

Sibling interactions:

The role of older siblings in the social and communication development of children with autism
spectrum disorders

by

Alayna Schreier

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of Bachelor of Arts

With Honors in Psychology from the

University of Michigan

2010

Advisor: Dr. Catherine Lord

SIBLING INTERACTIONS

Abstract

Studies are needed to examine the range of effects that an older sibling, both typically developing and on the autism spectrum, can have on a child with autism. Agonistic initiations, prosocial initiations, imitations and responses to agonism and prosocial behaviors were examined in three families, comprising three sibling dyads. Preliminary results suggest that the age of the siblings and the level of functioning of the target child play a crucial role in the presence of initiating behaviors. Further examination of the interactions between siblings will hopefully lead to increased focus on the importance of fostering sibling relationships and creating interventions that address the specific abilities and opportunities that siblings possess.

SIBLING INTERACTIONS

Sibling interactions: The role of older siblings in the social and communication development of children with autism spectrum disorders

The current study sought to examine the interactions of preschool children and their older siblings, with a particular focus on younger siblings with autism. By observing the patterns that exist between sibling dyads, we will be better able to address the needs of children with autism. It is our hope that such observations will be beneficial in the creation of sibling implemented interventions.

Sibling Relationships

The sibling relationship is one of the most enduring relationships throughout a person's life (Dew, Balandin, & Llewellyn, 2008). The interactions with a sibling provide a context in which social skills, reciprocal behaviors and play skills can be both practiced and observed. This relationship provides ample opportunities for behavioral modeling and facilitation of social and intellectual development beyond that of parents and before teachers become factors. Sibling interaction, among typically developing children, results in asymmetric yet reciprocal roles in which older siblings are responsible for the majority of initiations, though this pattern evens out over time (Knott, Lewis, & Williams, 2007). The nurturance and conflict that exist within a sibling relationship provides children with experiences that foster adequate emotional development (Orsmond & Seltzer, 2007). Among typically developing sibling dyads, McGillicuddy-De Lisi (1993) found that the older children initiate social interactions more frequently, are dominant towards their younger sibling, and display more prosocial behaviors, with the younger child acting more passively. As the younger child ages, the relationship reflects the social and communicative maturation that is occurring. Interactions become increasingly characterized by reciprocity and cooperation.

SIBLING INTERACTIONS

Play Behaviors

Play has long been considered one of the most important activities of childhood (Piaget, 1962). Engaging in such activity plays an integral role in the development of physical, sensory, cognitive and emotional maturity (Schaefer & DiGeronimo, 2000). While older, typically developing siblings may lead the play situation, the interaction is often determined by the social abilities of the younger sibling. It is common for children ages 18-36 months to engage in play for five to six hours every day (Schaefer & DiGeronimo, 2000). Age appropriate play skills for typically developing toddlers include playing with toys that challenge the child to think but allow for make believe and the use of imagination. Typically developing children engage in play activities that include toys and other in-home materials (Stoneman, Brody, & MacKinnon, 1984). It is also age-appropriate for toddlers to cling to a favorite doll or stuffed animal, as they provide the child with a sense of emotional security that can be a constant source of support. Similarly, imaginative and pretend play can allow a toddler to explore emotions, test boundaries, gain real world experience, develop cognitive skills and explore their own sense of right and wrong (Schaefer & DiGeronimo, 2000). Many children ages 18-36 months engage in parallel play, illustrated by engagement in side-by-side activities, sharing little verbal communication and no direct physical interaction (Schaefer & DiGeronimo, 2000). During this phase, it is also common for toddlers to demonstrate difficulty in sharing toys with others.

