Learning Preferences of Children with Autism Spectrum Disorder to Teach Theory of Mind

A thesis submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Speech Pathology and Audiology and the Honors Program

by

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ABSTRACT

Purpose: Children with autism spectrum disorder (ASD) present with persistent deficits in social communication and social interaction across multiple contexts. A specific social communication area of difficulty these children have is theory of mind (TOM), which is the ability to understand the perspective of other people. Professionals teach TOM concepts to improve the social communication of children with ASD. The primary purpose of this study is to determine learning style preferences for children with ASD when learning TOM concepts. A secondary purpose is to determine if the learning modality improved TOM concepts.

Method: Children were recruited from a local private speech therapy clinic for this pre/post case series design study. Three children between 6 and 12 years of age who were diagnosed with ASD participated in four 20-minutes sessions: Session 1: pretesting (Theory of Mind–2nd Edition), Session 2: learning style preference for one aspect of TOM, Session 3: learning style preference for another aspect of TOM, and Session 4: post-testing. During Session 2 and 3, children selected the modality in which they preferred to learn TOM concepts. Four different modalities were offered: audiovisual (i.e., social story, and video), auditory (i.e., talking), visual (i.e., flashcards), and kinesthetic (i.e., act out scenarios).

Results: Overall, the video modality was the most preferred learning modality across Session 2 and 3 with an 83% (5/6) selection rate. The average score for all children on the TOMI-2 decreased from pretest to posttest after receiving TOM instruction over a two-week span. Children exhibited different errors on the TOMI-2.
Discussion: Results suggested that learning modality preference was similar across all children. One session of teaching a TOM concept was not long enough to make meaningful changes in understanding TOM concepts.
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CHAPTER 1
INTRODUCTION

One out of every 68 children in the U.S. has been diagnosed with autism spectrum disorder (ASD; American Psychiatric Association, 2013). Autism has become one of the most prevalent diagnoses among children today (Center for Disease Control, 2015). For example, the Center for Disease Control and Prevention (CDC) reported that Cerebral Palsy occurs in 1 out of 323 children, Myotonic Muscular Dystrophy occurs in 15 out of 100,000 male children, and Fragile X Syndrome affects 1 out of 5,000 children (CDC, 2015).

In 2013, the American Psychiatric Association (APA) revised the Diagnostic and Statistical Manual of Mental Disorders (DSM), which is used to diagnose neurodevelopmental disorders such as autism. Previously, there were four distinct autism related diagnoses: childhood disintegrative disorder, Asperger syndrome, pervasive developmental disorder-not otherwise specified (PDD-NOS), and autistic disorder (APA, 2013). Now, in the 5th Edition of the DSM, there is one overarching diagnosis of ASD, which encompasses each of the four previously related diagnoses. In addition, the DSM-5 created a new diagnosis called social (pragmatic) communication disorder (SPCD).

A similar diagnostic feature across ASD and SPCD is social communication difficulties. Social communication is defined as “the synergistic emergence of social interaction, social cognition, pragmatics (verbal and nonverbal), and receptive and expressive language processing” (Adams, 2005, p. 182). However, children with ASD must meet the following diagnostic criteria: persistent deficits in social communication and social interaction across multiple contexts; restricted repetitive patterns of behavior,
interests or activities in two types; symptoms present in early developmental period; and symptoms cause clinically significant impairment in social, occupational, or other important areas, (APA, 2013; Autism, 2012).

Although all children with ASD possess these diagnostic features, they are a heterogeneous group (Autism Speaks, 2012). For example, ASD is more prevalent in males than females with a ratio of 5:1 (Kreiser, 2015). Children have varying IQ abilities. Twenty-five percent to 40% of children diagnosed with ASD have an IQ below 70, which is demonstrative of a learning disorder, while others do not have a learning disorder (Autism Speaks, 2012). In addition to varying IQ levels, individuals with ASD all have varying degrees of social communication difficulties. For example, in 67% to 80% of cases of children with ASD, parents reported their child’s prosocial verbal communicative behaviors were not present or were delayed, whereas in the remaining 20% to 30% of cases, parents reported their child’s behaviors as regressed (Luyster, 2005). Regression occurs when previously established skills are no longer present (Luyster, 2005). The most common display of regression amongst children with ASD is having the ability to produce many words and syllables and then completely stop saying them (Luyster, 2005). The lack of words contributes to the inability to communicate wants and needs socially.

Although children with ASD are a heterogeneous group, all children with ASD exhibit social communication difficulties. One aspect of social communication that is difficult for children with ASD to master is theory of mind (TOM). Psychologists describe TOM as the ability to “attribute mental states, such as beliefs, desires, intentions, to oneself and other people, as a way of making sense of and predicting behavior”
In other words, TOM describes the “normal” state of the ability to attribute mental states (McGuire, 2011). However, other developmental psychologists describe the inability to attribute these mental states as mindblindness (McGuire, 2011). Mindblindness is described as the inability to ‘see’ “the minds of others and the intentions and motives that exist in minds”, the inability to “make sense of how human action is oriented”, the inability to take another’s point of view, a lack of imagination, and a lack of empathy” (McGuire, 2011; Baron-Cohen, 1995).

Social communicative deficits that are characterized by mindblindness can negatively influence the success of social communication interactions, and in turn a child’s social quality of life. In particular, children with ASD have been bullied, feel isolated, and lack social friendships with same-age peers due to their social communication difficulties. Cappadocia, Weiss, and Pepler (2012) examined bullying experiences of children with ASD aged 5 to 21 years. Parents of these children completed the Promoting Relationships and Eliminating Violence Network Assessment Tool—Parent Version—select items, which asked questions regarding bullying perpetration and victimization experiences among children. Findings indicated that children with ASD were two times as likely to be victimized compared to the general population. Individual variables that significantly predicted the likelihood of victimization was younger aged children and presence of communication difficulties. The contextual variables that significantly predicted victimization were having fewer friends in school.

Characteristics of mindblindness have also led children with ASD to be less accepted by peers and feel isolated. Rotheram-Fuller, Kasari, Chamberlain, and Locke
(2010) examined the social involvement of children with ASD in kindergarten through 5th grade. Seventy-nine children with ASD and 79 gender matched peers completed a Friendship Survey, which asked questions about children they like to ‘hang out with’, children they do not like to ‘hang out with’, and children who ‘hang out together’ in groups. Findings indicated that children with ASD received nominations as friends and best friends, but these were not always reciprocated. There was a shift in social network centrality from early to later grades, with children with ASD considered more nuclear or secondary in the early and middle grades compared to later grades. Overall, children with ASD are more isolated that their gender matched peers in regards to classmate friendships.

Children with ASD who struggle with TOM can learn to become more aware of and ‘see’ the emotions and perspectives of others, which are usually communicated through verbal and nonverbal communication (Baron-Cohen, Alan, & Uta, 1985). Typically, TOM begins as early as being in the womb and perspective-taking skills begin to appear during the first weeks of life as babies as they attempt to mimic other peoples’ facial expressions (Winner, 2007). During infancy, human socialization begins and TOM continues to grow as it becomes more heavily dependent on education, parenting, and social relations (Korkmaz, 2011).

Although children with ASD struggle with TOM, professionals implement intervention and teach social communication strategies to establish and grow the TOM in children with ASD. Speech language pathologists focus on teaching strategies and skills to become more responsive and empathetic towards others’ needs and improve social
communication (Winner, 2007). Behavioral interventions that are intensive and highly structured have been successful in improving TOM (Mundy, 1997).

There are different approaches to teach TOM to children with ASD that include auditory, visual, audio/visual, audio, and kinesthetic learning modalities. Although there are different learning modalities approaches, it is unclear which learning modality children with ASD prefer. Because children are a heterogeneous group, it is likely that individuals will have different learning modality preferences. Identifying learning preferences is important because children with ASD may learn better if they are taught using a preferential learning modality. This study explores the learning modality preferences of children with ASD when being taught TOM concepts.
CHAPTER II

LITERATURE REVIEW

Difficulty with Social Communication

Children with ASD have difficulty using social communication. They may have deficits in “abnormal social approach and failure of normal back-and-forth conversation; reduced sharing of interests, emotions, or affect; to failure to initiate or reposed to social interactions” (APA, 2013). Because of these deficits, children with ASD require varying degrees of support in the area of social communication—requiring support, requiring substantial support, or requiring very substantial support (APA, 2013).

At the lowest level of support—requiring support, children with ASD who require support may experience difficulty initiating conversations and responding appropriately to a communicative partner independently. When engaged in conversation, children are able to use full sentences but have difficulty taking turns during conversation. Children with ASD who require substantial support may experience difficulty with both verbal and nonverbal social communication, which is demonstrated by their difficulty initiating and maintaining a conversation. Further, these children use a limited range of topics during conversation and markedly odd nonverbal communication. Children who require very substantial support may experience limited social interactions and provide minimal responses during social interactions. These children typically only communicate their needs. Difficulty with social communication inhibits these children’s ability to have interpersonal relationships.

Theory of Mind
One aspect of social communication that children with ASD have difficulty with is TOM, which can impact social interactions in social, academic, and work settings. Children with ASD who have difficulty with TOM demonstrate an inability to ‘see’ the intention and motivation of others as well as taking another person’s point of view (Baron-Cohen, 1995).

For example, Baron-Cohen, Alan, and Uta (1985) examined TOM in 20 children with autism spectrum disorder, 27 children without impairments, and 14 children with Down’s syndrome to understand their beliefs about a situation. Children were told a story about two girls, Anne and Sally. The story goes as followed:

Sally had a marble that she placed in her basket and then she left the room. Anne took the marble from Sally’s basket and put it in her box. Sally went back to the room and wants to play with her marble again.

After this story was told the children were asked where Sally thought her marble was. Results indicated that 12 of the 14 children with Down’s syndrome and 23 of 27 children without participants responded correctly and said Sally would look in the basket, whereas 16 of 20 children with ASD incorrectly responded that Sally would look in the box. The children with ASD were unable to recognize the “false belief” that Sally would have once she entered the room again. The children lacked the capacity to take into account what Sally has and hasn’t seen and answered the question based on their own perception.

Difficulty with aspects of TOM such as “false belief” can yield communication breakdowns and strain interpersonal relationships. Although children with ASD exhibit deficits in TOM, these concepts are teachable and can improve interpersonal relationships.
Therapy Approaches

Effective therapeutic and educational services for children with ASD are now in high demand of effective evidence-based practices due to increased prevalence of ASD (Wong et al. 2015). Wong et al. (2015) conducted a systematic review of evidenced-based focused intervention practices for children and youth with ASD. Findings revealed that a majority of the studies reviewed included children who were preschool-age and elementary school-age. There were 12 outcomes across these studies that included: social, communication, challenging/interfering behaviors, joint attention, play, cognitive, school readiness skills, pre-academic/academic, motor, adaptive/self-help, vocational, and mental health.

Of the 27 focused intervention practices that were considered evidence-based, some evidence-based practices were used more commonly than others during therapeutic service for children with ASD. The four evidence-based practiced that were cited the most were reinforcement (R+), which was used 43 times in single case studies; prompting (PP) and antecedent-based intervention (ABI), which were used 32 times each in single case studies; and video modeling (VM), which was used 31 times in single case studies and once in a group study. Following these, there was a frequency gap of at least six times an evidence-based practice was used. There were also practices that were used less frequently than others. Modeling (MD) was used in one group study and 4 single case studies and structured play group (SPG) was used in 2 group studies and 2 single case studies. The next evidence-based practice used was in 6 studies.

Interestingly, there were studies that examined social, communication, behavior, joint attention, play, and cognitive outcome measures for children ages 6 years to 14
years of age. These outcome measures are important because they can directly impact social communication abilities. Although this systematic review highlighted the wide range of evidence-based practices to improve aspects needed for social communication, the study did not compare different modalities of the interventions practices. Therefore, it is not known if it was the intervention practices or if it was the modality of the intervention practices that improved the outcome measures. Much needs to be learned about the focused intervention practices.

