general education class without special education support. The speech teacher referred him for an IEP for 4<sup>th</sup> grade but to no avail. When it came to the next year's IEP meeting, the parents got an advocate who called in an administrator from outside the school to be in the meeting. The administrator listened to the discussion, pulled the advocate out of the room for a private discussion, and when they returned the advocate and the administrator told the parents that there would be an IEP. The administrator explained to the parents, with the advocate's support, that it was necessary to take him out of his current school and move him to a different school in the district. He received an IEP with an autism diagnosis, was moved to a different school, and placed in an inclusion class for 5<sup>th</sup> grade. At the new school, he was supported and improved academically and socially. When he moved to middle school, he continued in inclusion classes. The school stopped providing socialization assistance in middle school.

His social issues persist and have gotten more complicated. He has gotten into a lot of difficult social situations in middle school due to his lack of understanding as well as his lack of knowledge of how to handle social situations. He also continues to struggle with executive functioning tasks such as not knowing when to seek assistance, not seeking assistance when needed, and anxiety about schoolwork. The middle school has provided less support than the student needs, both academically and socially. He is now in 8<sup>th</sup> grade and is struggling.

Student two is a 12 year-old male who was diagnosed with autism by the Developmental Pediatricians at Children's Hospital of Philadelphia (CHOP) at age 2 1/2. He is Caucasian and comes from an upper middle class socioeconomic background. He lives in a middle class suburban area with highly educated parents. He is an only child. He was placed in a half day Pre-School Disabled and half day Autism class when he was 3 and 4. Student two was born two months early at 32 weeks and spent six weeks in the NICU. He was born with an infection and was started on IV antibiotics after birth. He was on a ventilator, was jaundiced, and had several blood transfusions. He was given dopamine to start his kidneys and steroids due to pulmonary hypertension. He contracted a staphylococcus infection and was started on a different antibiotic. He had a hole in the heart (PFO) but it closed up on its own. He had difficulty bottle-feeding. His oxygen levels de-saturated during feeding and he went home on an oxygen monitor. This improved and the monitor was removed. He was not hitting developmental milestones and was started in the Early Intervention Program at six months of age. He had physical therapy to teach him to crawl and walk and he had occupational therapy to help with motor skills as well as speech therapy to help him develop language. Before age one, he was in the emergency room for an ear infection that ruptured his eardrums. He then had tubes placed in his ears. A year or so later the tubes were removed. At fifteen months of age, he had bilateral hernia repair. Speech therapy was successful in helping him to learn to speak, although he had lingering articulation issues with certain sounds and pragmatic issues. In his autistic class, he received Physical Therapy (PT), Occupational Therapy (OT), Speech Therapy (ST) and Applied Behavioral Analysis (ABA) as well as ABA at home that was provided by the school system. His parents arranged private PT, OT, and

ABA therapy to supplement the hours he received from the school. He was assigned to the kindergarten class for students with multiple disabilities. It was not a successful situation. According to his family's educational consultant, he needed a one-on-one aide and that service was not provided. In first grade, he was in a Learning Disabled class. After his parents sued the district and won, he was placed in an inclusion class with an aide for second and third grade. Additional social skills training was provided through an outsourced provider from first through third grade. They practiced a variety of communication skills that could be applied in many situations so that the student could interact in a positive way and get what he needed or wanted. He received private in-home ABA from kindergarten through fourth grade. He continued to receive OT, ST, and social skills training at school from kindergarten until 4th grade. He was assigned to an inclusion class with an aide for the beginning of 4<sup>th</sup> then transferred to the social behavioral program for fourth and fifth grade at parental request due to the make up of the class and its focus on social skills. For middle school, in sixth and seventh grade he was placed in inclusion classes without an aide. He continues to receive speech therapy at school. His family had extended school year offered for him every year but after kindergarten the parents declined. They felt that he would receive better social exposure at camp with an aide. In seventh grade, he began to have mild seizures that caused auditory hallucinations. They are currently trying to adjust his medication. At this time he continues to have auditory hallucinations when he has a seizer aura and pre-and post seizures.

## **Procedure**

The study used a single subject AB design. Parents assessed their children's abilities prior to and after therapy. Students were evaluated prior to the start of and at the end of the project.

### **Student Evaluation Procedure**

Each student was presented with five videos to evaluate his/her perspective-taking skills and how he/she evaluates scenarios. At the end of the training the student was evaluated with five similarly themed videos. Before the videos were presented, the researcher checked for understanding of key vocabulary. The student was asked to define the terms: think, intent, and interpreting. If the student could not explain or demonstrate understanding, then the researcher defined and provided examples of what the words meant.

**Thinking-**direct one's mind toward someone or something; use one's mind actively to form connected ideas. Have a particular opinion, belief, or idea about someone or something.

**Intent** – What someone is trying to do in a situation or get from a situation.

**Interpreting-** How someone sees what is being done. Explaining the meaning of information, words, or actions. Understanding an action, mood, or way of behaving as having a particular meaning or significance.

After defining the words, the researcher asked the student to provide examples before moving on to the videos.

Each student was shown the video at least twice. The researcher explained that the student would be answering questions and explaining why he chose his answers. The

student then watched the video. Next, the researcher read three of the questions with the student and showed the video again. The researcher continued to read two to three questions and then replayed the video until the student had answered all of the questions. The student was informed that he may request to watch the video while he answered the questions. Since many students have difficulty in writing, it was important to offer them options for responses. They were allowed to dictate into a recorder or have the therapist write the answers dictated if necessary.

### **Parent Evaluations of Students' Skills**

Parents were given The Theory of Mind Inventory (ToMI) (Hutchins, T.L., Prelock, P.A., Laura Bonazinga, L. ,2010) to evaluate their interpretation of their children's skills in interpreting theory of mind.. They were provided with additional evaluation material created by this researcher to further evaluate their children's perspective taking and skills in theory of mind abilities so as to better isolate difficulties. The evaluation was given prior to working on these skills and after therapy had been completed.

### **Teaching Skills**

Teaching, practicing, and evaluating took place in the home of the students as well as in other home-based settings to increase generalization. The researcher was scheduled to meet with the student three times a week for four months. Students were taught how to evaluate other peoples' actions and word choices. behavior. They were taught about motivation, understanding how perspectives are formed, intent, how the same thing can be evaluated in different ways, and what could impact how people say and do things. They were taught how to evaluate the impact of environmental factors and how those factors can influence people. In addition, they were taught what influences choices and

about how to interpret others' body language and facial expressions. Students were taught to discern what could impact how people express themselves through verbal and nonverbal means. They were guided through understanding of when to hold onto things that occurred and when to dismiss the past. They were introduced to the possibility of intent being different from how the student may have interpreted intent. They were also taught that situations are not easily or simply interpreted and how to deal with interpretation through communication. They practiced identifying multiple interpretations of intent. The students were taught new communication techniques to help them discover intent.

**for each skill the researcher:.**

- 1) Provided a rationale for learning the skill
- 2) Discovered the student's thought patterns regarding the skill being targeted and how he applied his skills in situations through discussion and scenario exploration
- 3) Guided the student through a thorough understanding of the topic and the many ways in which the concepts impact interaction.
- 4) Discussed the neurotypical population's interpretations (connected them to others' understanding and gave explanations of the reasoning and circumstances influencing interpretations)
- 5) Worked on thinking patterns, appropriate responses and why they are appropriate, used social stories with visuals, role-playing, and evaluation of real life scenarios. The materials: videos, U-tube, pictures from magazines, social stories created by the researcher and the student, and props from around the house depending upon the scenario being role played. (This took take many sessions with each sub-topic)

- 6) Guided the student in role-playing with peers
- 7) Discussed implications including limitations of ability to interpret information in real life scenarios. (Demonstrated the limitations)
- 8) Helped the student generalize to the natural environment either as individual skills or once a student grasped a certain number of sub skills.

Skills were taught by breaking skills into smaller or smallest components, teaching the skill, and combining them to form a larger picture. Depending upon the individual student, scaffolding or chaining were used to teach the sub-skills and eventually pair them with other sub-skills. Depending upon the student, reinforcement was social-emotional reinforcement or concrete. Sometimes it's necessary to put externalized reinforcement into place to help them acquire individual sub-skills. Teaching students the cognitive process they need in order to understand the perspective taking tasks is an important part of them applying the skill.

In this project, the use of social stories was geared towards developing an understanding of concepts and supporting the students in their practice. Thought bubbles in the social stories were utilized to develop the concept of other individuals' thoughts, internal speech, and emotions. This showed students the difference between the thoughts, feelings, and intent of the individual and what was said or done. Social stories with thought bubbles were used to help in understanding others' processes and the concepts being instructed. In addition, the social stories reduced unpredictability and gave students formulated responses when they began to practice. After they were able to implement formulated responses, the scenarios were changed slightly so that there would be a range of possible interactions and responses. In order to successfully change student behavior, it

was important to use social stories in conjunction with practice of a desired behavior, modeling, role playing, and coaching. Without this, the formulated responses would not be sufficiently generalized to multiple situations and would not be consistently implemented in real life scenarios. Practices were conducted with peer partners. The use of trained peer partners is supported in research by the increased positive outcome for students and with increased generalization. Findings indicate that skills practiced with trained peers are significantly more likely to be effectively used and generalized to the natural setting.

Using peer partners can be handled in two different ways. The therapist can include the peer partner from the start in the learning process or she can bring them in after the concept has been introduced and practiced to assist in the generalization process. Both of these methods have strengths and weaknesses. In this study, this researcher brought peers into the process after the students had learned the skills and practiced them with adult partners.

When the peer partners are brought in towards the end of the process, it gives the students the chance to review as they explain to the peers what needs to be done and why. It also allows them to have any discussions about concepts that need to be explored prior to involving others who look at concepts from a more typical point of view. This can avoid the peer being aggravated by the student with Asperger's Syndrome. In addition, including peers from the beginning might lead students to avoid exploring issues in order to avoid embarrassment. This researcher began use of peer partner practice by providing them with scenarios. Once they acted out a scenario, the student and peers evaluated it



and how it would be applied. After practicing several different scenarios, the students and peers came up with their own ideas for situations that needed practice. They evaluated those scenarios and how the lessons learned could be used in real life interactions. Then, they watched videos together and evaluated the interactions that took place between the characters.

## **Chapter 4**

### **Results**

#### **The Study**

In this single subject pretest-posttest design, the results of teaching the thinking process and application of skills to students with Asperger's Syndrome are discussed in regards to the impact it has on developing theory of mind and perspective taking. The research questions answered were as follows; Did teaching students individual skills, using a combination of methods and helping them to connect the skills, help students to:

A. Identify more than one possible perspective in a variety of situations. B. Improve the students' ability to recognize and identify the possibility of multiple perspectives relating to the same situation. C. Help students to discern that there may be more than one possibility when interpreting the actions and comments of other people. D. Be able to explain how perspectives are formed from multiple sources of input. E. Identify what influenced a particular perspective or specific interpretation. F. Increase their theory of mind and perspective taking skills?

The Theory of Mind Inventory (ToMI) (Hutchins, Prelock, & Bonazinga, 2010) is grouped into three subscales, Early ToM Subscale, Basic Subscale, and Advanced Subscale. A parent can rate their child's skill level on a sliding scale line. The rating system goes from definitely not knowing the skill to probably not knowing, which are low ratings. Then it goes to undecided, which is a middle rating. From that point, the parents can rate the child as probably knowing the skill or definitely knowing the skill, which are high ratings.

