A PRELIMINARY ANALYSIS OF INTERACTIONS BETWEEN SIBLING TRAINING AND TOY PREFERENCES

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Siblings of children who have been diagnosed with autism can play important roles in the lives of their brothers or sisters. Previous literature shows that siblings can effectively change behavior and can increase play interactions. Furthermore, the use of preferred materials may enhance social interactions between the siblings. The purpose of this study was to determine, the effects that material preferences and choices have on sibling social bids and cooperative play during a sibling training program. There were two main objectives. The first objective was to evaluate the effects of teaching with the high preference toy of the neuro-typical sibling during sibling training. The second objective was to determine if the training would produce different effects across four different toy conditions. Measures included social bids made by each of the siblings and cooperative play. Results indicate that teaching with the neuro-typical siblings' high preference toy during sibling training can be an effective method to increase social bids and cooperative play. The results of this study are discussed in the contexts of preference and choice selections, physical environments, motor skills, carry over effects, and participations based on gender.

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

INTRODUCTION

Children who have been diagnosed with autism spectrum disorders (ASD) are often described as having deficits in both verbal and nonverbal communication skills, deficits in social skills, as well as unusual, repetitive, or strictly limited activities and interests (American Psychiatric Association, 2008). These deficits and limitations make it very difficult for social interactions to occur. The difficulties have particular significance for the children's families, especially the children's siblings.

Siblings can play many roles across a lifetime, including the roles of friend, playmate, foe, teacher, and potential caregiver (Harris & Glassberg, 2003; Orsmond et al., 2009). The fact that siblings can play such an important role suggests that they should be included within the behavioral intervention program (Miller & Cantwell, 1976). This introduction provides a review of the literature addressing the interactions of siblings in treatment as well as a description of the purpose and design of the current study.

Research has examined participants involving sibling in a variety of ways. For example, siblings are taught to be playmates (Baker, 2000; Czekalski, 2009; James & Egel, 1986; Merker, 2005) and are taught to be teachers (Baker, 2000; Cash & Evans, 1975; Celiberti & Harris, 1993; Colletti & Harris, 1977; Czekalski, 2009; James & Egel, 1986; Merker (2005); Millar & Cantwell, 1976; Randall, 2000; Schreibman, O'Neil, & Koegel, 1983; & Weinrott, 1974). Table 1 provides brief summaries of the sibling intervention literature, describing what and how siblings were taught. Generally, siblings are taught basic behavior-change techniques (modeling, prompting, reinforcement, praise, contingent attention, shaping, discrete trials, and token systems) using behavior change procedures (modeling, instructions, role-playing). In the present study used modeling, instructions, role-play, and feedback to teach siblings. The specific

teaching methods for this study were adapted from Celberti and Harris (1993), Czekalski (2009), Merker (2005), and Randall (2000).

Play comprises one of the primary social activities of children. Children with autism often have deficits in play skills; therefore, it is important for clinicians to consider what materials to use in a behavior intervention program. There are a few studies that have examined play materials as aids to elicit social behaviors in children with autism. These studies suggest that toys or activities, which are considered to be social, and age appropriate, help to increase the social behaviors of children with autism (Chandler et al., 1992; Martin et al., 1991; McEvoy et al., 1988; Merker, 2005; Quiltch & Risley, 1973; Shaferm et al., 1984; and Twardosz et al., 1983). Carter (2001) observed that providing children with autism with a choice of materials during a language intervention within the context of playing a game effected levels of disruptive behaviors, social play initiations, and acquisitions of the targeted language skill. The results showed positive effects in play initiations, in actions to continue play, and in the targeted language skill. Results also showed a decrease in disruptive behaviors. When considering a behavior intervention program the role of choice may be important. A choice condition was implemented as part of the evaluation component of this study.

Studies have evaluated play materials in the context of play between children with autism and their peers (Odom et al., 1985; Chandler et al., 1992; McEvoy et al., 1988; Shafer et al., 1984; Twardosz et al., 1983). Twardosz et al. (1983) found that, during affection activities, children with autism were more likely to engage in reciprocal peer interactions than in the absence of affection activities. Twardosz et al. (1983) defined affection activities as activities involving social interactions, including tapping, hugging, kissing, or giving another child a high

five. Research by Shafer et al. (1984) suggests that utilizing the child with autism's most preferred toy resulted in positive social interactions that maintained over time.

In addition to peers, studies have evaluated play materials in the context of play between children with autism and their siblings. (Baker, 2000; Czekalski, 2009; El-Ghroury & Romancyk, 1999; James & Egel, 1986; Koegel, Dryer, Bell, 1987; & Merker, 2005) Literature suggests that play materials can affect sibling interactions. Suggestions have been made to use age appropriate activities for both children with autism and their siblings (Baker, 2000; Harris & Glassberg, 2003) and to use the highly preferred toys of the children with autism to aid in assessment and teaching procedures (Czekalski, 2009; El-Ghouroury & Romanczyk, 1999; James & Egel, 1986;1987; Merker, 2005). For example, Baker (2000) utilized age-appropriate and preferred items for both siblings. Neuro-typical (NT) siblings were taught how to incorporate obsessions or repetitive behaviors of the child with autism into an age appropriate games that they could play together (e.g. Bingo). Measures consisted of social interactions and joint attention. Results showed that incorporating the age appropriate and preferred items of both children increase social interactions, and joint attention. Results also show an increase in positive affect in the children with autism, a decrease in their ritualistic behaviors as well as skills generalizing to new games and settings.

In another study, Merker (2005) used the high preference toys of the child with autism to teach the older sibling to set up opportunities to entice conversations, and praise the correct responses of her younger sister. Measures consisted of social bids, imitations, compliments, and nonverbal affection. The NT siblings skills were looked at across three different toy conditions: the high preference toy of the neuro typical sibling, the high preference toy of the child with

autism, and an open choice toy condition. Results show that most gains were made when the training consisted of the child with autisms preferred toy.

Although these recommendations have been shown to be successful, research that systematically evaluates each of these activity variables is limited. Specifically, the purpose of this study was to determine what effects material preferences have on sibling social bids and cooperative play during different choice conditions. There were two aims. The first was to evaluate the effects of using the toy preference of the neuro-typical sibling during training. The second objective was to determine if this training produced differences across four different toy preference and choice conditions.

METHOD

Participants

Two brothers participated in this project. The participants reside with their mother, their father, and their 2-year-old neuro-typical sister. The sibling participants were an 8-year-old neuro-typical (NT) boy and a 6-year-old boy diagnosed with pervasive developmental disorder-not otherwise specified, (PDD-NOS). Pseudonyms are used to protect the identity of the participants. I will call the older brother "Brett (NT)" and the younger "Joe (ASD)." Brett (NT) attends classes in a regular elementary school. Joe (ASD) goes to a different school than his brother where he is in a special communication class for part of the day and a general education classroom for the other part of the day. Joe (ASD) also attends 8 hours of a behavioral intervention program and 1 hour of speech therapy a week at a local autism treatment program, Easter Seals of North Texas. In addition to Joe's (ASD) PDD-NOS diagnosis, he is also diagnosed with attention deficit disorder, static & encephalopathy, articulation disorder, and language disorder. Joe (ASD) has severe speech delays, stereotypical patterns of behavior, and significant social impairment. Joe's (ASD) speech is repetitive and loud, and he has trouble articulating most words.

This sibling project was initiated after the boys' mother expressed concerned that they rarely interacted and played together. Upon meeting with the mother the experimenter learned that often Joe (ASD) would try and keep up with his brother and their neighborhood friends but at times was physically too slow. For example the kids in the neighborhood and Brett (NT) would decided to go ride bikes. Joe (ASD) knew how to ride a bike but as he attempted to join the other boys he would still be putting on his shoes, as Brett (NT) would already be out the door. Brett (NT) recalled very few times when he played with his brother, expressing that he had

fun but often had a hard time understanding him and that they did not really like the same types of toys. The boy's mother also expressed interest in teaching Brett (NT) how to play with Joe (ASD) better as well as expanding Joe's (ASD) interest.

