Developing Joint Attention in Children with Autism Spectrum Disorder - A Pilot Study

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This thesis is presented in partial fulfilment of the requirements for the degree of Bachelor of Arts in Psychology (Honours), Murdoch University, 2012.
I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary educational institution.

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Sharonia Jeyabalalan
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Sharonia Jeyabalan
Abstract

This pilot study examined the general question; To what extent can joint attention be developed and generalised by children with Autism Spectrum Disorder? Children’s joint attention level was assessed and a behavioural intervention program based on the research of Holth (2005, 2006, 2009), was used to target deficits in responding and initiating joint attention. Four children diagnosed with Autism Spectrum Disorder (ASD) aged between 4 and 7 years were assessed prior to an intervention phase which targeted the joint attention behaviours of gaze following, monitoring, social referencing, verbal tacting and manding. Post assessments were conducted after the intervention. Intervention results showed that training of specific joint attention skills were successful. In particular, high level behaviours increased at post assessment whereas the low level behaviours decreased. The results show that behavioural intervention programs can successfully teach joint attention skills and those skills can be generalised and maintained after the intervention.

Keywords: Joint attention; intervention; assessment; behaviour;
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A mother takes her three year old son to the park and, as they are sitting on the bench, three fighter planes fly across the sky. A typically developing child would say something like “Mum, look at the planes,” as he points towards the planes and glances at her. The child’s initiations and coordination of the mother’s attention toward the planes is known as joint attention.

Cognitive psychologists have focused on normative patterns of emergence of the skills and the relationship of joint attention to later developing social and language skills (Holth, 2005). Joint attention has been recognized as one of the earliest emerging social behaviours and linked to the later development of both, symbolic and language abilities as well as general social cognition processes. It can be described in simple terms as the behaviour of looking where someone else is looking (Holth, 2006). However, a broader definition of joint attention is the ‘capacity of a person to use gestures and eye contact to co-ordinate attention with another person in order to share the experience of an interesting object or event.’ (Mundy, Sigman & Kasari, 1994 pg 389 as cited in Dube, MacDonald, Mansfield, Holcomb & Ahearn 2004). This includes checking another person’s face that occurs while one is attending to something, has accomplished a task, after one has pointed to something or is in an ambiguous situation and seeks clarification (Sigman & Kasari, 1995 as cited in Holth, 2005).

Two types of joint attention have been identified, responding to and the initiation of joint attention. Following another individual’s attempt at co-ordinating one’s attention towards an object or event by pointing, showing or gaze shifting is
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known as responding to joint attention (Naoi, Tsuchiya, Yamamoto & Nakamura, 2008). Whereas, initiating joint attention involves using behaviours such as pointing, gaze shifting and commenting to initiate co-ordinated attention with another individual (Naoi et al., 2008). Cognitive psychologists believe that joint attention can be further distinguished by behaviours which have been labelled as ‘protodeclarative’ and ‘protoimperative’ behaviours which are labelled based on one’s intentions (Holth, 2005). ‘Protoimperative’ behaviours are requests with the intention of asking someone to do something for one’s benefit. For example, a child will say “milk please” when he/she wants milk. Alternatively, ‘protodeclarative’ behaviours involve a social motive with the intent to share attention to something but not to gain access to that object or event. For example, a child may say “look, a rainbow” to bring his/her mother’s attention towards the rainbow in the sky (Holth & Isaksen 2009).

According to Mundy, Hogan and Doehrig (1996, as cited in Holth, 2005) the function of both responding and initiating joint attention behaviours is to share attention with the interactive partner or monitor the partner’s attention. They argue that this differs from requesting bids, previously identified as ‘protoimperative’ behaviour, as joint attention should not appear to serve an instrumental purpose but only serve to share attention for social reasons. However, Corkum and Moore (1995 as cited in Holth, 2005) argue that joint attention does play an integral role in both ‘protodeclarative’ and ‘protoimperative’ behaviours. The child is not only attempting to obtain an object with ‘protoimperative’ behaviour but is trying to change the intentions of others to align them with his/her own intentions, and as joint attention must involve some type of co-ordination of attention with other people, then
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‘protoimperatives’ can also be classed as joint attention (Tomasello, 1995 as cited in Holth, 2005).

In behavioural terms, the two functions of joint attention are explained in terms of Skinner’s verbal functions of a ‘mand’ and ‘tact’. ‘A ‘mand’ is evoked by an establishing operation such as deprivation or an aversive stimuli and is maintained by a specific consequence relevant to the establishing operation’ (Skinner 1957 as cited in Wallace, Iwata & Hanley 2006). For an example, a child may say “Milk” when thirsty and receive the glass of milk. In comparison, ‘a tact is evoked by a nonverbal discriminative stimulus, such as an object or event and is maintained by generalised or social reinforcers’ (Skinner 1957 as cited in Wallace et al., 2006). For example, a child may say “Milk” when a teacher points to a picture of a glass of milk. Once the child responds correctly, the teacher will say “That’s correct, well done”. Although both have differing functional properties, the form of the utterance is identical (Skinner 1957 as cited in Wallace et al., 2006).

Development of Joint Attention

Development of joint attention behaviour begins in typically developing children between the ages of 9 and 18 months (MacDonald et al., 2006). These behaviours include gaze shifts between an object or event in the environment and another person. As development increases, behaviours such as gaze shifting are combined with gestures toward the object or event and eventually verbalisations, eye contact, pointing, reaching towards or showing an object to a person (Dube et al., 2004). According to Jones and Carr (2004), by the age of 14 months, children should follow pointing gestures to the side, ahead and across the body, and follow their mothers’ glance and then look back at her face, which is known as gaze
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Alternation. By the second year of life, typical developing children begin to engage in more co-ordinated attention and make routine checks of their caregivers’ gaze as well as initiate joint attention by using gestures, such as pointing, in response to the presence of an interesting object or event. Children should also have developed well co-ordinated joint attention skills in the form of generalised gaze alternation and conventional gestures which should lead to interactions with a wider circle of adults (Jones & Carr, 2004). Children with Autism Spectrum Disorder (ASD) do not follow this pattern of development. At the end of the age of 2 years, many children with Autism, exhibit very few, if any joint attention behaviours while engaging in play interactions with an adult or their peers (Jones & Carr, 2004).

Autism is a disorder characterized by profound deficits in social behaviour, language, imitation and play skills (Whalen & Schreibman, 2003). Recently, deficits in joint attention have been cited as a potential component deficit that accounts for the abnormal development of communication, speech and social behaviours and is now considered one of the earliest emerging signs of the disorder. Children with Autism are not impaired in ‘manding’, such as pointing to request or in the ability to appropriately respond to joint attention bids but display profound impairment in ‘tacting’, such as pointing or commenting to share attention and initiating joint attention bids (Whalen & Schreibman, 2003). In other words, they can use the behaviours of gaze shifting and pointing for instrumental purposes, (‘manding’), but not for the social purpose of sharing attention with another person,( ‘tacting’) (Naoi et al., 2008).
Joint Attention and Language

Many children with Autism have deficits in language, social cognition and theory of mind abilities which have been reported as being linked to joint attention abilities (Macdonald et al., 2006). Not only is joint attention an important pre requisite for having a successful conversation (Kwisthout, Vogt, Haselager & Dijkstra, 2008) but is crucial to language development in infants. Baron – Cohen, Baldwin and Crowson (1997 as cited in Jones & Carr, 2004) suggests that infants acquire basic joint attention skills such as gaze shifting and joint engagement parallel to learning their very first words. Furthermore, he goes as far as suggesting that a child requires joint attention to acquire vocabulary. This is supported by findings that joint attention behaviours assessed at 45 months of age were predictive of language ability 12 months later (Mundy, Sigman & Kasari as cited in Charman 2003).

Kwisthout et al. (2008) report on a study that demonstrates that children who learn new words through a joint attention episode, do better than children without the joint attention episode. This has been explained by the associative learning principle whereby the joint attention episodes allows an individual to reduce the number of hypothetical meaning of an unknown word and the episodes are associations that strengthen a word and its meaning. Baron – Cohen et al., (1997, as cited in Jones & Carr 2004) examined discrepant labelling situations by comparing typically developing children and children diagnosed with ASD. They found that the typically developing children used joint attention skills to check the adult’s line of regard and correctly ascertained that the adults label referred to the item focused on by the adult. However, the group of ASD children who lacked the joint attention skills to check the adults line of regard, incorrectly associated the label of the object with the object
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of their own focus. This demonstrates the importance of joint attention skills in language acquisition.

**Joint Attention as a Pivotal Skill**

Pivotal is described as something which is of crucial importance and on which progress is dependent (Charman, 2003). Charman (2003) identifies joint attention as a pivotal skill in children diagnosed with ASD. Retrospective studies (Charman, 2003) which analyse home videos comparing typical developing and ASD children have found that children later diagnosed with ASD had marked delays in social interaction, social smiling, facial expressions and social attention in their first year of life. In their second year, there was more evidence of impairments, such as ignoring people, preferences to be alone, lack of eye contact and appropriate gestures, and rare instances of showing objects to others or making orientations to their name. This highlights that children with ASD have less exposure to people and their facial, gestural and eye gaze information and therefore have fewer social interactions and understanding of the social world. Prospective analysis studies (Charman 2003) have reported that impairments in gaze monitoring, pointing for interest and simple pretend play at 18 months of age is highly predictive of Autism. Charman (2003) reports that joint attention plays a pivotal role in language development by acting as a precursor to language development through growth and transformation and that joint attention episodes lead to language acquisition. These studies demonstrate the pivotal role joint attention plays in a child’s language and social development and the importance of joint attention in early interventions for children diagnosed with ASD.
Cognitive theorists however, insist that joint attention is not amenable to a learning explanation and that behaviour analysts are irrelevant to this area of research (Holth, 2005). Yet recently, researchers have called upon behaviourists to develop intervention programs to remedy joint attention deficiencies in children with ASD (Holth, 2005).