**Learning Modality**

Learning modalities are the ways in which people receive, give, and store information through their senses of smell, taste, tactile/kinesthetic, visual, and auditory. Learners can have a preference for a certain modality when being taught information (Reiff, 1992). It is important to note that modality preference is not identical to modality strength (Barbe, 1979). Modality preference represents an ideal learning situation for the learner whereas modality strength represents superior functioning (Barbe, 1979). If the learning modality preference is discovered, it is assumed that the preference will represent the strongest modality and would give the learner the best chance at achievement. Typically, people prefer their strongest modality but there is no guarantee that is the case for everyone creating the need to identify modality preference.

Children with ASD are impacted by many social/emotional deficits, which shape the individual’s moods, wants, and needs. The different wants and needs create personal preferences for activities and provides various perspectives between individuals creating different learning modality preferences. Because children with ASD are a heterogeneous group, it is important to consider individual learning modality preference when delivering
focused intervention for children with ASD. Currently, there is limited research with children with ASD regarding learning modality preference for visual (Snyder, Higbee, and Dayton, 2012; Hopkins et al, 2011; Lee, Chen, & Lin, 2016), audio/visual (Hagiwara & Myles 1999), and kinesthetic (Brady, 2012) learning modalities.

**Visual.** The visual learning modality is the method of learning in which the learner utilizes the visual senses through maps, diagrams, pictures, and moving pictures (videos) to learn a concept (Modalities, n.d). For example, to understand a concept these types of learners enjoy looking at directions or watching motion pictures to solidify information. This modality is frequently used and has been studied by few researchers in various video formats.

Snyder, Higbee, and Dayton (2012) compared the toy preference stimuli between a paired video and tangible stimulus, video paired-stimulus, and a paired tangible and tangible stimulus for six children. The six participants were between the ages of 3 and 5 years old who had been diagnosed with autism spectrum disorder (ASD) (Snyder, Higbee, and Dayton, 2012). Children participated in three different assessments. During the first assessment, paired video and tangible, children viewed a 5-second video clip of a child playing with a stimulus. Following the video, the children were given three toys and asked to select the one in the video. During the second assessment, video paired-stimulus preference, children viewed two running videos that stopped simultaneously to a still frame. One video still frame was of a child in full body view playing with a particular stimulus and the second video still frame was a point-of-view image displaying a child playing with the same stimulus as video one. Participants were asked to choose “which one”. The third assessment, tangible paired-stimulus, was identical to the video
paired-stimulus, but the participants were presented with pairs of toys rather than the videos. Children were presented with a stimulus and were allowed 5-seconds of access to it. Following the presentation of toys, the children were given three toys and asked to match one of the three toys to the stimulus they were previously exposed to.

Findings revealed that the top-ranked stimuli were the same for five out of six participants. Four out of the six participants had the same top-and bottom-ranked stimuli. While it appears that the stimuli were ranked the same, the authors caution that the methods may have contaminated the results for stimuli preference. Researchers found unclear stimuli preference for toys, therefore, it is unknown which modality (tangible or video) children with ASD prefer.

Similarly, Hopkins et al. (2011) evaluated the efficacy of the social skills training program using a video program called FaceSay compared to another video called Tux Paint. This study used a video modality but did not use a tangible stimulus like the procedures used by Snyder et al. (2012). Researchers determined the variability of the children’s functioning by administering the Kaufman Brief Intelligence test (KBIT) and the Childhood Autism Rating Scale (CARS). Forty-nine children were grouped into the control high functioning autism (HFA) group (11 participants), test HFA group (13 participants), control low functioning autism (LFA) group (14 participants), and test LFA group (11 participants).

Once children were grouped, children participated completed three separate tests at pretest and posttest. First, children participated in an emotional test in which they were asked to match six labels (anger, disgust, fear, happiness, sadness, and surprise) to the corresponding facial expression being shown in the picture they were given. Second,
children were shown a picture of a face in the Benton Facial Recognition Test (short form) and were given six more facial pictures (one being identical to the face shown) and were instructed to match them. Third, children’s social skills were observed for a 5-minute period on two separate days as a baseline and maintenance assessment.

The control HFA and control LFA groups used an open source drawing software called Tux Paint for 10-25 minutes twice a week for six weeks with the assistance of one or two investigators if needed. The test HFA and test LFA groups used the FaceSay software for 10-25 minutes twice a week for six weeks with the assistance of one or two investigators and were taught to listen and respond to the software by responding via touch screen or external mouse.

Results of the study found that FaceSay, an interactive video, improved social skills for children with ASD. Test LFA participants demonstrated improvement in emotion recognition and social interactions and test HFA participants demonstrated improvement in emotion recognition, facial recognition and social interactions. This study demonstrated that interactive visual stimuli were more effective than still frame visual stimuli.

Similar to Hopkins et al. (2011), Lee, Chen, and Lin (2016) used interactive video and static videos but required adolescents to mimic the emotions shown rather than having the children match a word to the emotion to the video. Lee et al. (2016) conducted a multiple baseline across six adolescents with ASD to examine the effect of teaching six basic facial expressions through the use of static and dynamic video materials. Adolescents were recruited from Taiwan Autism Association had normal range sensory abilities but poor communication and social skills were between 12 to 15
years. The adolescents rarely understood emotional expressions from other people and typically responded incorrectly.

In the baseline stage of the study, a speech therapist explained the meanings of the emotions targeted. All adolescents watched 20 dynamic videos to determine emotion and then chose the corresponding facial expression of emotion that matched the videos. During the intervention stage, participants were taught how to watch the Cliplets-based videos (CBV) and then asked to mimic the facial expressions and received feedback on the facial expressions. The children were then asked to select the best facial expression and adjective that belonged to that video. The maintenance phase occurred 4 weeks after the intervention phase and used procedures identical to the baseline phase to determine if the skills taught were retained.

Results of this study showed that the CBV intervention was an effective and relatively simple way to grasp the attention of adolescents with ASD to expressive facial cues during the intervention stage. Researchers found that all but one participant’s correct rate in determining facial expressions decreased during the maintenance stage.

In summary, the visual modality has proven as an effective method of teaching emotion recognition as demonstrated in increased rate of determining facial expressions and distinguishing between facial expressions. It is unknown whether the learning preference of the participants affected the ability of the children to recognize facial expressions and accompanying emotions and whether or not the skill was maintained throughout maturity.
**Audio/Visual.** The audio/visual learning modality is one of the combinations of learning modalities that can be created. Creating a hybrid learning modality, by combining two or more modalities, can be beneficial for individuals who have difficulties learning through one modality. The audio/visual learning modality combines the need for visual and audio senses to be stimulated through pictures, diagrams, listening to an audiobook or teacher, or reading aloud to themselves (Modalities, n.d.). Only one study was identified that focused specifically on the audio/visual modality.

Hagiwara and Myles (1999) examined the effectiveness of using social stories to teach skills to children with ASD in a multiple baseline study across three participants. Social stories are a teaching technique that uses pictures combined with short sentences in a storybook format. These stories are read aloud to children, while the child follows along with the pictures, in hopes of minimizing confusion of verbal instructions for those with autism.

Three elementary-aged children who were diagnosed with ASD had mild to moderate social skills and behavior problems. All children received social story training to improve a targeted behavior such as hand washing or staying on task in an academic setting. Children viewed an animated social story on a computer that had a synthesized computer voice that read the social story. Children were able to operate the computer to turn the “pages” on the computer and play the animations.

Child 1 and Child 2 were asked to perform the hand-washing task at three different times throughout the day for twenty-four days: before morning snack, before lunch, and after recess for Child 1 and before resource room, before lunch, and after
recess for Child 2. Child 3 had a focus of staying on task in three different locations: lunch room, resource room, and general education classroom.

Results indicated that Child 1 reached 100% accuracy on the last day of intervention in the before-morning snack and before-lunch settings. Generalization of the task was observed in the after-recess portion of the study. Child 2’s results indicated that the social stories promoted hand washing, however the child completed the study with 93% accuracy, meaning he needed prompts in order to complete the task at the end of intervention. Results from Child 3 indicated that social stories created no improvement in on-task behavior and intervention could not be completed in the general education classroom due to educational conflicts from the teacher. Using social stories as a learning modality to teach a skill proved to be effective when used to teach the skill of hand washing.

**Kinesthetic.** The kinesthetic learning modality requires movement and being able to touch props and classroom equipment to learn a concept (Modalities, n.d.). The kinesthetic modality has not been studied in regards to children with ASD, but has been studied with typically developing children. Persellin (1992) examined the effect of different kinesthetic modalities on the ability to produce rhythm. Two hundred ten children were recruited from two schools and included 70 first graders, 70 third graders, and 70 fifth graders. Children were presented with different test modalities on paper and asked to randomly select one piece of paper out of a field of seven pieces of paper. Each paper had seven different test modalities written on them: **visual; auditory; kinesthetic; visual and auditory; visual and kinesthetic; auditory and kinesthetic; and visual, auditory and kinesthetic.**
After the child selected the condition on the piece of paper, the researcher taught a rhythm using that modality. During the kinesthetic modality, investigators tapped the rhythm on the child’s forearm while the child was not looking. The child was asked to recreate that rhythm by tapping or clapping. During the visual and kinesthetic modality, investigators tapped the rhythm on the child’s forearm while the child was looking. The child was asked to recreate that rhythm by tapping or clapping. During the auditory and kinesthetic modality, investigators tapped the rhythm on the child’s forearm while the child simultaneously listened to the rhythm. The child was asked to recreate that rhythm by tapping or clapping. During the visual, auditory, and kinesthetic modality, children saw, heard, and felt the rhythm. The child was asked to recreate that same rhythm. Results indicated that the kinesthetic modality could be coupled with the visual and auditory modalities to teach rhythm.

There are limited studies that investigate the kinesthetic learning modality in isolation. Furthermore, the kinesthetic learning modality has not been examined in isolation for children with ASD. However, the closest study that examined kinesthetic learning with a child with ASD was conducted by Brady (2012). Brady (2012) examined the communication skills of children with ASD within an elementary school classroom. Brady’s goal was to integrate a communication system into the classroom in order to allow every student to express their wants and needs and learn in an effective environment. Children participated in a multimodality intervention program. Intervention began slowly with a picture exchange of highly motivating items for each student that
slowly progressed into social pragmatics techniques to teach sign language, voice output, and voicing to convey wants and needs through social communication.

Results concluded that all children within this classroom reached their communication potential and used multi-modality communication to express themselves. It is important to note that with this study many learning modalities, including kinesthetic, were used to examine the communication skills in this intervention program. However, it is unknown which modality made the most improvement for each child. Findings indicate that the kinesthetic modality has the potential to be effective in teaching children with ASD how to use multi-modality communication in an educational setting.

**Purpose and Research Questions**

Based on the limited literature surrounding learning modality preferences of children with ASD, it is unclear which modality children with ASD prefer to learn. The primary purpose of this study was to explore the learning modality preferences for children with ASD when taught TOM concepts. Specifically, the study focused on the following learning preferences modalities: auditory (i.e., talking), visual (i.e., flashcards), audio/visual (i.e., social story, and video), and kinesthetic (i.e., act out scenarios). A secondary purpose was to determine if learning modality preference improved comprehension of TOM concepts. The following research questions were asked:

1. What is the preferred learning preference modality among children with ASD?
2. Does identifying learning preference modality of children with ASD improve the understanding of TOM concepts?
CHAPTER III

METHODOLOGY

Institutional Review Board (IRB)

Human subjects were included as participants in this study. In order to uphold ethical standards of research and protect research participants’ rights, a proposal was written and submitted for approval of this study to University of Nevada Reno’s Institutional Review Board. Included in the submission of the proposal of Part II Application – Educational Records and Classroom Survey Research Form (Family Educational Rights and Privacy and Protection of Pupil Rights Amendment), Social/Educational Photo/Video Release Form, Population: Children as Research Participants Form, Youth Assent Script, Parent Consent/Permission Form, Information Sheet (intended purpose of study), and Social Behavioral/Education Form. IRB approval was obtained on February 24th, 2017.

