EFFECTS OF TEACHING PARTNERS OF A CHILD WITH AUTISM

JOINT ATTENTION BIDS

by

SEOYOUNG SHON

(Under the Direction of Cynthia O. Vail)

ABSTRACT

Joint attention is an essential early social-communication skill, which is strongly associated with social and language development. Children with autism usually exhibit deficits in joint attention. This study examined the effectiveness of training of joint attention bids to three partners of a child with autism. The study was conducted in the child’s home including the three-year-old child with autism, his mother, sister and babysitter. The results indicate that all partners increased their use of joint attention bids during the intervention phase of the study. They increased their use of each joint attention bid as well as their total joint attention bids. The child with autism increased contingent responses to each joint attention bid with all three partners during intervention. The three partners used the “touching/showing” bid most frequently during both baseline and intervention. However, the “giving” bid yielded the most contingent responses.

INDEX WORDS: Autism, Joint attention, Home-based research, Parent teaching, Children, Special Education
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SEOYOUNG SHON

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SEOYOUNG SHON

Major Professor: Cynthia O. Vail
Committee: Jonathan M. Campbell
Thomas J. Clees

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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CHAPTER 1

INTRODUCTION

Joint attention is an important early social-communicative skill. Children engage their attention between adults and objects with mutual interest. Joint attention is presented when referential looking is used in triadic exchanges among children, adults and objects (Klinger & Dawson, 1992). Observable behaviors that demonstrate joint attention include pointing, gaze shift, showing, giving, touching, or verbal statements (Zercher, Hunt, Schuler & Webster, 2001). Research indicates that joint attention is important for both language development and communication at an early age. Tomasello and Farrar (1986) found that joint attention was associated with vocabulary size. Joint attention is also correlated with both current and later language development (Charman, Baron-Cohen, Swettenham, Baird, Drew, & Cox, 2003; Loveland & Landry, 1986; Mundy, Sigman, & Kasari, 1990).

Autism is a pervasive developmental disorder with a primary characteristic of deficits in social skills and communication, such as eye contact, joint attention, imitation, or sharing affection. Typically developing children usually develop their joint attention skills when they are one year old, but this is usually not the case for children with autism. Even when compared with children with mental retardation, children with autism presented less consistent joint attention skills (Kasari, Sigman, Mundy, & Yirmiya, 1990). Similarly, children with autism displayed fewer correct joint attention responses than children with developmental language disabilities (Loveland & Landry, 1986). Mundy et al. (1990) found that joint attention was a significant precursor of language development for children with autism, but not for children with mental
retardation. The lack of joint attention may interrupt later development of social interaction between them and other children, and also impede acquisition of functional language. Therefore, several researchers emphasized the importance of joint attention intervention at an early age (Charman et al., 2003; Hwang & Hughes, 2000). Hwang and Hughes (2000) suggested joint attention intervention for preverbal children to “minimize obstacles to the learning of language and social interaction skills” (p 341).

There are few studies that have focused on joint attention in isolation. While research indicates that joint attention independently plays important roles for children with autism and affects children’s current and later language development, most articles examine effects based on several social skills together, such as imitation, affect sharing, or play. Hwang and Hughes (2000) indicated that joint attention increase less than other skills through training because joint attention is a complex skill.

Many studies took place in unnatural settings such as a laboratory or a quiet room with unfamiliar experimenters or toys. However, young children are typically strongly attached and showed more positive affection to their primary caregiver. Children’s ability to understand and relate to their environments depends on regularity and familiarity (Klinger & Dawson, 1992). Bakeman and Adamson (1984) found that infants presented more joint attention responses and initiations when they played with mothers than with peers.

Teaching parents to promote their children’s development is an effective strategy. Research has shown the effectiveness of parents teaching the development of various skills, even in a short time period (Koegel, Symon, & Koegel, 2002). In addition, it may help the parents feel more confident and may reduce stress. It also increases the parents sensitivity to their children’s
behaviors or activities, which are correlated with later communication skills (Siller & Sigman, 2002).

The purpose of this study is to examine the effect of parent training on joint attention skills regarding the child’s responses, using a multiple probe design. Specifically, there are four research questions: (a) will three caregivers/family members increase their use of joint attention bids during playtime with their young child with autism?, (b) will the young child with autism increase contingent responding based on joint attention bids?, (c) what type of joint attention bid yields the most contingent responses?, and (d) will joint attention bids generalize to non-intervention natural settings?
CHAPTER 2
LITERATURE REVIEW

Review of Joint Attention

Search Procedure

First, a computer search of Educational Resources Informational Clearinghouse (ERIC), Psychological information (PsycINFO), and Psychological articles (PsycARTICLES) databases was conducted for the years 1986 through 2003, using six descriptors either individually or combined. These descriptors were joint attention, autism, eye gaze, children, infant, and preschool. Second, an archival search of relevant journals (i.e., Journal of Autism and Developmental Disorders) from 1986 through 2003 was conducted.

Articles were chosen for evaluation if they met the following criteria: (a) the article was based on a research investigation, (b) joint attention was one of the dependent variables, (c) the target population was infant, toddler, preschooler, and preverbal children with autism, and (d) the article was published in a peer reviewed journal. All 10 articles selected met these criteria. To identify possible factors in the studies, reviewed articles were analyzed according to the following variables: participants, settings, target behaviors, measurement, and results.

Studies of Joint Attention Deficits in Autism

Table 1 provides a description of studies examining joint attention for children with autism. Almost every research study had 10 to 20 children, ages one through five years in each group (Charman, Swettenham, Baron-Cohen, Cox, Baird, & Drew, 1997; Kasari et al., 1990; Leekam, Lopez, & Moore, 2000; McArthur & Adamson, 1996; Morgan, Maybery, & Durkin,
<table>
<thead>
<tr>
<th>Author</th>
<th>Participant characteristics</th>
<th>Matched criteria</th>
<th>Setting</th>
<th>Target behavior</th>
<th>Joint attention tasks</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charman, Swettenham, Cox, Baird &amp; Drew (1997)</td>
<td>10 autism 9 DD 19 normal (20 mon.)</td>
<td>CA, NVMA, VC, EL, social class, gender</td>
<td>With experimenter and caregiver In lab</td>
<td>Play (pretend, empathy), joint attention, imitation</td>
<td>Switching gaze Looking at control box</td>
<td>Children with autism: gaze switched less, looked less at the tester than normal group No differences between the proportion of trials on which the autism and DD groups looked at the tester</td>
</tr>
<tr>
<td>Leekam, Lopez &amp; Moore (2000)</td>
<td>20 autism 20 DD (4 to 5 yrs)</td>
<td>Nonverbal ability (PIQ, PMA)</td>
<td>In lab</td>
<td>Response patterns Head turning</td>
<td>Response patterns Head turning</td>
<td>No significant difference in the number of attention bids received by children with autism and DD</td>
</tr>
<tr>
<td>Kasari, Sigman, Mundy, &amp; Yirmiya (1990)</td>
<td>18 autism 18 MR (4 to 5 yrs)</td>
<td>Maternal education, MA, gender, CA</td>
<td>Table in lab with experimenter</td>
<td>Attention Affect expression Communication</td>
<td>Following gaze</td>
<td>Children with autism gave faster responses than children with DD Children with autism in low IQ group had faster responses</td>
</tr>
<tr>
<td>McArthur &amp; Adamson (1996)</td>
<td>15 autism 15 DLD (3 to 5 yrs)</td>
<td>CA</td>
<td>Play session</td>
<td>Joint attention Communication</td>
<td>Looking to objects, to the experimenter’s face, or unfocused</td>
<td>Children with autism had low percentages of positive affect toward the adult during joint attention and requesting acts; Spent more time unfocused than control groups</td>
</tr>
</tbody>
</table>
| Morgan, Maybery & Durkin (2003) | 21 autism  
21 control  
(3 to 5 yrs) | CA, nonverbal ability, gender | Quiet room at the child’s regular center | Play  
Joint attention  
Central coherence | Blocking task  
Teasing task  
Active-toy task | Children with autism produced significant less eye contact than control group | communication with adult |
The researchers used the same sample size for the experimental and control group, but Leekam et al.’s second study (2000) used a different sample size for each group.