**Behavioural Intervention Studies**

Whalen and Schreibman (2003) examined the effects of a naturalistic behaviour modification procedure on the acquisition of responding and initiating joint attention. The study had eleven participants, five with an Autism diagnosis and 6 typically developing children all between the ages of two and five. In the study, they used pivotal response training and discrete trial training. Pivotal response training (PRT) is derived from applied behaviour analysis and focuses on core deficits and excesses of Autism which are considered pivotal areas (Burris 2009). PRT emphasises the child’s motivation by providing choices of reinforcement, reinforcing attempts at responding and interspersing maintenance tasks. The reinforcers which are used are initially directly related to the task so the child can establish a link between the target behaviour and the reinforcer which leads to generalisation. Discrete trial training (DTT) has also been used. It involves the process of breaking a skill down into discrete components and using repeated trials until the skill is mastered. A discrete trial is a three term contingency, the delivery of a discriminative stimulus followed by a prompt if necessary which is faded over time and finally, a response. If the response is correct, there is a consequence which is planned to function as a reinforcer. If the response is incorrect a variety of procedures such as error correction to elicit the correct response are used (Burris 2009).
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The training in Whalen and Schriebman’s (2003) study included the use of pivotal response training techniques, turn taking and the use of high preference natural consequences as reinforcement. There were two main phases, responding to joint attention training and initiating joint attention training. The training procedure successfully taught all participants the skills to initiate and respond to joint attention and this successfully generalised for all participants except one whose initiation skills did not generalise. It was found at follow up testing that there was a marked decrement in the initiation of joint attention skills. Whalen and Schreibman (2003) suggest that the decrease in the initiation skills could be due to parents having not known how to maintain the skills. The study provides evidence that joint attention skills can be taught by behavioural interventions to children with impaired joint attention.

Holth and Isaksen (2009) conducted a study on four children diagnosed with Autism aged between 3 and 6 years to investigate if joint attention can be successfully taught by a training protocol based on a combination of procedures. The study addressed the flaws in Whalen and Schriebman’s (2003) study by including parents in the training procedure and training them to implement the procedures. Additionally, Holth and Isaksen’s (2009) study used generalised reinforcers, such as social interaction, which motivate typically developing children to engage in joint attention. According to Holth and Isaksen (2009) the main treatment goal must be to teach the child with Autism Spectrum Disorder to respond to the same types of social cues as typically developing children do. The study used a modified version of the Early Social Communication Scale (ESCS) (Mundy, Delgado, Block, Venezia, Hogan & Seibert, 2003) to obtain baseline scores and establish adult social responses as conditioned reinforcers for the child’s behaviour.
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The assessment was divided into two main parts. The first part targeted responding to joint attention and involved following a proximal point and a distal point. The second part targeted initiating joint attention and consisted of two subtests that assessed alternated gaze, pointing and vocal responses in two toy activation tasks and a book presentation. The intervention involved three phases, responding to joint attention, establishing social conditioned reinforcers such as smiling and nodding, and the finally switching between initiating and responding to joint attention behaviours using tasks involving turn taking. The results from the study indicate that there was progress in both responding to and initiating joint attention skills when baseline and post training scores were compared. There were no changes during baseline scores suggesting that the improvements had to be from the explicit training. The skills that were taught during the training were maintained and in some cases improved immediately after the training until the follow up test, a month after the training was complete. Results suggest that the effects of smiling and nodding as generalized social reinforcers were maintained in daily life. Parents reported that their children used the skills that they learnt in different settings. After completing the study, all children were reported to engage in joint attention behaviours and showed enjoyment when doing so. This study further suggests that behavioural interventions can successfully teach children with Autism Spectrum Disorder joint attention skills these can be maintained once parents have been trained to reinforce them at home.

Operant Analysis of Joint Attention

Holth (2005) views joint attention as an operant, which is a class of behaviours which are related such that when one behaviour is reinforced, the entire class of behaviours is reinforced (Flora, 2012). Holth (2005, 2006) conducted an
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operant analysis on the behaviours called joint attention and found five related
behaviours which can be classed under joint attention. He used this research to
develop procedures to remedy each of the deficiencies in the area. An operant
analysis is an examination of how behaviours functionally operate in certain
environments with the intention to obtain a certain effect (Holth, 2005). The first and
most basic skill is the ability to gaze follow which is the earliest seen joint attention
skills in infants. It is classed as responsive joint attention and involves simply
looking where someone else is pointing, touching or looking. Gaze following can
only be classed as joint attention if one’s attention is influenced by the other’s
attention but not if something catches the eye of both people simultaneously. The
second skill that develops after gaze following is known as social referencing. This
occurs when a child is confronted by a novel stimulus and he/she looks towards a
familiar person and reacts to the novel stimuli in accord with the reaction of the
familiar person. It cannot be classed as joint attention if the child is comfort seeking
because then the child is not checking how the person is behaving (Baldwin 1995 as
cited in Holth, 2005). An important component of social referencing is that the child
understands that the person is attending to the same thing as themself. ‘Mands’ can
be classed as true joint attention if the child is not only attempting to obtain the
object but to change the adults’ intentions so they become aligned with its own
(Tomasello 1995 as cited in Holth, 2005). ‘Tacting’ is classed as true joint attention
if the child is intending to direct other’s attention to an object or event. The
behaviour of monitoring can be done in a simple responsive manner or in an
interactive manner to influence the other person’s attention. Holth’s (2005, 2006)
operant analysis of joint attention provides information on how each phenomena
classed as joint attention functionally operates in the environment, and the
consequences needed to maintain the behaviour. It provides insight into how these behaviours can be taught in early behavioural intervention programs and lead to the development of generalised joint attention in children with ASD.

**Rationale**

The current study builds on Holth’s (2005, 2006) operant analysis of joint attention behaviours in an attempt to answer the question, ‘To what extent can joint attention be developed and generalised by children with Autism Spectrum Disorder’? The intervention used in this study is based on Holth’s (2005, 2006) five behaviours classed as joint attention, gaze following, social referencing, ‘manding’, ‘tacting’ and monitoring. An ABA model was used which included the use of positive reinforcement, a token economy system and techniques for prompting and shaping behaviour. Positive reinforcement is when an event or stimulus is presented as a consequence of operant behaviour and the operant increases (Flora 2012). It includes the use of a token economy or generalized reinforcers which are delivered contingent upon a specified behaviour (Flora 2012), in this study, the child received a token for each correct response and after ten tokens were collected, a pre selected reinforcer was delivered as positive reinforcement. If the child does not have the skills required for the target behaviour, shaping of behaviour is necessary which is ‘the differential reinforcement of successive approximations to terminal behaviour’ (Flora 2012). Various tasks in this study’s intervention have steps to be completed leading to the development of the larger target behaviour. Each of the five goals are targeted by two tasks indentified by Holth (2006) as key tasks in the development of joint attention.
Joint attention has been linked to language and social cognitive processes which have been found to be deficient in children diagnosed with Autism. Therefore early intervention programs which successfully target joint attention have the potential to provide significant breakthroughs for the area of Autism. This study provides information for the development of Autism intervention programs that aim to improve joint attention as well as social and language abilities.

Method

Participants

Four children with a prior diagnosis of Autism Spectrum Disorder between the ages of 5 and 7 years participated in this study. All of the children were recruited from the Child Wellbeing Centre, Perth, Western Australia where they were receiving behavioural therapy from a Developmental Therapist and Clinical Psychologist which did not focus on joint attention behaviours. Flyers were placed in the reception area of the centre and parents contacted the researcher if they were interested in volunteering their child for the study. Acceptance into the study required the child to be between the ages of 3 and 7 years, have an independent, current diagnosis for Autism Spectrum Disorder and display deficits or delays in joint attention behaviours.

Participant 1, (JL) is a 5 year old boy with an Autism diagnosis. He was diagnosed at 4 years of age and has been receiving behavioural therapy from a Developmental Therapist and Clinical Psychologist for the past 14 months. His current therapy goals are mainly demonstrating flexibility for situations he has no control over and social skills such as having a conversation, joining in to play with other children and asking peers to play with him. JL has an older half sister who is
14 years of age and typically developing. There is no family history of ASD, JL has no other developmental problems or health problems and does not now have any self stimulation behaviours.

Participant 2, (BD) is a 5 year old boy with a diagnosis of Aspergers’ Syndrome. He was diagnosed at 4 years old and has been receiving therapy from a Clinical Psychologist for the past year for anxiety and behaviour management and previously received speech therapy. BD is an only child with a family history of Aspergers Syndrome. His language and academic abilities are two years above his chronological age, currently his self stimulation behaviours include pacing and flapping of hands.