Participant Recruitment

The director of Sierra Therapy Group, Shawna Ross, was contacted to review details of the study and gain a letter of support to recruit participants from this site. A letter of support was received on March 16, 2017. I provided English consent forms in envelopes to Shawna Ross and her staff to distribute. Sierra Therapy Group staff identified prospective participants that met the study’s inclusion criteria: 1) children were between 6 and 12 years old, 2) children were clinically identified on the autism spectrum, 3) children understand concept of cause/effect, and 4) children could attend to a lesson for 10 to 15 minutes. During Session 1 and 2, investigators confirmed that
children understand the concept of cause/effect. Children were excluded if they were nonverbal due to the study requiring a five to ten-word response at times.

After identifying potential participants, STG labeled the envelopes and delivered the consent forms to the parents. The consent form asked the parents if they would like to have their child participate in the study. The parents had one week to decide. If parents chose to have their child participate, they returned a signed consent form to the school. Children were not penalized for not participating in the study if they chose to do so.

Sierra Therapy Group contacted me to pick up the signed consent forms.

Sessions began April 11th and ended April 27th of 2017. During the study, the childrens’ ability to demonstrate cause and effect was confirmed through an activity. Participants were shown pictures of three objects and were asked to point to the picture of the object they wanted. Once they pointed to a picture (cause) the participant was given the object (effect) to play with for 3-5 minutes.

**Participants**

Three children returned signed consents and met inclusion criteria. All three children were previously diagnosed with ASD (0 females, 3 males). The average age of participants was eight years and eleven months and ranged from eight years nine months to nine years three months. Two of the three participants were Caucasian and one participant was Hispanic. Following the four sessions, I conducted a parent interview to collect participant descriptions that included information regarding ethnicity and severity level of ASD. See Table 1 for participant descriptions.
Table 1

Participant Descriptions

<table>
<thead>
<tr>
<th>Child</th>
<th>Gender</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>9;2</td>
<td>Hispanic</td>
<td>High Functioning</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>8;7</td>
<td>Caucasian</td>
<td>High Functioning</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>8;9</td>
<td>Caucasian</td>
<td>Low Functioning</td>
</tr>
<tr>
<td>Average</td>
<td>M</td>
<td>8;9</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: M = male; Age is in year; months.

Materials

Materials included in this research study were audio equipment, video equipment, and computers. A Sony IC Recorder model ICD-PX333/PX333F was used as the audio equipment. A Sony Digital HD Video Camera Recorders model HDR-CX240 was used as the video equipment and placed on a tripod during the study. Computers in the University of Nevada, Reno Savitt Library and Speech and Hearing clinic were used to upload and view the video and audio files to NevadaBox (a password protected cloud server). These computers were used to write this manuscript and to communicate through email and telephone with the school and researchers.

Cause/Effect To confirm the cognitive ability of cause/effect, children selected an object to play with. Each child chose one object: slime, bounce balloon, and ball. I marked the object chosen on a data sheet for each participant (See Table 2). This data was used to demonstrate the child understands the concept of cause/effect.
Each participant, in the beginning of Session 2 and Session 3, had three pictures of the three objects placed in front of them. Each picture had that corresponding object put away in the therapy room. All picture representations of objects were printed in color and laminated. All picture representations of the objects were placed in front of each participant in the same order each session to ensure choice reliability. As the child viewing the picture representations – ball, bounce balloon, and slime.

Children selected one of three objects to play with to confirm the cognitive ability of cause/effect. The percentage of times each object was chosen was calculated by amount of times chosen divided by the amount of possible times chosen (six): ball – 0%, bouncy balloon - 33%, and slime - 66% (See Table 2).

Table 2

Results for Cause/Effect Options Chosen

<table>
<thead>
<tr>
<th></th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>Slime</td>
<td>Slime</td>
</tr>
<tr>
<td>Child 2</td>
<td>Bounce Balloon</td>
<td>Slime</td>
</tr>
<tr>
<td>Child 3</td>
<td>Bounce Balloon</td>
<td>Slime</td>
</tr>
</tbody>
</table>

Note. Session 2 was the first session to determine understanding of cause/effect concepts. Session 3 was the second session to determine understanding of cause/effect concepts.

TOMI-2. Theory of Mind Inventory Task Battery (TOMI-2) was used as the assessment for the pretest and post-test. The TOMI-2 (Hutchins, Prelock, & Bouyea, 2014) is a norm-referenced and criterion-referenced test that assesses the broad functioning of theory of mind in any child aged 2 to 13 years. The TOMI-2 is presented
in a story-book format that has 15 test questions across three subsections, with 5 questions for each subsection: Early TOM subscale, Basic TOM subscale, and the Advanced TOM subscale. The Early TOM subscale measured the aspects of TOM that emerge between the ages of 1 to 3 years of age. Items generally include recognition of facial expressions. The Basic TOM subscale measured the aspects of TOM that emerge in the preschool years, ages 3½ to 5½ years. Items generally include questions about perspective taking. The Advanced TOM subscale measured the aspects of TOM that emerge in later childhood, ages 5½ to 8 years. Items generally include questions about perspective taking and also included false beliefs.

The TOMI-2 was considered to have good psychometric properties. It had four types of reliability: internal consistency, test-retest reliability by item, test-retest reliability and interval length, and test-retest reliability and verbal mental age (VMA). Internal consistency was measured using Cronbach’s alpha, a measure of content sameness (Hutchins, Prelock, & Bouyea, 2014). Test-retest reliability by item was the acceptable test-retest performance of the items in the test and test-retest by interval length was that variation in intervals does not significantly impact the reliability (Hutchins, Prelock, & Bouyea, 2014). Finally test-retest reliability and verbal mental age is that the variation of VMA of the individuals is not correlated with the variation of reliability (Hutchins, Prelock, & Bouyea, 2014). For TOMI-2 there was only criterion-related validity and it was defined as the individuals’ performance on the assessment should positively relate with the normative scores (Hutchins, Prelock, & Bouyea, 2014).

To score answers to the TOMI-2 task battery, responses were recorded on a score short form. The recorded answers were given a pass/fail score on the score summary
form. To score the test the total correct from task questions 1-5 from the early TOM subscale, task questions 6-10 from the basic TOM subscale, and task questions 11-15 from the advanced TOM subscale and added them together. This number was then placed into a fraction over the total possible correct answers, 15.

**Learning Modality Preferences.** In preparation of child selection, I created five tailored learning modality materials for Session 2 and five tailored different learning modality materials for Session 3; In total, 25 lesson plans were created. The learning modality materials were created based on the TOMI-2 answers and individualized to each of the participant’s needs. The learning modality preference that was chosen: audio/visual (i.e., social story), audio (i.e., talking), visual (i.e., flashcards), kinesthetic (i.e., role play), or audio/visual (i.e., video) was marked on a data sheet for each participant (See Table 3).

All learning modalities were placed in front of each participant in the same order each session to ensure consistency across children. The learning modality activities were always presented in the same order from left to right for all children: social story activity (audio/visual), audio activity (audio), flashcards activity (visual), role play activity (kinesthetic), and video activity (audio/visual).

**Social Story Activity (audio/visual modality).** I created social stories for two areas of weakness demonstrated by each participant on the TOMI-2 task battery score form. Some social stories were used/altered for more than one participant due to some overlapping areas of weakness across participants. Social stories were printed in color, laminated, and bound to create a booklet (See appendices A, B, and C for social story modality materials).
Audio Activity (audio modality). I created scripts of scenarios, which would be taught strictly verbally, for two areas of weakness demonstrated by each participant on the TOMI-2 task battery score form. Some scripts were used/altered for more than one participant due to some overlapping areas of weakness across participants (See appendices D, E, and F for audio modality materials).

Flashcard Activity (visual modality). I created flashcards and corresponding scripts for two areas of weakness demonstrated by each participant on the TOMI-2 task battery score form. Some flashcards and corresponding scripts were used/altered for more than one participant due to some overlapping areas of weakness across participants. Flashcards were printed in color and laminated. (See appendices G, H, and I for flashcard modality materials).

Role Play Activity (kinesthetic modality). I created scripts of scenarios, which would be taught by acting out the scenarios, for two areas of weakness demonstrated by each participant on the TOMI-2 task battery score form. Some scripts were used/altered for more than one participant due to some overlapping areas of weakness across participants. (See appendices J, K, and L for role play modality materials).

Video Activity (audio/visual modality). I selected clips from popular Walt Disney movies and youtube videos. Videos chosen were Perspective Taking with R Chi (1 minute, 55 seconds), Luffy’s Reacting to Fake Threw Ball (3 minutes, 40 seconds), and Pixar Short Films Collection: Mike’s New Car (3 minutes, 49 seconds). I created corresponding scripts for two areas of weakness demonstrated by each participant on the TOMI-2 task battery score form. Some videos and corresponding scripts were used/altered for more than one participant due to some overlapping areas of weakness.
across participants. Videos were watched on a laptop. (See appendices M, N, and O for video modality materials).

**General Procedures**

All participants were asked to participate in four separate speech therapy sessions:

1) **Session 1:** Pretest to determine theory of mind areas needed for intervention, 2) **Session 2:** Identify learning preference and teach one aspect of theory of mind, 3) **Session 3:** Identify learning preference and teach one other aspect of theory of mind, and 4) **Session 4:** Post-test was administered to determine progress in theory of mind concepts.

**Session 1: Pretest.** Prior to beginning Session 1, each participant was read the Verbal Assent Script for child consent ages 6-12 years old and was asked to sign the script for cognitive confirmation (See appendix P for verbal assent script). The Theory of Mind Inventory-2 (TOMI-2) Task Battery was administered to collect baseline measures for TOM concepts. The TOMI-2 took approximately 20 minutes to administer. Following Session 1, I created 5 lesson plans (per target concept) that reflected two of the TOM concepts missed on the TOMI-2 for each child and were used in Session 2 and Session 3. To act as reinforcement objects, a flashing LED bouncy ball was given at the end of the first session.

**Session 2: TOM Concept #1.** Session 2 consisted of modality preference #1. After pretesting, two concepts were selected for instruction based on the TOMI-2 results for each child individually. For each concept identified on the TOMI-2 as difficult for the child, five lesson plans were created to teach that particular concept using four different
learning modalities: auditory (i.e., talking), visual (i.e., flash cards), audiovisual (i.e., social story, video), and kinesthetic (i.e., act out scenarios).

Session 2 consisted of collecting learning modality preference for TOMI-2 concept #1, and began with the child demonstrating understanding of cause/effect and practicing selecting items in preparation for choosing the learning modality. Once the participant pointed to a picture they were given the corresponding object to play. This lasted approximately 3-5 minutes depending on child needs. The child was first asked to define concept #1. Then, the child was asked to select which activity they preferred to learn about concept #1 after being presented the five different modalities. Whichever modality the child selected, the researcher then taught that lesson. At the end of Session 2, the child was asked to define concept #1 again as a posttest measure. This session took approximately 15 – 20 minutes. To act as reinforcement, a sheet of teenage mutant ninja turtle, minion, or superhero stickers was given at the end of the second session.

**Session 3: TOM Concept #2.** Session 3, consisted of collecting baseline data for the second target, TOMI-2 concept #2, and began with the child demonstrating understanding of cause/effect and practicing selecting items in preparation for choosing the learning modality. Once the participant pointed to a picture they were given the corresponding object to play. This lasted approximately 3-5 minutes depending on child needs. The child was first asked to define concept #2. Then, the child was asked to select which activity they preferred to learn about concept #2 after being presented the five different modalities. Whichever modality the child selected, the researcher then taught that lesson. At the end of Session 3, the child was asked to define concept #2 again as a posttest measure. This session took approximately 15 – 20 minutes. To act as
reinforcement, a sheet of teenage mutant ninja turtle, minion, or superhero stickers was given at the end of the third session.

**Session 4: Post-Test.** During Session 4, the Theory of Mind Inventory – 2 (TOMI-2) Task Battery was administered to determine progress in TOM concepts, which took approximately 20 minutes. To act as reinforcement and as a thank you for participating in the study a book of silly jokes was given at the final session.