The Parent Evaluation of Children's Skills Supplement (Twersky 2014) has thirteen questions in which a parent can rate their child's skill level on a sliding scale line. The rating system goes from definitely not knowing the skill to probably not

knowing, which are low ratings. Then it goes to undecided, which is a middle rating. After that, the parents can rate the child as probably knowing the skill or definitely knowing the skill, which are high ratings.

Parents filled out the two sliding scale inventories with the therapist without their child present. On the same day, the child was asked to watch videos with five different scenarios. The child was tested using a question and answer format. The researcher wrote whatever the child said onto the evaluation form and used the child's answers to see if he fulfilled the requirements in the rubric. The children could earn between three and four points for each scenario. Each question about a scenario was worth up to three or four points. In total, for all five scenarios, a student could earn between fifteen and twenty points. A calculation of the percentage of points earned was determined to the nearest tenth.

The Student Evaluation Rubric evaluates the child's ability to apply theory of mind and perspective taking skills in order to assess a scenario. The students watched videos and answered questions which demonstrated their ability to see more than one perspective, identify multiple possibilities of intent, explain what they used to determine the intent of individuals, how they made that determination, and the reason why the characters in the videos responded to each other in the way that they did. The rubric was used to evaluate the use of specific skills that had been taught to the students.

### **Student 1**

#### **Results Theory of Mind Inventory**

In the Theory of Mind Inventory entrance evaluation, which evaluates parents' understanding of their child's skills, student one received a composite score between the

first and sixteenth percentile for the measure. His composite mean for the measure was 14.4048. He is at or below the 10th percentile for a child of his age.

In testing ToM, a student can score up to 20 points per question. Out of the seven questions in the Early ToM subscale, he received lower than perfect scores in three questions. He scored in the middle range in affect recognition-complex, receiving a nine point five. In sharing attention – responding, he also scored in he middle range, receiving nine points. He received a particularly low score of four point six in understanding intentionality. He received a mean of 14.5714 in the Early Subscale and was between the first and sixteenth percentile.

Out of nineteen questions in the Basic ToM subscale, student one received five scores lower than twenty. He received mid range scores of nine for emotion-based behavior, nine point seven for mental state term comprehension (think), nine point five for seeing leads to knowing, and ten for mental state term comprehension (believe). He received 19 points for counterfactual-reasoning. His Basic Subscale mean was 17.6842 and he was in the twenty first percentile.

In the Advanced ToM subscale, he received a lower score in fourteen of the sixteen questions. He was scored in the higher range for sarcasm with nineteen points; second order understanding of belief receiving fifteen points; second order understanding of emotion getting fifteen points; humor (play on words) receiving fourteen point six points, and mind as active interpreter with fourteen point eight points. He scored in the middle range, getting nine point five points for white lies, nine point one points level 2 visual perspective-taking, and nine points for empathy. He received particularly low scores of zero in biased cognition and four point five in understanding lies versus jokes.

His parents gave him a score of four point eight points in second-order false desire attribution, understanding display rules, and complex social judgment. He received a score of seven in a second complex social judgment question. He received a mean score of 10.4375 for the Advanced Subscale and was between the first and sixteenth percentile.

In the Theory of Mind Inventory exit evaluation, the student's overall composite mean was 16.8571 and his percentile rank was 24th percentile. He was at or below the 10th percentile for his age.

The Early ToM Subscale had a mean of 16.5714 and was between the first and sixteenth percentile. In the Early Subscale, the student's skills were scored in the average range for intentionality, receiving eight points. The student received higher ratings of fourteen point five for affect recognition (complex) and affect recognition (basic). For the rest of the questions, the student scored twenty points each, which is the highest possible rating.

In the Basic ToM Subscale, the student received a mean of 19.4211, which is the fifty-sixth percentile. Out of the nineteen questions, he was scored in the average range. He received a nine point five in emotion-based behavior and received the full amount of points for all other questions.

In the Advanced ToM Subscale, he received a mean of 13.9375 and a percentile rank between the first and sixteenth. He was rated with one lower score of six in second order false desire attribution. He was rated in the middle range with a nine for understanding lies versus jokes and a nine point five for complex social judgment and use of language to intentionally deceive. He received a ten point five for understanding display rules and an eleven for empathy. For complex social judgment and biased

cognition, he received a rating of twelve. He was rated in the higher range for level II visual perspective taking at a thirteen and mind as an active interpreter at fourteen point five. He received a rating of eighteen for humor (play on words) and a perfect score for the five other questions.

**Table 1:**  
**Results for student 1 on The Theory of Mind Inventory (ToMI)**

	<i>TEARLY ToM SUBSCALE</i>	Pre Subscale Mean= 14.5714 (of 20) Percentile= 1st-16th	Post: Subscale Mean= 16.5714 (of 20) Percentile= 1st-16th
3	affect recognition (complex)	9.5	14.5
6	affect recognition (emotion-expression relationship)	20	20
24	intentionality	4.6	8
25	affect recognition (basic)	20	14.5
28	social referencing	20	20
37	sharing attention - initiating	20	20
38	sharing attention - responding	9	20

***Table 1: Results for student 1 on The Theory of Mind Inventory continued***

	<i>BASIC ToM SUBSCALE</i>	Subscale Mean = 17.6842 (of 20) Percentile = 21st	Subscale Mean = 19.4211 (of 20) Percentile = 56th
1	physiologically-based behavior	20	20
4	emotion-based behavior	9	9.5
7	mental state term comprehension (think)	9.7	20
8	false beliefs in context of unexpected change of location	20	20
9	seeing leads to knowing	9.5	20
10	mental state term comprehension (know)	20	20
11	appearance-reality distinction	20	20
12	false beliefs in context of unexpected contents	20	20
15	certainty (knowing/guessing)	20	20
16	mental-physical distinction	20	20
26	pretense	20	20
29	counterfactual-reasoning	19	20
30	mental-physical distinction	20	20
31	ability to deceive	20	20
32	level 1 visual perspective-taking	20	20
33	speech acts (promises)	20	20
35	speech acts (secrets)	20	20
39	mental state term comprehension (believe)	10	20
42	attribute-based behavior	20	20

***Table 1: Results for student 1 on The Theory of Mind Inventory continued***

	<b>ADVANCED ToM SUBSCALE</b>	Subscale Mean= 10.4375 (of 20) Percentile= 1-16th	Subscale Mean= 13.9375 (of 20) Percentile= 1-16th
2	sarcasm	19	20
5	second-order false desire attribution	4.8	6
13	idiomatic language	20	20
14	use of language to intentionally deceive	20	9.5
17	understanding display rules	4.8	10.5
18	complex social judgment	4.8	9.5
19	white lies	9.5	20
20	understanding lies versus jokes	4.5	9
21	level 2 visual perspective-taking	9.1	13
22	second order understanding of belief	15	20
23	second order understanding of emotion	15	20
27	complex social judgment	7	12
34	empathy	9	11
36	humor (play on words)	14.6	18
40	biased cognition	0	12
41	mind as active interpreter	14.8	14.5

### **Parent Evaluation of Children's Skills Supplement**

The Parent Evaluation of Children's Skills Supplement entrance evaluation was completed at the same time as the theory of mind inventory. The mother did not rate her child on the scale as completely knowing any of the skills. He received a subscale mean of 7.4846. He was scored in the low range for affect recognition (emotional -- expression relationship), and intentionality -goal directed behavior with a rating of five. He was rated with a five point four for lies versus story telling and six point five for complex



social judgment. His score for affect recognition (emotional -expression relationship), attention to and comprehension of relevant features of an event, attention to and comprehension of relevant features of a situation, emotion-based behavior, behavior-environment distinction and complex social judgment was seven. He was rated in the middle range, receiving a nine point six for speech acts (promises) in context of unexpected events and eleven point eight for empathy. Eleven point eight was the highest rating he received.

The Parent Evaluation of Children's Skills Supplement exit evaluation was completed at the same time as the theory of mind inventory. The student received a subscale mean of 11.2923. The student was rated in the average range for attention to and comprehension of relevant features of the situation with a score of seven and complex social judgment with a score of eight. Lies versus story telling and intentionality -- goal directed behavior were scored by the parent with a nine and attention to a comprehension of relevant features of an event with a ten. Affect recognition (emotional -- expression relationship) received a score of eleven. He received a twelve point five for affect recognition (emotional body language relationship), speech acts (promises) in context of unexpected events and empathy. He was rated in the higher range for behavior-environment distinction and complex social judgment and received a rating of thirteen. He was rated at fourteen point five for emotion-based behavior and fourteen point eight for past experience complex -- what to dismiss.

**Table 2**  
**Parent Evaluation of Children's Skills Supplement**

	Questions	Pre: (of 20) Subscale Mean = 7.4846153846	Post: (of 20) Subscale Mean = 11.292307692
1	Affect recognition (emotion-expression relationship)	5	11
2	Affect recognition (emotion-body language relationship)	7	12.5
3	Complex social judgment	6.5	8
4	Lies verses story telling	5.4	9
5	Speech acts (promises) in context of unexpected events	9.6	12.5
6	Attention to and comprehension of relevant features of an event	7	10
7	Attention to and comprehension of relevant features of a situation	7	7
8	Emotion based behavior	7	14.5
9	Past experiences complex-what to dismiss	12	14.8
10	Behavior environment distinction	7	13
11	Complex social judgment	7	13
12	Intentionality - goal directed behavior	5	9
13	Empathy	11.8	12.5

**Student Evaluation Rubric**

The Student Evaluation Rubric entrance evaluation demonstrated that the student was able to perform each task to varying degrees. The student was able to answer questions indicating more than one perspective 45% of the time. He scored two points for some of the time in scenario one, two, four, five and one point for not at all in scenario three. The student was not able for any of the characters to indicate the possibility of

more than one possible intent receiving one point for each question with 30%. In answering the questions, student one received 35% and was able to explain the characters responses to each other some of the time, getting two points in scenario one, two, and four. He was unable to explain the responses in scenario three and five, so he received one point for each. The student earned 53% because he was able to suggest one alternative way for the characters to interact to get positive results in scenario three and five; giving him two points each. He could make no suggestions for ways in which the characters could interact to get positive results in scenario one and two and four, thus only getting one point, thus earning 67% of the possible points. He was able to suggest a change in one character's actions or responses in order to change the outcome of scenario in all of the scenarios getting, two points for each scenario. The student received 25% and was unable to explain his answers using cues from facial expressions and body language in any of the scenarios. He got 25% and was unable to explain why each character may have interpreted the scenario in a particular manner in any of the scenarios. He answered all the questions that were asked, giving him 100% and was given four points for each scenario. The student was given 25%, which is one point per scenario because he interpreted events, situations, actions, and intent in an extremely negative fashion in all of the scenarios.