Participant 3, (JS) is a 7 year old boy with a diagnosis of Autism. He received the diagnosis at the age of 5 years and then received developmental and occupational therapy from a Developmental Therapist and Occupational Therapist for a duration of 8 months. The main goals of his therapy were sound and letter recognition, reading and writing. He does not currently display any self stimulation behaviours and has no other developmental or health problems. He has a younger brother who is 5 years old and is typically developing.

Participant 4, TW is a 5 year old girl with a diagnosis of Autism. She received the diagnosis when she was 4 years old and is currently receiving developmental and occupational therapy from a Developmental Therapist, Occupational Therapist and Psychologist. Her main goals in therapy are management of anxiety, language comprehension, development of expressive language, greater independence and development of arm strength because of delayed development as well as fine and gross motor control. TW has many self stimulation behaviours
including grinding her teeth and wringing of her hands. She has a typically
developing younger sister who is 4 years old. She displays an intentional tremor and
there is a language and general developmental delay evident. There is no family
history of Autism and TW has no other developmental or health problems.

Table 1

*The age, gender and diagnosis for each participant.*

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**Materials**

Prior to the first phase of the study, parents had to fill out a questionnaire
(appendix F), based on the ESCS (Mundy et al., 2003), which assessed whether the
child has a deficit in joint attention required to be included in the study. The
questionnaire asked parents’ everyday observations of the child’s joint attention
behaviours such as eye contact, turn-taking, responding to commands, non verbal
gesturing and initiating and responding to pointing. The questionnaire has ten items
and takes about 10 minutes to complete (Appendix F).

The ESCS (Mundy et al., 2003) is a video-taped structured observation
measure which takes 15 to 30 minutes to administer. It aims to provide measures of
individual differences in joint attention, social interaction and behavioural requests.
Joint attention behaviours refer to the child’s skills in using nonverbal behaviours
with the aim of sharing an experience or object. Social interaction behaviours refer to the child’s ability to engage in playful, positive turn-taking interactions with others. Whereas, behavioural requests refer to the child’s ability to use nonverbal behaviours to gain assistance in obtaining a desired object or event (mands). The ESCS looks at both, initiating and responding to each of the three categories of behaviours.

The materials used in the ESCS such as the wind up mechanical toys, hand-operated toys, cars, a ball, big picture books, a hat, glasses, comb and big colourful posters are included to help elicit social interaction. The room is set up with a table in the middle of the room at which the child and tester are sat facing each other and the parent behind the child. The video recorder is to the back left or right of the table and with the child and tester in the line of vision. The toys are next to the tester, out of the child’s reach. The four colourful posters are hung around the room to the left, right, back left and back right of the child.

The materials used for the intervention phase include cups, tokens, toys used as potential reinforcement, envelopes, big bright picture books and pictures of things which are silly, funny or interesting (eg. A purple, flying elephant).

**Design**

The study is a single case experimental design in which each child’s joint attention behaviour will be examined individually. The behaviours are measured by ESCS scores. The ESCS scores from the pre-intervention phase are compared to their post intervention and follow up ESCS scores, the results are displayed on graphs. The intervention results for the ten tasks and the intervention assessment conducted during the intervention phase will also be displayed in separate graphs.
**Procedure**

Participants’ parents responded to flyers placed in the reception area of the Child Wellbeing centre at which their child received regular behavioural therapy. An information sheet was sent to the parents to read and discuss with their child once they had made contact with the researcher. Parents then responded if they wanted their child to participate. The parents, child and researcher then met at the child’s home to further discuss the project, answer any questions, explain to the child what would be happening (appendix G) and to obtain written consent (see appendix D) from the parent.

Next, parents filled out a questionnaire (appendix F) and the researcher and chief investigator decided if the child would benefit from an intervention targeting joint attention behaviours by looking at the scores from that questionnaire. The scoring was 0 for a response of ‘never’, 1 for ‘sometimes’ and 2 for ‘always’. The maximum score the child could receive from the ten questions was 20 (which indicated 100%). If the score was above 70% the child was excluded from the study. The participants then completed the pre-intervention phase.

**Assessment**

The pre-intervention phase involved obtaining baseline scores for the child’s joint attention behaviour. The ESCS (see appendix K for a description of all tasks) was administered once, at the Child Wellbeing Centre which ensured a structured, standardised environment for all testing. The ESCS began with the tester asking the child, “What do you want to play with?”
The child’s behavioural requests were targeted by the ‘following of commands’ task, the ‘Object Spectacle’ task and the ‘Plastic Jar’ task. The ‘following of commands’ task targeted responses to behavioural requests, it was administered eight times throughout the. While the child was playing with an object, the tester would use a firm voice and say “Give it to me”. If the child did not comply, the tester used a palm up gesture and if the child still did not comply, the tester retrieved the toy from the child. Meanwhile, the ‘Object Spectacle’ task targets initiating and responding to behavioural requests as well as initiating joint attention. The wind-up and hand held toys are activated and presented out of reach from the child three times each. Then the toy is pushed towards the child to play with followed by the tester requesting the toy. Finally, the ‘plastic jar’ task involved the tester pouring the contents of the two wind-up toys out of the jar and then putting it back in before the child retrieves any toys. The jar was closed tightly and given to the child, the child then passes it back to the tester, the jar is opened and one toy is taken out. The toy is presented identical to the procedure followed for the ‘Object Spectacle’ task. The tester then requests the toy and the same procedure is followed for the second toy.

The child’s initiation and responses to social interaction were assessed by the ‘Turn Taking’ and ‘Response to an Invitation’ tasks. The ‘Turn Taking’ task involved a car and ball being presented independently and placed in the middle of the table. The child retrieved the toy and the tester sat with open arms in a position to catch the ball or car. The ‘Response to an Invitation’ task involved the comb, glasses and hat being presented once each. The object was placed in the middle of the table and the child was allowed to play with it. Following this, the tester asked “Can I play” and the child was required to pass the object to the tester. Finally, to
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Assess the child’s ability to respond to joint attention bids, the ‘Gaze Following’ task was used. This involved the tester pointing on two separate occasions to the four pictures positioned around the room in the order of left, right, back left and back right of the child. The ‘Book Task’ involved pointing to pictures in the book on both left and right pages and saying the child’s name, this was presented once.

Scoring for the ESCS examines the behaviours of joint attention, behavioural requests and social interactions individually, and is further divided into responding and initiating behaviours. Initiating joint attention is separated into lower (eye contact and gaze alternating) and higher (point, point and eye contact and show) levels of behaviour and frequency of occurrences is scored. Responding to joint attention is also separated into lower (following proximal point or touch) and higher (following line of regard) levels and into left and right responses to joint attention. The scores are the percentage of correct responses. Initiating behavioural requests is the frequency of lower (eye contact, reach and appeal) and higher (point, point and eye contact, give, give and eye contact) level behaviours. Responses of behavioural requests are scored by the amount of correct responses in the ‘Following Commands’ task. The initiation of social interaction score is a numerical value between 0 and 2 based on the amount of times the child initiates turn taking sequences. Whereas, the response to social interaction behaviours are separated into lower and higher levels and each activity is scored differently. The ‘Turn Taking’ task is a higher level behaviour, and the child receives a score between 0 and 4 depending on how many turns occur during the two administrations of the task. The ‘Response to Invitation’ task is a high level behaviour and each time the child responds correctly, they score a 1, therefore a final score may range between 0 and 3. The final response to social
interaction score is a combination of each tasks total scores. Once baseline scores were formulated, the intervention phase began.

**Intervention Procedure**

The intervention phase of the study was conducted over four weeks, with one hour sessions completed twice a week. The sessions were conducted in the child’s home or the centre in an allocated therapy room free from distractions. The ten tasks (see appendix J for task descriptions) involved ten trials which were completed over the eight sessions. At the end of all sessions, a brief assessment based on the ESCS was conducted. The child received a score out of ten for each task according to the number of unprompted correct responses made. The researcher worked through the steps of the tasks until reaching the completion point. The task is successfully completed once the child achieves 100% on three separate occasions of the final step of the task. Reinforcement, chosen by the child, was used and the child received the chosen reinforcer once he/she had earned ten tokens.

The child’s mother was present during the sessions and was involved in some of the tasks. If necessary the mother was used for model prompting. Each task targets a specific goal which has been identified as key to the development of joint attention (Holth, 2005, 2006). Holth (2005) classed five behaviours under joint attention, these were social referencing, monitoring, gaze following, manding and tacting. Holth (2005) developed tasks to target these five goals and these were used in this study.
The social referencing goal was targeted by the Table Top task and the Hot and Cold game. These both teach the child to value the information given by researchers face.

1.) The ‘Table Top’ activity involved ten, scattered, edible reinforcers on the table. To retrieve the reinforcer the child sat patiently and looked at the researchers’ face. Once the researcher smiled and nodded, the child took one edible reinforcer. The process continued until all reinforcers were gone. Between trials, the researcher waited for the child to sit patiently before starting the next trial.

2.) ‘Hot and Cold’ game. The researcher hid a token and to find it the child had to use the researcher’s face for clues. Smiling and nodding meant they were getting closer and sad expressions and shaking of the head meant they were not near the reinforcer.

The monitoring goal was targeted by the Envelope Game and the Hide and Seek activity. The tasks encourage the child to watch people and monitor their movements and behaviours.