**Treatment Fidelity**

One research assistant who was blind to the purpose of the study viewed both the data collection videos and listened to the data collection audio recordings for treatment fidelity. The research assistant was assigned all three participants and was required to check off eleven observation tallies spread across the four sessions for each participant. Each of the eleven observation tallies involved the key steps I planned to implement throughout each session (See appendix Q for treatment fidelity sheet). Fidelity percentage was calculated by dividing the total number of observation tallies performed over the total number of possible observation tallies. Treatment was given a 100% fidelity score across all three study participants.

**Interrater Reliability**

A research assistant who was blind to the purpose of the study viewed both the data collection videos and listened to the data collection audio recordings for interrater reliability on TOMI-2 scoring, cause/effect option chosen, and learning modality preference option chosen. The research assistant had experience with checking reliability from previous research studies as a student studying neuroscience. I trained the research assistant how to score the TOMI-2 and check for treatment fidelity and interrater
reliability by providing step-by-step written instructions. The research assistant was encouraged to contact me in case of questions or concerns.

The research assistant was assigned all three study participants and was required to score TOMI-2 answers marked accurately and answers scored correctly for the pretest and post-test measures and the cause/effect option chosen and learning modality option chosen (See appendix R for interrater reliability sheet). Interrater reliability for all measures was 100%.
CHAPTER IV

RESULTS

Most Preferred Learning Modality

The first research question examined the most preferred learning modality preference among children with ASD when taught TOM concepts. Children were able to select activities based on different learning modalities: social story booklet (audio/visual), audio modality script (audio), flashcards and flashcard modality script (visual), role play modality script (kinesthetic), and laptop and video modality script (audio/visual). The modality preference was collected during Session 2 and Session 3, which were the sessions when a TOM concept was taught. The learning modality the child selected each time was noted on the learning modality preference data collection sheet.

Findings indicated that at Session 2, the audio/visual modality was the most preferred with 66% (2/3) selection rate, followed by the flashcard modality with 33% (1/3) selection rate. At Session 3, the video modality was most preferred with 100% (3/3) selection rate. Overall, the video modality was the most preferred learning modality across Session 2 and 3 with an 83% (5/6) overall selection rate. The audio, audio/visual, and kinesthetic learning modalities were not selected. See Table 3.
Table 3

*Results for Learning Modality Preferences Chosen*

<table>
<thead>
<tr>
<th></th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>Visual Modality (i.e., Flashcard)</td>
<td>Audio/Visual Modality (i.e., Video)</td>
</tr>
<tr>
<td>Child 2</td>
<td>Audio/Visual Modality (i.e., Video)</td>
<td>Audio/Visual Modality (i.e., Video)</td>
</tr>
<tr>
<td>Child 3</td>
<td>Audio/Visual Modality (i.e., Video)</td>
<td>Audio/Visual Modality (i.e., Video)</td>
</tr>
</tbody>
</table>

*Note.* Session 2 was TOM concept #1 and Session 3 was TOM concept #2.

**Theory of Mind Application**

The second research questioned examined whether or not TOM concepts improved if taught using an identified learning modality preference. There were two ways in which TOM concepts were assessed. The first assessment was the administration of the TOMI-2 at pretest (Session 1) and posttest (Session 4). The second assessment was during Session 2 and 3 when the child was asked to provide a definition of the TOM concept after being taught the TOM lesson. Specifically, the child was asked, “Tell me what perspective taking is,” and “Can you give me an example?”

There were 15 points possible on the TOMI-2. The average TOMI-2 score across the three children for Session 1 was 12.3. The average score across the three children for Session 4 was 11.3. The average score for all children decreased after receiving TOM instruction over a two-week span. See Table 4.
Although the children earned mostly similar correct items, most children missed different items on the TOMI-2 when compared to each other. At pretest, Child 1 missed two questions for the concept of \textit{inferring that people will have different visual perspectives based on physical positioning} and one question for the concept of \textit{inferring that beliefs can cause emotions}. At posttest, Child 1 missed two questions for the concept of \textit{inferring that people will have different visual perspectives based on physical positioning}, one question for the concept of \textit{inferring a belief in the context of an unexpected location change}, and one question for the concept of \textit{inferring that people can have false beliefs about others’ beliefs}.

At pretest, Child 2 missed one question for the concept of \textit{inferring a belief in the context on an unexpected location change} and one question for the concept of \textit{inferring that people will have thoughts about others’ emotions}. At posttest, Child 2 missed one question for the concept of \textit{inferring a belief in the context of an unexpected location change}, one question for the concept of \textit{inferring that beliefs can cause emotion}, and one question for \textit{inferring that people can have false beliefs about others’ beliefs}.

At pretest, Child 3 missed one question for the concept of \textit{inferring that people will have different visual perspectives based on physical positioning}, one question for the concept of \textit{inferring a belief in the context of an unexpected location change}, and one question for \textit{inferring emotions in the context of actual events}. At posttest, Child 3 missed two questions for the concept of \textit{inferring that people will have different visual perspectives based on physical positioning}, one question for the concept of \textit{inferring a belief in the context of an unexpected location change}, and one question for the concept of \textit{inferring emotions in the context of actual events}. 
Table 4

Results for TOMI-2 Assessment

<table>
<thead>
<tr>
<th>Child</th>
<th>Pretest Score</th>
<th>Posttest Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>12/15</td>
<td>11/15</td>
</tr>
<tr>
<td>Child 2</td>
<td>13/15</td>
<td>12/15</td>
</tr>
<tr>
<td>Child 3</td>
<td>12/15</td>
<td>11/15</td>
</tr>
<tr>
<td>Average</td>
<td>12.3/15</td>
<td>11.3/15</td>
</tr>
</tbody>
</table>

Note. TOMI-2 is a 15-point scale divided into Early TOM, Basic TOM, and Advanced TOM subsections.

During Session 2 and 3, children were asked to provide a definition and example of that specific TOM concept after the tailored TOM lesson. A correct definition was awarded if key words of the definition were stated and if the children were able to give a general example of the concept. Keywords that were awarded points include: understanding someone else’s emotions, understanding how someone else feels, or understanding what someone else sees. Overall, 0% (0/3) of children were able to provide an accurate definition and example at Session 2 and Session 3. Most notable was Child 1 who had the closest definition during Session 2. See Table 4 for children’s responses.

Table 5

Results for TOM Concept Definition

<table>
<thead>
<tr>
<th>Child</th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>“Like looking at peoples’ feelings and how they feel.”</td>
<td>“Someone’s feelings, what they see, and what they hear and what they’re looking at.”</td>
</tr>
<tr>
<td>Child 2</td>
<td>“The first story was Sully just closed his eyes. He was feeling happy.”</td>
<td>“Being mad. She’s sad because she takes her ball.”</td>
</tr>
</tbody>
</table>
Child 3

“To take toys. The car.”

“Let me think. Mom’s choose.”

*Note.* Session 2 was TOM concept #1 and Session 3 was TOM concept #2.
CHAPTER V

Discussion

The purpose of this study was to identify the learning preferences of children with ASD when taught TOM concepts. The research focused on five different learning modality options that were created to teach concepts missed on the TOMI-2 assessment per participant – audio/visual (i.e., social stories and videos), audio (i.e., talking), visual (i.e., video), and kinesthetic (i.e., act out scenarios). The study aimed to determine the learning modality preferences for children with ASD. Additionally, the improvement of TOM concepts were examined after teaching a TOM lesson in each child’s preferred learning modality.

Learning Preference Modality

Research question number one focused on identifying the individual learning modality preferences of children with ASD when being taught TOMI-2 concepts. The most preferred stimulus was the video activity. These research findings are similar to those of Snyder, Higbee, and Dayton (2012) who also found that the majority of their participants had the same preference of stimuli across participants. Participants in their study selected the same top- and bottom-ranked stimuli, but the stimuli preference between participants (tangible or video) was unclear.

In addition to having the majority of children choose the same learning modality preference, the children chose the audio/visual modality potentially due to the interactive nature of the video. These research findings are similar to Hopkins et al. (2011) who found that the interactive computer software FaceSay demonstrated more improvements in social skills than a still frame video.
One reason that the video modality may have been selected is due to the familiarity of electronic devices such as computers, Ipads, and smart phones. In addition to being interactive, electronics are integrated into everyday lives. Due to this increase in prevalence, the children may have chosen the video modality because they are most comfortable with it. School-age children are more frequently exposed to electronics, such as such as computers, within their immediate classrooms (Healy, 1998).

**TOM Concepts**

Research question number two focused on whether identifying the individual learning modality preferences of children with ASD would improve TOM. Results reveal that all three children’s TOMI-2 scores decreased by one in the post-test when compared to the pretest.

When compared to literature, this method of visual intervention described above has not been tested to improve theory of mind. Snyder, Higbee, and Dayton (2012) examined stimuli preference between various paired stimuli, Hopkins et al. (2011) examined social skills through static and interactive computer software, and Lee, Chen, and Lin (2016) evaluated the ability to determine facial expressions through mimicking facial expressions. None of these studies that examined video preference was trying to improve TOM concepts.

There could be several reasons why TOM scores decreased. One reason is that all children’s parents were in the room for the TOMI-2 pretest, whereas for TOMI-2 post-test only one child’s parent came into the session room. Having the parents in the room may have influenced the children to pay more attention to the TOMI-2 concepts at pretest and questions asked during Session 2. For the child whose parent was in the room for
both the pretest and post-test, the child was nervous and seemed to be having an off day and requested their parent to join them in the room for emotional support.

Another reason for the decrease in TOMI-2 scores could be due to the procedures used during the training of the TOM concepts. The videos that were used during each session of the video modality was played in its entirety for each child’s first viewing of the video. Children then watched the video again and I paused the video periodically to ask questions regarding the target TOM concept. The children were distracted by watching the video to focus on the questions being asked during the second viewing. This distraction could have caused poor comprehension of the lesson being taught.

The amount of time allocated to teaching a TOM concept may have not been long enough. It is likely that one session that was 20 minutes in length was not enough for a child to fully understand a new TOM concept. During Session 2 and 3, the children struggled to define and give an example of perspective taking regarding the target TOM concepts. Difficulty providing definitions could mean that they did not fully comprehend the TOM concept and needed more time to understand and apply the TOM concept. Teaching a new TOM concept during Session 3 could have added to their misunderstanding of the TOM concept.

Finally, another reason for lower TOMI-2 scores could be due to child performance. The TOMI-2 has good psychometric properties and should be able to be given again and obtain similar results. The TOMI-2 had good test-retest reliability and internal consistency. Perhaps children with ASD fluctuate in their understanding of TOM concepts. Children’s learning may not be linear and as they begin to learn new concepts they may have trade-offs in their knowledge. Evans (2001) describes this
learning process as Emergentism, which refers to the language acquisition process as a “dynamically evolving state, which can be represented by probabilistic information”.
CONCLUSION

Overall Summary

Due to the high prevalence of ASD diagnosis in children, professionals, such as speech-language pathologists and psychologists, have begun to take measures to improve areas in which children with ASD struggle. Children with ASD must meet the following criteria to be diagnosed: 1) persistent deficits in social communication and social interaction across multiple contexts; 2) restricted repetitive patterns of behavior, interests or activities in two types; 3) symptoms present in early developmental period; and 4) symptoms cause clinically significant impairment in social, occupational, or other important areas (APA, 2013; Autism, 2012). One specific area of weakness children with ASD face is TOM within social communication skills. This study explored the learning modality preferences of children with ASD when they were taught TOM concepts.

Three children, 0 female; 3 male, were recruited from Sierra Therapy Group based on the following inclusion criteria: 1) children were between 6 and 12 years old, 2) children were clinically identified on the autism spectrum, 3) children understand concept of cause/effect, and 4) children could attend to a lesson for 10 to 15 minutes. During Session 2 and Session 3, investigators confirmed that children understand the concept of cause/effect. The children’s average age was eight years and eleven months.