Autism and Communication

As children age, play begins to rely upon reciprocal interactions and communication (Knott et al., 2007). However, these patterns manifest themselves differently when one sibling has a developmental disability. Autism is one of the pervasive developmental disorders characterized by impairments in social and communication behaviors, with children typically

SIBLING INTERACTIONS

exhibiting a restricted range of behaviors and interests. The common deficits include delays in language development, communication skills, social interaction, and imaginative play (Chakrabarti & Fombonne, 2001). The classification of these disorders is more commonly known as the autism spectrum disorders (ASD). Although autism is not typically diagnosed until age three, some children show symptoms as early as just under a year (Werner, Dawson, Osterling, & Dinno, 2000). Specifically, some toddlers display abnormalities in joint attention tasks, in the initiation of both verbal and nonverbal communication, and are less able to engage in social object play (Landa, Holman, & Garrett-Mayer, 2007). Autism spectrum disorders are now more commonly diagnosed than they have been in the past. Among a target population of 15,500 children, Chakrabarti & Fombonne (2001) found that 62.6 out of 10,000 children met the criteria for a diagnosis of pervasive developmental disorder. This prevalence rate of 1/110 has been found in similar, more recent investigations (Rice, 2009).

Siblings with Autism

When a younger sibling has a developmental disability, these age-appropriate behaviors and the evolution of reciprocity with age do not occur at the same rate. A review of the relevant literature by Meyers and Vipond (2005) suggests that the sibling relationship advances at a slower pace as children with ASD age. Among typically developing children, both children develop along the same trajectory, allowing the relationship to mature reflectively. When the younger sibling has ASD, children's social and communication development does not mature at the same rate, thus creating a larger gap between abilities. Furthermore, dominant behavior towards a disabled child increases over time, as sibling dyads become more asymmetrical. This may be a result of the deficits in communication characteristic of children with ASD. Among a prospective study of 87 infants who were siblings of children with ASD, Landa and Garrett-

SIBLING INTERACTIONS

Mayer (2006) found a delayed onset of language development in this population. McGillicuddy-De Lisi (1993) states that a capability for communicative speech is essential before a child can regulate his or her own behavior in social interactions. If a child does not acquire effective communication, as is common among children with autism, the development of age appropriate behavior may become stagnant, resulting in asymmetrical play roles. It is important to recognize that despite this trend, children develop social understanding among a vast diversity of experiences – development for children with ASD is not static (Knott et al., 2007).

Autism and Play Behaviors

Although children with autism display a number of social and communicative impairments, some retain a limited ability to imitate the behavior of an older sibling (Knott, Lewis, & Williams, 1995). Disabled children have shown an ability to engage in some degree of play activity and may initiate infrequent interactions (El-Ghoroury & Romanczyk, 1999). For the most part, however, the typically developing sibling tends to initiate play behavior and imitation. In their study of sixteen sibling dyads (six comprising children with autism and a typically developing child, and ten comprising a child with Down syndrome and a typically developing child), Knott et al. (2007) examined the number of prosocial and agonistic behaviors present within dyads. The authors determined that while the rate of imitation increased on the part of both the child with ASD and the non-disabled sibling, it was primarily a result of increases made by the typically developing siblings. These findings suggest that the non-disabled sibling may be directing the interactions by responding to the different aspects of their disabled sibling's behavior and encouraging communication. Although not a sibling implemented intervention, it was found that among children with autism who are taught to initiate interactions by socially

SIBLING INTERACTIONS

competent peers displayed more responses to behaviors, while initiations primarily remain unchanged (Krantz & McClannahan, 1993; Lord & Magill-Toms, 1995).