For comparison with children with autism, researchers chose groups of children with mental retardation, developmental delay, and normal development. McArthur and Adamson (1996) chose children with developmental language disorder as a control group. The control groups were matched to children with autism on two more criteria such as mental age, chronological age, IQ, social class or SES, or nonverbal ability. Interestingly, Kasari et al. (1990) matched on maternal education, but did not mention why the criterion was chosen. Although gender is an important block factor, only Morgan et al.’s article (2003) considered it as a criterion.

Most of the research studies were conducted in the laboratory. Leekam et al.’s second study (2000) and Morgan et al. (2003) assessed children in a quiet room in a regular setting. The target children interacted with or were examined by the experimenters, although the place was familiar. A caregiver sat with the child in two of the studies, but did not play an active role. The experiments proceeded with toys while the child sat on a chair or in a play setting.

All of the literature focused on social and communication skills, and had more than one target behavior including joint attention; joint attention (5), play (2), communication (2), affect expression (2), imitation (1), and central coherence (1). Joint attention such as head turning, switching gaze, blocking, teasing, looking, pointing, touching, and commenting was specifically coded. All studies used direct observation as an assessment method. In Morgan et al.’s study (2003), two tests (the Preschool Embedded Figures Test, the Pattern Construction subscale of the Differential Ability Scale) were conducted to assess central coherence.
Most articles support the hypothesis that children with autism have deficits in joint attention, compared with children in other groups (Charman et al., 1997; Kasari et al., 1990; McArthur & Adamson, 1996; Morgan et al., 2003). In Kasari et al.’s study (1990), the children with mental retardation looked at the adult’s face significantly more than the typically developing children and children with autism, and the children with autism spent significantly more time unfocused than the other groups. In addition, the typically developing children displayed significantly more positive affect with the adult in the communicative context of joint attention than in the context of requesting. The children with autism displayed uniformly low percentages of positive affect with the adult during joint attention and requesting acts. The children with mental retardation displayed uniformly high percentages of positive affect toward the adult during joint attention and requesting acts. One study showed that the joint attention for children with autism was only half that for children with developmental language disorder. (McArthur & Adamson, 1996) Charman et al. (1997) also found that children with autism gaze switched less than did the other groups and that children with autism looked at the tester less than did the typically developing children in both the blocking and teasing tasks.

Contrary to other results, there was no significant difference in the number of attention bids received by children with autism and developmental delay and mutual gaze in the first study by Leekam et al. (2000). In addition, children with autism gave faster responses than did children with autism were divided into high and low groups, the children with autism in the low IQ group had significantly faster responses.

Studies of the Relationship between Joint Attention and Language Development

As seen in Table 2, three studies were examined for interaction between joint attention and language development (Charman, Baron-Cohen, Swettenham, Baird, Drew, & Cox, 2003;
Loveland & Landry, 1986; Mundy, Sigman, & Kasari, 1990). The sample sizes were similar, ranging from nine to 15 children. Children with autism were compared with children with developmental language delay (DLD), mental retardation, and pervasive developmental disorder. The children’s ages ranged from 20 months to 8 years. One article included children older than the ages described in the selecting criteria because the children with autism had older chronological age when matched with mental age (the mean was five years) and mean length of utterance (the mean was 1.94) (Loveland & Landry, 1986).

The control groups were matched to children with autism on nonverbal IQ, nonverbal mental age, language age, or mean length of utterance (MLU) (Charman et al., 2003; Loveland & Landry, 1986; Mundy et al, 1990). All three studies were conducted with an unfamiliar experimenter in the laboratory. In one study, the caregiver could be present in the lab (Charman et al., 2003), perhaps because the participants were infants.

All studies focused on social and language skills, including joint attention. In addition, social behavior, requesting, imitation, play and goal detection were examined. On joint attention skills, shifting gaze, pointing, showing, tapping, and looking were coded. Direct observation was used in the three studies as an assessment method. To assess language development, Mundy et al. (1990) and Charman et al. (2003) administered the Reynell Developmental Language Scales and conducted longitudinal studies 13 to 22 months apart.

Loveland and Landry (1986) found that children with autism and developmental language delay differed significantly in percent of correct responses to all joint attention tasks. Language-plus-gesture tasks were more difficult than gesture-only tasks for the children with autism but not for the children with DLD. Correct production of I/you was significantly correlated with number of spontaneous initiations for the autistic group. There were significant
Table 2. Summary of language development studies of joint attention

<table>
<thead>
<tr>
<th>Author</th>
<th>Participant characteristics</th>
<th>Matching criteria</th>
<th>Setting</th>
<th>Target behavior</th>
<th>Joint attention tasks</th>
<th>Design</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loveland &amp; Landry (1986)</td>
<td>11 autism 11 DLD (3 to 11yrs)</td>
<td>Nonverbal mental age and mean length of utterance</td>
<td>Playroom In lab With experimenter</td>
<td>Pronoun Gesture Language plus gesture Requesting situation</td>
<td>Shifting gaze Pointing Showing Tapping Moving hands</td>
<td>Experimental design</td>
<td>Children with autism and DLD differed significantly in percent of correct responses to all joint attention tasks. Language-plus-gesture tasks were more difficult than gesture-only tasks for the children with autism. Correct production of I/you was significantly correlated with number of spontaneous initiations for the autistic group.</td>
</tr>
<tr>
<td>Mundy, Sigman &amp; Kasari (1990)</td>
<td>15 autism 15 MR (mental age matched) 15 MR (language age matched)</td>
<td>MA Language age</td>
<td>Table in lab With experimenter</td>
<td>Social behavior Joint attention Requesting</td>
<td>Looking Pointing Showing</td>
<td>Longitudinal study (13mon. apart)</td>
<td>Children with autism showed fewer joint attention behaviors than did the control group. Joint attention was a significant predictor of language development in the autistic group.</td>
</tr>
<tr>
<td>Charman, Baron-cohen, Swettenham, Baird, Drew &amp; Cox (2003)</td>
<td>9 autism 9 PDD (infant age 20 mon.)</td>
<td>Nonverbal IQ</td>
<td>In lab With experimenter and caregiver</td>
<td>Play Joint attention Goal detection Imitation</td>
<td>Switching gaze</td>
<td>Longitudinal study (22mon. apart)</td>
<td>Later language was associated with joint attention and imitation, not play and goal detection.</td>
</tr>
</tbody>
</table>
correlations between the number of different joint attention behaviors and MLU for the DLD group but not for the group with autism.

In Mundy et al.’s article (1990), the children with autism showed fewer joint attention behaviors than did the language group with mental retardation and the mental age group with mental retardation. All of the groups displayed a similar increase in joint attention behavior scores throughout the follow-up period. In the relationship between joint attention and language, the results showed that joint attention was a significant predictor of language development in the autistic group. In the language control group with mental retardation, initial language level and mental age were significant predictors of language development.