Children participated in four separate speech therapy sessions: 1) pretest to determine theory of mind areas needed for intervention, 2) identify learning preference #1 to teach one aspect of theory of mind, 3) identify learning preference #2 and teach one other aspect of theory of mind, and 4) post-test was administered to determine progress in theory of mind concepts.
General procedures included the TOMI-2 – a norm and criterion-referenced test that consists of 15 test questions within nine tasks presented in story-book format and designed to assess the TOM of children. During Session 2 and Session 3, children were shown pictures of three objects and were asked to point to the picture of the object they wanted (cause) and were then given the object (effect) to play with for three to five minutes to demonstrate understanding of cause/effect. Session 2 and Session 3 mainly consisted in identifying learning modality preferences presented by five different learning modality scripts – flashcard script, video script, social story booklet, audio script, and kinesthetic script.

Results for the TOMI-2 pretest presented with an average score of 12.3 out of a possible 15 points. Learning modality preferences results in 16% flashcard modality and 83% video modality. Results for the TOMI-2 post-test presented with an average score of 11.3 out of a possible 15 points.

Limitations

This study was used to pilot procedures that would inform learning modality preferences of children with ASD. Because this was a pilot study, we recruited a small number of children. This study would be improved if there were more children allowing for generalization of findings. Additionally, two of the children had HFA and one had LFA. We would be able to learn more about these subpopulations if we had increased children and equal proportions across these two groups. Only male children were involved in this study; therefore, it is difficult to generalize results to the female population of ASD. The study would be improved by involving female children.
We were surprised to see the variety of TOM concepts that were difficult for each child. As our main focus of the study was aimed at the selection of the learning modality, we were secondarily interested in improvements in TOM. Wanted to not taint their selection because they already selected it in previous session. Therefore, two TOM concepts were taught. In moving forward, only one TOM concept would be taught. Along those same lines, the amount of time used for instruction was not the primary focus. However, findings indicated that teaching one TOM concept for 20 minutes was not enough time to yield changes in knowledge. It would be beneficial for the child to spend more than 20 minutes to learn a TOM concept.

**Clinical Implications**

ASD is a heterogeneous disorder represented by varying degrees of severity and different strengths and weaknesses. Due to this heterogeneity, it is important to use individual child preferences to motivate children to learn and inform instructional methods. Providing different modalities to learn content may be beneficial for children with ASD during speech therapy sessions to improve maintenance TOM concepts. Although it is important to teach children with ASD in a modality in which they prefer, it is important to note that modality preference does not always signify modality strength.

**Future Research**

Future research should include larger sample sizes with a mixture of male and female participants ranging in diagnosis severities. A larger sample size and mixture of female to male participants will improve being able to generalize results to the population of children with ASD.
In order to focus research on transfer knowledge of theory of mind concepts it may be beneficial to only focus on one theory of mind concept and increase the number of sessions to ensure comprehension of material presented. This will improve research results ability to be applied to speech therapy intervention strategies.

Research on effectiveness of knowing learning modality preferences when being applied to the transfer of knowledge of theory of mind concepts may be benefited by using a large sample size and create control groups. Assign a portion of participants to be control group and assign each to a specific learning TOMI-2 concept by modality – flashcard, video, social story, audio, and kinesthetic. In addition, allow a portion of participants to choose their learning modality preference. All research groups focus on one TOMI-2 target concept for multiple sessions to measure transfer knowledge of theory of mind concepts.

Considering aspects of this study’s procedures were successful in identifying learning preferences of children with ASD, it is possible it may be beneficial for children with ASD during speech therapy sessions to improve TOM concepts. Since TOM is a social deficit experienced by most children with ASD, it is recommended that TOMI-2 target concepts are practiced by parents as well as practiced by speech pathologists during speech therapy sessions.
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APPENDICES
Appendix A

Social Story Booklet – Visual Perspective Lesson

TOMI-2 Target Concept: Inferring that people will have different visual perspectives based on physical positioning.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else. We are going to read this social story book together and once we have finished reading the book you will tell me what you know about perspective.

Page 1

Perspective is known as point of view. Point of view is when you see something or feel something.

Page 2

If you look at this picture, what would you see?

You might see four legs. That’s your perspective.

(Dawson, 2011)  
(Dyck, n.d.)
If I saw this picture, I might see five legs. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking.

Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see.

What do you think he sees? How do you think he feels when he sees the fire?
Let’s think of a doctor. Doctors help save people’s lives. Let’s think about what the doctor might see.

What do you think she sees? How do you think she feels when she sees patients?

Understanding how someone else is feeling or understanding what they see is extremely important for conversations and being a friend.

Taking someone else’s perspective can help avoid fights and improve friendship.
Perspective-taking is when you think about what someone else sees or how they feel.
Appendix B

Social Story Booklet – Location Change Lesson

TOMI-2 Target Concept: Inferring a belief in the context of an unexpected location change.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else. We are going to read this social story book together and once we have finished reading the book you will tell me what you know about perspective.

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<td>(Dawson, 2011)</td>
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<td>Perspective is known as point of view. Point of view is when you see something or feel something.</td>
<td>If you are at the zoo and you see a lion, how would you feel? Yes, you might feel happy, that's your perspective.</td>
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<td>If I am at the zoo and I see a lion, I</td>
<td>Sometimes, we try to think what</td>
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might feel **happy** too that’s **my** perspective.  
other people might **see** or how they **feel**. That’s called perspective taking.

---

Let’s think of a library. Two students go into the library and read books at on opposite sides of the couch, Mark and Anthony.  
Mark gets up and puts his book on the **table**.

---

Anthony picks up the book and puts it back on the **shelf**.  
Where will Mark look for his book when he gets back? When Mark gets back he is going to look at the **table** first because he last saw the book on the **table**, that’s his perspective.
<table>
<thead>
<tr>
<th>Where will Anthony look for the book first? Anthony is going to look at the shelf first because he last saw the book on the shelf, that's his perspective.</th>
<th>Understanding how someone else is <strong>feeling</strong> or understanding what they <strong>see</strong> is extremely important for conversations and being a friend.</th>
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<td>Taking someone else’s perspective can help avoid fights and improve friendship.</td>
<td>Perspective-taking is when you think about what someone else <strong>sees</strong> or how they <strong>feel</strong>.</td>
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Appendix C

Social Story Booklet – Emotional Perspective Lesson

TOMI-2 Target Concept: This learning modality was taught for the following three concepts - inferring beliefs can cause emotion, inferring that people will have thoughts about other’s emotions, and inferring emotions in the context of actual events.

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective.

If you gave me a piece of candy, I might feel happy too. That’s my perspective. Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking.
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<td>(Fireman, n.d.)</td>
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<td>Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see.</td>
<td>What do you think he sees? How do you think he feels when he sees the fire?</td>
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<td>(Global, n.d.)</td>
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<td>Let’s think of a doctor. Doctors help save people’s lives. Let’s think about what the doctor might see.</td>
<td>What do you think she sees? How do you think she feels when she sees patients?</td>
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**Page 7**

**Page 8**
Understanding how someone else is feeling or understanding what they see is extremely important for conversations and being a friend.

Taking someone else’s perspective can help avoid fights and improve friendship.

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is?

________________________________________________________________________

________________________________________________________________________

**Question 2:** Can you give me an example of perspective-taking?

________________________________________________________________________

________________________________________________________________________
Appendix D

Audio Script – Visual Perspective

TOMI-2 Concept: Inferring that people will have different visual perspectives based on physical positioning.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson: Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to talk to you about different situations with different people and different daily activities. We are going to talk through a scenario and discuss what they see.

Scenario 1: Two friends, Max and Allie, go to a museum together. They both want to look at an oval hanging from the ceiling. Max goes in front of the oval and sees it painted green. Allie goes behind the oval and sees it painted yellow.

There are two people in this story. That means there are two perspectives. Max sees and feels things. Allie sees and feels things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: What does Allie see from the back?

Explanation: Allie sees yellow.
**Question 2:** What does Max see from the front?

**Explanation:** Max sees green.

**Scenario 1 Cont:** Max and Allie decide to switch sides so they could see both sides of the oval. Max is now behind the oval and Allie is in front of the oval.

Now, let’s think about perspective taking. **Question 3:** What does Max see?

**Explanation:** Max sees yellow.

Now, let’s take turns. That’s perspective taking. **Question 4:** What does Allie see?

**Explanation:** Allie sees green.

**Scenario 2:** Two people are riding the bus home from school. Kevin sits in the front of the bus and Hector sits in the back of the bus.

Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** What does Hector see sitting in the back of the bus?

**Explanation:** Hector sees the backs of heads and the backs of seats.

There are two people in the story. This means there are two perspectives. Hector sees and feels things. Kevin sees and feels things. Now, let’s think about perspective taking. **Question 2:** What does Kevin see in the back of the bus?

**Explanation:** Kevin can see the road and houses the bus drives past.

**Scenario 2 Cont:** The bus is getting closer to Hector’s house. To make it easier to get off the bus he moves to the front of the bus. He sits next to Kevin.

**Question 3:** What does Hector see sitting at the front of the bus?

**Explanation:** Hector can see the road and houses the bus drives past.

Let’s take turns. That’s perspective taking. **Question 4:** What does Kevin see sitting at the front of the bus?
Explanation: Kevin can see the road and houses the bus drives past.

Question 5: Why do they see the same thing?

Explanation: They are both sitting in the front of the bus and have the same perspectives.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

Question 1: Can you explain what perspective-taking is?

Question 2: Can you give me an example of perspective-taking?
Appendix E

Audio Script – Location Change Lesson

TOMI-2 Target Concept: Inferring a belief in the context of an unexpected location change.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If you are at the zoo and you see a lion, how would you feel? Yes, you might feel happy, that’s your perspective. If I am at the zoo and I see a lion, I might feel happy too that’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a library. Two students go into the library and read books at on opposite sides of the couch, Mark and Anthony. Mark gets up and puts his book on the table. Anthony picks up the book and puts it back on the shelf. Where will Mark look for his book when he gets back? When Mark gets back he is going to look at the table first because he last saw the book on the table, that’s his perspective. Where will Anthony look for the book first? Anthony is going to look at the shelf first because he last saw the book on the shelf, that’s his perspective.

Understanding how someone else is seeing or feeling is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to talk to you about different situations where people move objects unexpectedly and you will have to tell me where each person thinks the object is.

Scenario 1: Two brothers, Sam and Larry, are cleaning the garage together. Larry puts the broom and dust pan outside leaning on a wall. He goes inside to get a glass of water. Sam uses the broom and dust pan to clean a spider web. He puts the broom and dustpan in the closet.

There are two people in this story. That means there are two perspectives. Sam sees and feels things. Larry sees and feels things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: Where will Larry look for the broom and dust pan first? Why?
Explanation: Larry will look for the broom and dust pan leaning against the wall because that’s where he put it last.

Question 2: Where will Sam look for the broom and dust pan first? Why?

Explanation: Sam will look for the broom and dust pant in the closet because that’s where he put it last.

Scenario 2: Allie is pouring a glass of orange juice in the kitchen. She puts the orange juice on the kitchen counter and goes to get her doll from her room upstairs. Allie’s mom comes into the kitchen while she is upstairs and brings her juice to the patio outside. Allie comes downstairs and wants to have a sip of her milk.

There are two people in this story. That means there are two perspectives. Allie sees and feels things. Allie’s mom sees and feels things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: Where will Allie first look for her juice? Why?

Explanation: Allie will look for your juice on the kitchen counter because that’s where she last put it.

Question 2: Where will Allie’s mom look for her juice? Why?

Explanation: Allie’s mom will look for your juice on the patio because that’s where she last put it.

Scenario 3: James comes home from baseball practice and puts his dirty baseball cap on the counter. He goes upstairs to get ready for bed. His dad comes into the kitchen and sees the dirty baseball cap on the counter. He picks up the cap and puts it in the laundry room. James comes back downstairs to put his cap away.

There are two people in this story. That means there are two perspectives. James sees and feels things. James’ dad sees and feels things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: Where will James look for his baseball cap first? Why?

Explanation: James will look for his baseball cap on the kitchen counter because that is the last place he put it.
**Question 2:** Where will James’ dad look for the baseball cap first? Why?