The aforementioned results are affected by the distinct variations of each specific sample. Among sibling pairs, the age of the non-impaired sibling significantly informs the quality of the relationship. An older sibling who is still engaging in age-appropriate parallel play may be less likely to take on a dominant role and to consciously engage in modeling. As the typically developing sibling matures, he/she becomes better suited to facilitate comprehensive interactions that address the individual needs of the child with ASD. Although both younger and older non-autistic siblings are likely to take on a dominant role in the relationship, an older, typically developing sibling may provide added opportunities for increased social behavior (Dew et al., 2008). McGillicuddy-De Lisi (1993) found that young children with ASD often benefit from interacting with an older, more competent sibling. As the older child becomes conscious of the significance of facilitating meaningful interactions, they may employ more directed strategies that address their siblings' specific impairments. After having internalized their job as initiator and model of behavior, many older siblings of children with ASD will adopt the persona of 'teacher.' This finding was also present in a study of peers in a school program (Lord & Hopkins, 1986). Furthermore, Celiberti and Harris (1993) found that older siblings can acquire both modeling and prompting skills. As a result, their interactions may not reflect the behaviors of a child in a typically developing sibling dyad. Stoneman, Brody, Davis and Crapps (1987) mirror this hypothesis in their results, finding that older, typically developing siblings of children with ASD engage in more managing, teaching, and helping. Furthermore, prosocial and nurturing behaviors towards their impaired sibling increase as they become more aware of their crucial role in facilitating a relationship (Abramovitch, Stanhope, Pepler, & Corter, 1987; Dallas,

SIBLING INTERACTIONS

Stevenson, & McGurk, 1993b). Dew et al. (2008) believe that this process may have a positive impact on the typically developing sibling, though further examination is needed to determine if this is supported by data.

The gender of the sibling dyad also impacts the frequency and type of interaction that occurs. Dew et al. (2008) found that typically developing female siblings interact more frequently with their disabled siblings than do males. Interactions initiated by the female sibling are typified by more directive and facilitative behaviors, whereas males promote more competitive, toy-related play (Dallas, Stevenson, & McGurk, 1993a). In a naturalistic observation of sibling interactions in which one child is disabled, Stoneman et al. (1987) found that the sisters were more likely to engage in light physical activities such as swinging, compared to sisters of typically developing girls who served as comparisons. Similarly, male sibling dyads where one had a disability were more likely to play together with toys than were the comparison siblings. Additionally, girls tend to display more affection and intimacy in their sibling relationships than do boys, though this may be a result of gender socialization. Mandleco, Olsen, Dyches and Marshall (2003) found that older, female siblings were typically more involved in caring for their disabled sibling when compared to older, male siblings. Among typically developing children, some studies indicate that same-sex sibling dyads engage in more positive interactions and a lower number of negative interactions than mixed-sex dyads, though this finding has not been consistently replicated (Dunn & Kendrick, 1979). Similarly, Abramovitch, Corter, Pepler and Stanhope (1986) found that among mixed-sex dyads, the presence of imitation declined over time. Research is needed to further understand the dynamics of gender on sibling interactions in which one or both siblings is on the autism spectrum.

SIBLING INTERACTIONS

It is clear that the quality of the sibling interaction is highly dependent upon the level of functioning of the child with autism (El-Ghoroury & Romanczyk, 1999). As stated previously, the more verbal ability the child has, the greater the likelihood that he/she will engage in initiations and responses (Stoneman et al., 1987). Children with more verbal skills are also more likely to participate in joint play and reciprocal interactions. Charman et al. (2000) found that imitation, joint attention and play behaviors show longitudinal associations with language development. Joint interactions have also been found to be important in learning conversation skills (Loveland & Landry, 1986). As a result, deficits in language may play a large role in the success of the sibling interaction as a context for learning. There has been very little research done with severely disabled populations, likely a result of this inability to engage in communicative behaviors (Charman et al., 1997).

Children with autism display many behaviors that may impact this sibling relationship beyond a lack of verbal ability. As previously discussed, children with autism exhibit limited social, affective, and play behavior and may not be socially responsive (Rivers & Stoneman, 2003). When these deficits are pronounced, it is difficult to engage both siblings and families effectively.

General Issues in Current Research

Much of the current research on initiation and modeling has focused on parents as models. Researchers typically use parents or caregivers as the primary interventionists (Tsao & Odom, 2006). Interventions utilizing peers generally occur in a classroom setting or in early childhood programs (Brown, Odom, & Conroy, 2001). While this is a valuable practice, many children may benefit from practicing social communication in their home environment with a sibling. Celiberti and Harris (1993) note that siblings may be uniquely able to foster social

SIBLING INTERACTIONS

response behaviors and verbal interactions, likely a result of similarity in age or availability of the sibling relationship. Additionally, the authors note that siblings may have more intrinsic motivation to engage in teaching behaviors when compared to a classroom peer.