1.) The Envelope Game involved lining ten envelopes up along the wall out of the child’s reach, the child watched, a token placed in one of the envelopes. The child then directed the researcher towards the chosen envelope and if successful, the child gained the token. The researcher intentionally made mistakes, such as walking in the wrong direction, to ensure that the child was actually monitoring her behaviour.

2.) The Hide and Seek style activity involved the mother hiding the token around the room while the child observed. To access the token, the child
directed the researcher to where the token was hidden. The researcher acted like a robot, only moving exactly as directed by the child and made intentional mistakes to ensure the child monitored her behaviour.

The gaze following goal was targeted by the Cup game and ‘Guess what I am thinking about’ game. These tasks encourage the child to look at people’s eyes for clues and information about their thoughts. Both tasks involved turn taking so the child learns to use his or her gaze to inform other people as well.

1.) The Cup game involved the use of three cups turned upside down, lined up on the table, spread apart approximately 5cm. The researcher placed a token under one of the cups while the child faced the other way. The child then attempted to select which cup the token was under by using the researcher’s face as clues. In the initial step, the researcher used her entire head to obviously point out which cup had the reinforcer. The child used this clear prompt to select that cup and look underneath it and gain the reinforcer. Once the child clearly follows the head tilt prompt (100% for 10 consecutive trials), the prompt is faded to an obvious eye gaze lasting 3 seconds (100% for 10 consecutive trials) then to a quick one second glance.

2.) The ‘Guess what I am thinking about’ game involved the child trying to guess what the other person was thinking about around the room. The object must be visible and physical. The researcher obviously stares at the object and describes its features and functions and the child guesses and then the child has a go and the researcher guesses. Once 100% is achieved for 10 consecutive trials on three separate sessions, the task is completed.
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The manding goal is targeted by the child requesting unobtainable reinforcers and the Yes and No game. This teaches the child to be able to request and communicate what they want.

1.) The child watched as the researcher placed the reinforcer in places where the child could not access them and then the researcher acted being busy. The child got the attention of the researcher in an appropriate manner such as calling out her name or tapping her if the child is nonverbal. The researcher responded with a ‘yes, to her name’ and then faced the child with a smile. The child must then request the reinforcer while making eye contact and a gaze alternation between the reinforcer and the researcher. If the child is non verbal, pointing and eye contact is appropriate. Then the researcher gives the child the reinforcer. This is repeated ten times throughout each session. The researcher must engage in appropriate listener behaviour. If the child is not looking at the researcher, she can prompt with a “My face is here” or “Look here” or simply not responding until he or she maintains eye contact.

2.) The Yes and no game involves holding up two items to the child. One item is a valued and the other item is not valued. The researcher holds up both and asks him/her which one he/she wants. The child must use eye contact and gaze alternation while verbally requesting what he/she wants. If the child is nonverbal, he/she can point to which item he/she wants but eye contact must be made. Once these conditions are satisfied, the researcher gives him/her the item held, they are requesting. This is repeated ten times throughout each session, once the child achieves a 100%, the researcher begins to offer the child the item he/she do not want
and the child must then respond appropriately by refuting that item and requesting the other item, while maintaining appropriate eye contact. Once 100% is achieved for the 10 trials throughout the session, the task is completed.

The tacting goal is targeted by the ‘What’s missing/interesting/silly’ task and ‘I can see’ task. This goal is aimed at promoting commenting behaviour. These activities are conducted as turn taking activities.

1.) The ‘I can see’ task involves looking at different picture books each session with the child and commenting and pointing to what is on the pages using parallel statements. The researcher opens the book and prompts the commenting behaviour by saying, “I can see a....” and if the child independently labels what he/she can see, the process continues. If the child does not respond by pointing out what he/she can see, the researcher prompts with “What can you see?” and eventually (once the child independently responds, approximately 3 trials) fades the prompt. After 10 successful trials of the researcher initiating the commenting interaction and the child immediately responding, the next step is for the researcher to turn the page and wait for the child to initiate commenting independently. If after 5 seconds the child does not initiate the interaction, the researcher says “What can you see?” and then fades the prompts after 3 trials. Once ten successful trials have been completed on three separate occasions for the last step, the drill has been mastered.

2.) The ‘What’s missing/interesting/silly’ task involves a walk around the house and backyard and a set up of posters, pictures and objects which are obviously not meant to be there or are funny or silly. (Eg, A toy in the
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refrigerator, a picture of a purple flying elephant on the family portrait, the
researcher wearing a silly hat or a red nose). The child goes for a walk with
his/her mother and the researcher and points out and labels what he/she can
see as funny or silly or missing or interesting. If the child is nonverbal or has
language difficulties, he/she points and make eye contact with the researcher
or mother. If the child does not do this independently, the child’s mother
models the correct response or a prompt of “Oh is that usually there?” can be
used. Once a 100% is achieved on the ten trials on three separate occasions,
this task is complete.

The initial post intervention phase was conducted one week after the
intervention was completed. The ESCS was readministered once to examine the
effect of the intervention on the child’s behaviour.

Two weeks later, a follow up assessment was conducted, during which the
ESCS was delivered once at the Child Wellbeing Centre by a therapist from the
Centre. Additionally, the parent completed the questionnaire which they had
completed prior to commencing the study. This phase examined the generalisation of
the skills across people and settings as well as the retention of the skills taught to the
child during the intervention.

**Inter-rater Reliability**

The inter-rater reliability was measured by an independent person cross
checking the scoring accuracy of the researcher by rescoring all ESCS assessments.
The reliability was calculated by using the formula (agreements / agreements +
disagreements) and this was found to be 80.1% overall.
Results

The scores for baseline and post intervention assessments, for each child’s results in the Early Social Communication Scale are presented. The scores of each child’s performance in the tasks and assessment of the intervention are also presented.

The intervention graphs present the child’s percentage of correct responses during each session. The intervention assessment graph displays the child’s scores for gaze following, point or showing, gaze alternation, following commands, eye contact, social imitation and turn taking components in the assessment.

All participants possessed the skills required for the behaviour of ‘manding’ at the pre intervention phase and therefore this target was not targeted throughout the intervention phase.

Results for each of the 4 children’s results are shown in Figures 1 to 31. Social Validity scores are presented in Table 2.
Child JL

Assessment Phase

Figure 1. The frequency of JL’s low and high level initiations of joint attention.

Figure 1 shows that JL’s low level behaviours increased, particularly at the follow up assessment but high level behaviours only slightly increase.
Figure 2. The frequency of JL’s low and high level initiations of behaviour requests.

JL’s low level of initiation of behavioural requests decreased whereas high level behaviours increased as displayed in Figure 2.

JL’s scores for responding to joint attention, responding to behavioural requests and initiating and responding to social interaction began and remained at 100%. 
Intervention Phase

Figure 3. The percentage of JL’s correct responses for the ‘gaze following’ goal.

JL’s scores for each of the 3 steps in the Cup game were 100% and the completion point of the task was reached at session 6. JL’s scores for the ‘Guess what I am thinking about’ activity steadily increased over the 8 sessions (see Figure 3).
Figure 4. The percentage of JL’s correct responses for the ‘monitoring’ goal.

Accuracy in both, Hide and seek and Envelope game steadily increased, as evident in Figure 4.

Figure 5. The percentage of JL’s correct responses for the ‘social referencing’ goal.
JL’s ‘Table top’ activity increased and remained consistent at 100% throughout the 8 sessions whereas the ‘Hot and Cold’ task increased and steadied at 80% correct for the remainder of the sessions as seen in Figure 5.

Figure 6. The percentage of correct responses for the ‘tacting’ goal.

JL’s scores in the ‘I can see’ task was consistently high, fluctuating between 70% and 100% whereas the ‘Whats missing or silly’ task was completed within the first 3 sessions of the intervention.
Figure 7. The percentage of JL’s correct responses, at first and last assessment for the intervention. Scores are for following commands (FC), gaze following (GF), social imitation (SI), pointing or showing (P/S), eye contact (EC), gaze alternation (GA) and turn taking (TT).

JL’s initial and final assessment scores increased in all scores except for the turn taking and pointing and showing components. The turn taking component remained at 100% consistently and the pointing and showing task remained at 40% as indicated by figure 7.
Figure 8. The frequency of BD’s low and high level initiations of joint attention.

Figure 8 displays that BD’s low level behaviours stayed constant between pre and post assessment but decreased at follow up. His high level behaviours increased at post assessment and again at follow up.
**Figure 9.** The frequency of BD’s low and high level initiations of behavioural requests.

BD’s low level of initiation of behavioural requests decreased post assessment as displayed in Figure 9. In comparison, his frequency of high level initiations increased at post assessment and remained high at follow up.
Figure 10. The total number of BD’s initiations of social interaction.

Figure 10 shows that initiations of social interactions increased and held at follow up.

BD’s scores for responding to joint attention, behavioural requests and social interactions in the assessment began and remained at 100%.
Intervention Phase

Figure 11. The percentage of BD’s correct responses for the gaze following goal.

BD’s scores for the Cup game initially dropped for the final step before increasing and he reached completion point of the task at session 7. Figure 11 shows that BD’s scores for the ‘Guess what I am thinking about’ activity steadily increased although dropped slightly in the final session.
Figure 12. The percentage of correct responses for the monitoring goal.