Prior to beginning this project the boys' mother provided informed consent. Brett (NT) signed an assent form, which he and the experimenter read over. (See Appendix A for both consent and assent forms).

Trainer and Observers

I served as the trainer and the observer in this study. I was a third year graduate student at the University of North Texas in the Department of Behavior Analysis with four years of supervised experience working with children with autism. I have worked with clients in their homes as well as in a center-based setting. Other graduate students at the University of North Texas in the Department of Behavior Analysis served as reliability observers.

Settings and Materials

This study was conducted at Easter Seals of North Texas' Autism Treatment Program's, Trinity Site (ESATP). Sessions began in the same treatment room each week and ended in the physical therapy gym. The treatment room consisted of a small table, two chairs, an attached observation booth with a one-way window, cabinets, and a shelving unit containing various age-appropriate toys such as Bioncles™, cars, Thomas the Tank Engine™, various art supplies, a jungle set, an assortment of board games, blocks, play food, tools, and balls. The center's physical therapy gym contained large motor activities such as bikes, basketball hoops, and a variety of different size balls, a kitchen set, and a small trampoline. In addition to the toys in each setting the experimenter used, a Flip Cam™, and an experimenter designed instructional

booklet (WAM!) to illustrate the teaching skills to Brett (NT). The book is included in Appendix B and is discussed in detail in the procedures section.

Measurements

Two behaviors were measured in this study. The two behaviors observed for both children were social bids and cooperative play. Social bids were defined as any verbal initiations, responses, or gestures from one child to another. Social bids were measured for each child individually. Cooporative play were defined as instances in which the siblings are interacting with each other in some manner, and/or are engaged in the same or similar activity, and/or are looking at an item and then each other, and/or verbally communicate about an activity to one another. (For a complete list of measures see Appendix C).

Data Collection Procedures

During each weekly assessment, five-minute video was recorded by the experimenter at the end of every session. Video clips were scored for direct measures as well as interobsever agreement. The five-minute video assessments were scored away from the treatment facility in a private office. Social bids were recorded using a frequency count and were individually scored for both brothers. Cooperative play was recorded using 15-second whole intervals. If the observer could not see either child (due to them being off the camera for any part of the 15-second interval) their behavior was not recorded. (The data sheets and scoring protocols used can be found in Appendix D)

Reliability

Interobsever agreement (IOA) was calculated by the experimenter and one other observer. The reliability observer was provided with a written copy of the scoring instructions, the observation code and blank data sheets. The observer was first trained on the definition and

shown an example clip, scoring was explained and modeled and then the observer watched a clip, scored, and received feedback on accuracy. All videos used to calculate IOA were scored independently. IOA was assed in 30% (5 of 16) of baseline observations and 30% (7 of 25) of treatment observations. Interobsever agreement was calculated by dividing the number of agreements between the experimenter and the observer by the sum of the agreements and disagreements multiplied by 100. For frequency-recorded data, observer agreement was defined as at least 90% agreement for both Joe ASD) and Brett's (NT) social bids. For whole interval recorded data, observer agreement was defined as at least 80% agreement for cooperative play. All IOA agreement percentages can be found in Table 5.

Procedures

Intake and assessment. Prior to the introduction of baseline, the experimenter administrated a questionnaire to Brett (NT) and his mother. This consisted of questions regarding the siblings' relationships, their mothers concerns and comments about the boys and their interactions, as well as questions related to activity preferences. These questionnaires were re-administered post intervention (see Appendix E for questionnaires). Based on the intake questionnaires, it appeared that the siblings had very limited common interests. For example, Brett (NT) enjoyed Bakugans™ and Bioncles™ while Joe (ASD) enjoyed Thomas the Tank Engine™, play food, and fire trucks. These questionnaires used in combination with direct observation aided the development of observed preferred toys for each of the siblings. Based on the preference lists, four toy conditions were developed. The four toy conditions that were developed and assessed are as follows; Condition 1: Brett's (NT) preferred toy, Bionicles™. Condition 2: Joe's (ASD) preferred toy, Thomas the Tank Engine™. Condition 3: Open choice small motor toys. Condition 4: Open choice large motor toys (Table 6 displays a description of

each toy condition). A description of the specific stimulus items in each condition can be found in Table 7. Table 8 displays a further breakdown of activities chosen in Toy Condition 3 by Brett (NT) and Joe (ASD).

Phase 1: Baseline. Baseline consisted of four observation sessions. Each session consisted of four 5-minute assessments in each toy condition. The experimenter met Brett (NT), Joe (ASD), and their mother in the waiting room of the autism treatment center. After briefly discussing how the day was going, and addressing any questions, comments, or concerns about the study, the experimenter, Brett (NT), and Joe (ASD) headed back to the treatment room. The parents were given the option to watch in the observation booth if they chose to do so. The experimenter set up the camera prior to each condition. No instructions were given during baseline except for the designated instruction, which were as follows; In Condition 1, Brett's (NT) high preference toy, the siblings were told, "Why don't you boys go play Bioncles™ together?" In Condition 2, Joe's (ASD) high preferences, the instruction was, "Why don't you boys go play Thomas the Train together?" For Condition 3, open choice small motor toys, and Condition 4, open choice large motor toys the instruction was "Why don't you boys go play together. During baseline, no feedback was given to the children.

Phase II: Social bid training with Brett's (NT) Preferred Toy Condition 1. Intervention consisted of seven 1-hour sessions. Each session started off with only Brett (NT) and the experimenter. All training occurred with Brett's (NT) preferred item. The training period consisted of approximately 3 to 5 minutes of instructions and modeling of the teaching components, followed by 3 to 5 minutes of role-play with the experimenter and Brett (NT) for a total of 10 minutes. Following this teaching phase Joe (ASD) joined his brother and the experimenter. Approximately 20-25 minutes of practice on the teaching components with

experimenter feedback was given to Brett (NT) while both boys played with Condition 1 materials.

Three teaching components were taught to Brett (NT): watch, arrange, and make a response. The *WAM!* book was an instructional aid to illustrate procedures for these three skills (see Appendix B for the *WAM!* book). WAM is an acronym for watch (W), arrange (A), make a response (M). During training, the experimenter and Brett (NT) read through the *WAM!* book and discussed its content. Brett (NT) was instructed to watch what Joe (ASD) is doing. What is Joe (ASD) interested in, and what he is playing with at that moment? He was then instructed to arrange the environment so that Joe (ASD) would be more likely to play with him. Lastly, he was instructed to make a response. He was taught to make a response when he liked what Joe (ASD) was doing (i.e. playing or talking to him). A response consisted of handing Joe (ASD) the toy he asked for, telling Joe (ASD) he was doing a good job, and/or talking to Joe (ASD) about the current activity. These three teaching components were adapted from Baker, (2000); Czekalski, (2009); Merker, (2005). The *WAM!* book was often referenced during this role-play period by the experimenter.

After the practice and feedback portion of the training, the experimenter set up the camera and gave the designated instructions for each condition and asked the boys to go and play with each other. Each condition was video recoded for five minutes and assessed. The *WAM!* book continued to be available in every condition during video assessments but was not utilized by Brett (NT). No feedback was given during or after each five-minute assessment.