Studies of Joint Attention Intervention

Table 3 shows three research studies reviewed for joint attention intervention (Hwang & Hughes, 2000; Whalen & Schreibman, 2003; Zercher, Hunt, Schuler, & Webster, 2001). Two participants in Zercher et al.’s study (2001) were six-year-old twin brothers with autism, who exhibited echolalic and creative speech. In Hwang and Hughes (2000) study, three boys with autism participated. They were 32 to 43 months old with little expression of meaningful words and speech. The other study was conducted with five children with autism aged 48 to 52 months and six normal children to identify normal levels of social behaviors (Whalen & Schreibman, 2003)

Hwang and Hughes (2000), and Zercher et al. (2001) conducted interventions in natural settings: classroom and community setting (church). To implement the interventions, both research studies involved interactive partners. In one study, two graduate students interacted with the target children in the play area (Hwang & Hughes, 2000). The other study used three
<table>
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<tr>
<th>Author</th>
<th>Participant characteristics and setting</th>
<th>Setting</th>
<th>Target behavior</th>
<th>Joint attention tasks</th>
<th>Design</th>
<th>Length of study</th>
<th>Type of strategies</th>
<th>Results</th>
</tr>
</thead>
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<tr>
<td>Hwang &amp; Hughes (2000)</td>
<td>3 autism (32-43mon.)</td>
<td>In classroom</td>
<td>Eye contact</td>
<td>Joint attention Motor Imitation</td>
<td>Multiple baseline design across participants</td>
<td>10min/session 30 weeks (2sessions/week)</td>
<td>Social interactive training</td>
<td>Joint attention increased. But it had the least increase of three behaviors during and after training</td>
</tr>
<tr>
<td>Whalen &amp; Schreibman (2003)</td>
<td>5 autism (48-52mon.) 6 normal (mean28mon.)</td>
<td>In lab</td>
<td>Joint attention (responding and initiation)</td>
<td>Response (hand on, tapping, showing, eye contact, pointing, gazing) Initiation (gaze shifting, pointing)</td>
<td>Multiple baseline design across participants</td>
<td>10-34 sessions Various times and sessions across conditions and participants</td>
<td>Naturalistic behavior modification</td>
<td>Response training was effective for all and maintained. Initiation training was effective except one but not maintained</td>
</tr>
<tr>
<td>Zercher, Hunt, Schuler &amp; Webster (2001)</td>
<td>2 autism (6 yrs) 3 normal</td>
<td>In community setting</td>
<td>Joint attention Symbolic play Language</td>
<td>Pointing Gaze-shifting Showing Giving Touching Verbal</td>
<td>Multiple baseline design across participants</td>
<td>30min/session 20weeks (one/week)</td>
<td>Peer coaching</td>
<td>Joint attention increased the highest of all behaviors</td>
</tr>
</tbody>
</table>
typically developing girls, aged five to 11, who were coached by one adult on how to effectively
interact with the target children (Zercher et al., 2001). Unlike these two studies, Whalen and
Schreibman (2003) conducted their intervention in the lab.

For target behaviors, the three studies included joint attention as one of the social skills. Hwang and Hughes (2000) also chose eye contact and imitation, and Zercher et al. (2001) selected symbolic play and language for communicative skills. Whalen and Schreibman (2003) focused on only joint attention and trained participants for response and initiation of joint attention. All three studies incorporated a multiple baseline design across participants. In one study, training was conducted with ten-minute observation sessions twice a week, for 30 weeks (Hwang & Hughes, 2000). In another study, training was performed once a week, for 20 weeks, and the observation time was 30 minutes (Zercher et al., 2001). Whalen and Schreibman (2003) conducted training for various lengths of times and sessions across participants and conditions. As for types of strategies, Hwang and Hughes (2000) used contingent imitation, natural reinforcement, expectant look, and environmental arrangement; Whalen and Schreibman (2003) used natural behavior modification; and Zercher et al. (2001) utilized peer coaching with cueing.

The three studies had the same results that all participants increased their joint attention skill during and after training. Hwang and Hughes (2000) found that increases in joint attention were generally less pronounced than increases in eye contact or motor imitation across participants. During follow-up, increases for joint attention were more modest. In contrast, Zercher et al. (2001) found that, of the three social skills, the number of joint attention skills increased the most and continued to be more stable and higher than symbolic play and language after training. This different result might be due to the other social skills. That is, eye contact and motor imitation, used by Hwang and Hughes (2000), were lower level skills than joint attention,
but symbolic play and language in Zercher et al.’s study (2001) were higher. Whalen and Schreibman (2003)’s results showed that the training for both response and initiation of joint attention was effective. But, the initiation training showed less increase than response, did not have an effect on one child, and was not maintained for the follow-up session.

**Review of Parent Teaching**

Koegel, Bimbela, and Schreibman (1996) examined and compared the effects of two different parent training programs: the individual target behaviors (ITB) and the pivotal responses (PRT) in the home setting. Seventeen children with autism and their families who participated in the study were divided into two groups. Four interactional scales (level of happiness, interest, stress, and style of communication) before and after training were coded during dinnertime. The parents in both conditions were educated with manuals, videotape, in vivo examples, and in vivo feedback. The results showed that PRT had positive effects on all four scales, whereas ITB training had no significant effect.

More recently, Koegel, Symon, and Koegel (2002) examined the effects of parent education programs on families. These parent-education programs taught procedures using the pivotal concept of motivation to increase the expressive communication of children with autism. The multiple baseline study across participant was conducted with five families who resided in areas that were distant from the autism center where the interactions took place. During the intervention, the families were provided instruction, modeling, and feedback at the center. For the follow-up, distal interaction included the use of videotapes of interactions between partners and their children in the natural home environment. The results showed that parents increased the use of the techniques and exhibited more positive affect, and children improved their expressive communication. Also, the increases were maintained when they went home.
In summary, we know that most studies except Whalen and Schreibman’s study (2003) were focused on several skills along with joint attention, although joint attention alone played an important role for children with autism. The literature also indicates that joint attention, as an early communication skill, could be taught to young children with autism using the following techniques: giving, touching, showing, pointing, and eye gazing (Whalen & Schreibman, 2003; Zercher et al., 2001).

Most studies have been conducted in artificial environments or with unfamiliar researchers as the adult partner (Charman et al., 2003; Charman et al., 1997; Hwang & Hughes, 2000; Kasari et al., 1990; Leekam et al., 2000; Loveland & Landry, 1986; McArthur & Adamson, 1996; Morgan et al., 2003; Mundy et al., 1990; Whalen & Schreibman, 2003). Zercher et al. (2001) used familiar older children as partners at church, a natural environment for the children.

Parents can be affective change agents for teaching their child skills such as expressive communication skills and social skills (Koegel et al., 1996; Koegel et al., 2002). There is a need for research that links the need to teach young children with autism joint attention in their natural environment. Also, there is a need to document a method that is effective in imparting joint attention to the caregivers and family members in the natural environment. The proposed study will fill this research gap by teaching joint attention skills to caregivers and family member including as mother, babysitter, and sister, and by conducting the study with the child’s own toys in a natural setting like a living room or a kitchen in the child’s home.
CHAPTER 3

METHODS

Participants

One child and three people who were family members or caregivers for the child participated in this study. The child participant was chosen according to the following criteria: (a) diagnosed with autism, (b) aged between 24 to 36 months, and (c) taking no medication. The three others who were taught joint attention skills were selected based on the amount of time they could interact with the child at home and on parent recommendation and preference. To conduct the study, the researcher received approval from the Institutional Review Board (IRB). Participants were required to sign consent forms, parental permission forms, and a minor assent form in order to participate in the study, to allow a child to participate in, to receive the training, and to give permission to videotape the sessions in the parent’s home. All videotaped data were kept in a secure location, and pseudonyms were used to protect the participants.

All of the participants lived in a small city located in northeast Georgia and spoke English as their primary language. Table 4 provides descriptive information about the persons taught, including age, gender, education, and the amount of time they typically interact with the child per day.
Table 4. Characteristics of Partners

<table>
<thead>
<tr>
<th>Partner</th>
<th>Chronological age</th>
<th>Gender</th>
<th>Education</th>
<th>Frequency of interaction with Andy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mom</td>
<td>38 years</td>
<td>Female</td>
<td>Bachelor’s degree in speech communication</td>
<td>8 hours per day</td>
</tr>
<tr>
<td>Babysitter</td>
<td>21 years</td>
<td>Female</td>
<td>Senior in special education</td>
<td>8 hours per week</td>
</tr>
<tr>
<td>Sister</td>
<td>7 years</td>
<td>Female</td>
<td>2nd grade in elementary school</td>
<td>5 hours per day</td>
</tr>
</tbody>
</table>

Child

Andy (pseudonym) was 34 months old when this study began. He was formally diagnosed with autism at the age of 20 months by experts at the University of North Carolina at Chapel Hill. However, he was already suspected to have autism at around 12 months and had been receiving services of the State’s Part C Early Intervention System, Babies Can’t Wait (BCW) Early Intervention Service Program before formal diagnosis. When he was diagnosed, Vineland Adaptive Behavior Scales (VABS), Bayley Scales of Infant Development (BSID), and Autism Diagnostic Observation Schedule (ADOS) Module 1 were administrated. In VABS, Andy’s overall adaptive composite score was 68, which placed his abilities in the low average range of adaptive functioning. Specifically, his communication domain had the lowest score, 63,
which is the equivalent of a typical six month old. In BSID, he had a basal score of seven months and a ceiling score of ten months, with his overall age equivalent being seven to eight months.