Figure 12 displays BD’s results for the monitoring goal targeted by the Envelope game and Hide and seek activity. The Envelope game scores increased and then slightly dropped at the final session. Whereas, the Hide and seek activity remained consistently high between 90% and 100%.
**Figure 13.** The percentage of correct responses for the social referencing goal.

The scores for the ‘Table top’ activity stayed at a consistent 100% throughout the 8 sessions with only one decrease point at session 2. Scores for the ‘Hot and cold’ task steadily increased over the eight sessions as seen in Figure 13.

**Figure 14.** The percentage of BD’s correct responses for the ‘tacting’ goal.
BD’s scores in the ‘I can see’ task started low but increased and remained at 100%. However, scores for the ‘What’s missing or silly’ task increased by remaining low as seen in Figure 14.

*Figure 15.* The percentage of correct responses, at first and last assessment for the intervention. Scores are for following commands (FC), gaze following (GF), social imitation (SI), pointing or showing (P/S), eye contact (EC), gaze alternation (GA) and turn taking (TT).

BD’s assessment scores increased except for the turn taking, following commands and the social imitation components. The turn taking and following commands components remained at 100% consistently whereas the social interaction component decreased as indicated in Figure 15.
Child JS

Assessment Phase

Figure 16. The frequency of JS’s low and high level initiations of joint attention.

Figure 16 shows that the low level behaviours increased and were maintained at follow up. Meanwhile, the high level behaviours increased at post assessment but decreased at follow up.
Figure 17. The frequency of JS’s low and high level initiations of behavioural requests.

JS’s low level of initiation of behavioural requests increased at post assessment but decreased at follow up whereas his high level behaviours increased and were maintained at follow up as seen in Figure 17.

JS’s scores for responding to joint attention, behavioural requests and responding and initiating social interaction began and remained at 100%.
**Figure 18.** The percentage of JS’s correct responses for the ‘gaze following’ goal.

JS’s scores for the first two steps in the Cup game were 100% and initially dropped for the final step but increased and completion point was reached at session 6. Scores for the ‘Guess what I am thinking about’ activity steadily increased as evident in figure 18.
Figure 19. The percentage of JS’s correct responses for the monitoring goal.

Figure 19 displays JS’s results for the monitoring goal targeted by the Envelope game and Hide and seek activity. Accuracy in both tasks increase over the intervention duration.

Figure 20. The percentage of JS’s correct responses for the ‘social referencing’ goal.
JS’s accuracy in the ‘Table top’ activity increased at the beginning of the intervention and then remained consistent at 100%. JS’s performance in the ‘Hot and cold’ task fluctuated between 70% and 80% for the majority of the intervention as seen in Figure 20.

*Figure 21.* The percentage of JS’s correct responses for the tacting goal.

‘I can see’ task scores started at 80% and then increased slightly to 90% in the last session. However, scores for the ‘What’s missing or silly’ task began at 70% and slightly increased.
The percentage of JS’s correct responses, at first and last assessment for the intervention. Scores are for following commands (FC), gaze following (GF), social imitation (SI), pointing or showing (P/S), eye contact (EC), gaze alternation (GA) and turn taking (TT).

The gaze following and pointing and showing scores increased. The turn taking, following commands and eye contact components all remained at 100% consistently. The gaze alternation component remained consistent at 50% and the social imitation component decreased as evident in Figure 22.
Child TW

Assessment Phase

![Initiating Joint Attention](image)

*Figure 23.* The frequency of TW’s low and high level initiations of joint attention.

TW’s low level behaviours decreased at post assessment but increased at follow up while the high level behaviours remained at a frequency of zero, as evident in Figure 23.
Figure 24. The percentage of TW’s correct responses to joint attention.

TW’s low and high level of responses to joint attention are displayed in Figure 24. Both low and high level of responses increased at post assessments.

Figure 25. The frequency of TW’s low and high level initiations of behavioural requests.
The low level of initiations increased at post assessment but dropped considerably at follow up. However, the high level initiations decreased at post assessment but increased at follow up, as seen in Figure 25.

**Figure 26.** Total number of TW’s responses to social interactions.

TW’s responses to social interaction increased steadily from pre to post intervention as seen in Figure 26.

TW’s scores for responding to behavioural requests and initiating to social interaction in the assessment began and remained at 100%.
Intervention Phase

*Figure 27.* The percentage of TW’s correct responses for the ‘gaze following’ goal.

The first step of the Cup game had to be changed for TW’s developmental level pointing instead of a head tilt. This was completed in session 2. The head tilt was completed in session 5 and the obvious stare step fluctuated between 70% and 80%. Scores for the ‘Guess what I am thinking about’ activity increased as evident in Figure 27.
Due to TW’s delayed language ability, both tasks were adjusted. TW was required to physically take the person to where the token was and to point rather than use of words to direct the person. Accuracy in both tasks increased steadily as seen in Figure 28.

*Figure 28.* The percentage of TW’s correct responses for the monitoring goal.
Figure 29. The percentage of TW’s correct responses for the ‘social referencing’ goal.

TW’s performance on both tasks increased from very low scores at 10% and 20% to 100% in the final session of the intervention as seen in Figure 29.

Figure 30. The percentage of TW’s correct responses for the ‘tacting’ goal.
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The ‘What’s missing or silly’ task had to be changed so that TW had to point or show what was missing or silly rather than using words. TW’s scores in both tasks started very low and increased steadily throughout the intervention as seen in Figure 30.

![Intervention Assessment](image)

**Figure 31.** The percentage of TW’s correct responses, at first and last assessment for the intervention. Scores are for following commands (FC), gaze following (GF), social imitation (SI), pointing or showing (P/S), eye contact (EC), gaze alternation (GA) and turn turning (TT).

TW’s initial and final assessment scores indicates increases in all components except turn taking, gaze following, social imitation and gaze alternation which has already been mastered and remained consistent at 100%, see Figure 31.

**Social Validity**

Table 2 displays each child’s social validity scores which was calculated by scoring of completed pre and post questionnaires by the child’s mother. All
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children’s scores increased, child JL made the greatest gain, increasing from 32.5% to 65%

Table 2.

*Individual Percentage Scores of Parental Questionnaires.*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre Score</th>
<th>Post Score</th>
<th>Gains</th>
</tr>
</thead>
<tbody>
<tr>
<td>JL</td>
<td>32.5%</td>
<td>65%</td>
<td>32.5%</td>
</tr>
<tr>
<td>BD</td>
<td>42.5%</td>
<td>60%</td>
<td>17.5%</td>
</tr>
<tr>
<td>JS</td>
<td>70%</td>
<td>75%</td>
<td>5%</td>
</tr>
<tr>
<td>TW</td>
<td>32.5%</td>
<td>42.5%</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Discussion**

This study aimed to examine the question ‘To what extent can joint attention be developed and generalised by children with Autism Spectrum Disorder’? Prior to the study all participants displayed deficits in initiating joint attention behaviour but could respond to joint attention bids by others and mand. A behavioural intervention program was implemented to teach the children some of the skills necessary to develop joint attention such as gaze following and social referencing.

The results of the study suggest that results for each child were quite varied with most ‘low’ level behaviours (ie. Gaze alternation, eye contact and reach) decreasing and ‘high’ level behaviours (ie. Pointing, showing) increasing between pre and post assessments. Intervention results indicate positive results for every child across all goals that were targeted during the intervention. The most gains were made by child TW compared to the other children. Generalisation was assessed by the
follow up assessment being conducted by a different tester in a different setting, additionally, parents completed a questionnaire which asked parents’ everyday observation of the child’s joint attention behaviours such as eye contact and turn taking. The results from the questionnaire completed by parents at pre and post assessments suggest positive gains for all children, which suggests that the skills learned during the intervention were generalised to other settings.

**Child JL**

Child JL made gains in low level initiations of joint attention, particularly in the follow up assessment. However, the high level initiations remained at a low frequency with a slight increase. Conversely, there was a decrease in low level initiations of behavioural requests and high level behaviours increased, particularly at the follow up. These gains in high level behaviours suggest that the intervention training had a positive effect on JL, and he learnt complex joint attention skills such as pointing and showing. The decrease in low level initiations of behavioural requests compared to increase in the high level behaviours could be explained by JL’s replacement of low level behaviours with the newly learnt high level behaviours.

JL made gains in all intervention tasks, particularly in the ‘hide and seek’ and the ‘hot and cold’ activity which targeted the monitoring and social referencing goals respectively. Additionally, JL made gains in all components of the ESCS except pointing and showing which remained at 40%.

These positive results indicate that JL learned to check other people’s behaviour, follow gazes and reference someone’s face for information. Additionally, these tasks included turn taking. Therefore JL learnt to use his own gaze and face to
initiate joint attention, this was evident in his gains in the initiation of joint attention component of the ESCS.

**Child BD**

Child BD’s low level initiations of joint attention and behavioural requests dropped in the follow up assessment whereas his high level behaviours increased. His decreased low level behaviours compared to increases in high level behaviours may be due to the replacement of low level behaviours with his newly acquired high level behaviours. Additionally, his drop in high level behavioural requests at follow up may be due to a lack of maintenance of learned skills during the intervention or a lack of generalisation across people and settings which was tested in the follow up assessment which was conducted by a different tester in a new setting. BD made steady gains in initiating social interaction tasks.