Meadan, Ostrosky, Zaghlawan and Yu (2009) recommend teaching children in their natural environment as a best practice, utilizing daily routines as teachable moments. There have been few additional studies examining older siblings in this role. Colletti and Harris (1997) taught an older sister to modify her younger autistic sibling's behavior through contingent reinforcement. Similarly, Schreibman, O'Neill and Koegel (1983) found that younger siblings with autism generalized their learned skills to different environments. El-Ghoroury and Romanczyk (1999) found that children with autism typically made more initiations towards a sibling during a social interaction than towards a parent. Another role that an older, typically developing sibling exemplifies is that of a good language model (Wolk & Giesen, 2000). Older siblings in middle school have also demonstrated an ability to teach new cognitive concepts and language skills to their younger siblings (Brody, 2004). Siblings have the ability to create an environment that provides salient models of appropriate language (Woolett, 1986).

It is apparent that older children play an important role in the development of social and communicative abilities among their younger siblings with autism. However, having a sibling with a disability is difficult, and some siblings may associate negative experiences with their relationship. The level of functioning of the sibling with autism may have such effects on the sibling relationship. Orsmond and Seltzer (2007) found that some children reported feeling embarrassed by their disabled sibling, which could lead to feelings of guilt. Additionally, in a study of siblings ages 5-20, Bågenholm and Gillberg (1991) discovered that more than half of the children who had a sibling on the autism spectrum were unable to explain their sibling's

SIBLING INTERACTIONS

disability and what it meant. Cuskelly (1999) posits that such conflicting feelings may be a result of the newness of a diagnosis. She found that as experience with the sibling and the diagnosis increased, problem behaviors and negative emotions were reduced. Thus, while it is important to acknowledge the role that an older sibling can play in modeling behaviors, researchers must also remember that these are often children as well, and more policies and responses should be put in place to support their well-being. However, playing an active role in intervention may allow the older sibling to gain a better understanding of the disability and to feel an increased sense of self-efficacy and worth. Rivers and Stoneman (2003) reflect this, noting that typically developing older siblings may feel a sense of pride in their ability to ‘teach’ a younger sibling.

There has been very little research done on families that have two children on the autism spectrum, despite the fact that for families with one child with autism, the risk of recurrence is between 1/10 – 1/20 times that of the general population (Wolk & Giesen, 2000). In genetic studies related to autism, the authors found that three percent of families have multiple cases of autism. Relevant studies have examined differences between typically developing/autistic and typically developing/Downs dyads, but far fewer have examined families in which multiple children are on the spectrum. Studies have found that younger siblings of children with autism obtained lower receptive and expressive language scores on the Mullen Scales of Early Learning (Mullen, 1997) compared to younger siblings of typically developing children (Ozonoff, Rogers, & Sigman, 2005). As a diagnosis of ASD is rarely provided before age 3, the researchers were unable to determine whether the younger siblings would fit the criteria for a diagnosis, which would clearly confound the data (Landa et al., 2007). Knott et al. (2007) state that the child with autism takes on the passive “learner” role in the sibling dyad, and this pattern, different from

SIBLING INTERACTIONS

children without autism, is found regardless of birth position. There is no available research on which child takes the lead in a family of which both siblings are on the autism spectrum.

While there have been studies that examine the impact that a child with autism may have on the language development of a younger sibling or on the psychosocial development of an older sibling, very few studies have looked at the influence of both typically developing and autistic siblings on the social and communication development of young children with ASD. Toth, Dawson, Meltzoff, Greenson and Fein (2007) examined a sample of 42 typically developing siblings of children with autism, and a control of 20 typically developing siblings with no family history of autism in a study of early characteristics of autism. The authors determined that the siblings of children with autism had lower receptive language skills, lower adaptive behavior skills and lower rates of communication and social functioning than did the controls. Much more research is needed on the extent of the influence that older siblings can have on the development of specific social behaviors should be a focus of future projects.