The Student Evaluation Rubric exit evaluation demonstrated a change in the student's ability to perform evaluations of scenarios. His answers indicated more than one perspective some of the time in scenario two, giving him two points; most of the time in scenarios six and nine, giving him three points each; all questions in scenario eight and ten, giving him four points each. He received 80% of the points possible. The student was

able to reflect multiple possibilities of intent for each character in scenario ten, giving him four points, for multiple characters in scenario seven and eight, giving him three points each, and for one character in scenario six and nine, giving him two points each. He received 70% of the points possible. Most of the time in scenario six, seven, and nine, the student was able to explain the characters' responses to each other, giving him three points each. He received four points for being able to explain all of the time in scenario eight and ten, giving him 85% of the points possible. His answers reflected the ability to suggest multiple alternate ways for the characters to interact to get positive results, giving him four points for each question, in all of the scenarios six through ten. This gave him 100% of the points possible. In scenarios six, seven, eight, and ten, he was able to make suggestions to change multiple characters' actions or responses in order to change the outcome of the scenario, giving him four points each and in scenario nine was able to make suggestions to alter one character's actions or responses, giving him three points. He received 93% of the possible points. He explained use of facial expressions and body language most of the time in scenario seven, eight, and ten, getting three points each. In scenario six and nine, he used facial expressions and body language in some explanations, receiving two points each. He received 65% of the points possible. In scenario eight and ten, the student completely explained why each character may have interpreted the scenario in a particular manner, receiving four points for each. He was able to explain mostly why a character interpreted a situation in a particular manner for scenario six, seven, and nine, receiving three points each. He earned 85% of the point possible to earn. He answered all the questions, getting four points for each scenario and received 100% of the points possible. The student interpreted events, situations, actions,

and intent in an extremely negative manner in the scenario six, receiving one point, a moderately negative manner in scenario nine, receiving two points, both positively and negatively in scenario seven and eight, receiving three points and in a positive fashion in scenario ten, receiving four points. He achieved 65% of the possible points.

**Table 3: Student Evaluation Rubric**

Questions	1 Points	2 Points	3 Points	4 Points	Enter	Exit
1. Answers indicates more than one perspective	Not at all Scenario 3	Some of the time Scenario 1,2,4,5 Scenario 2	Most of the time Scenario 6,9	All Questions Scenario 8,10	9/20 45%	16/20 80%
2. Multiple possibilities of intent for each character	No characters Scenario 1,2,3,5	One character Scenario 4 Scenario 6,9	Multiple characters Scenario 7,8	All possible characters Scenario 10	6/20 30%	14/20 70%
3. Explain characters responses to each other	None of the time Scenario 3,5	Some of the time Scenario 1,2,4	Most of the time Scenario 6,7,9	All of the time Scenario 8,10	7/20 35%	17/20 85%
4. How to get positive results	No different ways to change the scenario Scenario 1,2,4	One different way to change the scenario Scenario 3,5	Multiple ways to change the scenario Scenario 6-10		8/15 53%	15/15 100%
5. Suggestions to change outcome	Change no characters action or response	Change one characters action or response Scenario 1-5 Scenario 9	Change multiple characters actions or responses Scenario 6,7,8,10		10/15 67%	14/15 93%
6. Explained their answers using facial expressions and body language	Not used in explanation Scenario 1-5	Used in some explanation Scenario 6,9	Used most explanation Scenario 7,8,10	Used in all explanation	5/20 25%	13/20 65%

**Table 3: Student Evaluation Rubric continued**

Questions	1 Points	2 Points	3 Points	4 Points	Enter	Exit
7. Explained their answers	Did not explain Scenario 1-5	Partially explained	Mostly Explained Scenario 6,7,9	Completely Explained Scenario 8,10	5/20 25%	17/20 85%
8. Answer questions	No questions	Some questions	Most questions	All questions Scenario 1-5 Scenario 6-10	20/20 100%	20/20 100%
9) The student interpreted events, situations and action an intent	Extremely Negatively Scenario 1-5 Scenario 6	Moderately Negative Scenario 9	Both Positives and Negatives Scenario 7,8	Positive Scenario 10	5/20 25%	13/20 65%
Scenarios 1-5                      Scenarios 6-10						

## **Student 2**

### **Theory of Mind Inventory Results**

In the Theory of Mind Inventory entrance evaluation, student two received a 12.9048 composite score and was between the 1<sup>st</sup> and 16<sup>th</sup> percentile for the measure. He was rated at or below the 10th percentile for his age.

Out of the seven questions in the Early ToM subscale, he received less than the total twenty points in all of the questions. He was scored extremely low in the affect recognition (emotional -- expression relationship) with a score of seven. In social referencing, he was scored in the average range at ten. He received eleven point three for intentionality, at twelve point three for affect recognition (complex,) he was scored in the high range for affect recognition (basic) at seventeen point five, and received 20 points for sharing attention -- initiating and sharing attention -- responding.

Out of the nineteen questions in the Basic ToM Subscale, he scored less than twenty on nine of the questions. He received a subscale mean of 16.3684 and was in the 1st through 16th percentile. His mother scored him as particularly deficient in false beliefs in context of unexpected change of location with a score of five and appearances - reality distinctions with the score of six point five. He was rated in the average range for physiologically -based behaviors with a score of twelve. He was rated at twelve point one for emotion-based behavior and mental state term comprehension (think). He received a score of twelve point five for certainty (knowing/guessing). He received a high score of seventeen for counterfactual - reasoning and attribute-based behavior. Level I visual perspective taking was rated with an 18. He received 20 points for all the rest of the questions in the Basic ToM Subscale.

In the Advanced ToM Subscale, he received a subscale mean of 8.375 and was between the first and sixteenth percentile. He was given no points for both complex social judgment questions. He was given one point for understanding lies versus jokes and two points for biased cognition and humor (play on words). He received a score of two point five for use of language to intentionally deceive and two point nine for level II visual perspective taking. He was scored in the middle range with a score of seven for the second order false desire attribution and a nine point five for mind as an active interpreter. He received a twelve point five for empathy. He was scored in a high range for white lies at fifteen point two and at sixteen for second-quarter understanding of belief. Sixteen point five was given for sarcasm and for second order understanding of emotion, he received a sixteen point six. Idiomatic language and understanding display rules received a seventeen.

In the Theory of Mind Inventory exit evaluation, student two received a 16.2857 composite score and was in the 18th percentile for the measure. He was at or below the 10th percentile for a child of his age.

In the Early ToM Subscale, he received a subscale mean of 16.5714, which is between the first and sixteenth percentile. He received an average rating of ten in social referencing and twelve in intentionality. He was rated highly in affect recognition (complex) at seventeen and affect recognition (basic) at eighteen. He received a nineteen in affect recognition (emotional -- expression relationship) and twenty for sharing attention initiating as well as sharing attention responding.

In the Basic ToM Subscale, he received a subscale mean of 17.9474, which is in the 23rd percentile. He received an average score of nine point five for false beliefs in context of unexpected change of location. Appearance reality distinction was rated with a twelve and psychologically-based behavior was rated with a twelve point five. He received a rating of thirteen for motion-based behavior. Counterfactual - reasoning was given a seventeen. Certainty (knowing/guessing) and attribute -based behavior are both rated with a nineteen. All other questions received 20 points.

The Advanced ToM Subscale mean was 14.1875 and the percentile was 1<sup>st</sup>-16<sup>th</sup>. He received no points for complex social judgment. He was given two point five points for humor (play on words) and six point eight points for complex social judgment. He received an average score of ten for understanding lies versus jokes and level II visual perspective taking. Empathy was scored with thirteen points. He was scored in the higher range with a fifteen point five for sarcasm and seventeen point five for use of language to intentionally deceive, as well as biased cognition. He was given eighteen points for



second order false desire attribution and nineteen for understanding display rules. He received twenty points for the other five questions.

**Table 4**  
**Results for student 2 on The Theory of Mind Inventory (ToMI)**

	<i>EARLY ToM SUBSCALE</i>	Pre Subscale Mean= 13.8571 (of 20) Percentile= 1st-16th	Post Subscale Mean = 16.5714 (of 20) Percentile = 1st-16th*
3	affect recognition (complex)	12.3	17
6	affect recognition (emotion-expression relationship)	7	19
24	intentionality	11.3	12
25	affect recognition (basic)	17.5	18
28	social referencing	10	10
37	sharing attention - initiating	20	20
38	sharing attention - responding	20	20

***Table 4: Results for student 2 on The Theory of Mind Inventory continued***

	<i>BASIC ToM SUBSCALE</i>	Subscale Mean = 16.3684 (of 20) Percentile = 1st-16th	Subscale Mean = 17.9474 (of 20) Percentile = 23rd
1	physiologically-based behavior	12	12.5
4	emotion-based behavior	12.1	13
7	mental state term comprehension (think)	12.1	20
8	false beliefs in context of unexpected change of location	5	9.5
9	seeing leads to knowing	20	20
10	mental state term comprehension (know)	20	20
11	appearance-reality distinction	6.5	12
12	false beliefs in context of unexpected contents	20	20
15	certainty (knowing/guessing)	12.5	19
16	mental-physical distinction	20	20
26	pretense	20	20
29	counterfactual-reasoning	17	17
30	mental-physical distinction	20	20
31	ability to deceive	20	20
32	level 1 visual perspective-taking	18	20
33	speech acts (promises)	20	20
35	speech acts (secrets)	20	20
39	mental state term comprehension (believe)	20	20
42	attribute-based behavior	17	19

***Table 4: Results for student 2 on The Theory of Mind Inventory continued***

	<b>ADVANCED ToM SUBSCALE</b>	Subscale Mean= 8.375 (of 20) Percentile= 1-16th	Subscale Mean = 14.1875 (of 20) Percentile =1st-16th
2	sarcasm	16.5	15.5
5	second-order false desire attribution	7	18
13	idiomatic language	17	20
14	use of language to intentionally deceive	2.5	17.5
17	understanding display rules	17	19
18	complex social judgment	0	6.8
19	white lies	15.2	20
20	understanding lies versus jokes	1	10
21	level 2 visual perspective-taking	2.9	10
22	second order understanding of belief	16	20
23	second order understanding of emotion	16.6	20
27	complex social judgment	0	0
34	empathy	12.5	13
36	humor (play on words)	2	2.5
40	biased cognition	2	17.5
41	mind as active interpreter	9.5	20

### **Parent Evaluation of Children's Skills Supplement**

The Parent Evaluation of Children's Skills Supplement entrance evaluation was completed at the same time as the theory of mind inventory. He was given zero points for affect recognition (emotional expression relationship), affect recognition (emotional body language relationship), complex social judgment, lies versus story telling, emotion-based behavior, and intentionality-goal directed behavior. He was scored in the low range for past experience complex -what to dismiss- with a score of three. Attention to and comprehension of relevant features of the situation and attention to a comprehension of

relevant features of the event were given six point five and six point eight respectively. He was rated with a seven for empathy. He was scored in the middle range at ten point five for complex social judgment, eleven point three for behavior environment distinction, and eleven point five for speech acts (promises) in context of unexpected events. His subscale mean was 4.3692.

In the Parent Evaluation of Children's Skills Supplement exit evaluation, his subscale mean was 9.2538. He received scores in the low range for intentionality -- goal directed behavior at one point five, emotion-based behavior at two points, lies versus story telling at two point eight points, and complex social judgment at three points. He was rated with four points for past experience complex -what to dismiss- and six point five for attention to and comprehension of relevant features of the situation. He was rated in the middle range for attention to comprehension of relevant features of an event at ten points and eleven point five for affect recognition (emotion expression relationship) as well as affect recognition (emotion body language relationship). He was scored in the higher range and given fourteen points for empathy, sixteen point five points for behavior environment distinction, eighteen point five points for complex social judgment, and nineteen points for speech acts (promises) in context of unexpected events.