BD showed positive results on all tasks for gaze following, monitoring, social referencing and tacting. He made particular gains in the ‘tacting’ goal (see Figure 14) with both task scores initially low at 30% and 50% respectively. The scores in the ‘What’s missing or silly’ task of the ‘Tacting’ goal remained low but increased. In comparison BD made particular progress in the, ‘I can see’ of the ‘tacting’ goal. In addition, BD made gains on all components of the intervention assessment (see Figure 15) particularly in gaze alternation however, social imitation decreased by 60%.

BD’s questionnaire results display positive improvements from pre and post intervention scores which suggest that his transferred learned skills from the intervention across settings.
Child JS

JS’s low level initiations of joint attention scores increased whilst his high level scores remained consistently low (see Figure 16). The increase at post intervention may be due to the training in the intervention and the drop at follow up could indicate a lack of maintenance of skills. JS’s low level initiations of behavioural requests decreased overall and there was a particular decrease at follow up. In contrast, his high level initiations increased, particularly at follow up. This suggests that JS replaced his low level behavioural requesting skills with the newly acquired high level skills.

JS’s intervention performance displayed positive results from the training during the intervention phase. However, JS did begin the intervention with scores of 60% or above (see Figures 19 to 22). JS’s scores during his intervention assessments (see Figure 23) increased in the gaze following and point and showing components but decreased in the social imitation component. However, gaze alternation showed no improvement, remaining at 50%, this could because gaze alternation is a low level behaviour (Mundy et al., 2003) and these were not targeted by the intervention.

JS’s questionnaire results demonstrate a slight increase from pre to post scores. JS’s high pre intervention scores and slight increases at post intervention, suggest that he may have been too advanced for this study and perhaps an advanced intervention program including more complex behaviour such as conversational skills and empathy training would have benefited him.
Child TW

TW’s low level initiations of joint attention decreased at post intervention but increased at follow up. However, TW’s high level behaviour remained at zero (see Figure 23). This could be due to her low developmental level which required her intervention to be adjusted and therefore, did not include the complex high level behaviours that were targeted with other participants. Scores for the responses to joint attention increased at post assessment and were maintained at the follow up assessment. TW’s positive results during the post assessment in responses to joint attention could be attributed to the training conducted during the intervention phase. TW’s low level of initiations of behavioural requests increased at post intervention but dropped at follow up. Alternatively, her high level initiations decreased at the post assessment but increased considerably at follow up. The gains in low level behaviours can be attributed to the intervention training and the use of high level behaviour at follow up which involved a greater use of pointing, may be due to the intervention teaching TW to point, a skill which she lacked prior to intervention. Additionally, after intervention training, TW’s mum, education assistant and therapist began to encourage her to point to request when she had developed the skill of pointing. This may account for increase at the follow up assessment. Scores in responses to social interaction increased to the maximum score of 7 (see Figure 26).

Due to delayed development, TW’s tasks for some of the goals had to be adjusted and different skills had to be taught to shape her behaviour such as the earlier skill of point and show. TW has delayed language abilities therefore she had to physically show and point rather than use words. TW, compared to the other participants, began the intervention with a more severe joint attention deficit but showed greater gains after the intervention program than the other participants. This
could be due to the intervention targeting skills which TW was deficient in where as the other participants already had some of these skills and had less room to grow.

TW’s intervention results display steep learning curves, particularly for the following commands, pointing and showing and eye contact in the assessment as well as the ‘gaze following’, ‘social referencing’ and ‘tacting’ goals. These results can be attributed to the direct effect of the intervention training. There were no declines in any of TW’s results.

TW’s questionnaire results increased by 10% pre to post which suggests some transfer of skills across settings. Furthermore, her mother spontaneously commented on a “dramatic increase” in expressive language and pointing which was also recognized by TW’s teachers and therapists. The importance of this finding will be discussed later.

**Overall Findings**

Positive intervention assessment results and increase of higher level behaviours at the post intervention assessment for all participants suggest that the intervention had a positive effect on all participants and new joint attention skills were successfully taught.

Overall, there were few declines in scores at the three week follow up assessment which was conducted by a different tester in a different room. This is a significant finding as this test for generalisation across settings and people (particularly a new person) and the test for the maintenance of skills after three weeks was particularly challenging for children with ASD. The results of the follow up assessment and the post intervention questionnaire show that all children
successfully transferred the newly acquired skills across to different settings and new people and the skills that were learned were maintained.

All children began with an increased frequency of lower level behaviours compared to higher level behaviours in all components of the assessment and this is consistent with existing research which suggests that children with ASD are deficient in frequency and complexity of joint attention behaviours rather than the belief that they lack joint attention skills completely (Sheinkopf, 2005). The general increase of high level behaviours such as pointing and showing, across all children indicates that complex behaviours can be taught by a behavioural intervention program in a relatively short time period of focused ABA.

The increase in high level behaviours for initiations of joint attention and behavioural requests could be due to the intervention targeting complex, higher level behaviours rather than lower level behaviours. In fact, all of the low level initiations of behavioural requests decreased at follow up but the high level behaviours increased, the drop in low level behaviours could be due to the increase in more complex higher level behaviours which were targeted in the intervention training program and these may have replaced the lower level skills.

**What do the results mean?**

All participants possessed the required skills to respond to joint attention prior to the intervention but did not demonstrate initiation of joint attention skills. This supports the research which reports that responding develops before initiation of joint attention skills in the typical development of joint attention (Whalen & Schreibman 2003).
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The varied level of skills across participants from this study are consistent with research which suggests that impairments in joint attention is not absolute and young children with autism display individual differences in joint attention capacities and factors such as the severity of ASD symptoms can affect the individual differences evident between children (Naber, et al., 2008). In this study, this is evident in the results of TW who displayed more severe symptoms of ASD and had a greater deficiency in joint attention skills compared to the other participants who had less severe symptoms of ASD.

Child TW’s results offers support for the relationship between language and joint attention abilities. TW has delayed language, particularly expressive and also had more severe deficits in both initiating and responding to joint attention bids, but particularly in initiations. The other participants had more joint attention skills than TW and higher language abilities. There was significant improvement in TW’s joint attention as a result of the intervention, all her skills began very low and increased throughout the intervention. Additionally, TW’s mother, school teacher and therapist all reported that her expressive language has improved dramatically over the last few months. This finding supports research which suggests that joint attention is concurrently linked and predictive of language abilities (Jones & Carr, 2004).

This study compared to previous studies

This study was conducted in a similar way to Whalen and Schreibmans (2003) by using a naturalistic behavioural procedure which included turn taking, reinforcement and the use of prompting. As in Whalen and Schreibman (2003), this study successfully taught participants the skills to initiate and respond to joint attention bids with adults. However, the study did not find any marked decrement in
the initiation of joint attention skills at follow up assessments showing better maintenance of skills. This difference could be attributed to the inclusion of parents in the process of the intervention training in this study. Parents were included during the intervention sessions and learnt the skills involved in joint attention training and their follow up at home, although, not asked to continue training at home could have lead to the maintenance of joint attention skills.

Holth and Isaksen (2009) also included parents in the training procedure and used generalised reinforcers. Both found progress in initiations and responses to joint attention bids when comparing baseline and post intervention assessment scores. Similar to Holth and Isaksen’s (2009) reports, parents of the participants reported that their children began ‘spontaneously’ to use the skills that were taught during the intervention in different settings. This finding is significant as it suggests social validity of recorded changes the in the behaviours and provides support for the generalisation of the skills learned in the behavioural intervention program.

Limitations and future studies

Participants from this study, excluding TW, could have benefited from a more advanced intervention program to train more complex joint attention skills such as conversational skills, empathy and complex ‘manding’, as the participants already had some of the lower joint attention behaviours and skills. Additionally, this study could have benefited from the analysis of results from more participants with a wider range of developmental levels to explore how the intervention affected children with different levels of development.

Also, future studies should include participants with delayed language and longer term intervention phase, to further explore the link between language
development and joint attention development. Parental training procedures should be further researched and specific programs developed to ensure children maintain the skills taught by joint attention training programs. Finally, methods to explore how to promote generalisation of joint attention skills across to peer interactions should be explored.

**Conclusion**

The intervention results suggest that the intervention program successfully taught the children some of the necessary skills to develop generalised joint attention behaviours.

Furthermore, it provides valuable support for the link between language and joint attention evident by the results for child TW. Findings from this study emphasise the importance of including joint attention as a priority target in early intervention programs for children Autistic Spectrum Disorder, particularly children who have language delays and are lower functioning.
References


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doi: 10.1007/s00787-007-0648-6


doi:10.1016/j.ridd.2007.10.001


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Guidelines specified in the *Publication Manual of the American Psychological Association* (APA; 6th edition, 2009) should be followed. Pay particular attention to the sections concerning guidelines for nonsexist language (APA 3.12, p. 73), avoiding ethnic bias (3.14, pp. 75), and disabilities (3.15, p. 76).

**General Guidelines**

1. Authors must submit a separate title page, with (1) article title; (2) first name, middle initial, and last name of each author, with highest academic degrees; (3) names of institutions to which each author is affiliated, along with complete addresses AND e-mail addresses; and (4) any acknowledgments, financial disclosure information, author notes, and/or other text that could identify the authors to reviewers.


3. Heads: Do not use small capital letters.

4. Place figures in separate files. Tables may appear at end of main text file. Tables should be double-spaced; please use Word’s table functions. All tables and figures must be cited in text.