The current study sought to investigate the impact of older, typically developing siblings and older siblings with ASD on a number of social and communication variables. Specifically, we aimed to examine the different relationships between these dyads by identifying themes in these interactions. It is our hope that this study may lead to the increased utilization of siblings in early intervention practices.

Method

Recruitment

This study was an independent piece of research created and conducted as part of a larger study of early intervention. Four families were recruited from the Early Social Interaction Project at the University of Michigan in February 2009. Participation in this study did not affect

SIBLING INTERACTIONS

participation in the Early Social Interaction Project or any other interventions or treatment programs. This study was approved by the University of Michigan Institutional Review Board before the collection of any data, and all families provided written informed consent for the participation of their children. Data was collected from March 2009 through January 2010.

Participants

Four sibling dyads (i.e., four target children and four older siblings) participated in this study. A psychologist at a local center had diagnosed three of the four target children and one of the older siblings with autism or an autism spectrum disorder. In each dyad, the younger sibling was designated as the target child. The probands ranged in age from two and a half to four years of age. The older siblings were between four to ten years old at the beginning of the study. Participant information is shown in Table 1.

The first sibling dyad was composed of Tom and his sister, Tara (names have been changed to protect confidentiality). Tom was 3 years, 10 months old, and Tara was 6 years old at the beginning of this study. Both Tom and Tara were typically developing and utilized as the control for this study. Tom's parents were Caucasian, and both had graduated from college.

The second dyad consisted of Adam, age 3 years 10 months old, and his sister Avery, 5 years 11 months. Both Adam and Avery met criteria for a diagnosis of ASD. Adam's parents were Caucasian, and both had some college-level education.

Sibling Dyad 3 was made up of Bobby, age 2 years 6 months and his brother Brad (10 years, 3 months). Bobby had a diagnosis of ASD, while Brad was typically developing. Bobby's parents were Caucasian. His father graduated from high-school and his mother holds a college degree.

SIBLING INTERACTIONS

Sibling Dyad 4 was composed of Lisa and her older sister, Mary. Lisa was 2 years, 8 months old, and Mary was 3 years, 10 months at the beginning of the study. Lisa had a diagnosis of ASD at the beginning of the study. In the middle of data collection, Mary received a diagnosis of ASD, and the family decided not to continue participating in the study. Lisa's parents were African American. There is no additional demographic information on this family.

Materials

The study took place in the homes of each participant or in the center's clinic. The researcher selected play materials based on toys that were age-appropriate and that met the level of functioning of the children involved. The set of toys included the following types of items: blocks, dolls, toy food items, kitchen items, barn animals, puzzles, tools and pop up toys. The sessions were scheduled at the family's convenience.

Procedure

The toys were set up in a large room with open space, in groupings of similar objects. Each set of siblings was provided the toys and the instruction "Play together." A parent was present during every taping. The parents were told that they were not to facilitate any play between siblings, though they could respond if a child approached them. Each play session lasted 60 minutes, and occurred once per month over a nine-month period. The researcher of this study videotaped each session.

Coding

Each tape was coded for specific behaviors by two separate coders to ensure reliability of coding. The coding system for interactions was a continuous scale based on one created by Abramovitch et al. (1987) (Appendix A). Six agonistic behaviors (physical aggression, object struggle, verbal command, verbal insult/disapproval, verbal threat, verbal tattle-tell) and eight

SIBLING INTERACTIONS

prosocial behaviors (give/share an object, cooperate/help, request, praise/approval, comfort/reassurance, physical affection, laugh/smile, approach) were used to code initiations of interaction made by the target child. Three responses to prosocial initiations (positive, negative, no response) and three responses to agonistic initiations (submit, counterattack, no response) made by the non-target sibling were also coded. Imitation was also coded, but was not considered an initiation.