Phase III: Reassess preference and change Joe's (ASD) Toy Conditions 2 and 3. Beginning in the ninth session the materials for Joe's (ASD) high preference toy were changed to tools and blocks per his request. Condition 2, Joe's (ASD) high preference toy, Thomas the

Tank Engine™ was made available for Sessions 1 through 8. In Sessions 7 and 8 he stated that he did not want to play with Thomas "No Thomas," but rather "I want blocks" and "I want my own saw." Joe's (ASD) repeatedly protested Thomas the Tank Engine and requested to play with tools and blocks and so they were changed. Training and video assessments continued to be ran the exact same. Again, no feedback was given during or after each video assessment.

Exit and final assessment. Upon completion of training, the sibling and parent questionnaires were re-administered. The forms were identical to intake.

Experimental Design

A multi-element design, with baseline and intervention across 4 toy conditions was used in this study.

RESULTS

Figure 1

Figure 1 shows three graphs displaying siblings' responses across four experimental conditions. The three graphs are as follows from top to bottom: Brett's (NT) total number of social bids, Joe's (ASD) total number of social bids, and the siblings' percentage of time engaged in cooperative play. In all three of these graphs, the first experimental phase is baseline, the second experimental phase is social bid training with Brett's (NT) preferred toy, the third experimental phase is reassessment and change of Joe's (ASD) preferred toys. In the legend, four symbols represent each observation condition. The filled-in circles represent Condition 1, Brett's (NT) preferred toy. The open circles represent Condition 2, Joe's (ASD) preferred toy. The open triangle represents Condition 3, open choice small motor toys. The open square represents Condition 4, open choice large motor toys.

Graph 1: Brett's social bids. The top graph represents Brett's (NT) number of social bids within each of the four toy conditions across the three experimental phases. In general, Brett's (NT) frequency of social bids increases following intervention in Phase II. In Toy Condition 1, Phase 1, Brett's (NT) social bids continually decrease (ranging from 20 to 1). Upon implementation of Phase II, responses dramatically increase (ranging from 1 to 47). Responses increase and maintain at high levels in Phase III (ranging from 43 to 66).

In Toy Condition 2, Phase 1, the frequency of Brett's (NT) social bids increase (ranging from 1 to 22). Phase II, shows low levels of responses (ranging from 4 to 10). At the beginning of Phase III, Brett's (NT) initiations dramatically increase (ranging from 47 to 74)

In Toy Condition 3, Phase 1, Brett's (NT) social bids display low levels (ranging 0-10). In Phase II, Brett's (NT) social bids increase, however the responses were variable (ranging from 11 to 63). In Phase III, responses maintain at high levels (ranging from 41 to 63).

Toy Condition 4, Phase I, Brett's (NT) social bids displayed low levels for all observations, with the exception of Observation 3 (ranging from 3 to 33). During Phase II, low levels of social bids were observed with little variability (ranging from 8 to 12). Then in Phase III, social bids dramatically increase (ranging 23 to 49).

Graph 2: Joe's (ASD) social bids. The middle graph represents Joe's (ASD) frequency of social bids in each of the four toy conditions across the three experimental phases. Overall, all toy conditions show an increase in Joe's (ASD) frequency of social bids. However, when training began varying levels of bounce was seen throughout all three experimental phases. In Toy Condition 1, Phase 1, a bouncing trend is seen as social bids vary (ranging from 3 to 23). This trend continues in Phase II, and shows the most variability in social bid responses (ranging from 13-53). In Phase III, the trend continues although minimal variability is seen (ranging from 29 to 43).

In Toy Condition 2, Phase I, social bids vary (ranging from 6 to 20). With the introduction of Phase II, the frequency of Joe's (ASD) social bids display a steady increasing trend (ranging from 11 to 51). In Phase III, the social bids remain at a high levels (ranging from 34 to 57) displaying some bouncing in the data.

In Toy Condition 3, Phase I, the frequency of social bids display low levels with variability (ranging from 1 to 18). Phase II, displays a trend of low level social bids (ranging from 11 to 14). Following the introduction of Phase III, social bids steadily continue to increase (ranging from 23 to 45).

In Toy Condition 4, Phase I, social bids are low and variable (ranging from 2 to 15). In Phase II, social bids show an increasing steady trend (ranging from 9 to 27). Phase III, continues this increasing trend (ranging from 36 to 43).

Graph 3: Cooperative play. The bottom graph represents the percentage of time that Brett (NT) and Joe (ASD) engaged in cooperative play during each of the four toy conditions across the three experimental phases. The percentage of time the brothers engaged in cooperative play increased in Toy Conditions 1, 2, and 3. However, Toy Condition 4 shows increases in the beginnings of Phase II and Phase III but displays a repeating decreasing trend as each phase continues.

In Toy Condition 1, Phase I, displays low levels of intervals engaged in cooperative play showing an almost flat line trend (ranging from 0% to .5%). In the beginning of Phase II, this low trend maintained followed by a dramatic increase (ranging from 0% to 90%). Phase III, continues to show high levels of intervals engaged in cooperative play (ranging from 50% to 80%).

In Toy Condition 2, Phase I displays low levels of intervals engaged in cooperative play during the Observations 1 & 2 but dramatically increases in Observations 3 and 4 (ranging from .5% to 65%). In Phase II, cooperative play dramatically decreases and remains low (ranging from 0.5% and 15%). In Phase III, cooperative play dramatic increases and steadily maintains at high levels (ranging from 75% to 85%).

Toy Condition 3, shows an overall increase with varying levels of bounce in all experimental phases. Phase I, displays a lot of bounce with variability in the data (ranging from 0% to 45%). During Phase II, cooperative play increases, although remains variable (ranging

from 15% to 80%). In Phase III, cooperative play further increases, and maintains at a high level (ranging from 60% to 75%).

In Toy Condition 4, Phase I, low levels of intervals engaged in cooperative play is seen with the exception of Observation 3 (ranging from 0% to 40%). With the introduction of Phase II, cooperative play immediately increases followed by a decrease that levels and maintains (ranging from 15% to 50%). Phase III, shows a similar trend with an immediate increase followed by a dramatic decrease that also levels and maintains (ranging from 15% to 70%).

Participant Questionnaires

Responses from the sibling and parent, questionnaires, in entirety, can be found in Appendix F. Brett's (NT) reported on the pre questionnaire that he and Joe (ASD) had limited interests. For example, Brett (NT) liked to play Bakugans™ and Wii™ whereas Joe (ASD) liked to play with Thomas the Train™ and play food. Following intervention Brett's (NT) reported that the brothers' common interests increased. For example, Brett (NT) reported that they both liked to play with Bionicals™ and Wii™. Overall Brett's (NT) responses were more positive in the post questionnaire. For example, Brett's (NT) response to the question "Does your brother/sister play with you very much?" was "yes, use to be 1% and now its 50% / 60%."

Prior to intervention, the mother reported that the boys interacted very little and that she was concerned about the boy's relationship. Following intervention, her responses were more positive. She reported that the training, "really helped my boys interact more" and that "they are interacting and talking more."

DISCUSSION

The purpose of this study is to determine if material preferences have an effect on sibling social bids and cooperative play within a sibling training program. This study has specific objectives: to evaluate the effects of using the neuro-typical siblings' toy preferences and to determine if this variation training produced differences across the four toy choice conditions.

The results of this study support previous literature in that sibling training can be effective in teaching siblings to be change agents. This study also suggests that utilizing the high preferences toys of NT children can lead to improvements in both the NT sibling and the child with autism's behavior and their social interactions. Specifically, the results show that, following training, there was a general increase in Brett's (NT) frequency of social bids toward Joe (ASD) in all four toy conditions. Joe (ASD) also showed an overall increase in social bids in the four toy conditions. Toy Conditions 1, 2, and 3 shows an overall increase in the percentage of intervals the brothers engaged in cooperative play. However, Toy Condition 4 did not display these results. Several variables could be involved in the observed changes. At first, I discuss the variables that could account for the increase in Toy Conditions 1, 2, and 3. Then I discuss the variables that could account for the different trends seen in Toy Condition 4.