**Parent Evaluation of Children's Skills Supplement Table**

	Table 5: Questions	Pre: (of 20) Subscale Mean = 4.3692307692	Post: (of 20) Subscale Mean = 9.2538461538
1	Affect recognition (emotion-expression relationship)	0	11.5
2	Affect recognition (emotion-body language relationship)	0	11.5
3	Complex social judgment	0	3
4	Lies verses story telling	0	2.8
5	Speech acts (promises) in context of unexpected events	11.5	19
6	Attention to and comprehension of relevant features of an event	6.8	10
7	Attention to and comprehension of relevant features of a situation	6.5	6.5
8	Emotion based behavior	0	2
9	Past experiences complex-what to dismiss	3	4
10	Behavior environment distinction	11.3	16.5
11	Complex social judgment	10.5	18.5
12	Intentionality - goal directed behavior	0	1.5
13	Empathy	7	14

**Student Evaluation Rubric**

In The Student Evaluation Rubric entrance evaluation, the student can earn between fifteen and twenty points for each scenario. The student earned 55% of the points possible reflecting more than one character's perspective by receiving one point for scenario three and two points for scenario one, two, four, and five. He was unable to indicate multiple possibilities of intent for each character in any of the scenarios,

receiving one point for each scenario, which gave him 25% of the points possible. He received 40% of the points possible for explaining the characters' responses to each other, getting three points for scenario one, four, and five, and one point each for scenario two and three. The student was unable to suggest alternate ways for the characters to interact to get positive results. Therefore, he was given one point per scenario and received 33% of the points possible. The student was able to make suggestions to change the outcome of the scenario by altering characters' actions or responses in scenario one, two, and five. He received two points for each of those scenarios and received one point for scenario three and four in which he was unable to make any changes. He received 53% of the points possible. The student did not use facial expressions and body language to explain behavior in scenarios and did not explain why each character may have interpreted a scenario in a particular manner. For both of those scenarios, he earned one point for each scenario and received 25% of the points possible. The student answered all of the questions in scenario one and three, receiving four points for each question. He answered most of the questions in scenario two, four, and five, receiving three points for each question. He earned 85% of the points possible. The student interpreted events, situations, actions, and intent in both a positive and negative manner in scenario five, earning three points. He interpreted them as moderately negative in scenario one, two, and four, earning two points for each scenario and extremely negative in scenario three, earning one point. He received 50% of the points possible.

In The Student Evaluation Rubric exit evaluation, the student was able to improve all of his scores. The student received three points for scenario seven, reflecting more than one character's perspective most of the time. He received four points for being able

to indicate more than one perspective in all of the questions in scenario six, eight, nine, and ten, receiving 95% of the points possible. He received 70% of the points possible by being able to indicate multiple possibilities of intent for one character in scenario eight and nine. He was able to indicate multiple possibilities of intent for multiple characters in scenario six and nine and all characters in scenario seven. He received three points each for scenario eight, nine, and ten, and four points for scenario six and seven by explaining the characters' responses to each other. He received 85% of points possible. He received 3 points for each scenario, which is 100% of the points for suggesting alternate ways for the characters to interact to get positive results and for making suggestions to change the outcome of the scenario by altering characters' actions or responses in the scenarios. The student used facial expressions and body language to explain answers, earning 80% of the points possible most of the time in scenario six, seven, eight, and ten, earning three points each. He earned four points for using facial expressions and body language in all of his explanations in scenario four. He earned 70% of the points possible by explaining why each character may have interpreted a scenario in a particular manner partially in scenario seven, as well as in nine, mostly in scenario eight and ten and completely in scenario six. The student earned 100% of the points possible by answering all the questions in scenario six through ten. The student interpreted events, situations, actions, and intent in a both positive and negative manner in scenario nine and ten, receiving three points for each. He received four points each in scenario six, seven, and eight by interpreting scenarios in a positive manner. He received 90% of the points possible.

**Table 6: Student Evaluation Rubric Table**

Questions	1 Points	2 Points	3 Points	4 Points	Enter	Exit
1. Answers indicates more than one perspective	Not at all	Some of the time Scenario 1,2,3,4,	Most of the time Scenario 5 Scenario 7	All questions Scenario 6,8,9,10	11/20 55%	19/20 95%
2. Multiple possibilities of intent for each character	No characters Scenario 1-5	One character Scenario 8,10	multiple characters Scenario 6,9	All possible characters Scenario 7	5/20 25%	14/20 70%
3. Explain characters responses to each other	None of the time Scenario 2,3,	Some of the time Scenario 1,4,5	Most of the time Scenario 8,9,10	All of the time Scenario 6,7	8/20 40%	17/20 85%
4. How to get positive results	No different ways to change the scenario Scenario 1-5	One different way to change the scenario	Multiple ways to change the scenario Scenario 6-10		5/15 33%	15/15 100%
5. Suggestions to change outcome	Change no characters action or response Scenario 3,4	Change one characters action or response Scenario 1,2,5	Change multiple characters actions or responses Scenario 6-10		8/15 53%	15/15 100%
6. Explained their answers using facial expressions and body language	Not used in explanation Scenario 1-5	Used in some explanation	Used most explanation Scenario 6,7, 8,10	Used in all explanation Scenario 4	5/20 25%	16/20 80%
7. Explained their answers	Did not explain Scenario 1-5	Partially explained Scenario 7,9	Mostly Explained Scenario 8, 10	Completely Explained Scenario 6	5/20 25%	14/20 70%
8. Answer questions	No questions	Some questions	Most questions Scenario 2,4,5	All questions Scenario 1,3 Scenario 6-10	17/20 85%	20/20 100%



**Table 6: Student Evaluation Rubric Table Continued**

Questions	1 Points	2 Points	3 Points	4 Points	Enter	Exit
9) The student interpreted events, situations, action and intent	Extremely Negatively Scenario 3	Moderately Negative Scenario 1,2, 4	Both Positives and Negatives Scenario 5 Scenario 9,10	Positive Scenario 6,7,8	10/20 50%	18/20 90%
Scenarios 1-5      Scenarios 6-10						

**Student Evaluation Rubric Table Average Change in Points**

Overall, both students made gains in all skills named in the student evaluation inventory. Their average change in points per question was: seven point five for question one, seven point five for question two, nine point five for question three, eight point five for question four, five point five for question five, nine point five for question six, ten point for question seven, one point five for question eight, and eight for question nine

**Table 7: Student Evaluation Average Change in Points Rubric Table**

Average Change in Points for both Students
7.5
7.5
9.5
8.5
5.5
9.5
10.5
1.5
8

## **Chapter 5**

### **Discussion**

#### **Overview**

Providing a rationale for learning theory of mind and perspective taking skills, guiding the students through a thorough understanding of the skills involved and the many ways in which the concepts impact interaction, as well as discussing the neurotypical population's interpretations of those interactions helped this researcher's students to make progress in learning the thinking process behind social interaction. The results of this research suggest that by utilizing social stories with thought bubbles, role-playing with researchers as well as peer partners, and coaching students with autism can increase their theory of mind and perspective taking skills. Time spent on teaching skill building can change how students view people, events, and situations.

Some supplementary findings include an increase in parental understanding and a fast adjustment in the application of skills for student two. The parent of student one developed insight into her child's interpretation of events, situations, theory of mind, and perspective taking skills that she previously lacked. Student two was quickly able to gain facility in ways to use language to alter how situations turned out despite having significant deficits reflected in the initial evaluation in ability to explain situations, events, and thought processes.

#### **Student One: Theory of Mind Intervention Summary**

During the intake interview, the mother of student one seemed unsure of some of her son's skills regarding theory of mind. She indicated her confusion by frequently stating that she was unsure of her answer while she was completing the paperwork. When she was unsure, she had a tendency to choose undecided. To complicate the evaluation,

she also chose undecided when she felt her son's sub-skills were between definitely not and definitely.

When student one's mother filled out the exit Theory of Mind Inventory, she had a clearer grasp of her son's skills. This was most likely due to her participation in the research process. Hearing where he struggled and how he understood the discussions seem to have the unintended consequence of giving her a more complete understanding of her son's deficits and strengths. During the first month of sessions, the parent told this researcher during follow up discussions that she did not realize that her son was looking at situations and events from the perspective he described during our exploration of concepts. Over time, the number of these comments decreased. She began to be able to predict what issues would be brought up by her son when she was told ahead of time what topics were going to be covered in the next session. Data was not collected regarding improved parental insight.

The student's percentile rank, normed to his age in the Early and Advanced Subscale, did not show movement between the intake parental interview and the exit interview but his scores in the individual areas did increase. This showed that he was gaining in skill development. His percentile rank did increase significantly in the Basic Subscale, which demonstrated an advancement in his skills.

During the intake inventory, it was indicated that student one struggled with a variety of skills that impact perspective taking and ability to utilize theory of mind. He struggled with understanding the difference between when someone is teasing in a friendly manner and when someone is making fun of another. He had trouble understanding the difference between lying and joking and understanding intentional

actions versus accidents. Lack of skill in these areas makes judging other people's actions difficult.

The parent felt that her son did not understand intentional actions versus accidents. Skill deficits in recognizing intent behind actions can lead to ascribing negative motivation where none exists. After the intervention in which we worked intensively in understanding others' behavior by exploring how past history with an individual, body language, facial expressions, and motivation impacts how to interpret behavior, his mother saw an improvement in his understanding.

When his skills were evaluated, they indicated that he did not understand that when people see something from different angles, different information becomes apparent. This can lead him to assume that people have information that they do not have, which can lead to great misunderstanding. Understanding that people may not have the same information as you do even when they are viewing the same situation helps people to see one reason why people may have different viewpoints about the same situation. Through the intervention, his skills improved and he began to see people could have different information about the same situation. He also learned in the intervention that people's beliefs, biases, past experiences, and expectations can impact how a situation is viewed. In the intake evaluation, he did not take into consideration, when relating to others, that past history with an individual impacts present decision-making on interpreting behavior. When he related to others, he did not take into consideration past encounters and how they impact his and their current perceptions. By the end of the intervention, his exit evaluation showed that his mother had seen a vast improvement in his understanding of this concept.

Entering the study, he had difficulty understanding that people can hide their emotions. He had some difficulty during the intervention learning about reading cues from body language and facial features other than those around the mouth. His main source of information prior to the intervention for figuring out how others felt was by looking at their mouth. He, like others with autism, was evaluating how someone feels purely on what someone's mouth shows. This was shown in a study by Adolphs, Hurley, & Piven (2007). It showed that adult individuals with autism focused chiefly on the mouth to determine emotions. Through the intervention, he was able to acquire skill in reading the eyes, eyebrows, facial muscles, gestures, and body positioning.

His lack of understanding that people can hide their emotions and that people can lie to purposely mislead others, as well as to avoid something they don't like, also negatively impacts his ability to judge others' behaviors and actions. Although his mother feels that the training helped him to improve his understanding that people can lie to mislead others, this researcher did not see any real gains in his ability to apply this understanding even to role played scenarios. Understanding what motivates an individual to hide their emotions and to mislead helps people to judge the accuracy of the visual and verbal information they are given.