His mother reported that she did not have any difficulties during pregnancy and delivery. Andy was born full term at 40 weeks and delivered with inducement. He kept his immunization as scheduled. The mother stated that she was concerned early on by one year of age about Andy’s development because of lack of speech and communication, failure to follow directions or listen, lack of interest in other children, poor sleeping habits, and repetitive behaviors.

Andy lived with his mother, 7-year-old sister, and father, who worked in the city far from home and commuted home for weekends. Andy had a babysitter who assisted the mother during the evening and he often played with his grandparents.

At the time of the study, he was receiving services for speech, occupational and physical therapy from BCW. Also, he went to an autism center at a different university once every six weeks for consultation regarding the use of contingent vocalization with communication partners. Andy had participated in the inclusive toddler classroom at a child development center at a university located in northeast Georgia and switched to a self-contained preschool for children with autism in a public school during the study.

Andy usually communicated with adults with gestures and physical manipulation, such as pulling an adult’s hand or pointing when he wanted something, rather than with vocalization. Although he was able to make repetitive consonant-vowel combinations, he was usually observed using the ‘eeeeee’ vowel sound. Andy had just started trying verbal imitation of adult vocal modeling, but his progress was nascent. He liked to interact with adults, especially with his mother. Andy usually expressed his feelings by crying or smiling and was able to make eye
contact. He sometimes looked at a person who had spoken and turned his head when hearing his name.

**Partner 1**

The mother participated in the study. As table 4 presented, she was 38 years old and had a bachelor degree in speech communication. The mother was a full-time caregiver in order to help her son. She spent the most time with him after school. She and Andy played together or with the sister or cousins.

The mother had been trained with Andy at an autism center at a different university once every six weeks regarding the use of incidental vocalization and playing techniques. She reported that she did not know about joint attention but had learned play skills. Also, she occasionally participated in a seminar or a conference on autism. She had an energetic and enthusiastic personality and was eager to learn and help her son. Andy showed great affection for her, smiling, producing sounds, and making eye contact with her more than anyone else.

**Partner 2**

The babysitter was 21 years old and a senior in the special education department at a university located in northeast Georgia. She had been babysitting him for a year. She came to assist the mother twice a week and sometimes to take care of Andy and his sister when the parents left for the weekend. She stayed for two or three hours playing with Andy, while the mother spent time with the sister helping her with homework or putting her to bed.

**Partner 3**

The sister was seven years old and a second grade student in a private catholic school located in northeast Georgia when the study started. She was interested in interacting and playing with Andy. However, the play was limited only to physical activities such as wrestling, tickling,
or holding him, which made Andy fussy. She mostly spent her time with her mother and Andy after coming home from school her cousin’s house, or her friend’s house. She spent more time with Andy than the babysitter did, but she did not spend most of that time playing or interacting with him.

Setting

This study took place in Andy’s natural environment: his home. The majority of the study was conducted in the playroom. The room was chosen because it was a familiar natural context to facilitate Andy’s play. The room also had sufficient lighting and enough space (15x17) to videotape interaction between Andy and his partners. This setting contained a sleeper sofa, chairs, a TV, a VCR, a small desk and chairs for children, and various toys, books, and cushions. All the toys and books, not used for the study, were well organized and hidden during interaction.

The partners’ first training session took place in the dining room, which was a convenient place to talk and display materials. Generalization data were collected in the dining room in his house during mealtime. The dining room was located next to kitchen, and its dimensions were 7x10 feet. There was a dining table and four chairs, a highchair for Andy, a small refrigerator, and a shelf.

Materials and Equipment

Table 5 presents five sets of toys and materials used in the playroom during the study. The toys and materials were chosen from among Andy’s own favorite toys in the home and were sequentially classified into five sets from high interest to neutral interest. Each set had several toys or materials, from the same class, to facilitate each joint attention skill. In each session, one toy was randomly chosen from each set a total of five toys by the researcher or the mother.
During generalization, mealtime items such as a juice cup, a spoon, a folk, or a plate, and food provided during supper were used for the study.

Table 5. Toy/Material Sets

<table>
<thead>
<tr>
<th>Set 1: Books</th>
<th>Set 2: Pictures</th>
<th>Set 3: Small figures</th>
<th>Set 4: Sound-producing toys</th>
<th>Set 5: Puzzles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue’s clue books</td>
<td>Peer photos</td>
<td>Animal figures</td>
<td>Talking dolls</td>
<td>Animal puzzles</td>
</tr>
<tr>
<td>Barney books</td>
<td>Animal photos</td>
<td>Small dolls</td>
<td>Animal sounds</td>
<td>Shape puzzles</td>
</tr>
<tr>
<td>ABC books</td>
<td>Family member photos</td>
<td>Character figures</td>
<td>ABC sounds toys</td>
<td>ABC puzzles</td>
</tr>
<tr>
<td>Einstein books</td>
<td>Teacher photos</td>
<td>(Blue, Barney,</td>
<td>Music toys</td>
<td></td>
</tr>
<tr>
<td>Magazines</td>
<td></td>
<td>Sesame street figures)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal books</td>
<td>Andy photos</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Chapter books</td>
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</tbody>
</table>

For data collection, two video cameras were used to record the sessions. Each camcorder was a Sony Model CCD-TRV11 video 8, which included microphone, zoom camera, and a tripod. One camera stood on a tripod between the child and a partner, and the other was held by the researcher and moved around to capture the child’s contingent responses. Teaching video clips were created to demonstrate joint attention skills to the partners; the clips showed the researcher and her own daughter imitating each joint attention bid. Print material was provided describing the definition, the importance, and the kinds of joint attention and playing tips with which joint attention bids could increase.
Dependent Variables

The dependent variables were (a) the number of initiations of four kinds of joint attention bids made by the partners per minute, giving, touching/showing, and pointing, and (b) the number of contingent responses Andy made to each bid per minute, such as looking at a toy or manipulating it. Table 6 presents definitions of the four joint attention bids. Touching and showing were taught separately; however, they were categorized as one bid due to the difficulty of distinguishing a behavior as one or the other. For generalization, the definitions of the joint attention bids were slightly changed to accommodate the dining room environment. For example, giving was defined as handing food to him or putting food on his tray, rather than putting it in his hand or on his lap.

Recording Procedures

An event recording system was used to record joint attention skills. The researcher recorded every time a partner initiated and the child contingently responded within the total observation period. This system yielded the rate that the behaviors occurred. The researcher specifically coded the number of joint attention bids per partner, the type of joint attention bid, and whether the child responded contingently. Data collection forms divided into minute intervals were used to record all responses, joint attention bids, and Andy’s contingent response (see Appendix A). Data were collected during a 15-minute interval on average. The number of joint attention bids and the child’s contingent responses per minute were calculated because the length of the observation period varied slightly across sessions.

General Procedures

This study used a multiple probe design across partners with four conditions: baseline, intervention, generalization, and follow up. Between baseline and intervention conditions, two
Table 6. Definitions of joint attention bids and responses

<table>
<thead>
<tr>
<th>Skill</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giving</td>
<td>Bid</td>
</tr>
<tr>
<td></td>
<td>Response</td>
</tr>
<tr>
<td>Touching</td>
<td>Bid</td>
</tr>
<tr>
<td></td>
<td>Response</td>
</tr>
<tr>
<td>Showing</td>
<td>Bid</td>
</tr>
<tr>
<td></td>
<td>Response</td>
</tr>
<tr>
<td>Pointing</td>
<td>Bid</td>
</tr>
<tr>
<td></td>
<td>Response</td>
</tr>
</tbody>
</table>
training sessions were conducted for partners to teach joint attention bids. The study took place in the playroom and dining room in Andy’s own home. Free play interaction between Andy and his partners was recorded by two video camcorders for 15 minutes on average. A session was usually conducted for each dyad one or three days a week when it was convenient for the participants. Sessions were conducted either weekdays or weekends, either in the morning or in the evening, based on their schedules and Andy’s mood. Overall, the study was conducted over six months, with 16 sessions for the mother, 16 sessions for the babysitter, and 18 sessions for the sister. Before collecting baseline data, the researcher interviewed the mother regarding typical routines and made sets of Andy’s preferred toys and materials.