5. Use tab key and centering functions for head alignment, paragraph indents, and so forth. DO NOT USE THE SPACE BAR.

6. Use endnotes sparingly. Number with Arabic numerals starting with 1 and continuing through the article. Example: (see Note 1). NO footnotes.
DEAR PARENTS,

I am currently seeking participants, aged between 3 – 7 years old, with a diagnosis of autism, for a research project which examines if initiating and responding to joint attention requests can be taught to children with autism.

Joint attention is the process of sharing one’s experience of observing an object or event. There are two types of joint attention behaviours, initiating and requesting. Joint attention has been reported as impaired in children with autism and this study looks at a method for developing the behaviour in children, using a behavioural approach (similar to the therapy your child receives at the centre). If successful, this study can provide valuable information for early intervention programs for children with autism.

This study will be conducted at your homes, in addition to the existing therapy sessions your child receives and will run for the duration of 9 weeks. The study consists of four phases, a pre intervention phase, an intervention phase and two follow up post intervention phases.

If you are interested in participating and would like to volunteer your child for the study, please contact me for further information. I will be happy to answer any questions

Sharon Jeyabalan

0423 106 440
Chief Investigator: A/Prof David Leach
Address: School of Psychology, Social Sciences Building at Murdoch University
Telephone No. (08) 9360 2703

Research Student: Sharonia Jeyabalan
Telephone No. 0423 106 440

Your child is invited to participate in this study conducted by Sharon Jeyabalan under the supervision of A/Prof David Leach. The study seeks to determine if joint attention behaviours can be developed in children with autism spectrum disorder who have been slow to develop them naturally.

**Background and Aim**

Joint attention can be defined as the use of behaviours, including gestures and shifts in eye gaze to direct the attention of another person to share an experience or event. There are two different types of joint attention behaviours. The first type is joint attention responding which occurs when the child responds to another person’s initiation of an interaction. The second type is joint attention initiating when the child initiates the interaction to share attention. Research suggests that joint attention responding is not delayed in children with autism, unlike initiating joint attention which usually is. Both types will be looked at in this study.
Joint attention is one of a child’s earliest emerging social behaviours and has been associated with emerging language abilities as well as social awareness. Therefore, developing joint attention is very important, especially in children with autism, who typically have social and language problems.

The sessions for this study will be conducted as additions to the existing home therapy sessions that your child receives. Participation will involve five one hour assessment sessions, three of which will be conducted prior to the four week intervention phase and two conducted after the intervention phase. The assessment will be based on the Early Social Communication Scale. Each session will be digitally videoed so that the chief investigator and the student researcher can look back on sessions to ensure the sessions were conducted in the appropriate, standardized way and scoring can be cross checked to ensure accuracy.

**Procedure**

First, you will be asked to give written consent that you and your child wish to participate in this study and then you may ask your child to provide verbal consent to participate if appropriate. Then, these procedures will follow:

- A questionnaire will be completed by you to assess how often you observe your child displaying specific behaviours related to joint attention. This will allow us to examine if your child has the foundational skills required to participate in this study.
- Each session of the study will be videoed. The video recorder will be positioned in the room so that interactions between your child and me are in the line of vision.
- The recordings will be stored in the office of the chief investigator, Associate Professor David Leach and will only be viewed by David and myself. The recordings will be used to ensure sessions are carried out in a standardized manner across all participants and David will cross check my scoring to ensure accuracy. The video recordings will be stored in a locked cabinet in David Leach’s office.
- In the first phase of the study, your child will taken through an initial assessment to find a baseline level of their existing joint attention behaviours.
- In the second phase of the study, your child will complete the intervention phase. A one hour session will be conducted twice a week. Ten activities will be completed each week. These activities have been identified to help the development of joint attention behaviours. At the end of each session, a brief assessment will be conducted based on the Early Social Communication Scale.
- One week after the intervention phase has been completed your child will complete the first follow up assessment.
• Two weeks later, another follow-up assessment will be conducted to examine how well your child retains the behaviours taught during the intervention phase and their general use when interacting with adults.

**Voluntary Participation and Withdrawal from the Study:**

Your own and your child’s involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline.

There will be no consequences to you or your child if you decide not to participate, and this will not affect any future treatment or service. You may choose to withdraw your child from this study at any time during the testing period without any reason or prejudice and all information and data will be destroyed.

**Risks and Benefits of Study:**

This pilot study aims to provide your child with some of the necessary skills to develop joint attention. The study is a single case design and due to the small sample size the results cannot be generalized to children in the wider community. Positive results cannot be guaranteed but any measurable benefits from your child’s participation will be displayed on graphs and a verbal explanation of the results will be given to you by the research student at the end of the study.

Your child’s participation will help in research aimed at developing behavioural intervention programs targeting joint attention but there may not be any direct benefit to your child from participating in this study. There are no known risks to your child from participating in this study.

**Confidentiality and Consent:**

Any personal information provided by you or your child will be kept strictly confidential and will only be disclosed with your written permission or if required by law. The results from the study may be published or disclosed but full anonymity of your child’s identity will remain.
Further Information/ questions:

If you would like to discuss any aspect of this study please feel free to contact either Sharon Jeyabalan on 0423106440 or A/Prof David Leach on (08) 9360 2703. Either of us would be happy to discuss any aspect of the research with you.

Once we have analysed the information from this study we will email you a summary of our findings. You can expect to receive this feedback by December of 2012.

We would like to thank you in advance for your assistance with this research project. We look forward to hearing from you soon.

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval xxxx/xxx). If you have any reservation or complaint about the ethical conduct of this research, and wish to talk with an independent person, you may contact Murdoch University’s Research Ethics Office (Tel. 08 9360 6677 or e-mail ethics@murdoch.edu.au). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Copy of Consent Form for Parents

APPENDIX D

Developing Joint Attention in Children with Autism Spectrum Disorder – A Pilot Study

1. I voluntarily agree to participate in this study and give consent for my child to take part in this study.

2. I have read the Information Sheet provided and received a full explanation of the purpose of this study, the procedures involved and what is expected of me and my child. The researcher has answered all my questions and has explained the possible problems that may arise as a result of my participation in this study.

3. I understand that I am free to withdraw my child from the study at any time without needing to give any reason.

4. I understand that my child will not be identified in any publication arising from this study.

5. I consent to the researcher accessing my child’s files from the Child Wellbeing Centre to access diagnosis records and I understand that the information from these files will remain confidential.

6. I understand that my child’s name and identity will be stored separately from the data, and these are accessible only by the investigators. All data provided by my child will be analysed anonymously using his/her code number.

7. I understand that all information provided by my child and me, is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

Signature of Parent / Guardian: ________________________ Date: ________________________

Signature of Investigator: ________________________ Date: ________________________
Copy of Consent Form for Tester

APPENDIX E

Developing Joint Attention in Children with Autism Spectrum Disorder
– A Pilot Study

1.) I agree to keep the identities, personal information and results of the participants strictly confidential.

2.) I understand that I will be videoed while conducting the assessment and that these videos will be kept in a locked cabinet in David Leach’s office.

3.) I have a current working with children’s check and police clearance.

4.) I will follow all security measures and protocol as advised by the researcher to ensure that the child is safe and secure at all times.

5.) I understand that the child’s mother will be present throughout the testing session.

Signature of Therapist: __________________________ Date: __________________________

Signature of Investigator: __________________________ Date: __________________________
APPENDIX F

Parent Questionnaire

Please take a few minutes to fill out this questionnaire regarding your child’s joint attention behaviour. Please base your responses on your own, everyday experience of living with your child. Thank you for your participation.

1.) Does your child use eye contact when they communicate, play with you or request for help or to obtain an object?
   ○ ○ ○
   Always Sometimes Never

2.) Does your child point when they want help to obtain an object or an object related event?
   ○ ○ ○
   Always Sometimes Never

3.) Does your child respond when given commands to obtain an object or action?
   ○ ○ ○
   Always Sometimes Never

4.) Does your child initiate turn-taking sequences?
   ○ ○ ○
   Always Sometimes Never

5.) Does your child respond when you initiate turn-taking sequences?
   ○ ○ ○
   Always Sometimes Never
6.) Does your child point to initiate shared attention towards an object or event?

   Always  Sometimes  Never

7.) Does your child respond to your initiation of shared attention towards an object or event?

   Always  Sometimes  Never

8.) Does your child follow your pointing gestures?

   Always  Sometimes  Never

9.) Does your child use nonverbal gesturers to elicit aid in obtaining objects or events?

   Always  Sometimes  Never

10.) Does your child engage in playful, affectively positive turn-taking interactions with other children?

    Always  Sometimes  Never
Copy of Script of Explanations to Children

APPENDIX G

To inform the children as to what will be happening in the sessions.

For assessment phases (pre intervention, post intervention and follow up post intervention):

“Hello. In today’s session, I need to see what you can do. I need you to try really hard for me and really listen to what I am asking you to do and then show me how well you can do it. Would you like to do that for me?”

Intervention Phase:

“Hello. Guess what we are going to do in today’s session? Lots of new fun activities! First, you’re going to have to turn your listening ears on so that you know what to do just like in your other sessions and then I will tell you what we’re going to do today. Does that sound like fun to you? Shall we begin?”

Consent from the child to participate.