The evaluation of skills revealed that he struggles to recognize when someone needs help. This can give a negative impression of his feelings for another human being. Being able to recognize that when you evaluate others you can be wrong about what other people want, opens people's minds to the possibility of not completely understanding what is going on in any particular situation. This is a skill in which he is deficit and according to his mother she did not see much gain in his understanding. From

this researcher's perspective based upon how he began to respond during therapy, he was beginning to open his mind to the possibility that he may not read the intent behind the actions of an individual correctly but still had trouble in figuring out what could be motivating people. He recognized that he may be misreading what they want or their intent, but it had not yet changed how he responds to a situation. More time and a great deal of practice should help in the application of the skill. He is also deficit in recognizing when the listener is not interested and placing oneself in another person's position to understand how they feel. These deficits prevent him from adjusting his behavior to maintain conversations and relationships. He has made gains in both of those skills in controlled situations but we did not have time to practice these skills enough to see a great deal of carryover.

#### **Student One: Supplementary Inventory Summary**

Student one's mother was surer of her responses when filling out the supplementary questionnaire for ToM and perspective taking skills developed by this researcher. She had a clear view of her child's skills in these areas. The evaluation of the supplementary inventory indicated that the student was deficit in skills in all areas being evaluated. The areas of greatest weakness were reading facial expressions that were closely related and understanding intentionality of an action. His mother also evaluated him as struggling with differentiating between when someone is telling an embellished story or lying to manipulate others. He had poor skills, according to his mother, in the ability to determine when someone is making fun of him and evaluating how to behave based upon who or where a person is. This showed a lack of understanding that people alter what and how they say things based upon who is present and that where someone is

also impacts behavior. The other things that his mother felt he struggled with were noting and understanding relevant features of situations that he saw and in which he took part.

Throughout the intervention, he gained skill in understanding the thinking process involved in understanding behavior and how people evaluate behavior. He struggled with getting past his own biases and his past history of evaluating actions, situations, and events without the context of intent behind his evaluations. He made improvement in his ability to evaluate the external signs of internal emotions as well as his understanding of how behavior is impacted by the environment in which it occurs. His mother evaluated him as improving in his skills between the entrance evaluation and the exit evaluation. The only score he did not increase in was attention to and comprehension of relevant features of situations. The data shows that in the very short amount of time in which he participated in therapy, his understanding grew. This demonstrates the possibility that these skills can be taught. Student One and Student Two were able improve their ability to understand theory of mind and perspective taking concepts with instruction.

### **Student One: Student Evaluation Summary**

For the entrance evaluation, the student demonstrated an understanding of the terms before beginning the evaluation. He requested that this researcher write the answers he dictated. He tended to see only one possibility of intent for each of the characters presented. He had a realization during scenario four and changed his understanding midway through his interpretation of the scenario. This changed his responses but he didn't perceive that it could be one or the other intent. He just changed what he perceived the intent to be. He wasn't really demonstrating the ability to see that there might be more than one possible intent. This researcher was able to determine the information by the

complete switch in the way in which he answered the questions. He did not use logic from the first half of the interpretation at all. He just switched to his new understanding after he had an aha moment and stated that the girl could be being left out. Being able to discern more than one possibility within the same scenario is the first step to seeing that there may be more than one possible intent, but his answers didn't demonstrate that he was making a connection to that possibility. In scenario one and two, he was able to explain why they were responding to each other on a superficial level. He was stating responses that he connected with and this allowed him to explain the boys' responses based upon his own feelings about what was happening in the scenarios. The student was only able to offer basic ways to alter situations in the entrance evaluation. It is interesting to note that most of the suggestions had to do with changing the intensity of the response or action. In scenario three, he could not come up with a change in the interaction in order to bring about a positive outcome. He identified with the teacher and the other students rather than the main character in the scenario. That hindered his ability to make suggestions because he could not connect to the experience. He was not able to change more than one simple surface action or response.

It is interesting to note that student one decided after watching scenario three only one time that the main male character was being excluded. He noted this without any questions being presented. It was his first impression. He noticed that exclusion even though in answering the questions he indicated that he felt that the main male character was annoying and wrong in his actions. At the beginning of scenario five, when the student was evaluating an interaction between a mother and two siblings, the student stated after the first viewing that the mother did not care about the boy and that he was a



mistake. This was not indicated at all in the scenario. It was an extreme interpretation and shows how drastically negative the student's first interpretation of the scenario was. After reconsidering what occurred in the scenario, his answers to the questions were less drastic, although he indicated that the boy felt that the mother liked the daughter better. In all of the scenarios, the student's answers were slanted towards the negative when stating the intent of any of the characters. He tended to interpret behavior negatively and make a judgment about the person rather than decide that a behavior may be situationally based.

He requested that this researcher write the answers he dictated in the exit evaluation. It is interesting to note that the student often included tone of voice and word choice to explain his evaluation, which was not present in the entrance evaluation. He related the situations strongly with things that he would feel and was able to place himself into the situations that were taking place in order to discuss how each individual character was interpreting the situation. He showed some of his own anxieties by interpreting motivation in a student by reflecting that the student seemed to be focused upon not participating because he thought he would not do well at the task. He showed a slant towards the male perspective in his evaluation of scenario nine by stating, after watching the scenario once, "that was awkward and she is defensive". He provided many situational explanations of why the characters were interpreting actions in a specific manner and provided many examples of evaluating body language as well as facial expressions using the new techniques taught during therapy. He stayed away from using references to the mouth and focused more on the eyes, eyebrows, facial muscles, gestures, and body language. His suggestions concerning changing the characters' environment, actions, or responses to have a more positive outcome were improved over

the intake evaluation but still lacked a fully developed understanding of compromise. He was able to suggest some specific compromises that were discussed multiple times during therapy but did not come up with unique compromises to each situation.

It is interesting to note that when the subject was describing how characters interpreted situations, he often used extreme negativity in his explanations. In scenario ten, he decided that the male character was thinking that the mother cared more about the person on the other end of the phone than she cared about him. He even stated that she did not care about him. A lot of work was done in therapy to demonstrate to the student that it is difficult to determine why somebody is feeling negatively about something. He had a good grasp, by the end of therapy, that people could be feeling negative about something completely unrelated to the topic under discussion, the situation, or the person. He worked on the concept that people have thoughts and experiences that could be on their minds when involved with something else. He explored the idea that the negativity being directed at an individual may be directed at them or may be directed towards something unrelated to the current situation. He learned that it is difficult to determine if negativity is purely about the current situation. This helped him to reevaluate his initial negative impression of situations. The new understanding was demonstrated in his exit evaluation. When he was asked to evaluate the entire situation in the exit evaluation, he was sometimes able to put aside the negativity. This indicated that he was beginning to be able to put aside his first negative impression of a situation and was willing to reevaluate the intent of others. Overall, throughout the evaluation of the scenarios, he put his new skills to good use in interpreting intent, perspective, and reasoning.

## **Student Two: Theory of Mind Intervention Summary**

The student's mother seemed to have a good grasp of her child's understanding and ability to apply concepts in theory of mind. The student's percentile rank, normed to his age in the Early and Advanced Subscale, did not show movement between the intake parental interview and the exit interview but his scores in the individual areas did increase. This showed that he was gaining in skill development. His percentile rank did increase in the Basic Subscale in a significant manner.

In the entrance evaluation, she determined that he was particularly deficit in understanding the difference between when someone is teasing in a friendly manner and when someone is making fun of another individual. Past history with an individual impacting present decision-making and interpreting behavior was another weakness as was understanding the difference between lying and joking. During therapy, there were many social stories and practices with the student about how past experience impacts interpretation. He struggled to take into account past history with an individual when trying to understand a situation. When he had a negative experience with a person, he had difficulty letting go of the upsetting feelings about that experience. He held onto negative feelings without attempting to consider that person's intent. When he judged what they were doing, he did not take into account his past experience with that person. He did not take the situation itself into account. A good example of this was his relating an incident he had with a longtime friend, at the beginning of therapy. The incident had occurred a number of years ago. They had been playing with Nerf Guns and she shot him in the face. He stated that he is still sometimes unsure when she comes over if it will go well because of this incident. He was able to admit that the girl was klutzy and has poor aim but could

not determine if her hitting him in the face was deliberate and intended to be mean or not. The discussion of all the positive past history he had with her was not enough to have him recognize that it was unlikely that she had hurt him deliberately. By the end of therapy, he had accepted that her intent was to play the game. He understood that she did not deliberately hit him in the face. He was able to use his past and current history with the child to evaluate the incident and let it go. He learned how to use a combination of past history, body language, facial expressions, and situational factors to evaluate various situations. His scores improved between the entrance and exit evaluation. His mother determined that he had improved in understanding how past history impacts interpretation. He also made improvements in understanding when someone is teasing in a friendly manner or making fun of someone based upon past history. Though the student made significant progress, clearly more work needs to be done with additional practice on the thinking and application of these skills. He still struggles with differentiating between when someone is trying to be a friend and when someone is trying to be mean to him. Contributing to this difficulty is the lack of understanding that people can lie to purposely mislead others.

Understanding that he may not know what other people want, and understanding that just because he knows information does not mean that others do, were other deficits revealed in the entrance evaluation. During therapy, there was a lot of work done with the student so that he could understand that it is difficult to understand what another person is thinking and what they know in a particular moment. He worked on learning that it is important to give people the benefit of the doubt as far as understanding that they may lack information. In the exit evaluation, he demonstrated that he had made gains in

understanding that he may be wrong about interpreting what people want and understanding that somebody else may not have the information that he possesses. This also helped him to become more familiar with the concept that seeing things and events from different positions provides people with different information. Two skills that we did not work on during therapy did not improve. Recognizing when the listener is not interested was not a skill we had time to pursue before the end of this study. Despite the fact that we worked on understanding body language and facial expressions, we did not have a chance to work on them in that particular context. Students on the autism spectrum have a difficult time generalizing skills, so direct application of evaluating body language and facial expressions while speaking about interesting topics needs to be pursued. We also did not work on understanding humor in regards to play on words.

### **Student Two: Supplementary Inventory Summary**

The second student's mother mentioned to this researcher that she felt that the questions in the supplementary inventory were much clearer. The mother evaluated the child as showing a deficit in all areas being assessed. He is extremely deficit in the ability to differentiate between more subtle differences in facial expressions, in reading body language, and the ability to recognize when someone is making fun of him or of others. She evaluated him as having extreme difficulty in differentiating between when someone is elaborating on a story, telling a story, or lying to get what they want. In the entrance evaluation, his mother scored him as having difficulty connecting actions to how a person is feeling. She noted that he also had difficulty with goal directed behavior. Working on understanding the reasoning behind actions, how to interpret actions, and on understanding why people respond in a particular manner helped the student to improve

his understanding of the above mentioned skills. His scores improved, especially in recognizing body language and facial expressions. After therapy, he was better able to understand how beliefs, emotions, and thought impact behavior and his mother saw the impact of the training in his actions.

He was also scored as being extremely deficit in knowing what to dismiss, what to focus upon, and whether to attribute a behavior to a person or a situation. He had difficulty with attending to and comprehending the features of a situation. He had difficulty with these skills when he was not involved in the situation and when he was involved a situation. These skills depend upon noting the relevant details in a situation and comprehending them. This difficulty matches the research findings by Shulman, Guberman, Shiling & Bauminger (2012), that determining the applicable factors in a situation is difficult for people with ASD. The study found that more irrelevant, unsubstantiated details were present in the descriptions presented by participants with ASD. It is interesting to note that his score in attending to and comprehending the relevant features of the situation in which he was involved did not improve between the entrance and exit evaluation. He did improve in identifying the relevant features of the event in which he was not involved. The training in identifying response by looking at body language and facial expressions assisted him in identifying important features within a situation in which he was not involved. During therapy he also learned about how environment can impact behavior. This information also seems to have helped him to better identify relevant features within a situation. The student was rated poorly in understanding how to be empathic, in his entrance evaluation, By the exit evaluation, he had improved. Empathy is reflected by the ability to inhibit actions due to being aware of

the impact of those actions. The student improved most of his skills and this was reflected in his scores between the entrance evaluation and the exit evaluation.