The current study utilizes the NT child's preferred item to teach him how to make social bids for his brother's attention and to engage his brother in play. The results differ from previous literature in that materials were either preferred by the child with ASD or by both children. Data shows an overall increase in social interactions during the first three toy conditions. However, it is unclear if the increase can be attributed to teaching with Brett's (NT) preferred material or some other aspect that accounts for the increase in social interactions. Three possible variables could account for the increase in social interactions.

The use of preferred materials could account for the first possible variable. Baker (2000) utilizes materials that are age-appropriate, that require two or more players, and are preferred by both children. Baker's results indicated that children with autism and their typically developing siblings increase their social interactions and joint attention as the outcome of teaching thematic ritualistic board games to the sibling dyads. These preferred games set the occasion for social interactions between the sibling dyads by incorporating the preferred interest of both siblings. The current study uses only Brett's (NT) preferred item to teach but analyzes both Brett's (NT) and Joe's (ASD) preferred toys. With training, the experimenter observed an overall increase in social bids in both Brett (NT) and Joe's (ASD) preferred toy conditions. Although Brett (NT) showed that he was an effective change agent in Phase II, it appeared that lower social bids occurred when the materials were less preferred, as was the case in Toy Condition 2 during Phase II. As Joe's (ASD) preferred materials were changed in Phase III, Brett's social bids in Toy Condition 2 increased. This suggests that training and preferred materials together have an effect on social bids. Future research should evaluate if combining both siblings preferred toys during teaching procedures would aid in increasing social interactions across several conditions.

The use of choice in the material conditions could account for the second possible variable that attributes to the increase in social interactions. The current study analyzes two choice conditions: Toy Condition 3, open choice small motor toys and Toy Condition 4, open choice large motor toys. Carter (2001) suggests the notion that choice may demonstrate more intrinsic reinforcing properties than do preferences. The results of examining choice show dramatic differences between choice and no choice conditions. Carter (2001) offers three possible explanations for the effects of choice. The first could be related to the fact that, in a choice condition, children may engage with their preferred items. A second explanation could be

that when given a choice, children can adapt materials to their current preferences. Lastly, choice allows for the children to have control over their environment. Again, they are able to select and adapt according to current preferences. Based on the data, choice alone did not produce and increase in interactions but combined with training an increase was seen. It should be noted, in the open choice small motor toys condition, the brothers in this study mainly play concurrently with Brett's (NT) preferred item, Bioncles™ and a jungle set. The boys create a new activity by incorporating both of their preferred activities, Joe's (ASD) preference in tools and Brett's (NT) preference in Bioncles™. In the newly created activity, the Bioncles™ became men who saw down jungle trees. This supports the idea that, when given a choice, children may engage with items in their own recombined and preferred manner. It also supports the idea that children may display alternative responses when given a choice, such as creating new activities.

The use of materials that lends themselves to social interactions could account for the third possible variable account for the increase in social interactions. Twardosz et al. (1983) and McEvoy et al. (1998), show that choosing activities that lend themselves to more social interactions is important to incorporate into training. Building toys, such as Bioncles™ that require two or more participants, lend themselves to aid in social interactions. Future research should control and account for these variables.

Overall, this study demonstrates positive results as all toy conditions show a general improvement in social bids from both boys, Brett (NT) and Joe (ASD) following training. However, unlike Toy Conditions 1, 2, and 3 that show an increase in cooperative play, Toy Condition 4 shows variable increases and decreases in cooperative play. Three possible explanations may account for the differences in Toy Condition 4. The size of the rooms is the

first possible factor to consider. In Toy Condition 4, open choice large motor toys, the room was larger and less confined then the room in which Toy Conditions 1,2, and 3 were conducted. It is possible that a more confined space sets the occasion for more social interactions.

The differences in the set of motor skills required for each toy condition could also account for the variability seen in cooperative play. In Toy Condition 4 gross motor skills was required whereas Toy Conditions 1, 2 and 3 requires fine motor skills. Another important, but unclear issue is that basketball was a highly preferred activity for Brett (NT) and that Joe (ASD) repeatedly indicated to staff that, "I have to practice basketball, so I can play with my brother." A skill discrepancy or a need for training Brett (NT) to engage Joe (ASD) during large motor conditions could account for the lower bids and reduced cooperative play.

Carry over effect is the third possible account. In both Phase II and Phase III, data from Toy Condition 4 displays an initial increasing jump in cooperative play, followed by an immediate decrease in the following observations. The initial increase could be attributed to a carry over effect or the novelty of different types of toys. Researchers assessed Toy Condition 4, at the end of each day. It could be that training effects diminished at the end of the fourth probe condition. Future research should account for these variables by controlling conditions and by introducing training to both types of behaviors.

One final note, an important limitation of this study is that the participants in this study were the same gender. The participants were two boys within a similar age range. There could be a potential for variety in the results if participants were a boy/ girl sibling dyad or a girl/ girl sibling dyad. Osmond et. al. (2009) found that gender contributes to the sibling relationships. Future research should control and compare the effects of gender in adolescent sibling dyads along with toy selection and social engagement.

Overall, this study supports that teaching a NT sibling of a child with autism while utilizing their high preference toy can improve a sibling dyads social interaction with each other, within multiple toy conditions. Similarly, in keeping with the findings of Baker (2000), Carter (2001), Merker (2005), and Twardosz et al. (1983), this study suggests that when designing a sibling-training program to elicit social interactions, an assessment of materials/ activities can be valuable and facilitate outcomes. Although it may not necessarily matter whose preferred toy or activity is chosen, it is important to incorporate the toy or activity that will elicit the most social interaction within the particular sibling dyad at hand. In this study training with the NT sibling's preferred item appeared to influence the social interactions in multiple different toy conditions.