**Baseline Procedures**

Baseline data were collected for three sessions with the mother, five sessions with the babysitter and six sessions with the sister. Sessions were conducted one or three days a week for 15 minutes a day. At least three consecutive baseline probes were conducted immediately prior to intervention for each partner. For each session, five toys and materials were randomly chosen from the five sets of toys (see Table 5). The partner was asked to play with Andy as she typically using the selected toys. The partners knew the purpose of the study but did not know the specific bids for joint attention. Andy and his partners sat on the floor and were recorded by two video camcorders as they naturally interacted. Intervention began after three days of stable or decelerating baseline probes. Baseline probes were also conducted in the generalization setting. For these probes, mealtime interaction between Andy and his partners was recorded for about 15 to 20 minutes. The partner was directed to interact with Andy according to normal routine.
Training Procedures

Prior to beginning intervention with Andy, partners were taught joint attention bids. The training was independently conducted in the home for the 45-minute sessions. The training included the following steps: (a) present written information that explained joint attention, along with in vivo examples (see appendix B), (b) watch videotapes that showed examples of each joint attention skill, (c) practice bids with the child, and (d) feedback (Koegel et al., 1996).

On the first day of training, the partner was provided with written information that explained specific joint attention bids (see Appendix B). The researcher explained the definition and the importance of joint attention skills for children with autism and reviewed the material demonstrating brief in vivo examples. The researcher and the partner watched videotape clips of the researcher interacting with her own daughter with her own toys in her house to demonstrate four joint attention bids: giving, touching, showing, and pointing. Because pointing involved eye contact, the partner was also taught how to make eye contact with the child (Whalen & Schreibman, 2003). In addition, the partner was taught not only to use joint attention bids but also to use techniques that help joint attention increase and facilitate play such as saying words along with the bid, calling the child’s name, following the child’s lead, or using an excited tone of voice. ‘Exclamatory verbalization’ “Wow!” or “What a cool toy!” or an exaggerated smile or funny face, as a previous study suggested, was encouraged to provide natural social reinforcement (Jones & Carr, 2004). Prior to the end of closing on the first training session, the researcher answered any questions that the partner might have. Before the next session, the partner and the researcher reviewed the four joint attention bids with the teaching videotape and written information. The partner practiced each skill with Andy and received feedback from the
researcher. The training was concluded once the partner demonstrated the ability to use all joint attention bids without the researcher’s prompts.

*Intervention Procedures*

As soon as the training was completed, the intervention procedures with Andy were conducted. Intervention began with the first dyad between Andy and his mother moved to the second dyad between Andy and his babysitter, and then to the final dyad between Andy and his sister. Data between Andy and his mother were collected for seven intervention sessions and for three follow-up sessions. Data between Andy and his babysitter were collected for eight intervention sessions and for one follow-up session. Data between Andy and his sister were collected for eight intervention sessions. Before starting each intervention session, the researcher sometimes provided verbal review or with the partner, watched video clips from previous sessions. The sister, who had difficulties playing and using joint attention bids with Andy, watched several video clips to see what she had done well and how she could improve. In addition, she was taught each bid with each toy following her mother’s example.

The intervention sessions were conducted in Andy’s playroom like the baseline sessions. Prior to each session, the researcher or the mother randomly took a toy from each set for a total of five items. Andy and the partner sat on the floor and started playing after the researcher presented the five toys. Because the study emphasized natural interaction, if Andy had brought out other items from other places and interacted with his partners, joint attention between Andy and the partner with the items was also counted, and the other items were noted by the researcher. In addition, Andy and the partner were not forced to maintain the interaction, although the partner was asked to play with Andy for about 15 minutes. If he lost interest in playing with his
partners or with toys, the observation was stopped. However, a partner sometimes tried playing again by leading him back into the room.

*Generalization procedures*

To examine whether Andy and the partners generalized with different materials in different settings, generalization sessions were recorded periodically during intervention. Generalization probes were conducted in the dining room during mealtime, using the same procedures as indicated in the baseline section. Data for the mother were collected during one baseline session and two intervention sessions. Data for the babysitter were collected during one baseline session and one intervention session. And data for the sister were collected two baseline sessions and two intervention sessions. For the generalization sessions, the sister presented with the mother or babysitter and sat across from Andy, according to mealtime routine. The first three sessions were conducted with the mother and Andy, and the last session was conducted with the babysitter and Andy. Joint attention bids were slightly adapted for the dining room during these sessions. For example, the definition of giving was giving food in his hand or putting it on a highchair tray, rather than on his lap.

*Experimental Design*

A multiple probe design across partners was employed to examine the effects of teaching partners to use joint attention bids. Data were collected for each partner prior to intervention, during intervention, generalization, and follow-up. After data indicated a therapeutic effect and were stable in the first dyad between Andy and his mother, the second dyad between Andy and his babysitter began intervention. After data between Andy and the babysitter indicated a therapeutic effect and were stable, the third dyad between Andy and his sister began intervention.
Follow up probes were conducted periodically during the first and second dyads until the study was completed with the third dyad.

This design was appropriate for this study because joint attention is an acquired skill that should not be reversed or withdrawn (Tawney & Gast, 1984). The researcher could monitor participants’ progress over time with this design.

Reliability

The researcher was the primary observer. A secondary observer was trained for reliability purposes. The secondary observer was a doctoral student in the special education department and was trained using the following procedure. First, she was informed about the definition and kinds of joint attention bids and was provided examples through the training videotape. She was also trained to observe and record each joint attention bid and Andy’s contingent responses on the training videotape using data collection forms. She practiced and trained with the initial baseline sessions with the partners until 100% agreement across the sessions was attained. An additional training session was implemented mid way through the study when reliability dropped on specific bids.

Interobserver agreement was independently collected for 23.4% of all sessions across dyads and conditions by two observers using the point-by-point method and was measured according to minute intervals. The second observer collected data for 11 of the 47 total sessions. Interobserver agreement was calculated with following formula: the number of agreements divided by the number of agreements plus disagreements times 100.

Procedural reliability was recorded by the second observer to determine treatment fidelity. The second observer viewed videotapes of the partner training sessions to ensure that the study
followed procedures in a consistent manner. A form with the key intervention procedures guided the observer’s observation (see Appendix C).

Validity

The mother was interviewed about her perceptions after the intervention. She was asked to explain her perception of the importance of joint attention skills, the kinds of changes she could see, her satisfaction with the training, and suggestion for future intervention.

In addition, social validity data were collected during a presentation in state level conference for special education, in which the researcher presented joint attention skills and the study. Eleven conference participants, who were graduate students, teachers, and parents of children with autism, provided validity data. They watched 12 video clips from three dyads. Videos for each dyad consisted of four clips intermixed with two baseline sessions and two intervention sessions. Each clip lasted 45-50 seconds. They were then asked to take a quiz, which asked whether a clip was from a baseline or intervention session, testing to see whether they could detect interactional differences between baseline and intervention data. Social validity was calculated using the following formula: the number of agreements divided by the total number times 100.
CHAPTER 4

RESULTS

This chapter presents results of the study based on the research questions: effects of the three partners’ joint attention bids, effects of the child’s contingent responses according to the partners’ bids, effects of the partners’ joint attention bids based on the child’s contingent responses, and generalization of the joint attention bids. In addition, the results of reliability and validity tests are presented.

Reliability

Interobserver agreement was independently collected for 23.4% of all sessions across dyads and conditions using the point-by-point method. Mean agreement on partners’ bids was 88% with a range of 78% to 100%, and mean agreement on the child’s responses was 76.18% with a range of 63% to 100%.