### **Student Two: Student Evaluation Summary**

At the beginning of the entrance evaluation, student two did not understand how to explain the terms thinking, intent, and interpreting. He understood what thinking and interpreting were but could not explain it. After he had a good grasp of the definitions and how to explain them to somebody else, the evaluation began. He requested that the researcher record his answers for him. He was able to explain a little bit of the characters' responses to each other by explaining what they were thinking. He was unable to think of ways for the characters to interact in order to get positive results. He was able to make suggestions to change the outcome of scenarios, though the suggestions that he made were often not practical or they required a character to give up what they wanted. He was not able to problem solve ways in which multiple individuals could be happy or at least satisfied with the outcome.

The student had a hard time getting past the literal interpretation of the scene many times in all of the scenarios. He could not determine intent because he focused upon what he felt were their emotions. He struggled with interpreting how a character in the scenario would perceive another character's actions. These difficulties caused him to respond "I don't know", a number of times. Many times, this response was followed by an answer but on a few occasions it was not. He focused upon what the characters wanted and what they were doing in his responses. He made more personal statements and comments about school interactions and parent child interaction in the scenarios involving situations that he could relate to. In the scenario in which the circumstances

involved sibling interaction only, his answers seemed more disconnected from personal experiences. He is an only child. He said that two children in a family is hard to deal with and how he had observed families that had multiple children and had seen difficulties arise that were similar to the ones in the videos. Looking at the situations from an outsider's point of view rather than connecting it to himself seemed to give him some objectivity and he was able to see the perspective of more than one character. His answers indicate a solid black and white view of right and wrong. It is interesting to note that during the scenario with both siblings trying to have their mother check their work, the student referenced his own mother's desire for his work to be checked by him before she checks it. This scenario depicted a situation between a parent and her children rather than between siblings. He related to the parent child interaction. He was connecting his experiences to his evaluation of the scenarios. In this scenario, he was able to see the mother's perspective and the main male character's perspective. Surprisingly, he was instantly able to note some subtle things about the scenarios that took the first student longer to note. His answers were short and not always in complete sentences. He had difficulty organizing his thoughts in order to answer the questions.

In the exit evaluation, the student was able to explain all of the definitions to the researcher. His answers were specific and longer in nature. He explained his answers using facial expressions, body language and tone of voice. Occasionally, he also added situationally based explanations. The student improved in his ability to provide multiple possibilities of intent for each character but still struggled to provide multiple possibilities. Explanations of why characters interpreted situations in a specific manner were hard for the student to come up with. He became much better at this through



practice during therapy but still found it a struggle. He was clearly able to see the perspective of multiple characters. This was demonstrated in all of his answers. He was able to make multiple suggestions for changing the environment, actions, and responses, in all of the scenarios, in order for them to turn out differently. He came up with specific language the characters could utilize in order to relate in a more productive manner. He was able to utilize unique compromises not practiced during therapy and situationally based suggestions to alter how the characters were interrelating in order to have better outcomes. During therapy he seemed to have some familiarity with the use of varying language in order to change how others interpret your message. He was able to come up with many variations of how to say things in order to change how people perceive the message. Quickly, after starting therapy, he began to utilize this skill. It is probable that his ability to do this during role-playing activities and discussions stems from previous therapy. His skills clearly improved through therapy in all aspects of his evaluation. Practice also assisted him in answering all the questions.

A pattern emerged in student two's training that was not seen with student one. Student two began to apply some of the changes into his verbal patterns before practice had begun with peers. The big difference between student one and student two was that student two had previous training in using language in compromising to get what he wants when he was younger. He participated in many role-play scenarios where he needed to try different means of compromising. Though there is not enough information to draw conclusions, this indicates that early training can positively impact the acquisition of new or more complicated theory of mind and perspective taking tasks. Student two, having the background of being taught skills in verbal compromise at a

younger age, picked up the skills at a faster pace and seemed to develop a deeper understanding of how they can be applied in situations. Though his overall scores were not as good as the other student, his grasp of application during therapy was stronger. He also began to apply the skills outside of the therapy situation even though therapy had not progressed that far by the end of the study. Student one is still struggling to apply skills inside the therapy situation, even though he understands the concepts being taught. There are not enough students in this study to prove that the gradual repeated teaching of these skills with ever greater sophistication improves the ability of the students to apply the skills. This project also does not look at the ability to apply the skills taught but both of these things should be investigated.

### **Research Question and Hypothesis**

The purpose of this study was to examine whether, by using theory of mind skills as well as developing the understanding of how perspectives are formed, students would be able to identify more than one possible perspective in a variety of situations. The goal was for them to accept that other peoples' intent may be different than their interpretation of intent. They would be able to demonstrate understanding of this concept of multiple perspectives by identifying multiple possible intents for each individual in the same scenario during an exchange.

It was hypothesized that teaching students to integrate the skills involved in perspective taking would improve the students' ability to recognize and identify the possibility of multiple perspectives relating to the same situation. It was further hypothesized that the understanding that there are multiple perspectives will help students to discern that there may be more than one possible interpretation of intent that could be

possible when interpreting the actions and comments of other people. I predicted that, by the end of this study, students would be able to understand and be able to explain how perspectives are formed from multiple sources of input. In addition, I predicted that they would be able to identify what influenced a particular perspective or specific interpretation and would be better able to determine why people are interpreting a behavior, situation, or action in a particular way. It was also predicted that they would be able to identify multiple perspectives when considering the same scenario, accept the idea that the intent of the individual may not be the same as how the action was perceived, and to be able to state more than one possible intent of the people in a scenario.

Students involved in this research learned some theory of mind and perspective taking skills that are necessary to interpret social situations. Students identified actions in scenarios that impacted the interpretation of social situations and the factors that influenced how others behave. The students used social stories with thought bubbles, role-playing, and peer role-playing to work on skill development. Developing their understanding of and practicing the use of these skills improved students' ability to identify multiple perspectives within a situation. During therapy, the students were able to accept and identify the possibility of more than one intent in the actions of an individual. They were able to reflect multiple perspectives within the same scenario. Students were able to demonstrate improvement in their skills during their exit evaluation. They used multiple sources of input to explain their conclusions about how situations were being interpreted. They demonstrated their understanding of why situations were being interpreted in a specific manner by explaining the cues people used to determine responses. They explained using body language, facial expressions, tone of

voice, word choice, and situationally based examples to enumerate the reasons for the interpretation. Students were able to accept the possibility that the intent perceived might not be the intention of the individual. They demonstrated this by suggesting multiple possibilities of intent.

### **Comparison of Results to Research**

The skills in which students one and two performed poorly are the same ones that research indicates people with Asperger's Syndrome often experience difficulty. They have difficulty determining the intent of others. They do not know what gestures, body positioning, eye gaze, facial expressions mean. Therefore, they struggle to assimilate the information to determine the intent of another individual. They have difficulty identifying the relevant features of an event and determining what information about things that occur should be attributed to the person they are dealing with and what information about what occurred is situationally based. They have difficulty understanding what behavior is being deliberately aimed at them and what things happen as the result of others' goal directed behavior or due to accidents. The students' results also show a deficit in their ability to use past experience with an individual to better determine what is happening in a situation and that they have a poor understanding of how evaluating the environment impacts people's behavioral choices.

The results of this study show that, like many people with Asperger's Syndrome, they struggle with connecting people's emotions, their beliefs, and their behavioral choices. The results of their evaluation show that these two students tend to use the literal meaning when they interpret social input, whether in language or a situation as previous research has demonstrated for other students on the autism spectrum. The findings in the

students' testing agree with past research about their interpretation of situations being black-and-white when it comes to actions, word usage, and language choices.

Their improvement correlates with previous research that indicates that specific theory of mind skills can be taught. Previous research focused upon teaching one skill. The research conducted by this researcher demonstrates that improvements can be made in the understanding of multiple skills. This research indicates how much of an impact it could have to teach multiple concepts and then connect them into a whole understanding of how the skills used together impact social thinking. The results demonstrate that these skills can be instructed individually and then combined with other skills to form the broader understanding that comprises socialization. It shows that instructing the students in skills can have a positive outcome in their understanding of theory of mind and perspective taking skills. Time spent on teaching the skills can change how students view people, events, and situations.

### **Future Research and Limitations**

Some variables that impacted this study are: one of these students had previously worked with the therapist on related as well as on other skills. The same therapist is working with both students and there are only two students in this study. Practice with the therapist helped the students understand the format in which they were evaluated. The students are from a similar community and are similar in age. The students' parents have similar educational levels.

One limitation in the study was that the ability to apply the skills taught was not evaluated. More research should be conducted on the ability to apply the skills that were taught in the manner described in the project. Future research might expand the time span

spent on teaching the application of skills, in order to insure successful application.

Applying the skills and thought processes to students' own lives is very time intensive and in this project time limitations were a factor that impeded giving enough time to role playing and guided practice with peers in order to see global changes in the application of skills in the natural environment. Future research to determine if further instruction would improve students' understanding as well their ability to apply concepts could be conducted. Future studies could explore using a larger population with many researchers to complete similar studies. Another skill that is beyond the scope of this research is students utilizing new knowledge to adjust their behavior or response to others' behaviors. These are essential extensions of this research that should be explored.

Due to the patterns that emerged during this project, it would be beneficial to explore the change in parental awareness as well as to determine if training that is conducted in the early years can impact how students acquire more sophisticated theory of mind and perspective taking skills. A longitudinal study on the differences between students who had early therapy and with students who were first introduced to these concepts in a formal manner at a later age could be conducted to determine if having early therapy that is then extended and continued in a more sophisticated manner makes a difference in outcome. A study could be conducted concerning the difference participating in therapy makes to parents' understanding of their child's thinking patterns, theory of mind and perspective taking skills. Another facet of students' deficits that remained unexplored in this project concerned students with Asperger's Syndrome understanding what messages they are projecting and how that impacts other peoples' response to them, as well as their ability to alter what they are projecting in order to

achieve a goal. All of these studies would be important in knowing how to improve students' skills.

### **Implications for Practice**

Making teachers and administrators aware of the students' challenges and deficits in communication and in understanding the behavior of others can prepare them to support students within their classrooms and school to function effectively. We know, through this research and other research about theory of mind, that ToM and perspective taking skills can be taught to students with Asperger's Syndrome to improve how they engage. Other research shows examples of working on one theory of mind skill in isolation. This research indicates that many skills can be instructed to improve students' understanding of interactions. Teachers, therapists, and other professionals need to keep in mind that these skills can be taught and develop goals as well as create environments in which to help students make progress in these areas. Using their awareness of the students' deficits, teachers can organize a class and social situations within the classroom to function in a way that mitigates these deficits. Before any group work, the framework for positive and appropriate communication needs to be put in place and practiced to proactively prepare students to deal with disagreements with their peers. In addition, their awareness that these students may perceive interactions in a negative way, can help teachers to be aware of how they approach the students and instead of viewing responses from them as being rude, they can simply perceive it as a lack of skill. Keeping this lack of skill in mind, they can focus upon teaching the student how to meet their objective in an appropriate manner instead of dealing with them punitively. Teachers can be proactive by being aware of interactions between students and explain the perspectives of others to

the student with Asperger's Syndrome in order to prevent difficulties arising between the student and his peers. Thinking of these deficits as skills that can be instructed instead of considering them as acting out, rudeness, unreasonableness, or deliberate acts of carelessness of others' feelings can change how responses occur to these behaviors and empower teachers, parents, and therapists to work on helping the student acquire skills.