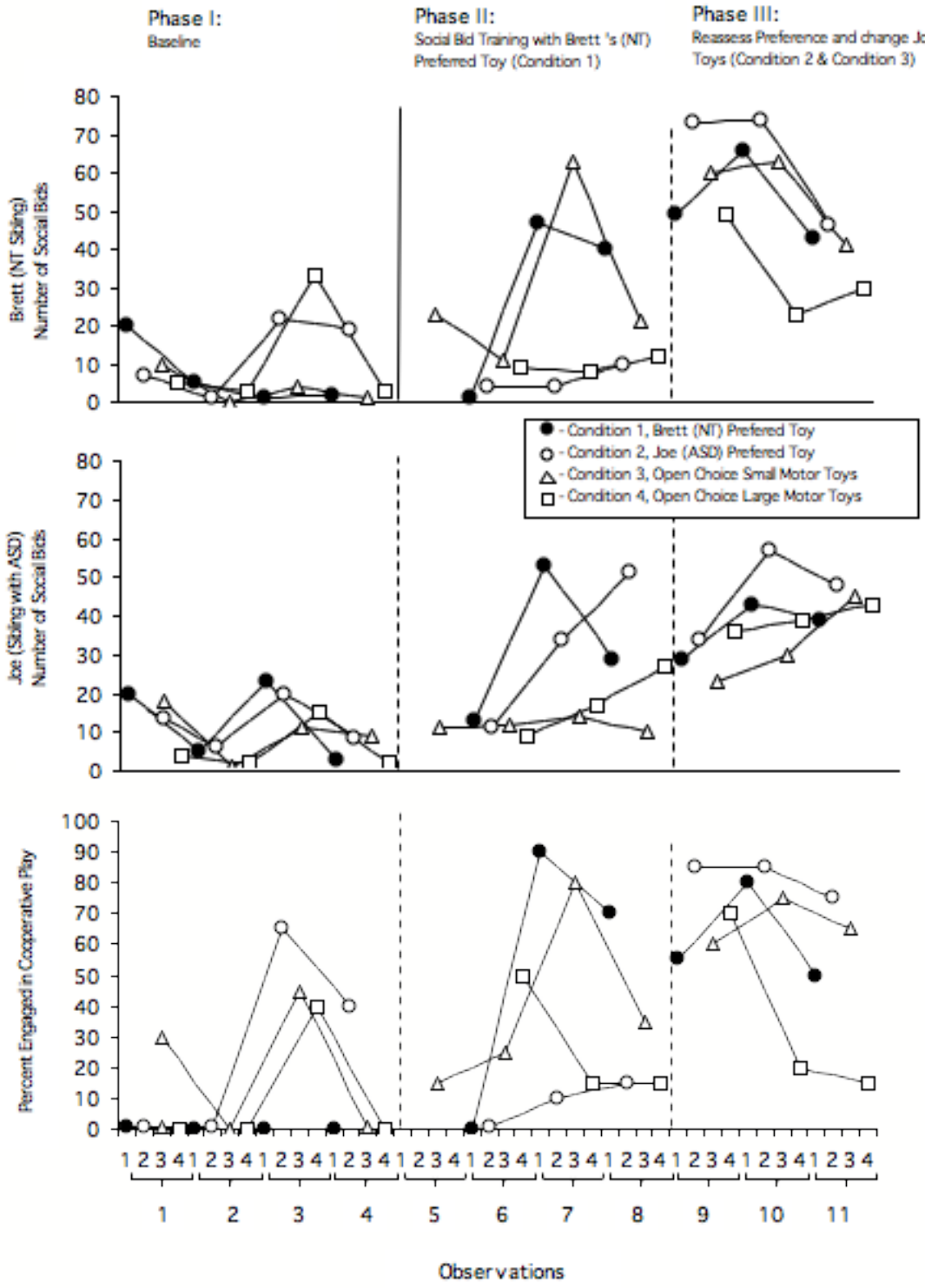

Figure 1. Sibling responses across four experimental conditions.

Table 1

Previous Sibling Literature

Reference	Purpose	Target Behaviors	Materials	Child's Preference	Results & Conclusion
Baker (2000)	To incorporate thematic ritualistic behaviors into games to increase social interactions within siblings	Increase time engaged in social play, joint attention, positive affect and to decrease ritualistic behaviors in the child with ASD.	Toys that require 2 or more players, age appropriate for both children, and preferred for children of this age. Game was modified to include thematic ritualistic interests of the child with autism	Games preferred for children of this age and used child was ASD ritualistic behavior as interest	Increase in social interactions and joint attention. ASD child increased positive affect, decrease ritualistic behaviors and generalized to new games and settings
Cash & Evans (1975)	To see if NT sibling can teach MR sibling.	NT siblings were taught Instructions, Modeling, Prompting, Calling Attention, Positive Reinforcement, Punishment			Siblings successfully taught MR siblings. All skills increased
Celiberti & Harris (1993)	To see if sibling can acquire behavior skills & use them during play with their sibling with ASD	NT sibling was taught to elicit play related speech, play, praise and to prompt	Mattel Disney Mickey-Clown Circus Playset, the Kenner Play Doh Modeling Set, Lucky Star Enterprise & Co., wood blocks, Fisher Price medical kit, assorted non-connective puzzle, 1 nerf ball	Does not specify how toys were chosen	Siblings showed an increase and maintained all teaching behaviors. Skills also generalized to novel toys
Colletti & Harris (1977)	To see if NT siblings can modify their sibling with ASD's behavior in their homes.	Sibling was taught reinforcement, Child with ASD was taught to string beads, answer addition problems, & out of seat			Siblings showed proficient reinforcement. Children with ASD improved targeted skills, parents showed to be reliable data collectors.

(table continues)

Table 1 (*continued*).

Reference	Purpose	Target Behaviors	Materials	Child's Preference	Results & Conclusion
Czelaski, (2009)	Evaluate direct and collateral measures with two different skills, toy play and social play.	27 behaviors were measured including 4 teaching components within toy play and social play.	Toy Play- NT sibling was taught to choose a toy of interest to ASD sib. Social Play- hybrid list of toys was used for interest of both children	Toy Play- Child with ASD's toy of interest Social Play- hybrid list of activities in interest of both children.	Increase in teaching component within toy and social play as well as increase in collateral measures.
El-Ghoroury et al., (1999)	Compare mother, father and sibling behaviors during play interactions, and the relationships between the social and language skills of the child with autism within the play interaction	Specific verbal, and motor behaviors, as well as global interactions and child with ASD vocal and motor behaviors	Open Choice, family toys to allow the child with ASD to engage in preferred activities with family member. Materials not specifically targeted	ASD child preferred activities (USED TO ASSESS, NOT TO TEACH)	Siblings showed relatively low social behaviors towards sibling with Autism. ASD sibling showed more vocal-verbal initiations towards siblings than parents.
James & Egel (1986)	Evaluated a direct prompting training program for increasing reciprocal interactions between NT siblings and handicapped siblings.	NT sibling was taught to prompt, model and reinforce reciprocal interactions	Toys that were in the families' homes were assessed to find preferred toys to use during training	Handicapped siblings toy.	Sibling training increased initiations and responses to initiations. Showed generalization to play groups and diff. settings.
Merker, (2005)	Determine what play materials would evoke the most social interactions between siblings and to utilize these materials to enhance sibling training	NT sibling was taught to set up opportunities for conversations, & to praise correct responses. Complements, social bids, nonverbal affection and imitation interactions and proximity was also measured	3 toy conditions; Child with ASD preferred toys, NT child's preferred toys, and open choice.	Taught with child with ASD preferred toys	Sibling increased teaching behaviors. Interactions between siblings, nonverbal affection & proximity Increase were seen especially in child with ASD preferred toy condition

(table continues)

Table 1 (*continued*).

Reference	Purpose	Target Behaviors	Materials	Child's Preference	Results & Conclusion
Randell, Domonique (2000) Thesis	Replication of Celibrti & Harris (1993) see if siblings can teach as well as see if skills would generalize	NT sibling was taught instructions, model, and praise during sibling play	Playskool spin around carousel, tractor, farmer, farm animals	Did not specify	NT sibling implemented all skills taught and showed generalization in untrained material and setting
Schreibman et al., 1983	1. Could siblings be taught to implement correct behvior modification procedures at high level of proficiency, 2. Would these skills generalize 3.Would siblings with ASD show improvements?	NT sibling was taught Discrete Trials: deliver instructions, prompting, deliver consequences. Children with ASD - compliance	Siblings showed to be reliable teachers, generalization in novel settings was maintained, and child with ASD showed improvements in compliance		
Weinrott (1974)	During a 5 day summer camp, siblings were expose to others, social ease. Siblings were taught to shape, use a token economy, contingent attention and to ignore undesirable behaviors of siblings with MR during camp activities	NT siblings were taught skills in order to shape, use token system, contingent attention and ignoring undesirable behaviors.			Sibling were able to implement shaping, token system, contingent attention, and ignore undesirable behaviors.

Table 2

Percent of Interobsever Agreement

Measure	*Baseline*					*Treatment*						
Social Bids, Brett (NT)	91	100	96	100	100	91	100	100	97	98	95	100
Social Bids, Joe (ASD)	100	93	80	100	100	100	80	100	97	98	95	80
Cooperative Play	80	100	65	100	100	90	100	85	85	65	65	90

Table 3

Toy Condition Descriptions

Toy Condition	**Toy Condition 1**	**Toy Condition 2**	**Toy Condition 3**	**Toy Condition 4**
Name	NT High Preference Item	ASD High Preference Item	Open Choice Small Toy Activates	Open Choice Large Motor Activates
Description	Only Brett's (NT) high preference item, Bionicles™ were made available during this condition. All training occurred during this condition.	Only Joe's (ASD) high preference items were made available. The following toys were identified as Joe's (ASD) high preference items, sessions 1-8, Thomas the Tank Engine™ and sessions 9-11, Tools and Blocks.	Various age-appropriate small toys such as various art supplies, trains, Bionicles™, blocks, and games were made available for both Joe (ASD) and Brett (NT).	Various large motor actives such as bikes, a basketball hoop, and various size balls were made available for both Joe (ASD) and Brett (NT). This condition was ran in a physical therapy gym.