Specifically, mean agreement on the partners’ giving bid was 91% with a range of 61% to 100%, mean agreement on the partners’ touching/showing bid was 87.82% with a range of 80% to 100%, and mean agreement on the partners’ pointing bid was 94.55% with a range of 80% to 100%. Mean agreement on Andy’s responses of the giving bid was 84% with a range of 39% to 100%, mean agreement on responses of the touching/showing bid was 68.91% with a range of 0% to 100%, and mean agreement on responses of the pointing bid was 90.36% with a range of 60% to 100%. In addition, procedure reliability, to ensure that the study followed procedures in a consistent manner, was checked by a second observer. The results showed 100% agreement for each partner being taught joint attention bids during the first session.
Effects of Partners’ Total Joint Attention Bids

The results of each partner’s total joint attention bids per minute across the sessions are shown in Figure 1. All three partners increased their use of joint attention bids during the intervention phases in terms of mean and median values. The mother used joint attention bids most frequently both during baseline and intervention.

The three partners showed variable but accelerating trend lines in the total bids per minute during intervention. There was a 0% overlap in the total bids per minute between baseline and intervention for the mother and babysitter dyads. In the sister and Andy dyad, there was a 12.5% overlap in the total bids per minute between the two conditions (Tawney & Gast, 1984).

Mother displayed an average of 6.01 joint attention bids per minute and a median of 6.22 bids per minute with a range of 5.47 to 6.33 bids per minute during baseline. The bids increased to an average of 7.58 bids per minute and a median of 7.25 bids per minute with a range of 6.78 to 8.92 bids per minute during intervention. During follow up sessions, the mother increased her use of joint attention bids compared to intervention. She showed an average of 9.00 bids per minute and a median of 9.6 bids per minute with a range of 7.65 to 9.74.

The babysitter demonstrated an average of 4.26 joint attention bids per minute and a median of 4.72 bids per minute with a range of 2.43 to 5.14 bids per minute in the baseline. She increased to an average of 7.17 bids per minute and a median of 6.98 bids per minute with a range of 5.86 to 8.83 bids per minute during intervention. Babysitter displayed 6 bids per minute in the follow up session.

The sister used an average of 3.28 joint attention bids per minute and a median of 3.38 bids per minute with a range of 1.75 to 4.54 bids per minute during baseline. She increased to an
Figure 1. Dyads’ Total Number of Joint Attention Bids and Responses per Minute across Sessions
average of 5.04 bids per minute and a median of 4.98 bids per minute with a range of 4 to 13.78 bids per minute during intervention.

Effects of Child’s Contingent Responses

Figure 1 also shows graphs of the results of Andy’s contingent responses per minute across partners. Andy increased his contingent responses based on his partners’ joint attention bids in the intervention phase. In addition to increasing the quantity of responses, he also increased the percentage of the contingent responses based on partners’ joint attention bids.

Andy demonstrated variable but accelerating trend lines in the total responses per minute across partners during intervention. There was a 0% overlap in the total responses per minute between baseline and intervention for the sister dyad. There was a 12.5% overlap in the babysitter and Andy dyad and a 71.43% overlap in the mother and Andy dyad in the total responses per minute between the two conditions (Tawney & Gast, 1984).

In the mother and Andy dyad, he demonstrated an average of 2.88 responses per minute and a median of 3.11 responses per minute in the baseline. He increased his responses to an average of 4.02 per minute and a median of 3.81 in the intervention. The range of his responses was from 1.20 to 4.33 responses per minute during baseline and from 2.63 to 6.46 responses per minute during intervention. His contingent responses increased to an average of 5.00 responses per minute and a median of 4.09 responses per minute during follow up sessions with a range of 4.02 to 6.3 responses per minute.

To his babysitter’s bids, Andy demonstrated an average of 1.25 responses per minute and a median of 0.71 responses per minute during baseline. He increased his responses to an average of 3.26 responses per minute and a median of 3.35 responses per minute during intervention. The range of his responses was from 0.29 to 1.76 per minute during baseline and from 2.00 to 4.14
responses per minute during intervention. He responded 4.56 times per minute during the follow up session.

In the sister and Andy dyad, he demonstrated an average of 1.03 responses per minute and a median of 0.96 responses per minute during baseline. He increased them to an average of 3.19 per minute and a median of 2.33 per minute during intervention. The range of his responses was from 0.50 to 1.54 per minute during baseline and from 1.75 to 6.37 per minute during intervention.

Percentage of partners’ bids, Andy contingently responded to, are as follows. In the mother and Andy dyad, he increased his contingent responses from 46.89% in the baseline to 52.41% in the intervention. He increased to 55.51% during follow up. In the babysitter and Andy dyad, he increased from 30.14% in the baseline to 45.41% in the intervention. He showed 76% during the follow up session. In the sister and Andy dyad, he increased from 30.97% in the baseline to 52.27% in the intervention. As shown, Andy increased contingent responses as well as total responses per minute.

Effects of Three Partners’ Each Joint Attention Bid

Figure 2 presents the number of bids per minute for each partner and each type across the sessions. Figure 3, Figure 4, and Figure 5 show the results of each partner’s bid and Andy’s contingent responses per minute across the sessions. All three partners showed similar results using each bid. They used the touching/showing bid most frequently both during baseline and intervention.

The mother displayed the touching/showing bid an average of 5.43 times per minute and a median of 5.33 bids per minute in the baseline and increased to an average of 5.67 bids per minute and a median of 5.78 bids per minute in the intervention. She decreased to an average of
Figure 2: Partners’ Number of Each Joint Attention Bid per Minute across Sessions
Figure 3: Number of Each Bid and Contingent Response per Minute in Mother and Andy Dyad
Figure 4: Number of Each Bid and Contingent Response per Minute in Babysitter and Andy Dyad
Figure 5: Number of Each Bid and Contingent Response per Minute in Sister and Andy Dyad
5.21 bids per minute and a median of 4.20 bids per minute during follow up. The mother used the giving bid an average of 0.47 times per minute and a median of 0.4 bids per minute in the baseline and increased to an average of 0.63 bids per minute and a median of 0.43 bids per minute in the intervention. She increased further to an average of 0.70 bids per minute and a median of 0.82 bids per minute during follow up. The mother used the pointing bid an average of 0.11 bids per minute and a median of 0 bids per minute in the baseline. She increased to an average of 1.28 bids per minute and a median of 1.54 bids per minute during intervention and an average of 3.09 bids per minute and a median of 3.83 bids per minute during follow up.

The babysitter displayed the touching/showing bid an average of 3.86 times per minute and a median of 4 times per minute in the baseline. She increased to an average of 5.21 bids per minute and a median of 5.22 bids per minute in the intervention. During the follow up session, she presented 3.11 bids per minute. The babysitter used the giving bid an average of 0.32 times per minute and a median of 0 times per minute in the baseline. She increased to an average of 1.10 bids per minute and a median of 1.16 bids per minute in the intervention and 1.22 bids per minute during follow up. She used the pointing bid an average of 0.09 times per minute and a median of 0.08 times per minute in the baseline. She increased to an average of 0.87 bids per minute and a median of 0.70 bids per minute during intervention and 1.67 bids per minute during follow up.

The sister displayed the touching/showing bid an average of 3.19 times per minute and a median of 3.27 times per minute in the baseline. She increased to an average of 4.60 bids per minute and a median of 4.30 bids per minute in the intervention. The sister used the giving bid an average and a median of 0.08 times per minute in the baseline and increased to an average of 1.20 bids per minute and a median of 0.48 bids per minute in the intervention. She used the
pointing bid an average and a median of 0 bids per minute in the baseline and increased to an average of 0.33 bids per minute and a median of 0.15 bids per minute.

The partners used the touching/giving bid most frequently across conditions, and they received the most contingent responses from Andy using the giving bid across conditions. The touching/showing bid yielded the second most contingent responses and pointing the third. In the mother and Andy dyad, he presented 55.22% contingent responses to the giving bid, 52.86% of to the touching/showing bid, and 48.56% to the pointing bid across conditions. In the babysitter and Andy dyad, he presented 60.84% contingent responses to the giving bid, 42.15% to the touching/showing bid, and 30.06% to the pointing bid across conditions. In the sister and Andy dyad, he presented 46.04% contingent responses to the giving bid, 42.97% to the touching/showing bid, and 18% to the pointing bid across conditions.