**Conclusion:**

Direct instruction in reading cues, facial expressions, body language, and the environment, as well as exploring their own thought processes, developing an understanding of how others think and how past experience, beliefs, and situations impact circumstances, helps students to combine skills in order to identify multiple perspectives and intent. This understanding allows for them to form a picture of how people interact and have a better grasp of the social environment in which they need to function. With instruction, students can make gains in their skill levels, which positively impacts how they function within their social environment. Gaining skill in determining others' intent can increase the ability of the person to be successful in understanding and relating to others. These skills can be taught utilizing a combination of mediums including social stories with thought bubbles, role-playing with adults, peer role playing, and coaching. Awareness and acceptance of multiple perspectives and intent can have a significant and positive impact upon the life of the student with Asperger's Syndrome.



## References

- Allen, J. R., & Kinsey, K., (2013) Teaching Theory of Mind. *Early Education & Development*, 24, 865- 876. DOI 10.1080/1040 9289.2013.745182
- Bohlander,A.J., Orlich,F., & Varley,C.K.,(2012).Autism Spectrum Disorders: Practical Overview for Pediatricians Social Skills Training for Children with Autism. *Pediatric Clinics of North America*, 59.165-174
- Charlop-Christy,M.H.,(2003).Using Video Modeling to Teach Perspective Taking to Children with Autism. *Journal of Positive Behavior Interventions*, 5.12-21. DOI: 10.1177/10983007030050010101
- Carlson, S., & Moses, L. (2003). Individual differences in inhibitory control and children's theory of mind. *Child Development*, 72, 1032–1053. DOI: 10.1111/1467-8624.00333
- Carpendale, J. I. M., & Lewis, (2004).Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences*,27. 79-151. Retreived from ProQuest
- Cartledge,G.,Tsai,S.,Ya-yu Lo,Y.,&Feng.H.,(2008).The Effects of Theory-of-Mind and Social Skill Training on the Social Competence of a Sixth-Grade Student With Autism.*Journal of Positive Behavior Interventions*.10.228-242. DOI:10.1177/1098300708319906
- Clements, W.A., Rustin, C.L., McCallum, S.,(2000). Promoting the Transition from Implicit to Explicit Understanding: A Training Study of False Belief. *Developmental Science*, 3.81-92. DOI: 10.1111/1467-7687.00102
- David,N.Aumann,C.,Bewernick,B.H.,Santos,N.S.,Lehnhardt,F.G.,&Vogeley,K.,(2009). Investigation of Mentalizing and Visuospatial Perspective Taking for Self and Other in Asperger Syndrome.*Journal of Autism and Developmental Disorders*,40.290-299. DOI:10.1007/s10803-009-0867-4
- Dunn, J. (2000). Mind reading, emotion understanding, and relationships. *International Journalof Behavioral Development*, 24, 142–144. DOI: 10.1080/016502500383241
- Fisher, N., & Happe', F. (2005). A training study of Theory of Mind and executive function in childrenwith Autistic Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 35(6), 757–771. DOI 10.1007/s10803-005-0022-9
- Flavell,J.H.,(2004).Theory-of-Mind Development: Retrospect and Prospect. Wayne State University Press, Merrill-Palmer Quarterly,50.3.274-290. Retrieved from [http://www.ida.liu.se/~729A15/mtrl/Flavell\\_ToM.pdf](http://www.ida.liu.se/~729A15/mtrl/Flavell_ToM.pdf)

- Gehlbach, H., Brinkworth, M.E., & Wang, M.T., (2012). The Social Perspective Taking Process: What Motivates Individuals to Take Another's Perspective?. Teachers College Record, 114.1-29 Retrieved from EBSCOhost EJS
- Gehlbach, H., & Brinkworth, M.E., (2012). The Social Perspective Taking Process: Strategies and Sources of Evidence in Taking Another's Perspective. Teachers College Record, 114.1-29 Retrieved from EBSCOhost EJS
- Gould, E., Tarbox, J., O'Hora, D., Noone, S., & Bergstrom, R. (2011). Teaching children with autism a basic component skill of perspective-taking. Behavioral Interventions, 26.50–66. DOI: 10.1002/bin.320
- Guajardo, N. R., & Watson, A. C. (2002). Narrative discourse and theory of mind development. The Journal of Genetic Psychology, 163(3), 305–325. Retrieved from proquest
- Harwood, M.D., & Farrar, M.J., (2006). Conflicting emotions: The connection between effective perspective taking and theory of mind. British Journal of Developmental Psychology, 24.401-418. DOI: 10.1348/026151005X50302
- Hutchins, T.L., Bonazinga, L.A., Prelock, P.A., Taylor R.S., (2008). Beyond False Beliefs: The Development and Psychometric Evaluation of the Perceptions of Children's Theory of Mind Measure—Experimental Version (PCToMM-E). Journal of Autism and Developmental Disorders 38,143-155. DOI10.1007/s10803-007-0377-1
- Hutchins, T. L., Prelock, P.A., Bonazinga, L., (2010) The Theory of Mind Inventory (ToMI) Retrieved from <http://www.theoryofmindinventory.com/caregivers/>
- Hutchins, T.L. & Prelock, P.A., (2008). Supporting Theory of Mind Development: Considerations and Recommendations for Professionals Providing Services to Individuals With Autism Spectrum Disorder. Topics in Language Disorders, 28.340-364. DOI: 10.1097/01.TLD.0000341128.01158.f2
- Kamps, D., Royer, J., & Dugan, E. (2002). Peer training to facilitate social interaction for elementary students with autism and their peers. Exceptional Children, 68.173-187. Retrieved from Education Full Text (H.W. Wilson)
- Kokina, K., & Kern, L., (2010). Social Story Interventions for Students with Autism Spectrum Disorders: A Meta-Analysis. Journal of Autism and Developmental Disorders, 40.812-826 .DOI10.1007/s10803-009-0931-0
- Laushey, K.M., & Heflin, L.J., (2000). Enhancing Social Skills of Kindergarten Children with Autism Through the Training of Multiple Peers as Tutors. Journal of Autism and Developmental Disorders, 30.183-193. DOI10.1023/A:1005558101038

- LeBlanc, L. A., Coates, A. M., Daneshvar, S., Charlop-Christy, M. H., Morris, C., & Lancaster, B. M., (2003). Using Video Modeling and Reinforcement to Teach Perspective-Taking Skills to Children with Autism. *Journal of Applied Behavior Analysis*, 36.253-257. DOI: 10.1901/jaba.2003.36-253
- Mason, M. F., & Macrae, C. N. (2008) Perspective-Taking from a Social Neuroscience Standpoint. *Relations Group Processes & Intergroup*, 11.215-232  
DOI: 10.1177/1368430207088039
- McHugh, L., Barnes-Holmes, Y., & Barnes-Holmes, D., (2004). A Relational Frame Account of the Development of Complex Cognitive Phenomena: Perspective-taking, False Belief Understanding, and Deception. *International Journal of Psychology and Psychological Therapy*, 4.303-324. Retrieved from ProQuest
- Michael, L., Spezio, Adolphs, R., Hurley, R. S. E., & Piven, J., (2007) Abnormal Use of Facial Information in High-Functioning Autism. *Journal of Autism and Developmental Disorders*, 37.929-939 .DOI10.1007/s10803-006-0232-9
- Pierce, K., & Schreibman, L. (1997). Multiple peer use of pivotal response training to increase social behaviors of classmates with autism: results from trained and untrained peers. *Journal Of Applied Behavior Analysis*, 30.157-160.  
DOI:10.1901/jaba.1997.30-157
- Reed, T., (1994). Performance of autistic and control subjects on three cognitive perspective-taking tasks. *Journal Of Autism & Developmental Disorders*, 24.53-66. Retrieved from CINAHL
- Rehfeldt, R. A., Dillen, J. E., Ziomek, M. M., & Kowalchuk, R. K. (2007). Assessing Relational Learning Deficits in Perspective-Taking in Children with High-Functioning Autism Spectrum Disorder. *Psychological Record*, 57.23-47. Retrieved from ProQuest
- Rogers, S., (2000). Interventions That Facilitate Socialization in Children with Autism. *Journal of Autism and Developmental Disorders*, 30.399-409.  
DOI10.1023/A:1005543321840
- Shulman, C., Guberman, A., Shilling, N., & Bauminger, N., (2012). Moral and Social Reasoning in Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 42.1364-1376. DOI10.1007/s10803-011-1369-8
- Steele, S., Joseph, R. M., Tager-Flusberg, H., (2003). Brief Report: Developmental Change in Theory of Mind Abilities in Children with Autism. *Journal of Autism and Developmental Disorders*, 33.461-467. DOI:10.1023/A:1025075115100
- Tager-Flusberg, H., (2007). Evaluating the Theory-of-Mind Hypothesis of Autism  
Source: *Current Directions in Psychological Science*, 16..311-315 Retrieved from

Sage Publications, Inc. on behalf of Association for Psychological Science Stable URL: <http://www.jstor.org/stable/20183226> .

Takeda, T., Kasai, K., Kato, N., (2007). Moral judgment in high-functioning pervasive developmental disorders. *Psychiatry and Clinical Neurosciences*, 61. 407–414. DOI: 10.1111/j.1440-1819.2007.01678.

Utley, C. A., Mortweet, S. L., & Greenwood, C. (1997). Peer-mediated instruction and interventions. *Focus On Exceptional Children*, .291-23EBSCOhost EJS

Weiner, J. S. (2005). Peer-Mediated Conversational Repair in Students With Moderate and Severe Disabilities. *Research & Practice For Persons With Severe Disabilities*, 30(1), 26-37. Retrieved from EBSCOHost

Wellman,H.M., Baron- Cohen,S., Caswell,R.,Carlosgomez,J., Swettenhm,J., Rtoye,E., Lagattuta,K.,(2002).Thought-bubbles help children with autism acquire an alternative to a theory of mind. *Autism*,6.343–363. DOI: 10.1177/1362361302006004003

Wellman, H. M., Phillips, A. T., & Rodriguez, T. (2000). Young children's understanding of perception, desire, and emotion. *Child Development*, 71, 895–912. Stable URL: <http://www.jstor.org/stable/1132333> Published by: Wiley on behalf of the Society for Research in Child Development

## Appendix A

1) My child can differentiate between facial expressions that reflect irritation or anger.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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2) My child understands that if someone crosses their arms and leans away from them that the other person is indicating discomfort.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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3) My child recognizes when someone is making fun of him/her.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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4) My child can differentiate between when someone is lying to get what the person wants and someone is telling a story.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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5) My child understands that circumstances can affect fulfilling a promise.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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6) My child can describe relevant details about an event.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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7) My child can describe relevant details about a situation in which he/ she is involved.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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8) When my child encounters a situation where a friend or family member notes that they are stressed and exhausted and they are acting in a manner that is atypical because of this, my child will attribute the behavior to stress and exhaustion.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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9) When my child encounters a situation where a friend or family member is acting in a manner that is atypical due to stress or exhaustion, he knows enough not to alter his opinion of that person.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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10) My child recognizes that where people are impacts how they respond (home, grocery store, library, work being, filmed).