Table 4

Stimuli Selected in Toy Condition 1-4

Toy Condition	**Toy Condition 1**	**Toy Condition 2**	**Toy Condition 3**	**Toy Condition 4**
Name	NT High Preference Item	ASD High Preference Item	Open Choice Small Toy Activates	Open Choice Large Motor Activates
Stimuli Selected	• Bionicles™.	• Thomas the Tank Engine™ (Sessions 1-8) • Tools and Blocks (Sessions 9-11)	• Bionicles™. • Thomas the Tank Engine™ • Jungle Set • Tool Set • Don't Spill the Beans™ • Play Food • Fire Truck • Kosh™ Ball • Helicopter Set • Blocks • Don't Break the Ice™ • Art Supplies	• Bikes • Basketball hoop • Various size balls • Large kitchen set • Roller blades • Small trampoline

Table 5

Toy Engagement Analysis in Toy Condition 3, Open Choice Small Motor Toys

	No Engagement
	Brett (NT) Sibling engaged in toy alone
	Joe ASD Sibling engaged in toy alone
	Both sibling engaged in toy together

	Observations										
Toys	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Bionicles											
Jungle Set											
Thomas the Train											
Tool Set											
Don't Spill The Beans											
Play Food											
Cars											
Fire Truck											
Kosh Ball											
Helicopter Set											
Blocks											
Don't Break The Ice											
Art Supplies											

APPENDIX A

INFORMED CONSENT AND ASSENT FORMS

University of North Texas Institutional Review Board

Informed Consent Form and Authorization to Use and Disclose Health Information for Research

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted. Signing this form also gives permission for use and disclosure of your health information as part of this research study.

Title of Study: The Effects Of Sibling Interventions On Children With Autism And Their Families.

Principal Investigator: Shahla Alai-Rosales, *Ph.D.*, *BCBA-D*, University of North Texas (UNT) Department of Behavior Analysis.

Purpose of the Study:

The purpose of this study is to understand the effects of a sibling intervention (Project SMILE) on social and play skills. In this case, intervention means a teaching package to help siblings get along better.

Teaching siblings of children diagnosed with Autism Spectrum Disorder is beneficial for both the children with autism and their siblings. There are, however, few studies that measure if these skills maintain and generalize. This study will involve a sibling training package (modeling, roleplaying, feedback and small toy rewards), a short questionnaire, direct observation and follow up evaluations. By including follow up evaluations we hope to see if the effects of the sibling intervention maintain over time. Some benefits that we hope to report are enduring play and social skills as well as an increase in the time, proximity and cooperative play between the siblings. We will report these outcomes so that the findings can be used by interventionists working with families. In addition to this we would appreciate your evaluation anytime during and after the training. We will report this information so that others can benefit from your perspective on this type of intervention.

Study Procedures: You will be asked to 1) Participate in an interview pre- and post intervention regarding the training that your children will receive. This will take about 20 minutes of your time for each interview (total being about 40 minutes). 2) Before, during and after the sibling intervention we will record videotapes of your children interacting during a 15-minute play period. These observations will take place at the UNT sibling playroom or Easter Seals of North Texas Trinity Center and in your home. Observations will be scheduled at your convenience. 3) The siblings' intervention will involve teaching your children to play together. They will be taught using instructions, models, feedback and small activity rewards (stickers, dollar store toys). Neither your child's name or your name will not be linked to anything that we discuss and at all times you and your children will be referred to with pseudonyms. Investigations will be supervised by Dr. Shahla Alai-Rosales, through the Department of Behavior Analysis at the

University of North Texas: (940) 565-2274.

Foreseeable Risks: No foreseeable risks are involved in this study. No harm has been reported in previous clinical and research participation in similar interventions. If you children show distress (crying, protests) at anytime, we will stop the training and consult with you.

Benefits to the Subjects or Others: We hope that by participating in this project you and your family will benefit. Although we cannot guarantee positive results, we hope that your children will increase their positive interactions and play together for longer periods of time. The results of this research may also add to our knowledge on how to better help families with siblings of children with autism. This may benefit other families receiving similar services.

Compensation for Participants: There is no payment or other form of compensation for your family's participation in this study.

Procedures for Maintaining Confidentiality of Research Records: All signed forms will be kept in a locked cabinet in a locked room at the University of North Texas in Chilton Hall room 361E. All videotapes will be copied onto a computer in the locked room in Chilton Hall room 361 E. Following the research study, all personally identifiable data will be coded with a pseudonym (fake name). The confidentiality of all personal information will be maintained in any publications or presentations regarding this study.

Use and Disclosure of Health Information: If you sign this document, you give permission to Dr. Shahla Alai-Rosales at the University of North Texas to use your children's health information that identifies them for the research study described in this document.

Health Information to be Used or Disclosed: The health information that we may use for this research includes the medical papers with you child's diagnosis.

Who may use or disclose the information: The health information listed above may be used by and/or disclosed (released) to Dr. Shahla Alai-Rosalis, Julie Winn Greer, Samantha Nelson, Kellyn Johnson, Rachael Shrontz, Irina Pasat, Megan Thompson and Holly Kowalchuk.

Who may receive the information: Dr. Shahla Alai-Rosales is required by law to protect your health information. By signing this document, you authorize Dr. Shahla Alai-Rosales to use and/or disclose (release) your health information as related to this research your name, however, will in no way be made public in association with your identity. The health information we will use will include in the reporting of diagnostic information in the research participation description. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it and may share your information with others without your permission, if permitted by laws governing them.

Expiration of the authorization: This Authorization does not have an expiration date.

Right to revoke authorization: Please note that you may change your mind and revoke (take back) this Authorization at any time, except to the extent that Dr. Shahla Alai-Rosales has already

acted based on this Authorization. To revoke this Authorization, you must write to: Dr. Shahla Alai-Rosales, shahla.alai-rosales@unt.edu or (940) 565-2274.

Questions about the Study: If you have any questions about the study, you may contact Dr. Shahla Alai-Rosales at telephone number (940) 565-2274.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- *Dr. Shahla Alai-Rosales or a designee* has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study. You have been told how my health information will be used and disclosed for the study.
- You understand that you do not have to take part in this study or authorize use and disclosure of your health information, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. If you decide to withdraw from the study, the study personnel may only use and disclose your health information already collected. If you decide to revoke your authorization to use and disclose your health information, you may not be allowed to continue in the study. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study. You also consent to use of your health information in this study.
- You have been told you will receive a copy of this form.

_____

Printed Name of Participant

_____ _____

Signature of Participant Date

For the Principal Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing

above. I have explained the possible benefits and the potential risks and/or discomforts of the study and the use and disclosure of health information. It is my opinion that the participant understood the explanation.

_____	_____
Signature of Principal Investigator or Designee	Date

ASSENT FORM

Purpose of the Study:

My name is Shahla Rosales and my students and I would like to teach you and your brother/sister how to play with each other. I would like to do this through a teaching program that has been done before with brothers and sisters of children with autism. Other people have taught like this and they have found that children enjoy the project. I would like for you and your brother/sister to have fun with each other.

I would like to share all that I learn from working with you with other people who work with brothers and sisters.