Generalization of Joint Attention Bids

Figure 1 shows the use of joint attention bids per minute across the generalization sessions. Although not enough generalization data were collected to determine a functional relationship between joint attention bids and Andy’s response in other settings, joint attention bids across partners increased during intervention compared to baseline. The mother used 1.24 bids per minute during baseline and increased to an average of 3.62 bids per minute across two intervention sessions. The babysitter used 1.64 bids per minute during baseline and increased to 3.54 bids per minute during intervention. The sister used an average of 0.06 bids per minute across two baseline sessions, increased to an average of 0.16 bids per minute across two intervention sessions.

Andy also increased his contingent responses based on his partners’ initiations. He increased from 0.83 bids per minute during baseline to an average of 1.41 bids per minute during
intervention with his mother. He increased from 0.5 bids per minute during baseline to 1 bid per minute during intervention with the babysitter. He increased from an average of 0.04 bids per minute during baseline to an average of 0.10 bids per minute during intervention with his sister.

Social Validity

The mother was very satisfied with the study. She could distinguish the conditions demonstrated by all the video clips. She reported that she never thought about putting a toy in his hand to introduce it when interacting with Andy before; however, after training she realized that giving was a powerful bid among the others. Also, she stated that she was sensitive to use of joint attention bids after training. Even though she naturally used joint attention bids before training, she did not know how important it was to Andy nor to look for his contingent responses. However, she started using each bid when interacting with him more consciously and then observed his eyes to examine whether he was following or interested. For example, she tried using pointing every morning when the school bus was coming, and Andy followed her pointing and saw the bus, which had never happened before. Because the study was conducted in her home with Andy’s toys, she claimed it was easy to use joint attention skills without feeling any manipulation from the researcher.

In addition, social validity was checked by 11 conference attendees who participated in the conference presentation. Overall, they demonstrated 90% agreement in finding differences between baseline and intervention in the video clips. The mother and Andy dyad showed 97.73% agreement. The babysitter and Andy dyad presented 80.95% agreement. And the sister and Andy dyad showed 90.91% agreement.
CHAPTER 5

DISCUSSION

Findings

Overall, all three partners increased their use of joint attention bids during the intervention phase of the study. They increased their use of each joint attention bid as well as their total joint attention bids. The child with autism increased contingent responses to each joint attention bid with all three partners during intervention. The three partners used the touching/showing bid most frequently during both baseline and intervention. However, the giving bid yielded the most contingent responses, the touching/showing bid second most, and the pointing bid the least. In the mother and Andy dyad, she further increased her use of joint attention bids during follow-up. During mealtime, the mother and babysitter generalized joint attention bids, and the sister began to use them after training.

The range of interobserver reliability was variable. Despite of fairly high mean agreement, the range started from 0%. It could be explained because of low incidence of each bid during generalization and baseline sessions. For example, 0% agreement of Andy’s responses on the touching/showing bid was presented in a generalization session, in which a partner showed only one touching/showing bid. Therefore, despite of 100% agreement of the partner’s touching/showing bid in the same session, disagreement occurred when the primary observer and the second observer coded Andy’s response. In addition, the agreement on the child’s responses represented lower percentage than the agreement on the partners’ bids in the interobserver
reliability. Coding Andy’s behavioral responses was sometimes difficult because the observers could not discern if Andy looked at the toy based on the videotape.

These data demonstrate the importance of joint attention training for young children with autism. Like subjects in previous studies, Andy showed deficits in joint attention skills during baseline but increased his correct responses to the joint attention bids during intervention (Hwang & Hughes, 2000; Whalen & Schreibman, 2003; Zercher et al., 2001). In addition, the increase in Andy’s contingent responses after each partner’s joint attention bid training when compared to baseline is in keeping with prior research (Hwang & Hughes, 2000; Zercher et al., 2001).

In this study, partners from the child’s natural environment were taught joint attention bids to engage the child with autism. Specifically, a primary caregiver (babysitter) and family members (Mother and sister) who interacted the most with Andy were taught these interaction skills. After intervention, not only did the partners increase their use of joint attention bids, but the child also increased his contingent responses to their initiations.

These results are important in two ways. First, it is important that children with autism learn to use the joint attention skills with familiar people because joint attention is a reciprocal social skill. If familiar persons are knowledgeable about the skills, joint attention skills training for both the child and partner will be expedited, as the result show. Another important factor was the efficiency of teaching. Whalen and Schreibman (2003) spent 16 to 26 days teaching children to respond to joint attention skills. However, partners in this study were taught the joint attention bids for two to three sessions, and the child with autism naturally increased his contingent response to the bids. It takes less time to teach adults, siblings, or peers without disabilities to use joint attention bids than to teach children with autism joint attention skills directly. This method
also fits with current practice in early childhood special education, according to which
interventionists serve as coach to impart skills to primary caregivers of children with disabilities.

The results indicate differences in the use of bids and frequency of response among the
partners, although all partners and Andy increased their bids and responses. Mother used the
most joint attention bids among the three. Also, Andy responded to his mother’s bids the most, a
finding that could be explained by the fact that the mother had previously been trained to use
play skills and incidental teaching. She also had an energetic and enthusiastic interaction style.
A positive affect appears to be a key factor in gaining joint attention.

The sister had a hard time engaging Andy. Even though bids and responses increased in
her first and second intervention sessions, this dyad played for a very short period: two and a half
to three minutes. During baseline, she was observed being with him without talking, rather than
playing with him. When the sister finished the training, she could use all the bids without
prompts. However, she was confused about how to mix both play and joint attention bids and
lost interest during first two sessions, despite encouragement with verbal prompts and
information from the primary researcher. In the third and fourth sessions, the mother presented
the bids with the sister and simply showed her how to use the bids with all the toys. Then the
sister tried the bids again. Using this method, interaction time increased slightly, lasting from
four to five minutes. However, she again lost interest and engaged in rough and tumble play with
Andy, rather than sitting and playing with joint attention bids. Therefore, modeling and
videowatching were systematically introduced as teaching methods beginning with the fifth
session. Before starting each session, she watched video clips of her appropriate use of joint
attention bids. During the session, her mother specifically modeled how to use a bid for each toy,
and she copied exactly what the mother did. Even though the mother and sister shared the
interaction time, she still increased her bids per minute and started using them appropriately. In addition, the length of interaction time dramatically increased from nine to 15 minutes. This modification of training was important given the young age of the sister. The mother served as a necessary scaffold, and the triadic arrangement facilitated the sister’s successful use of the joint attention bids.

Uniquely, this study analyzed each bid per minute as well as total bids per minute. In previous studies, children and partners were taught five joint attention bids (Whalen & Schreibman, 2003; Zercher et al., 2001). However, not every bid used by the child or partner was analyzed. Whalen and Schriebman (2003) only reported responses to the showing and following gaze/point bid.

However, the results from the current study show that the giving bid yielded the most contingent responses from the child, although the touching/showing bid was used most frequently by the partners across sessions. The Mother also reported that she had never thought of using the giving bid to present a toy before the training, but she found she could elicit more responses from him when using the giving bid. There may be no hierarchy of effectiveness among the bids, for each bid could be appropriately and uniquely used for each toy. For example, giving could not be used with a big object such as a television or a bicycle but could be used easily with a small figure toy. Touching is appropriate to present a sound-making toy. Therefore, a child with autism should be exposed to every joint attention bid. As the results indicate, all partners increased giving and pointing with a modest increase of touching/showing, and Andy’s contingent responses to other bids as well as the touching/showing bid increased.

However, the four joint attention skills could be conceptualized hierarchically in terms of the area of physical contact. Whalen and Schreibman (2003) divided joint attention bids into six
‘levels’ and introduced each level after the previous level had been mastered. Along this line, the definition of giving was modified in this study. Giving included a partner tapping or touching a toy with Andy’s hand or foot while holding it as well as placing a toy in his hand. With this definition, giving could be used with big toys. Because giving is a basic, effective skill, it worked well when a new toy was introduced, whereas pointing could be used with the toy once Andy was engaged.