“Hello. What do you think about what Mum/Dad just told you? Do you think you’d like to have a go and do some work with me? I’m going to tell you a little bit more about it. We’re going to be doing lots of new games and activities and just like in your normal sessions, you have to try your very best and have a go at what I ask you to do. In our first sessions, I will be having a look at what you can do, and then we will be doing all the fun, new activities, and at the end we will have a look at how much you have learned. How does that sound? Would you like to have a go? You don’t have to, if you don’t want to have a go you can say ‘no’ and that will be ok with Mum/Dad and me. You get to choose.”
### Template of Intervention Assessment Scoring Form

**APPENDIX H**

<table>
<thead>
<tr>
<th>Name of Task</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow Commands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaze Following</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Imitation</td>
<td>(clap)</td>
<td>(hands on heads)</td>
<td>(bang on the table)</td>
<td>(stamp feet)</td>
<td>(point at something)</td>
</tr>
<tr>
<td>Pointing/Showing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eye Contact</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaze Alternation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn Taking</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Intervention Assessment

### Tasks:

1. Follow Commands (5 commands throughout the session) **RBR**
2. Turn – taking Task (twice in the session) **IBR & RBR**
3. Gaze following task (point to two things and see if they follow the point and label, gaze at two things and they label, final one, hide the reinforcer and they find it following your gaze). **RJA**
4. Social Imitation (5 random actions that they must copy throughout the hour)
5. Eye Contact (throughout entire session, do they make eye contact to check what you are doing or to see if you are looking at the same thing) **IBR & IJA**
6. Gaze Alternation (two windup toys) **IJA**
7. Pointing / Showing (throughout entire session) **IJA**
Goal: Gaze Following

What to do: Both activities require turn-taking

1.) Cup Game: Tell child to close their eyes while you place a token underneath one of the cups. Then the child must watch your eyes to find where the reinforcer is. Initially start with a whole head tilt in direction of the cup, then fade to eyes, finally a simple glance to indicate to them which cup houses the reinforcer.

2.) Pointing to pictures around the room and in a book and the child must see what you are pointing to by following your line of regard. Sometimes point, other times just look in that direction.

Prompts:

Most: Very obvious gaze/pointing and physically showing them where you are looking.
**Goal:** Monitoring

**What to do:**

1.) Envelope Game: line up envelopes on the wall, child watches as his/her mother (or anyone) puts the token in one of the envelopes. The child must then direct you to get to that envelope to get the token for them. Researcher makes intentional mistakes along the way to ensure the child is actually paying attention and monitoring your behaviour.

2.) Hide And Seek: Child see’s where his/her mother hide a reinforcer and to gain access to the reinforcer, the child must direct the researcher to find the token to gain the token. Researcher must be like a robot, follow their every direction and intentionally go the wrong way occasionally to make sure they are watching.

**Prompts:**

Most: Yoked learning of the tasks

Least: Prompt the child with what to say. Eg: Do I go left or right? Which way do I go to get to the token?
Goal: Social Referencing

What to do:

1.) Sit at a table with edible reinforcers scattered across the table. You sit opposite the child. Block the child’s attempt to access reinforcers. When they are sitting, waiting patiently, smile and nod at them and allow them access to the ONE reinforcer. Then wait about 5 seconds, once they have finished eating and are once again sitting, waiting patiently, smile and nod and allow the child access to the reinforcer. Repeat this process until all reinforcers are gone, leaving time a minimum of 5 seconds in between each time the child is allowed access. Block any other attempts.

2.) Hot and Cold Game: hide the reinforcer while the child closes his/her eyes. They must use your face as clues to find the reinforcer, nods and smiles indicate to the child that they in the right direction, neutral face and shaking of head indicates that they going in the wrong direction and should change their direction.

Prompts:

Most: Hand over hand to make them look at your face.

Least: Tell them to look at your face.
Goal: Monitoring

What to do:

1.) Place reinforcers up high where the child cannot access them. Then the child must use attention getting behaviour, while you act busy, to access them. If the child calls out your name or uses other appropriate attention gaining behaviour, respond with the appropriate listening behaviour and once they request the reinforcer with good eye contact/face value and also pointing/glancing at the reinforcer, give the child the reinforcer. Wait for the child to be looking at your face before you respond (smiling and nodding).

2.) Yes/No Game: Set up so they ask you for the reinforcer, then hold up two things, the reinforcer and something they do not value. Initially, just ask them if the reinforcer is what they want, then give them it. Once they can ask for what they want, offer them the one they do not want and if they say no, give them the reinforcer they do want. But if they say yes, give them what they asked for.

Prompts:

Most: Yoked learning of the tasks

Least: Tell them that your ‘over here’ so they look.
Goal: Tacting

What to do:

1.) What’s missing/silly: Walk around the house and garden and have things set up that are silly or missing from a picture you have pinned up. Eg. A toy in the fridge or a picture of a purple elephant in a family photo etc. The child must label things during the walkabout, use turn taking and the child must label what they find that is missing, silly or interesting.

2.) I Can see a….: Using books, comment on things you can see on the pages in a turn taking activity.

Prompts:

Most: Yoked learning of the tasks

Least: “What can you see?” “That doesn’t look right does it?”
Copy of ESCS Task Administration Flow Charts (Mundy et al. 2003)

APPENDIX K

Beginning of ESCS

Ask child: “What do you want to play with?”
*Gesture to toys*

- Child does not respond
  - Place ball in front of child; See administration chart for Turn-Taking Tasks

- Child indicates interest in a toy
  - Give toy of interest to child; Follow administration guidelines for that toy
1.) Following Commands (Mundy et al., 2003)

- Administer at least once for each toy presented (do not administer on the first presentation of a toy)
  - Child does not give the toy spontaneously on the 2nd or 3rd presentation of the object
    - Verbally request the toy twice ("Give it to me!"); use a clear "command" tone of voice
      - Wait 3 sec.
      - Child responds to the request and gives the toy
      - Child does not respond to the request
        - Request the toy again using both a palm-up ‘give it to me’ gesture while saying “Give it to me!” two times
          - Wait 3 sec.
          - Child still does not respond
            - Gently retrieve the toy
2.) **Object Spectacle Task (Mundy et al., 2003)**

Activate toy 3 times on table in front (and out of reach) of child for 6 sec.; remain silent but attentive.

- **Child initiates joint attention bid**
  - Provide a natural but brief response (“Yes, I see!”)

- **Toy ceases and child has not bid for the toy**
  - Place toy within reach of the child; child plays with toy for approximately 10 sec.

- **Child initiates behavior regulation bid**
  - Respond to bid by moving the toy within reach of the child.
3.) Turn-Taking Task (Mundy et al., 2003)

Place ball or car in front of child; wait 10 sec. with hands apart

- Child throws or rolls toy to, or away from tester
- Roll toy to the child while saying: “Whee; Brrrn; Zoom”
- Continue turn-taking until child has had 12 turns
- Slowly bring toy back in front of you and roll it to child again

- Child does not initiate a turn-taking game
- Request and retrieve toy using “Follows Commands Trial”
- Child does not return the ball
- Discontinue trial if child does not respond after 2 turn-taking bids
4.) Gaze Following Task (Mundy et al., 2003)

Get child’s attention by tapping the table or gently touching the child, then touching one’s own nose.

Administer in the following order: Left, Left-Behind, Right, and Right-Behind.

- **Left and Right Trials**
  - Turn entire torso and look at the left target while pointing at it (short-arm point).
  - Say child’s name 3 times with increasing emphasis.
  - Allow 2 sec. between enunciations; do not look back at child until after saying name the 3rd time.
  - May make a statement related to the target (e.g., “There’s Mickey”).

- **Left-Behind and Right-Behind Trials**
  - Lean slightly forward and to the left or right while pointing.


5.) Response to Invitation Task (Mundy et al., 2003)

Place object directly in front of child; allow child to play with it for approximately 15 sec.

- Child uses object in a socially conventional way
  - Lean forward, shake head gently, and say: "[child's name]. Can I play?"
  - State question 3 times with a 2-sec. interval in between, or until child responds

- Child does not use object in a conventional fashion
  - Place the hat or glasses on the child or comb the child's hair briefly
6. Book Presentation Task (Mundy et al., 2003)

Open picture book and put on table within child’s reach


Child points to pictures spontaneously

Responds briefly, but naturally (“Yes, I see”)

Child rejects book or refuses to attend to it

Administer something else and present the book once again at a later time

After 20 sec., begin pointing to pictures in the book

Point about 2 inches from each picture for 3 sec. (do not touch or tap the picture while pointing)

Say child’s name while pointing to a picture on the left side of the book

Point to a new picture on same open page but on the right side of the book

Turn page and repeat this procedure twice
7.) **Plastic Jar Task (Mundy et al., 2003)**

- Show child the jar with sealed lid and two novel wind-up mechanical toys inside.
  - Shake jar, unscrew the lid and pour the toys onto the table.
  - Put toys back in the jar and seal the lid tightly.
  - Give jar to child and wait for approximately 10 sec.

- Child does not give the jar back after 10 sec.
  - Request the jar verbally using **Follows Commands Trial**

- Child gives the jar back spontaneously
  - Open jar and remove one toy, set jar aside with other toys table.
    - Wind up toy and place it on the table following **Object Spectacle Task** administration guidelines (only once per toy).
    - Repeat procedure with the second wind-up toy still in the jar.