I would like to video tape you and your brother/sister while I am teaching. I will watch and write down what you and your brother/sister do before, during and after I teach you. This means I will count things like how many times you play together and if you smile while you are playing. I will also interview you to see what is important to you and what you think of my teaching. I will write the information you share in my paper. This paper will teach others how to help sisters and brothers get along better.

Study Procedures:

1) We will interview you before and after the teaching. I will read you the questions, write down what you say and answer any questions that you have.
2) We would like to teach you and your sister/ brother how to play with each other through instructions, practicing, and small activity rewards (stickers, dollar store toys).
3) I would also like to video tape you and your brother/sister during 15 minute play periods so that I can see if the teaching is working.
4) We would like to make pictures and to write about how well the teaching works. Your name will never be on any of the information we write down about you or the answers you give so that your privacy will be protected. Instead, we will use a made-up nickname for you.
5) We will give you a copy of the final report.

Voluntary Participation: You can stop helping us whenever you want to. If you do not wish to help or decide at any time that you want to stop, no one will be upset with you.

Foreseeable Risks: If you do not feel like answering more questions, learning how to play with your bother/sister, or being videotaped, just let me or your parents know at anytime

Confidentiality: Other professors, my students, and I will watch the videotapes of you and your sister/brother playing so that we can learn more about teaching siblings. We will always use nicknames for you and only the people who promise not to tell who is in the tapes will be able to view these tapes.

CHILD ASSENT

I_____, have read (or it has been read to me), and Shahla or one of her graduate students has explained and answered any of my questions. I understand that I do not have to agree to be in this project if I do not want to and I can stop at anytime. By signing or printing I agree to participate in the study mentioned above.

_____ _____ Printed
Name of Child Date

_____ _____
Printed Name of Child Date

WAIVER OF ASSENT FOR CHILDREN 6 AND UNDER

The child named_____ has been waived from signing an assent for the following reason:
____ Age
____ Maturity
____ Psychological State of the Child

_____
Signature of Participant's Parent or Guardian Date

APPENDIX B

SIBLING *WAM!* BOOKLET

WAM!

The Power of Brothers

By, Julie Winn Greer
and Sara Czekalski

Table of Contents

Being a Big Brother is
<u>Very Important</u>

Big Brothers play many roles.

Some parts of being a big brother are fun and some are not. Just like bionicals can change, so can the roles you play as a big brother. As a big brother you can be a teacher, and a friend.

·2·

Friend

Big Brothers also just play with their siblings. Brothers that are friends have some things that you BOTH like. For example you and Joe both like to play outside.

Sometimes Joe might choose something different to play with then you; you might prefer Bakugans while Joe prefers Thomas the Train.

·3·

Teacher

One part of being a big brother is teaching Joe. Remember when you taught him how to build a fort in the snow?

-4-

WAM!

Playing Together

WATCH

Watch what Joe likes

- **What is he playing with?**
- **What is he talking about?**
- **What is he paying attention to?**

ARRANGE

Arrange things so that Joe wants to play with you

- **Do you have <u>toys</u> to give him?**
- **Do you have things to <u>do</u> he likes?**
- **Do you know things he likes to <u>talk</u> about?**

MAKE A RESPONSE

When Joe plays and talks with you make a response and let him know its great

- **Get really excited**
- **Give Joe the toy, talk to him about the toy AND play with him!**

HAVE FUN!

Being a big brother is very important. I hope you and Joe will be friends for life.
The most important thing to remember is to have fun, and keep trying to learn how to be his friend and teacher.

·7·

APPENDIX C

OBSERVATION CODE

Code Symbol	Category Label	Definition
SB	**Social Bids**	Verbal initiations, responses, or gestures from one child to another

Examples	Non-Examples
• Joe (ASD) is playing with a ball and Brett (NT) asks him to play and Joe (ASD) says "no." • Brett (NT) is playing with Bionicles™ and says, "Can you hand me the red piece?" • Joe (ASD) and Brett (NT) are playing with tools. Brett (NT) offers Joe (ASD) a hammer and Joe (ASD) says, "no I don't want the hammer."	• Brett (NT) looks at the camera and says, "how do we play this game?" • Joe (ASD) is crying. • Brett (NT) and Joe (ASD) are playing with trains and Joe. (ASD) whines about his backpack not being in the room. • Joe (ASD) mumbles to himself. • Brett (NT) says, "uh, he is so loud" out loud to himself. • Joe (ASD) hands Brett (NT) a block and Brett (NT) does not say anything.

Code Symbol	Category Label	Definition
CP	**Cooperative Play**	Includes instance in which BOTH children are interacting with one or another in some manner. • BOTH children are engaged in same or similar activity AND • One or Both children look at item and then at the other sibling or vise versa AND/OR • Verbal communication about activity to other child Can include but not limited to • Turn-taking • Physically touch one another

Examples	Non-Examples
• Brett (NT) and Joe (ASD) are building train tracks, Brett (NT) looks for a new track, then looks at Joe (ASD) and says. “here you go.” • Joe (ASD) and Brett (NT) are using Bionicles™ as men to saw down a tree. Joe (ASD) looks at the tree, and then at Brett (NT). • Brett (ASD) and Joe (NT) take turns building a train track, looking at the next piece they are going to use and then at each other.	• Joe (ASD) screams and cries while saying that he does not want to play with the trains during the toy condition where only trains are offered. • Joe (ASD) and Brett (NT) are rolling a big ball back and forth, the ball rolls off the camera and Brett (NT) goes to get it. Brett (NT) is no longer on camera. • Brett (NT) offers Joe (ASD) a Bionicles™ and Joe (ASD) walks away. • Brett (NT) and Joe (ASD) are sitting side by side building Bionicles™. Neither boy looks at each other or talks to each other while building their Bionicles™.

APPENDIX D

SCORING INSTRUCTIONS AND DATA SHEET

Scoring Instructions

Thank you so much for helping me score! If you have any questions or need anything do not hesitate to ask. We will practice a couple videos together and then I will give you instructions for the targeted behavior you will be observing. At this point I will no longer be able to answer any questions regarding definitions or how to score. You will be provided with a complete list of definitions, scoring instructions, blank data sheets, a timer and a pencil.

Thanks again!

Julie Winn

General Scoring Instructions

Before beginning:

Make sure you have:

- A pencil
- A timer
- Blank data sheet

You will also be provided with a paper copy of the scoring instructions and a copy of the observation code. Make sure you read these carefully and that you understand fully. You will be able to reference these while scoring.

General Rules:

- All videos are stored in the Autism Lab on the large MAC computer.
- Do not record any target behaviors that you cannot directly see or hear.
- Start ALL videos at 0:05 sec.
- Place all finished data sheets in the provided folder, as well as the scoring instructions and observation code when you are finished.

Scoring Frequency
Tally the number of times *each* child emits a social bid based on the bellow definition. Make sure you tally in the right column for each child. Remember; do not score any behaviors you cannot directly see or hear.

Behavior: Social Bids

Definition:
Social Bids are any instances of verbal initiations, responses, or gestures from one child to another.

Examples include but are not limited to:
- Single Words
- Whole Sentences
- Refusal of a toy offered (ex. Saying "no I don't want the hammer" when one child offers a hammer)

Non-examples include but are not limits to:
- Talking to the camera (i.e. asking the person filming a question, or stating a comment to the person filming)
- Crying
- Social Bids before :05 seconds of the assessment. (If one of the children begin to emit a social bid prior to :05 seconds and continues to emit a social bid beyond :05 ex. :07 do NOT count this as a social bid.)
- Whining about an event unrelated to the current events (ex. Playing trains and whines about a backpack)
- Talking to oneself.