As Figure 2 shows the mother and babysitter demonstrated that they decreased their use of the touching/showing bid. However, their total number of bids per minute increased during intervention condition, so they may have consciously tried to use various joint attention bids like giving and pointing more during intervention, while they mostly used touching/showing during baseline.

As noted in the results, all the partners showed accelerating but variable trend lines after training, perhaps because the sessions were not conducted regularly and often. Instead, sessions were conducted once or twice a week, sometimes once every two weeks based upon the partners’ and Andy’s schedules. In keeping with home-based research, a priority of the study was the convenience of the family. In addition, the variable trend lines may have been influenced by other variables such as the kinds of toys, Andy’s mood, and the partner’s stress, fatigue, or positive attitude during the session. Especially, the toys mainly used during a session greatly influenced the type of bid used and how many times the bid was used, a phenomenon demonstrated by the last session between the sister and Andy. The sister mostly used a drum, which she tapped on the top to reveal alphabet letters with sounds. In the session, she tried to tap the drum or to use Andy’s hand to tap it quickly several times in one minute. That action
significantly increased her total to 13.78 bids per minute, 6.52 giving bids per minute and 7.11 touching/showing bids per minute.

Even though the results are variable, the interventions for all three partners were effective based on the small overlap between baseline and intervention. The mother and babysitter showed no overlap at all between baseline and intervention. The sister showed a 12.5% overlap between baseline and intervention, although she struggled with using joint attention bids during intervention. In contrast, Andy showed no overlap with the sister, a 12.5% overlap with the babysitter, and a 71.43% overlap with the mother. It could be interpreted that the intervention between the sister and Andy was very effective for him but that the intervention between the mother and Andy was modestly effective for him because he had already demonstrated good interaction with mother during baseline.

During the generalization sessions, the mother and babysitter increased their use of bids two to three times compared to baseline, although these data must be interpreted with caution based on the low number of generalization probes analyzed. However, these results provide a contrast to the Hwang and Hughes (2000) study, in which joint attention was seldom generalized. Data for the sister and Andy dyad showed that she rarely interacted with Andy in the generalization sessions. Generalization sessions for the sister were conducted when the mother or babysitter were present during mealtime. Given this context, it was not natural for the sister to give Andy his food. In fact, her interaction with Andy was somewhat prompted because the mother or babysitter sat between sister and Andy and assisted him during mealtime. However, sister started talking and using joint attention bids with her brother with the help of the mother’s verbal prompts after the sister’s training.
Limitations and Implications

Although this study has merit as home-based research, it also has limitations due to its exclusive setting. Given this context, a priority of the study was the convenience of the family, including everyday, typical, real life circumstances. Consequently, data were difficult to collect regularly. Depending on the schedules of all four participants, data were collected in either the morning or evening, on either weekdays or weekends. Depending on each partner, data were collected one or two times a week or once every two weeks. In addition to their schedule, there were variables such as Andy’s mood or the partner’s attitude. If Andy had not been taking a nap or sleeping at night, data could not be collected although a time had been scheduled. It is recommended for future studies that data be collected more consistently so that perhaps data between partners and the child with autism will be more consistent and stable.

Another limitation was coding the joint attention bids. Joint attention is a natural phenomenon used to communicate with others. Therefore, it was difficult to categorize the interaction into four joint attention categories. For example, a partner could show the toy by tapping it or place the toy on his lap as it made a sound. Such touching and showing could not be divided into discrete categories, so they were combined for data collection; however, they were taught separately during intervention. Nonetheless, analyzing each bid was valuable in determining the relationship between each bid and the child’s response. Given this limitation, future studies should continue to refine definitions for each bid. In addition, several other joint attention bids exist along with the four bids studied here, including verbal comments or eye gaze. Future studies could examine the effects of other joint attention bids for older children with autism.
A final limitation was a weakness in generalization and data maintenance. Because of time constraints, only three sessions for the mother, two sessions for the babysitter and four sessions for the sister for generalization, and three sessions for the mother and one session for the babysitter for follow-up until sister’s intervention was completed. Therefore, these data hardly generalize to other situations. Considering this limitation, future studies should contain enough data for generalization or follow-up sessions so that they can verify effects of joint attention during generalization and follow-up.

Several studies have emphasized the relationship between language and joint attention. Therefore, future research could use a formal assessment during baseline and intervention, then examine whether there is contingent language development along with the development of joint attention. As Whalen and Schreibman (2003) suggested, future research could examine the functional relationship between ‘positive affect’ and joint attention skills. In the current study, it was assumed that the mother’s positive affect influenced joint attention skills and the child’s positive affect increased more with his mother’s. In addition, future researchers could study a child’s initiations as well as his/her responses to partners.

Conclusions

This study contributes to joint attention intervention for children with autism, to parent education, and to home-based research, indicating the effectiveness of teaching family members and a caregiver joint attention bids to engage a young child with autism. This study focused only on joint attention bids and analyzed the total bids and each specific bid. The results showed that each bid as well as all of joint attention bids remarkably increased for the three partners. Also, Andy’s contingent response to each bid increased. In addition, this study demonstrates that a parent, with whom a child shows the most affection, plays an important role. In this study, the
mother was the most powerful change agent for both of her children. Prior to starting the study, the mother and the primary researcher discussed and decided which toys Andy enjoyed the most. In addition, the mother exhibited the greatest use of joint attention bids during both baseline and intervention, leading to more contingent responses from Andy. She also participated in modeling for the sister, which increased the latter’s use of bids. This finding confirms current practice, that parents play an important role as partners for teachers.

Finally, this study was conducted with familiar family members and caregivers in natural settings: the home playroom and dining room. Although the sessions could not be conducted consistently, the study still showed the effectiveness of training. In addition, family members or caregivers could use joint attention bids they learned without any modifications after the study was done.
REFERENCES


APPENDIX A

DATA COLLECTION SHEET
Data Collection Sheet

Partner: _______________________ Observer: _______________________
Toys: ________________________
Date: __________ Session: _________ Time (Total Min.): ___________

<table>
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<th>Minute</th>
<th>Giving</th>
<th>Touching/Showing</th>
<th>Pointing</th>
<th>Total</th>
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Key: +: Correct  -: Incorrect  0: No Response  √: Unknown

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</tr>
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Comments:
APPENDIX B

JOINT ATTENTION TRAINING MATERIALS
Joint Attention

什么是联合注意？
联合注意是一种早期发展的社交沟通技能，其中两个人（一个孩子和伴侣）使用手势和凝视来分享对有趣物体或事件的注意力。

例如：Joy和她的妈妈在散步时，一辆消防车鸣笛经过。Joy的妈妈看着它，然后回头看着Joy，最后指着消防车，好像在说：“Hey, Joy, look at that!” Joy看着妈妈指着的地方，兴奋地回应道，“Firetruck!”

为什么联合注意很重要？
- 帮助孩子关注物体/环境和学习新词汇
- 自然的社会互动
- 提高社交发展和沟通技能
- 与当前和后来的语言发展有关
- 这是自闭症儿童的一项关键技能。

四种联合注意的请求
- 给出：将物品放在孩子手中或膝盖上
- 触摸：触摸或轻拍物品以吸引孩子的注意力
- 展示：将物品放在孩子视野中
- 指向：指向（但不接触）你希望孩子看或玩的物品

一些额外的技巧可能有助于增加联合注意！
- 新的请求应指向孩子感兴趣的玩具，或当他对某个玩具失去兴趣时引入新玩具
- 说出与请求相关的话
- 叫孩子的名字
- 做到：与孩子进行眼神交流之前，孩子和成人间应建立眼神接触
- 用兴奋的声音：做出非常大声的“Wow!”或表达“What a cool toy!”或夸张的笑容或搞笑的表情
- 遵循孩子的引导
APPENDIX C

PROCEDURAL RELIABILITY CHECK SHEET
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