**Explanation:** James’ dad will look for the baseball cap in the laundry room because that is the last place he put it.

**Scenario 4:** Mike is playing with legos on the floor and wants to go get his toy cars too. He runs up to his room and leaves his legos on the floor of the living room. His sister, Jenna, comes into the living room and plays with the legos. Jenna puts the legos in the toy box to clean them up when she is done. Mike comes back downstairs to play with his cars and legos.

There are two people in this story. That means there are two perspectives. Mike sees and feels things. Jenna sees and feels things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will Mike look for his legos first? Why?

**Explanation:** Mike will look for his legos on the floor of the living room because that is where he last put them.

Let’s take turns. That’s perspective taking. **Question 4:** Where will Jenna look for the legos first? Why?

**Explanation:** Jenna will look for his legos in the toy box because that is where she last put them.

**Question 5:** Why do they see the same thing?

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is and how people can look for objects in different areas?

**Question 2:** Can you give me an example of perspective-taking when someone moves an object unexpectedly?
Appendix F

Audio Script – Emotional Perspective Lesson

TOMI-2 Target Concept: This learning modality was taught for the following three concept - inferring beliefs can cause emotion, inferring that people will have thoughts about other’s emotions, and inferring emotions in the context of actual events.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to talk to you about different situations with different people and different daily activities. We are going to talk through a scenario and discuss how they would feel.

Scenario 1: A teacher is getting ready for his first day as a teacher at a new school. He loves to teach children, but has never switched schools before. He sets an alarm to wake up early to have extra time to make coffee and pack his lunch; his alarm doesn’t go off.

Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. The teacher has never been to this school before, let’s take his perspective. Question 1: How does the teacher feel about going to a new school?

________________________________________________________________________

________________________________________________________________________
**Explanation:** The teacher is nervous or scared. It’s hard to go to a new school even for teachers.

**Question 2:** The teacher woke up late and is now running late for his first day of school. How is he feeling?

________________________________________________________________________

________________________________________________________________________

**Explanation:** The teachers is mad because he believes it is important to arrive on time to work. He is mad that his alarm didn’t go off and now he is going to be late.

**Scenario 1 Cont.:** The teacher gets to work, but has to go to the principal’s office to explain why he is late. The principal gives him a warning since it is the first day of school and the teacher has a successful first day of school.

There are two people now in the story. This means there are two perspectives. The teacher sees and feels things. The principal sees and feels things. Now, let’s think about perspective taking. **Question 3:** How does the teacher feel having to go to the principal’s office on the first day?

________________________________________________________________________

________________________________________________________________________

**Explanation:** The teacher is sad because he believes he is going to be in trouble for being late to his first day of work.

Now, let’s take turns. That’s perspective taking. **Question 4:** How does the principal feel having to give a warning to the new teacher on the first day?

________________________________________________________________________

________________________________________________________________________

**Explanation:** The principal is happy to give a warning because she believes in second chances. She knows mistakes happen and doesn’t want to write him up.

**Scenario 2:** A baseball player is playing in the playoffs. He really wants to win the championship with his team. His coach has been coming early and staying late so he can get more practice. The coach also wants to win the championship.

Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** How will the baseball player feel about having extra practices?

________________________________________________________________________

________________________________________________________________________

**Explanation:** The player is happy about the extra practices because he believes the more he practices the better he will play.

There are two people in the story. This means there are two perspectives. The baseball player sees and feels things. The coach sees and feels things. Now, let’s think about perspective taking. **Question 2:** How will the coach feel about the extra practices?
Explanation: The coach is happy about the practices because he believes the more practice the players get the better chance they have of winning the championship.

Scenario 2 Cont: The baseball player and the coach make it to the championship game! It’s a long game and the other team is really good too! It comes down to the last run of the game and the other team is winning. The baseball player hits a home run and his teammates run the bases. THEY WON!

Question 3: The baseball player believed in himself and hit a home run, how does he feel?

Explanation: He feels happy because he knew he could do it!

Let’s take turns with perspective. Question 4: How does the coach feel about winning the championships?

Explanation: The coach is happy and proud of his team because he believed in them and knew they could win.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

Question 1: Can you explain what perspective-taking is?

Question 2: Can you give me an example of perspective-taking?
Appendix G

Flashcard Script – Emotional Perspective Lesson (Kuzma, 2014)

TOMI-2 Target Concept: This learning modality was taught for the following three concept - inferring beliefs can cause emotion, inferring that people will have thoughts about other’s emotions, and inferring emotions in the context of actual events.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to show you some flashcards of dogs dressed up in Halloween costumes. On the back of each flashcard is a scenario and you are going to read the scenario. After we read about the pets I will ask a question or two about what they see or feel.
Dog with feather hat: The dog loves to eat food and his best friend is a cat. He loves running around outside and rolling pumpkins. The cat doesn’t like being outside. He is scared of water and likes to stay inside. The dog is the cat’s best friend.

Now there are two animals in this picture. That means there are two perspectives. The dog sees and feels things. The cat sees and feels things. Now, let’s think about perspective taking. Question 1: How do you believe the dog feels about taking the picture outside based on the description?

________________________________________________________________________
________________________________________________________________________

Explanation: The dog is happy to be outside because he likes running around outside and rolling pumpkins.

Now let’s take turns. That’s perspective taking. Question 2: How do you believe the cat feels about taking the picture outside based on the description?

________________________________________________________________________
________________________________________________________________________

Explanation: The cat is not happy to be taking the picture outside because he doesn’t like to be outside.

Question 3: How do you believe the cat feels about taking the picture with the dog?

________________________________________________________________________

Explanation: The cat is happy taking the picture with the dog because the dog is the cat’s best friend.
Let’s change the perspective. **Question 4:** How do you believe the dog feels about taking the picture with the cat?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog is happy taking the picture with the cat because they are friends.

**Question 4:** How do you believe the dog feels about being in a costume?

________________________________________________________________________

**Explanation:** The dog is happy about being in the costume because of the smile on his face.

Let’s change the perspective. **Question 5:** How do you believe the cat feels about being in a costume?

________________________________________________________________________

**Explanation:** The cat is mad about being in the costume because of the smile on his face.

*Cheerleading Dog:* This dog likes to be outside. He likes rolling around in flowers and grass. He tends to chase and eat string.
The dog has his own perspective. The dog sees and feels things. Now, let’s think about perspective taking. **Question 1:** How do you believe the dog feels about being inside the house based on the picture description?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog is not happy about being inside the house because he likes to be outside.

**Question 2:** How do you believe the dog feels about wearing the costume based on the picture description?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog is sad about the costume because he likes to chase and eat string and the costume has string on it.

**Dogs in ghost costumes:** These dogs love spending time with each other. They love to sleep, and eat EVERYTHING! They’re all very well trained and like to play with each other.

The dog on the far left is scared of the dark, but when he is with his friends he’s not as scared. The dog second to the left is fearless and loves Halloween! He’ll chase away the ghosts.

The dog in the front is very young but loves new adventures. This is his first Halloween! The dog behind the front dog is his mom and she loves to watch him have fun.

The dog on the right is the oldest dog of all and likes to spend his time inside. His bones are starting to hurt him so he doesn’t like to run as much anymore.
There are 5 dogs in this picture. This means there are five perspectives. Each dog sees and feels things of their own. Now, let’s think about perspective taking.

**Question 1:** How do you believe the dog on the right feels about being outside based on the picture description?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog is sad about being outside because he likes to be inside instead of outside.

Now, let’s change perspective. **Question 2:** How do you believe the dog on the left feels about being outside with his friends?

________________________________________________________________________
________________________________________________________________________

**Explanation:** He is scared to be outside but since he is with his friends he is not scared.

**Question 3:** How do you believe the Mom dog feels about her kids first Halloween?

________________________________________________________________________
________________________________________________________________________

**Explanation:** She is happy about her kids first Halloween because she loves to watch him have fun.

Now, let’s change perspective. **Question 4:** How do you believe the young dog feels about his first Halloween?

________________________________________________________________________
________________________________________________________________________

**Explanation:** He is very happy for his first Halloween!

**Question 5:** How do you believe the dog second to the left feels about wearing a costume?

________________________________________________________________________
________________________________________________________________________

**Explanation:** He is happy for Halloween and feels happy wearing the costume.

Now, let’s change perspective. **Question 6:** How does the young dog feel about wearing a costume?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The young dog loves wearing the costume because it’s his first Halloween!
**Wizard Cat:** This cat is very tired and likes to spend a lot of time sleeping. He likes to cuddle and doesn’t like to run around and play games. He likes to be left alone unless he comes up to you.

The cat has his own perspective. The cat sees and feels things. Now, let’s think about perspective taking.

**Question 1:** How do you believe the cat feels about posing for the picture?

________________________________________________________________________

**Explanation:** He is mad about posing for the picture because he likes to be left alone.

**Question 2:** How do you believe the cat feels about wearing the costume?

________________________________________________________________________

**Explanation:** He is mad about wearing the costume because he likes to be left alone.
**Dracula Dog:** This dog in the Dracula costume is small but mighty. He likes to show that he’s a tough guy and barks/growls a lot. He likes attention but doesn’t like bright lights. The dog laying down loves attention and doesn’t mind taking pictures. Sometimes he gets scared when the bigger dog growls.

There are two dogs in this picture. That means there are two perspectives. The dog in the Dracula costume sees and feels things. The dog laying down sees and feels things. Now, let’s think about perspective taking.

**Question 1:** How do you believe the dog in the Dracula costume feels about taking the picture?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog is mad about taking the picture because he doesn’t like bright lights.

Now, let’s change perspective. **Question 2:** How do you believe the dog laying down feels about taking the picture based on the picture description?

________________________________________________________________________

**Explanation:** The dog is happy about taking the picture because he loves attention.

Now, let’s change perspective. **Question 3:** How do you believe the dog in the Dracula costume feels about wearing the costume?

________________________________________________________________________

**Explanation:** The dog is mad about wearing the costume because of the angry face he is making in the picture.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.
Question 1: Can you explain what perspective-taking is?

________________________________________________________________________

Question 2: Can you give me an example of perspective-taking?

________________________________________________________________________
Appendix H

Flashcard Script – Visual Perspective Lesson

TOMI-2 Target Concept: Inferring that people will have different visual perspectives based on physical positioning.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to show you some flashcards of dogs dressed up in Halloween costumes. On the back of each flashcard is a scenario and you are going to read the scenario. After we read about the pets I will ask a question or two about what they see or feel.
Now there are many people looking at a statue in this picture. That means there are many perspectives. The person in the pink shirt sees and feels things. The person in the purple shirt sees and feels things. Now, let’s think about perspective taking.

**Question 1:** What does the person in the purple shirt see based on the picture?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The girl in the purple shirt is looking at the statue of the woman.

Now let’s take turns. That’s perspective taking. **Question 2:** What does the person in the pink shirt see based on the picture?

________________________________________________________________________

**Explanation:** The girl in the pink shirt is looking at the statue of a man.
There are two people in this picture. That means there are two perspectives. The person on the left sees and feels things. The person on the right sees and feels things. Now, let’s think about perspective taking.

**Question 1:** What does the person on the left see?
________________________________________________________________________

**Explanation:** The person on the left sees four logs.

**Question 2:** What does the person on the right see?
________________________________________________________________________

**Explanation:** The person on the right sees three logs.
There are 2 people in this picture. This means there are two perspectives. The person in the boat sees and feels things. The person on the island sees and feels things. Now, let’s think about perspective taking.

**Question 1:** What does the person on the boat see?

**Explanation:** The person on the boat sees an island with a person on it and feels excited because he has probably been floating for a long time.

Now, let’s change perspective. **Question 2:** What does the person on the island see?

**Explanation:** The person on the island sees a boat with a person on it and feels excited to be rescued because he has probably been stranded for a long time.

(Vintage, n.d.)

There are two people in this picture. There are two perspectives. The boy catching the ball sees and feels things. The boy sliding into base sees and feels things. Now, let’s think about perspective taking.

**Question 1:** What does the boy catching the ball see?

**Explanation:** The boy catching the ball sees the other player sliding into the base and he is looking for the ball to catch.
**Question 2:** What does the boy sliding into base see?

**Explanation:** The boy sliding into base sees the other player trying to catch the ball.

There are two six people in this picture. That means there are six perspectives. The team on the left sees and feels things. The team on the right sees and feels things. Now, let’s think about perspective taking.