Example of Social Bids on Data Sheet:

Frequency				
Time		**Event**	**NT SB**	**ASD SB**
:05 - :20	1		IIII	II

Above: Nero-typical sibling emitted FOUR social bids and Autism Spectrum Disorder Sibling emitted TWO social bids.

Scoring Whole Intervals:

- Set the timer for repeating15 seconds
- Always start the timer at :05 seconds into every video
- Circle CP if the targeted behavior occurred for the ENTIRE 15-second whole interval.

Behavior: Cooperative Play

Definition:

Includes instances in which BOTH children are interacting with one or another in some manner.

- BOTH children are engaged in same or similar activity AND
- One or both children look at an item and then at the other sibling or vise versa AND/OR
- Verbal communication about activity to other child

Can include but not limited to:

- Turn-taking
- Physically touch one another

Examples include but are not limited to:

- Building Trains
- Sawing down a tree

Non-examples include but are not limited to:

- Whining/ angry
- If either boy is off camera during the interval do not score as cooperative play

Example Data Sheet:

Whole Interval		
Time		**CP**
:05 - :20	1	CP
:20 - :35	2	CP
:35 - :50	3	CP
:50 - 1:05	4	CP

Above: The siblings engaged in cooperative play in ONE of the first four conditions.

Data Sheet

Session Date _____ Scoring Date _____ Observer_____ Ob1 Ob2

Toy Condition 1 2 3 4 Experimental Condition_____

Frequency					Whole Interval		
Time		**Event**	**NT SB**	**ASD SB**	**Time**		**CP**
:05 - :20	1				**:05 - :20**	1	CP
:20 - :35	2				**:20 - :35**	2	CP
:35 - :50	3				**:35 - :50**	3	CP
:50 - 1:05	4				**:50 - 1:05**	4	CP
1:05 - 1:20	5				**1:05 - 1:20**	5	CP
1:20 - 1:35	6				**1:20 - 1:35**	6	CP
1:35 - 1:50	7				**1:35 - 1:50**	7	CP
1:50 - 2:05	8				**1:50 - 2:05**	8	CP
2:05 - 2:20	9				**2:05 - 2:20**	9	CP
2:20 - 2:35	10				**2:20 - 2:35**	10	CP
2:35 - 2:50	11				**2:35 - 2:50**	11	CP
2:50 - 3:05	12				**2:50 - 3:05**	12	CP
3:05 - 3:20	13				**3:05 - 3:20**	13	CP
3:20 - 3:35	14				**3:20 - 3:35**	14	CP
3:35 - 3:50	15				**3:35 - 3:50**	15	CP
3:50 - 4:05	16				**3:50 - 4:05**	16	CP
4:05 - 4:20	17				**4:05 - 4:20**	17	CP
4:20 - 4:35	18				**4:20 - 4:35**	18	CP
4:35 - 4:50	19				**4:35 - 4:50**	19	CP
4:50 - 5:05	20				**4:50 - 5:05**	20	CP

APPENDIX E

PRE AND POST PARENT AND SIBLING QUESTIONNAIRES

Parent Questionnaire

Parent _____ Teacher_____

Date/Time_____

1. How would you describe the relationship between your children?
2. What are some strength's in your children's relationship?
3. What are some difficulties in your children's relationship?
4. What toys do your children play with together?
5. PRE: How do you see this project helping the relationship between your children?
   POST: How did you see this project helping the relationship between your children?

Any additional comments?

Parent Questionnaire adapted from Merker, Stephanie K. (2005)

Sibling Questionnaire

Sibling _____ Teacher _____

Date/Time_____

1. What toys do you like to play with?
2. Do you think your brother/sister knows how to play with those toys?
3. What toys does your brother/sister like to play with?
4. Do you like to play with their toys?
5. Does your brother/sister play with you very much?
6. Does he/she play with you when you ask?
7. When do you usually play with him/her?
8. What do you two play/ do together?
9. Do you like playing with your brother/sister?
10. PRE: What would you like him/her to be able to do after this project?
    POST: What do you think you and your brother/ sister learned from this project?

Additional Comments:

Sibling questionnaire adapted from Czekalski, S. (2009) and Baker, M.J. (2000).

APPENDIX F

PRE AND POST PARENT AND SIBLING QUESTIONNAIRES

Parent Questionnaire

Parent Mom Teacher Julie Winn Greer

Date/Time PRE: 4/8/2010 at 4:00 PM
POST: 7/8/2010 at 4:00 PM

6. How would you describe the relationship between your children?
   Pre: Good.
   Post: They are interacting and talking more.

7. What are some strength's in your children's relationship?
   Pre: He loves to help me and goes places with me.
   Post: Brett (NT) does try to interact with his brother.

8. What are some difficulties in your children's relationship?
   Pre: Understanding him when he throws fits.
   Post: It is still hard to get Joe (ASD) to react sometimes.

9. What toys do your children play with together?
   Pre: Cars, watching TV, and out-side.
   Post: Bikes, walks, swimming, tools, and weapons.

10. How do you see this project helping the relationship between your children?
    Pre: Help Brett (NT) know how to play with Joe (ASD).

    How did you see this project helping the relationship between your children?
    Post: It really helped my boys interact more.

Any additional comments?
   Pre: A lot of kids in the neighborhood.
   Post: Thanks for working with the boys it really helped them!

Parent Questionnaire adapted from Merker, Stephanie K. (2005)

Sibling Questionnaire

Sibling _____*Brett (NT)*_____ Teacher _____Julie Winn Greer_____

Date/Time___PRE: 4/8/10 at 4:00 PM_____
___POST: 7/8/10 at 4:00 PM___

11. What toys do you like to play with?
    Pre: Bakugan, water guns, trampoline, pool, snow, cars, Wii™.
    Post: Bioncles™, Wii, snowball fights, swimming, DS™ and watching TV.

12. Do you think your brother/sister knows how to play with those toys?
    Pre: Yes, not Bakugan™.
    Post: Knows how to play with Bioncles™, some Wii™.

13. What toys does your brother/sister like to play with?
    Pre: Thomas, play food, fire truck play mobile™.
    Post: Tools, Bioncles™, and lincon ogs.

14. Do you like to play with their toys?
    Pre: Sometimes, more the fire truck play mobile™ and cars.
    Post: Yes.

15. Does your brother/sister play with you very much?
    Pre: Sometimes. He helped my friend and I build a snow fort once.
    Post: Yes, use to be 1%, now 50%/ 60%.

16. Does he/she play with you when you ask?
    Pre: No. Yes, to outside and sprinklers
    Post: Yes. Depends, Bioncles™ he will, swimming, and definitely tools.

17. When do you usually play with him/her?
    Pre: Outside.
    Post: At night and after school.

18. What do you two play/ do together?
    Pre: Go outside, sometimes fire truck play mobile, watch sponge bob movie and sometimes Thomas the Train™ movies. Sometimes connect 4, pop out and pop 10.
    Post: Tools, swimming, Wii™, Bioncles™, Lincon Logs™, and tools/weapons a game we made up with our friend.

19. Do you like playing with your brother/sister?
    Pre: Yes, told a story about a sleep over a couple of years ago that he remembered Joe (ASD) playing with him and his friend.
    Post: Yes.

20. What would you like him/her to be able to do after this project?
    Pre: Play in the snow and build a fort. Use basketball hoop.
    What do you think you and your brother/ sister learned from this project?
    Post: How to play together better and what "arrange" means.

Additional Comments:

Pre: Brett (NT) likes almost all sports except baseball. Said he liked football, basketball. Brett (NT) also likes art projects.
Likes to play games such as connect 4, pop out and pop 10, sorry (mom thought this one would be to hard for Joe (ASD) to play), cards (Go Fish) Brett (NT) said "he probably would do better with animal ones"
Post: N/A

Sibling questionnaire adapted from Czekalski, S. (2009) and Baker, M.J. (2000).

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