Reliability

During data collection, inter-rater reliability was calculated using the first three tapes for each family. Two raters were used to calculate inter-rater reliability. Intra-rater reliability checks were made on the sixth and ninth tape for each family. The average percent agreement of all categories was 95.2%.

Measures

The diagnosis of autism for all probands and ASD siblings was confirmed by the use of the Autism Diagnostic Observation Scale Module 1 or the Autism Diagnostic Observation Scale Module 2 (ADOS; Lord et al., 2000), performed by a clinical psychologist at a university-based clinic. The ADOS Module 1 is designed for children who do not consistently use phrase speech, while the ADOS Module 2 is utilized when children exhibit some phrase speech but may not be verbally fluent. It is a semi-structured, play based assessment that provides systematic probes for autism symptoms in the realms of social affect and restricted, repetitive behaviors (RRB) (Gotham, Risi, Pickles, & Lord, 2007). Diagnosis of autism was defined as meeting criteria for autism or an autism spectrum disorder based on a single score.

Parents also reported on family functioning, and family resources. The self-report measures utilized include:

SIBLING INTERACTIONS

The Family Impact Questionnaire – Revised (Donenberg & Baker, 1993) was used to measure a parent’s perception of the impact of their child on their family, relative to the impact that other children have on other families. Sample items include “The other children in the family feel more embarrassed by his/her behavior” and “The other children in the family enjoy spending time with him/her more.” The primary caregiver completed the 50-item questionnaire using a four-point Likert-type scale ranging from “not at all” to “very much.” The items are organized into six categories, which are 1) impact on social life; 2) financial impact; 3) impact on marital relationship; 4) impact on siblings; 5) positive feelings towards the target child; and 6) negative feelings towards the child.

The Family Resource Scale (Leet & Dunst, 1987) is a 30-item scale designed to measure the adequacy of family resources, for both the target child and the family as a whole. Sample items include “time for family to be together”, “babysitting for children” and “money to save.” The primary caregiver completed the five-point scale represented by numbers 1-5 (1 = not at all adequate; 5 = almost always adequate). Low scores indicate inadequate access to resources and supports.

The Vineland Adaptive Behavior Scales (Sparrow et al., 1984) is a parent interview designed to assess adaptive behavior across four domains: socialization, communication, daily living and motor skills. The Vineland also includes a Parent/Caregiver Rating Form which covers the same content as the interview, but instead uses a rating scale. The Rating Form was used by Dyads 1 and 2 while Dyad 3 was given the Survey Form.

SIBLING INTERACTIONS

Results

The sample used for data analysis included the three families who completed the videotaped interaction procedure over the course of nine months. The family who did not continue participating in this study is not included in the data analysis.

ADOS Module 1 and ADOS Module 2 Scores

As previously described, the ADOS Module 1 and ADOS Module 2 provides cut-off scores on the classification algorithm for autism and the autism spectrum. To receive a diagnosis of autism or an autism spectrum disorder, a child must exceed the cutoff score. The domains reported on by the psychologists at our center were social affect and restricted, repetitive behaviors (RRB). As many of the children have participated in multiple ADOS assessments, the scores obtained at the closest approximate date to the start of data collection for this study were utilized for data analysis. The target child in Dyad 1 scored a composite of 0, indicating the absence of autism spectrum disorder. In Dyad 2, both children were diagnosed with autism; Adam, with a score of 12, and Avery with a score of 17. Bobby, in Dyad 3, received a score of 25, also indicating the presence of an autism spectrum disorder. The typically developing older siblings in Dyads 1 and 3 were not tested for the presence of autism. Further breakdown of the composite scores, including severity scores, can be found in Table 2 (Gotham, Pickles, & Lord, 2009).

Family Resource Scale

We administered the Family Resource Scale to assess the family's resources, such as time, money and energy to meet the needs of their family. For our purposes, a single item was chosen to characterize time for family to be together. Dyads 1 and 2 both indicated "usually adequate resources," while Dyad 3 indicated "seldom adequate resources."