**Question 1:** What does the team on the left see?

**Explanation:** The team on the left is looking at the net and the ball.

Now, let’s change perspective. **Question 2:** What does the team on the right see?

**Explanation:** The team on the left is looking at the net and the ball. Both teams can have the same perspective.

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is?

**Question 2:** Can you give me an example of perspective-taking?
Appendix I

Flashcard Script – Location Change Lesson

TOMI-2 Target Concept: Inferring a belief in the context of an unexpected location change.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If you are at the zoo and you see a lion, how would you feel? Yes, you might feel happy, that’s your perspective. If I am at the zoo and I see a lion, I might feel happy too that’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a library. Two students go into the library and read books at on opposite sides of the couch, Mark and Anthony. Mark gets up and puts his book on the table. Anthony picks up the book and puts it back on the shelf. Where will Mark look for his book when he gets back? When Mark gets back he is going to look at the table first because he last saw the book on the table, that’s his perspective. Where will Anthony look for the book first? Anthony is going to look at the shelf first because he last saw the book on the shelf, that’s his perspective.

Understanding how someone else is seeing or feeling is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I am going to show you flashcards about different situations where people move objects unexpectedly and you will have to tell me where each person thinks the object is.

Scenario 1: You and I are cleaning the garage together.
I put the broom and dust pan outside leaning on a wall (move dust pant flashcard to wall of house flashcard).

I go inside to get a glass of water. You use the broom and dust pan to clean a spider web. You put the broom and dustpan in the closet (put broom and dustpan flashcard under house flashcard “in closet”).

There are two people in this story. That means there are two perspectives. I see and feel things. You see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will I look for the broom and dust pan first? Why?

**Explanation:** I will look for the broom and dust pan leaning against the wall because that’s where I put it last.

**Question 2:** Where will you look for the broom and dust pan first? Why?

**Explanation:** You will look for the broom and dust pant in the closet because that’s where you put it last.
Scenario 2: You are pouring a glass of orange juice in the kitchen.

You put the glass of orange juice on the kitchen counter and go to get your toy truck from your room upstairs. I come into the kitchen while you are upstairs and bring your juice to the patio outside.
You come downstairs and want to have a sip of your milk.

There are two people in this story. That means there are two perspectives. You see and feel things. I see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will you first look for your juice? Why?

**Explanation:** You will look for your juice on the kitchen counter because that’s where you last put it.

**Question 2:** Where will I look for your juice? Why?

**Explanation:** I will look for your juice on the patio because that’s where I last put it.

**Scenario 3:** You home from baseball practice and put your dirty baseball cap on the kitchen counter.
You go upstairs to get ready for bed. I come into the kitchen and see the dirty baseball cap on the counter. I pick up the cap and put it in the laundry room.

You come back downstairs to put your cap away.

There are two people in this story. That means there are two perspectives. You see and feel things. I see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will you look for your baseball cap first? Why?

**Explanation:** You will look for your baseball cap on the kitchen counter because that is the last place you put it.

**Question 2:** Where will I look for the baseball cap first? Why?

**Explanation:** I will look for the baseball cap in the laundry room because that is the last place I put it.

**Scenario 4:** You are playing with Legos on the floor and want to go get your toy cars too.
You run up to your room and leave your Legos on the floor in the living room. I come into the living room and play with the Legos. I put the Legos in the toy box to clean them up when I am done.
You come back downstairs to play with your cars and Legos.

There are two people in this story. That means there are two perspectives. You see and feel things. I see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will you look for your Legos first? Why?

**Explanation:** You will look for your Legos on the floor of the living room because that is where you last put them.

Let’s take turns. That’s perspective taking. **Question 4:** Where will I look for the Legos first? Why?

**Explanation:** I will look for your Legos in the toy box because that is where I last put them.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is and how people can look for objects in different areas?

**Question 2:** Can you give me an example of perspective-taking when someone moves an object unexpectedly?
Appendix J

Kinesthetic Script – Visual Perspective Lesson

TOMI-2 Target Concept: Inferring that people will have different visual perspectives based on physical positioning.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: We are going to look at the same DVD cases from different perspectives. You are going to tell me everything you see and I will tell you what I see. Then we will switch perspectives and flip the DVD case. You are going to tell me everything you see on the other side as well.

DVD 1:
Part 1: Tell me what you see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 2: I’ll tell you what I see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Now let’s change perspective. That’s perspective taking. *Switch sides of DVD Case*
Part 3: Tell me what you see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 4: I’ll tell you what I see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

**DVD 2:**
Part 1: Tell me what you see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 2: I’ll tell you what I see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Now let’s change perspective. That’s perspective taking. *Switch sides of DVD Case*
Part 3: Tell me what you see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 4: I’ll tell you what I see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

DVD 3:
Part 1: Tell me what you see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 2: I’ll tell you what I see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Now let’s change perspective. That’s perspective taking. *Switch sides of DVD Case*

Part 3: Tell me what you see on the back of the DVD case.
________________________________________________________________________
________________________________________________________________________

Part 4: I’ll tell you what I see on the front of the DVD case.
________________________________________________________________________
________________________________________________________________________

DVD 4:
Part 1: Tell me what you see on the front of the DVD case.

________________________________________________________________________
________________________________________________________________________

Part 2: I’ll tell you what I see on the back of the DVD case.

________________________________________________________________________

Now let’s change perspective. That’s perspective taking. *Switch sides of DVD Case*

Part 3: Tell me what you see on the back of the DVD case.

________________________________________________________________________

Part 4: I’ll tell you what I see on the front of the DVD case.

________________________________________________________________________

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

Question 1: Can you explain what perspective-taking is?

________________________________________________________________________
Question 2: Can you give me an example of perspective-taking?
Appendix K

Kinesthetic Script – Location Change Lesson

TOMI-2 Target Concept: Inferring a belief in the context of an unexpected location change.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is-known as point of view. Point of view is when you see something or feel something. If you are at the zoo and you see a lion, how would you feel? Yes, you might feel happy, that’s your perspective. If I am at the zoo and I see a lion, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a library. Two students go into the library and read books at on opposite sides of the couch, Mark and Anthony. Mark gets up and puts his book on the table. Anthony picks up the book and puts it back on the shelf. Where will Mark look for his book when he gets back? When Mark gets back he is going to look at the table first because he last saw the book on the table, that’s his perspective. Where will Anthony look for the book first? Anthony is going to look at the shelf first because he last saw the book on the shelf, that’s his perspective.

Understanding how someone else is seeing or feeling is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: We are going to act out different situations where people move objects unexpectedly and you will have to tell me where we each thinks the object is.

Scenario 1:

CO-I: Puts the DVD on the table. “I’m going to leave the room. You put the DVD in a new spot”

Child: Moves the DVD.

There are two people in this story. That means there are two perspectives. I see and feels things. You see and feel things. Now let’s think about perspective taking. That means
thinking about what someone else sees or how they feel. **Question 1:** Where will I look for the DVD first? Why?

<table>
<thead>
<tr>
<th>Explanation: I will look for the DVD on the table because that is where I put it.</th>
</tr>
</thead>
</table>

Now let’s change perspectives. **Question 2:** Where would you look for the DVD first? Why?

<table>
<thead>
<tr>
<th>Explanation: You would look for the DVD where you put it because that’s the last place you saw it.</th>
</tr>
</thead>
</table>

**Scenario 2:**

CO-I: Puts the cup on the table. “I’m going to leave the room. You put the cup in a new spot”

Child: Moves the cup.

There are two people in this story. That means there are two perspectives. I see and feel things. You see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will I look for the cup first? Why?

<table>
<thead>
<tr>
<th>Explanation: I will look for the cup on the table because that is where I put it.</th>
</tr>
</thead>
</table>

**Question 2:** Where would you look for the cup first? Why?

<table>
<thead>
<tr>
<th>Explanation: You would look for the cup where you put it because that’s the last place you saw it.</th>
</tr>
</thead>
</table>

**Scenario 3:**

CO-I: Puts the folder on the table. “I’m going to leave the room. You put the folder in a new spot”

Child: Moves the folder.

There are two people in this story. That means there are two perspectives. I see and feel things. You see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** Where will I look for the folder first? Why?
Explanation: I will look for the folder on the table because that is where I put it.

Question 2: Where would you look for the folder first? Why?

Explanation: You would look for the cup where you put it because that’s the last place you saw it.

Scenario 4:

CO-I: Puts the ball on the table. “I’m going to leave the room. You put the ball in a new spot”

Child: Moves the ball.

There are two people in this story. That means there are two perspectives. I see and feels things. You see and feel things. Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: Where will I look for the ball first? Why?

Explanation: I will look for the ball on the table because that is where I put it.

Question 2: Where would you look for the ball first? Why?

Explanation: You would look for the ball where you put it because that’s the last place you saw it.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

Question 1: Can you explain what perspective-taking is and how people can look for objects in different areas?

Question 2: Can you give me an example of perspective-taking when someone moves an object unexpectedly?
Appendix L

Kinesthetic Script – Emotional Perspective Lesson

TOMI-2 Target Concept: This learning modality was taught for the following three concepts - inferring beliefs can cause emotion, inferring that people will have thoughts about other’s emotions, and inferring emotions in the context of actual events.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is-known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: We are going to act out different situations with different people doing different daily activities. We are going to act through a scenario and discuss how they would feel.

Scenario 1: A teacher is getting ready for his first day as a teacher at a new school. He loves to teach children, but has never switched schools before. He believes it is very important to arrive at work on time. He sets an alarm to wake up early to have extra time to make coffee and pack his lunch; his alarm doesn’t go off. (Child = teacher; Co-I = principal)

Child: Acts as a teacher. Child pretends to be waking up out of bed when he realizes his alarm never went off.
**Child:** Runs around pretending to get ready in a hurry. He keeps saying, “It’s my first day. It’s my first day.”

Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. The teacher has never been to this school before. Let’s take his perspective. **Question 1:** How does the teacher feel about going to a new school?

**Explanation:** The teacher is nervous or scared. It’s hard to go to a new school even for teachers.

**Question 2:** The teacher woke up late and is now running late for his first day of school. How is he feeling?

**Explanation:** The teachers is mad because he believes it is important to arrive on time to work. He is mad that his alarm didn’t go off and now he is going to be late.

**Scenario 1 Cont:** The teacher gets to work, but he has to go to the principal’s office to explain why he is late. The principal gives him a warning since it is the first day of school and the teacher has a successful first day of school.

**Child:** Pretends to pull up to the school and parks the car. Walks into school and finds out he has to go to see the principal.

**Co-I:** “Hi ______, why are you late today?”

**Child:** Explains that his alarm never went off and he woke up late and had to rush to get ready.

**Co-I:** “Well, since it’s your first day and mistakes happen you’re only getting a warning. Have a great rest of your day.”

There are two people now in the story. This means there are two perspectives. The teacher sees and feels things. The principal sees and feels things. Now, let’s think about perspective taking. **Question 3:** How does the teacher feel having to go to the principal’s office on the first day?

**Explanation:** The teacher is sad because he believes he is going to be in trouble for being late to his first day of work.

Now, let’s take turns. That’s perspective taking. **Question 4:** How does the principal feel having to give a warning to the new teacher on the first day?
Explanation: The principal is happy to give a warning because she believes in second chances. She knows mistakes happen and doesn’t want to write him up.

Scenario 2: A baseball player is playing in the playoffs. He really wants to win the championship with his team. His coach has been coming early and staying late so he can get more practice. The coach also wants to win the championship. (Child = baseball player; Co-I = coach)

Child: Pretends to be a baseball player. He and his team made it to the playoffs and decide they need more practice.

Co-I: “Let’s start having extra practices. I will come in early if you agree to come in early and I will stay as late as you guys want to practice. This will help us prepare for championships.”

Now let’s think about perspective taking. That means thinking about what someone else sees or how they feel. Question 1: How will the baseball player feel if about having extra practices?

Explanation: The player is happy about the extra practices because he believes the more he practices the better he will play.