Definitely Not	Probably Not	Undecided	Probably	Definitely
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11) My child recognizes that people respond differently based upon who is present or with whom they are speaking.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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12) If someone is walking in a crowded environment and bumps into my child and continues towards where they were going without acknowledging the incident, my child understands that the person is focused on getting where they're going.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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13) My child refrains from making comments that he recognizes as hurtful to others.

Definitely Not	Probably Not	Undecided	Probably	Definitely
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## **Appendix B**

### **Student Evaluations of Perspective Taking Rubric**

**1) The student answers the questions presented reflecting more than one character's**

**perspective.**    Not at all    Some of the time    Most of the time    All the questions

**2) Student can reflect multiple possibilities of intent for each character.**

No characters    One charter    Multiple characters    All possible characters

**3) The student can explain the characters responses to each other?**

None of the time    Some of the time    Most of the time    All of the time

**4) Students suggest alternate ways for the characters to interact to get positive**

**results.**    No different ways    One way to change the scenario

Multiple ways to change the scenario

**5) The student makes suggestions to change characters actions or responses in order to change the outcome of scenario?**

Change no characters action or response    Change one characters action or response

Change multiple characters actions or responses

**6) Use body language or facial expression to explain why they interpreted the situation as they did?**

Not used in explanation    In some explanations    In most explanation    In all explanation

**7) Explain why each character may have interpreted the scenario in the manner the student explained.** Did not explain    Partially explained    Mostly Explained    Explained

**8) Answer questions**

No questions    Some questions    Most questions    All questions

**9) The student interpreted events, situations action and intent**

Extremely Negatively    Moderately Negative    Both Positives and Negatives    Positive

## **Appendix C**

### **Scenes**

#### **Scene One**

(The female actor is sitting on the couch watching TV with the controller in her hand.)

(Zoom in on the clock that says the hour and 15 minutes past)

M: (the male actor walks into the room frowns at the girl) “You've been watching TV forever. It's my turn to use the TV.”

F: “I'm watching my show” (mild voice)

M: “I'm taking my videogame time!” (angry tone, continues to frowns)

F: “I'm watching my show “(irritated voice)

M: (the male actor turns the TV channel to be able to play video games)

F: (frowns and crosses her arms) “Hey! My show isn't over. Turn it back!” (Angry voice)

#### **Scene Two**

(Three people are in the same room. One person is doing an activity that has many pieces.

(Lego's, Blocks, BayBlades) (The other two people are together.)

F1 & F2: (One of the girls begins to sing into a microphone.)

M: (Looks up, glares, and uses an irritated tone) “Stop singing!”

F1 & F2: (Look at the boy with the irritated expression) “We Are Doing Karaoke!” (Both girls resume singing)

M: (Angry voice) “I asked you to stop singing! I don't want to hear you sing. Go in a different room to sing.”

F1 & F2: (Irritated voice) “You go in a different room.” (Resume singing)

M: (The boy goes over and turns off the karaoke machine or pulls plug)



### **Scene Three**

Classroom with the teacher and students (Student wants the teacher and his peers to know that he is smart and knows all the answers.)

T: The teacher asks a question of the class

ST: Raises his hand (excitedly)

T: Calls on another student

ST: Mouths the answer

S: Answers the question

Other Students notice the student mouthing the answer

T: Asks another question

ST raises his hand

(The teacher calls on him)

ST Answers correctly with a satisfied expression on his face)

(Other students look at his expression)

Teacher asks another question

(ST raises his hand excitedly)

Teacher calls on another student

(ST mouths the answer)

(Student answers correctly noting that ST mouthed the answer to the question)

(Teacher tells the students to get into groups and do an activity)

(Other students chat, ask each other to be a part of their groups, and form up

ST is not invited into a group and has to just join one: fade out)

**Scene Four**

(School hallway: three students are standing around.)

Student one: “Did you see the picture of that red Audi in (car magazine)? I’m going to get one of those when I get a car. It has sweet-maneuvering capabilities.”

Student two: “Those are okay, but have you seen the new BMW’s? My dad is buying one of those. He's picking it up next weekend, if you want to go for a ride.”

(Student three frowns and stands listening quietly.)

Student one: “Sure, that sounds like fun!”

Student two: “Maybe when it's time for me to get a car I can get the BMW and my dad will get a new car.”

Student one: “Maybe”

Student two: “This weekend, I really want to see that new Avengers movie.”

Student one: “Yeah me too.” (turns to the third student)” Do you want to see it?”

Student three: “No, not really.”

(It's time to go into class. The students walk into class and sit down.)

**Scene Five**

(A mother is cooking. She seems distracted. She is getting things out of different locations in the kitchen. Her son and daughter both walk in the kitchen at the same time.)

Son: “Mom, I finished my work. You said you needed to check it before I could play the computer.”

Daughter: “Mom, I finished my part of the science project. I need you to check it over so I can be ready to put it on the poster when I meet my partner in an hour.”

Mother: (To both children) “Ok. I will be there to check things over in a few minutes. I just need to finish this. Go check things over one more time and by the time

you're finished I will be there."

Son: (Mildly irritated tone) "Mine is fine. I am going to my room to read. Get me when you're ready."

Stage direction: (The mother puts stuff in the fridge. Mother walks out of the kitchen and spends some time looking over her daughter's papers. She makes some comments and suggestions.)

Mother: "This looks good. You need to add a comma here. Change the spelling of this. That's great honey." ( The mom goes back into the kitchen and looks in the oven, takes out the stuff from the fridge and continues cooking.

Son: (Comes out of his room, notices that his sister has been assisted and goes into the kitchen.) (Angry tone)" Mom you are not letting me play computer. That's not fair ! I did all my work! (yell) You looked at (sister name) but not mine.

### **Scene Six**

(Female polishing nails)

Male: "Mom told you to fold the laundry and put it away."

Female: "Okay, I've got it."

Male: "You've been hanging out all day"

Female: "Leave me alone. You do your own chores. You haven't done them. Take out the garbage! Mow the lawn!"

Male: "You can't tell me what to do! I'm going to call mom."

Female: "Go ahead!" (Grabs his phone )

Male: "Give it back now!"

Female: "Make me!"

(Mother walks in the door. End scene)

### **Scene Seven**

(The sister and her friend are playing an imagination game like Princess or Adventurer)

Boy: (frowns at the two friends playing.) He says: “play elsewhere, like in your room”

(He sets up his stuff to play a game in the middle of the floor.)

(The sister frowns at her brother and continues to play with her friend. As she is playing, she trips and kicks what he's playing with.)

Boy: Hey!!! Go away!

Sister: It was an accident (irritated voice). I am playing... with my friend. You go away!

(The boy chases his sister from the room)

### **Scene Eight**

Teacher: “We are going to be researching different types of trees. I'm going to place you in groups. Once I have placed you into groups you can decide which role you are going to take. One person in the group will be responsible for drawing or creating a picture about your type of tree. That person will also discover what climate the tree prefers. Another person will be finding pictures on-line of the type of tree assigned. This includes finding pictures of different varieties of the tree. Look into soil conditions that are appropriate for the tree you are assigned. The person who looks up soil conditions needs to find out what nutrients the tree needs and what type of care the soil requires in order to maintain the tree. The third person will be in charge of organizing all of the pictures and will be responsible for discovering how to harvest the tree produces and how to store what is harvested. All participants will put together a poster with all the information they have collected in a creative way. “

(The teacher assigns students to groups.)

Student one: (little heavy-handed but friendly) “I will look up the trees online and find

the soil conditions.”

Student two: “I will organize the pictures and find out about harvesting and storing  
the stuff the trees produce.”

Student three: “No! I won't be doing the drawing and finding out the climate. I'm not  
doing that!” (Indignant)

Student one: (pleasant tone) “Fine, You can ...”

Student three: (interrupting student one) “You can just do the whole project without me.”  
(Student two looks irritated.)

### **Scene Nine**

Boy: “I played Mind Craft last night. I built a huge castle.”

Girl: “Yeah, I played that too. I built a really high tower. There was a zombie attack  
and they overwhelmed me.”

Boy: “A thousand zombies attacked my castle and I killed them all. It was simple.”

Girl: “Well skeletons attacked me before that and I got rid of them all.”

Boy: “They're easy. The zombies are the hard ones to kill.”

Girl: “How many skeletons have you killed?”

Boy: “I killed 3 billion, way more than you !”

Girl: “That's not even possible.”

Boy: “Yeah, it is. I've done it.”

Girl: “Ok fine, see you later.” (boy leaves)

### **Scene Ten**

(A mother is in the kitchen on the phone making lunches. She begins to make lunch. A  
boy comes into the kitchen and begins to speak.)

Mother: (Asks the person on the phone to hold on)

Son: “Mom I don’t want jelly on my sandwich.”

Girl: “I do” (calling into the kitchen)

Mom: “Ok, just set the table” (She resumes talking.)

(The boy and girl go to set the table and both children sit down.)

(The mother puts the peanut butter with jelly sandwich in front of the boy and peanut butter sandwich in front of the girl.)

Son: (looking upset) “Mom, you gave me the one with jelly”

(The mom smiles at the boy and switches the plate.)

(The son continues to look annoyed. Slightly rolls his eyes)

## **Appendix D:**

### **Definitions:**

**Neurotypical-** It is used to describe individuals who are not developmentally disabled. In other words, they are not autistic and do not have intellectual or developmental differences. The term was not defined as a medical or psychological term. It came into use to avoid using words to describe individuals with autism in a possibly demeaning way. Neurotypical people are assumed to have traits such as strong social and communication skills and the capacity to navigate new or socially complex situations.

**Intent-** Some action or thing that an individual plans to do or achieve: An aim, purpose, or design.

**True belief** is the awareness that an individual can only know what they have seen and that they will act on this understanding.

**Perspective taking** – Reflects the ability to recognize the emotional state of someone else, even when it differs from that person's own emotional state. It takes the information presented by the outward expression of internal states (body language, facial expressions, eye gaze, gestures, tone of voice, emotions) understanding of theory of mind, past experience, the environment, and interpreting and applying that knowledge in order to understand another individual's interpretation of a situation. In order to be able to have skill in perspective taking, a person must be aware that people may express those beliefs and emotions in a variety of ways that may differ from expectations. The knowledge that these outward expressions of an internal state may vary and the understanding that one's own past experience may impact how one is interpreting an attitude or situation provides a person with the information they need to attempt to understand other peoples'

perspectives. One also needs to try and be aware of the environment and that the other person's experiences may affect how he/she forms his/her perspective.

**Perspective-** A point of view, a particular attitude towards a situation, or a way of looking at a situation, or event.

**Theory of Mind --** Theory of mind is the ability to understand another person's state of mind. That understanding includes being aware that an individual's state of mind is affected by having different experiences which make up what a person knows, different beliefs systems, empathy, visual perception, motivations or goals, as well as moods. It is the understanding of how these factors influence the actions and behavior of an individual that make up theory of mind. It includes the ability of an individual to understand his or her own actions and behavior.