There are two people in the story. This means there are two perspectives. The baseball player sees and feels things. The coach sees and feels things. Now, let’s think about perspective taking. Question 2: How will the coach feel about the extra practices?

Explanation: The coach is happy about the practices because he believes the more practice the players get the better chance they have of winning the championship.

Scenario 2 Cont: The baseball player and the coach make it to the championship game! It’s a long game and the other team is really good too! It comes down to the last run of the game and the other team is winning. The baseball player hits a home run and his teammates run the bases. THEY WON!

Child: Pretends to walk onto the baseball field and starts to stretch for the game. The game begins. He and his team play the best they can but the other team is good and are ahead by 2 points.

Child: The bases are loaded and he steps up to bat. He is focused and hits a home run. He and his teammates run and slide across home base!
Child & Co-I: Celebrate that they won the championships!

Question 3: The baseball player believed in himself and hit a home run, how does he feel?

________________________________________________________________________
________________________________________________________________________

Explanation: He feels happy because he knew he could do it!

Let’s take turns with perspective. Question 4: How does the coach feel about winning the championships?

________________________________________________________________________
________________________________________________________________________

Explanation: The coach is happy and proud of his team because he believed in them and knew they could win.

Instructions: Think back to the beginning of this lesson when I told you what perspective-taking is.

Question 1: Can you explain what perspective-taking is?

________________________________________________________________________
________________________________________________________________________

Question 2: Can you give me an example of perspective-taking?

________________________________________________________________________
________________________________________________________________________
Appendix M

Video Script – Visual Perspective Lesson

TOMI-2 Target Concept: Inferring that people will have different visual perspectives based on physical positioning.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I’m going to show you a short video clip. I am going to play it all the way through the

Video clip: Perspective Taking with R Chi (Weatherley, 2010)

Now I am going to show you the clip and sometimes I am going to stop it and ask you a question.

Let’s talk about how many people were in the video.
There are two people. That means there are two perspectives. R Chi sees and feels things. The captain on the right sees and feels things. Now, let’s think about perspective taking. That means thinking about what someone else sees or how they feel.  

**Question 1:** What does R Chi see?

________________________________________________________________________
________________________________________________________________________

**Explanation:** R Chi sees darkness/black because he has his sunglasses on.

**Question 2:** Now, let’s take turns. That’s perspective taking. What does the captain on the right see?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The captain on the right can see the ocean and sun because she isn’t wearing sunglasses.

They are now three people in the video. That means there are three perspectives. R Chi sees and feels things. The captain sees and feels things. The man on the left sees and
feels things. Now, let’s think about more perspective taking. **Question 3:** After he takes his glasses off, what does R Chi see??

**Explanation:** R Chi can see the ocean and sun now that he takes his sunglasses off.

**Question 4:** What does the man on the left see in the picture above?

**Explanation:** The man on the left sees the back of R Chi. He sees his back and back of his legs and head.

Let’s change perspectives. **Question 5:** What does the captain on the right see?

**Explanation:** The captain on the right can see the ocean and sun because R Chi isn’t in her way.

**Question 6:** What does R Chi see?

**Explanation:** R Chi is looking at the captain on the right and can see her hair, hat, and the window.

Now there are four people in the video. That means there are four perspectives. **Question 7:** What does the anteater see?

**Explanation:** The anteater sees darkness because he is wearing the sunglasses. **Question 8:** What does R Chi see?
**Explanation:** R Chi is looking at the back of the anteater and sees his back and his tail.

**Question 9:** How is the anteater’s perspective now the same as R Chi’s perspective in the beginning? Was the anteater taking his perspective?

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**Explanation:** They were both seeing darkness/black when they wore the same pair of sunglasses.

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is?

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**Question 2:** Can you give me an example of perspective-taking?
TOMI-2 Target Concept: Inferring a belief in the context of an unexpected location change.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If you are at the zoo and you see a lion, how would you feel? Yes, you might feel happy, that’s your perspective. If I am at the zoo and I see a lion, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a library. Two students go into the library and read books at on opposite sides of the couch, Mark and Anthony. Mark gets up and puts his book on the table. Anthony picks up the book and puts it back on the shelf. Where will Mark look for his book when he gets back? When Mark gets back he is going to look at the table first because he last saw the book on the table, that’s his perspective. Where will Anthony look for the book first? Anthony is going to look at the shelf first because he last saw the book on the shelf, that’s his perspective.

Understanding how someone else is seeing or feeling is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I’m going to show you a short video clip. I am going to play it all the way through the first time.

Video clip: Luffy’s reaction to fake throw ball (Zhang, 2015)

Now I am going to show you the clip and sometimes I am going to stop it and ask you a question.

Let’s talk about how many people were in the video.
The dog and a person are in this video (We will count the hand as a second perspective). That means there are two perspectives. The dog sees and feels things. The person sees and feels things. Now, let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** What does the dog see?  
________________________________________________________________________  
________________________________________________________________________  
________________________________________________________________________  
________________________________________________________________________

**Explanation:** The dog sees the person and the ball.

Now, let’s take turns. That’s perspective taking. **Question 2:** What does the person see?  
________________________________________________________________________

**Explanation:** The person can see down the hallway and sees the dog.
The person throws the ball and the dog fetches it. There are two perspectives happening. The dog sees and feels things. The person sees and feels things. Now, let’s think about more perspective taking. **Question 3:** Where did the dog look for the ball? How did the dog know to look there?

________________________________________________________________________
________________________________________________________________________

**Explanation:** The dog looked for the ball at the end of the hallway. The dog knew to look there because he saw the arm throw the ball in that direction.
The person goes to throw the ball again, but doesn’t let go of the ball. The dog runs.

**Question 4:** Where will the dog first look for the ball? Why?

**Explanation:** The dog looks at the end of the hall first because he saw the arm throw the ball in that direction and that’s where he fetched it last time.

**Question 5:** Where does the dog look next?

**Explanation:** After the dog realizes the ball is not at the end of the hall he looks for the ball by the person because that is the last person that had the ball.

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is?

**Question 2:** Can you give me an example of perspective-taking?
Appendix O

Video Script – Emotional Perspective Lesson

*TOMI-2 Target Concept: Inferring beliefs can cause emotion.

**TOMI-2 Target Concept: Inferring that people will have thoughts about other’s emotions.

***TOMI-2 Target Concept: Inferring emotions in the context of actual events.

Instructions: Today we will be discussing perspective-taking. First I’m going to tell you what perspective is and what it means to take the perspective of someone else.

Perspective-taking Lesson:

Perspective is known as point of view. Point of view is when you see something or feel something. If I gave you a piece of candy, how would you feel? Yes, you might feel happy. That’s your perspective. If you gave me a piece of candy, I might feel happy too. That’s my perspective.

Sometimes, we try to think what other people might see or how they feel. That’s called perspective taking. Let’s think of a fireman. Firemen go into buildings that are on fire. Let’s think about what the fireman might see or how he might feel. What do you think he sees? (house on fire, people need help, smoke, flames). How do you think he feels when he sees (house, people, smoke, flames)? You told me what the fireman sees or how he might feel. That is taking the fireman’s point of view or perspective.

Understanding how someone else is feeling or thinking is extremely important for conversations and being a friend. Taking someone else’s perspective can help avoid fights and improve friendship.

In summary, perspective-taking is when you think about what someone else sees or how they feel.

Instructions: I’m going to show you a short video clip. I am going to play it all the way through.

Video clip: Pixar short films collection: Mike’s New Car (Funny, 2015)

Now I am going to show you the clip and sometimes I am going to stop it and ask you a question.

Let’s talk about how many people were in the video.
There are two people. That means there are two perspectives. Mike sees and feels things. Sully sees and feels things. Now, let’s think about perspective taking. That means thinking about what someone else sees or how they feel. **Question 1:** *How does Mike believe Sully is going to feel when he sees the car? Why does he think that?** **Question 2:** *How does Mike think Sully is going to feel when he sees the car? Why does he think that?*

Explanation: Mike believes Sully is going to feel happy. He thinks this because since he is happy about his car he thinks his friend, Sully, is going to feel happy about his car.

Now, let’s take turns. That’s perspective taking. **Question 2:** *How does Sully feel about the car?*

Explanation: Sully doesn’t feel happy about the car.
Mike sees and feels things. Sully sees and feels things. Now, let’s think about more perspective taking. **Question 3**: *How does Mike believe Sully is going to feel when he gets into the car? Why does he think that? **How does Mike think Sully is going to feel when he gets into the car? Why does he think that? ***How does Sully feel when he gets into the car?*

________________________________________________________________________
________________________________________________________________________

**Explanation:** Mike thinks Sully will feel happy when he gets into the car. Mike thinks once Sully gets into the car he will feel happy because there are adjustable seats just for him. Sully actually feels unhappy when he first gets in because it’s so small, but once he adjusts the seat he is happy about being inside the car.

Let’s change perspectives. **Question 4**: *How does Sully believe Mike will feel when he helps to close the hood of the car? Why does he think that? **How does Sully think Mike will feel when he helps to close the hood of the car? Why does he think that?*

________________________________________________________________________
________________________________________________________________________

**Explanation:** Sully believes Mike will feel happy when he helps to close the hood because people are typically happy when they get help.

**Question 5**: */*** How does Mike feel when Sully helps close the hood? Why does he feel like that? 

________________________________________________________________________

**Explanation:** Mike feels angry when Sully closes the hood because he didn’t move his fingers and he got hurt.
Let’s change perspectives. Remember Mike sees and feels things. Sully sees and feels things. **Question 6:** *How does Sully believe Mike will feel when he gets back in the car? Why does he think that?** How does Sully **think** Mike will feel when he gets back in the car? Why does he think that?

________________________________________________________________________
________________________________________________________________________

**Explanation:** Sully believes Mike will be mad once he gets back into the car because he just got hurt.

**Question 7:** */***How does Mike feel once he gets back into the car? Why does he feel that way?

________________________________________________________________________

**Explanation:** Mike is mad once he gets back into the car because he just got hurt.
**Question 8:** *How does Sully believe Mike will feel when the mirror breaks? Why does he think that? **How does Sully think Mike will feel when the mirror breaks? Why does he think that?*

________________________________________________________________________
________________________________________________________________________

**Explanation:** Sully thinks Mike will feel angry when the mirror breaks because people typically aren’t happy when their stuff breaks.

**Question 9:** */***How does Mike feel when the mirror breaks?
________________________________________________________________________
________________________________________________________________________

**Explanation:** Mike feels angry that his mirror was broken.

**Instructions:** Think back to the beginning of this lesson when I told you what perspective-taking is.

**Question 1:** Can you explain what perspective-taking is?
________________________________________________________________________

**Question 2:** Can you give me an example of perspective-taking?
________________________________________________________________________
Appendix P

Verbal Assent Script for Children, 6-12 Years Old

Hi, my name is Megan!

We are asking you to take part in a research study. We are doing the study because we want to learn more about your favorite way of learning!

If you agree to be in this study you will be asked to pick one out of five activities! We will complete the activity you choose. After everything is done, you’ll get a prize!

We will do this today and then I’ll come back three more times. Each time, it will take about 20 minutes and you will get a prize at the end.

If you say “yes” to being in this study, you might feel stressed during the activities if you do not like the topic.

If you are in this study and feel any of the things I just talked about or feel bad in other ways, please tell your parents right away. It’s important they call us about what you are feeling.

Before you decide if you do or do not want to be in this research study, we want you to talk to your parents. We will also ask your parents to give their permission for you to be in this study. Even if your parents say “yes” you can still decide not to be in the study.

Being in this study is up to you and no one will be upset if you don’t want to participate or if you change your mind later and want to stop. You can stop at any time for any reason. Nothing bad will happen and no one will mind.

If you have any questions about the study, please ask me now. If you have questions later you or your parents may call me at any time. My name is Megan and my phone number is (815) 530-9165. You may also ask me questions about this study any time we meet.

If you have a problem or complaint about the research or want to talk about your rights as a research participant, call the University of Nevada, Reno Research Integrity Office at 775.327.2368.
Appendix Q

Treatment Fidelity

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Appendix R

Interrater Reliability

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