SIBLING INTERACTIONS

Family Impact Questionnaire

The Family Impact Questionnaire was utilized to measure the parent's perception of the target child on his or her family. For our purposes, we used items from the category "impact on siblings." Results indicate that the target sibling in Dyad 1 has little impact on his sibling, while the target child in Dyad 2 has the most impact. Further breakdown of the results can be found in Table 3.

Case Descriptions

Any quantitative data resulting from video analysis should be treated with caution, as the total number of items or events are small.

Tom & Tara (both typically developing, aged 3 years, 10 months and 6, respectively). Tom and Tara displayed great variation in their behaviors in each videotaped interaction over the course of nine months. Frequency of total behaviors ranged from 13-184 ($M = 75.77$, $SD = 63.56$). At all nine observations, initiations were more common than responses to initiations (Table 4a). Of these initiations, Tom exhibited an average of 17 agonistic initiations and 26.67 prosocial initiations per session. The most frequent agonistic initiation was verbal command ($M = 7.33$, $SD = 5.76$). Object struggle ($M = 3.88$, $SD = 2.66$) and verbal insult/disapproval ($M = 3.66$, $SD = 3.64$) were also exhibited at a higher frequency than other agonistic initiations. The most frequent prosocial initiation was a request ($M = 7.33$, $SD = 8.12$), followed by an approach ($M = 6.11$, $SD = 3.44$). It is important to note that there were far fewer behaviors exhibited during the observations at months 6 and 7, due in part to the time of day of the taping. Proportions and frequencies of agonistic and prosocial initiations can be seen in Table 5a, and Figures 3, 4 and 5a.

SIBLING INTERACTIONS

In Tom's responses to agonistic initiations, he engaged in "counterattack" most frequently ($M = 8.66$, $SD = 9.66$), though all of these responses were highly variable over the nine month span. Tom did display more responses to agonistic initiations compared to no responses (Figure 6). Tom also displayed variable frequencies in his responses to prosocial initiations by Tara. He engaged in positive responses most frequently ($M = 11.44$, $SD = 13.69$), specifically when compared to negative responses to prosocial initiations ($M = 3.33$, $SD = 2.29$).

Imitation was highly variable, though present in very low frequencies throughout the course of observation ($M = 3.55$, $SD = 6.96$). Presence of imitation performed by the proband appeared to drop off over time.

Adam & Avery (both have ASD; aged 3 years, 10 months and 5 years, 11 months, respectively). Adam and Avery displayed high frequencies of behavior over the course of their videotaped interactions, though with less variation than that of Tom and Tara. Frequency of total behaviors ranged from 35-111 ($M = 70.11$, $SD = 22.36$). Adam consistently displayed more initiations than responses at each observation (Table 4b). Of these initiations, he engaged on average in 16.44 agonistic initiations and 34 prosocial initiations. The most frequent agonistic initiation was verbal insult/disapproval ($M = 5.00$, $SD = 3.84$). Of the prosocial initiations, Tom engaged in approach most frequently ($M = 8.22$, $SD = 4.60$), followed by giving or sharing an object ($M = 8.00$, $SD = 4.35$) and laughing or smiling ($M = 7.88$, $SD = 4.01$). All data pertaining to agonistic and prosocial initiations can be found in Table 5b, and Figures 3, 4 and 5b.

Adam's responses to agonistic initiations appeared indiscriminate, though less variable than the responses exhibited by the first sibling dyad. He engaged in more total responses to agonistic initiations as opposed to no response (Figure 6). He displayed the most frequency in counterattack ($M = 4$, $SD = 2.69$) as compared to other behaviors, and these behaviors seemed to

SIBLING INTERACTIONS

be increasing over time, while both submitting behaviors and no response to initiations showed a decreasing trend. Despite the variability, Adam displayed higher frequencies of positive responses to prosocial initiations ($M = 5.33$, $SD = 4.89$). He engaged in more no response ($M = 3.00$, $SD = 2.12$), as compared to negative responses to prosocial initiations ($M = 2.66$, $SD = 2.12$), though this difference is small. He consistently displayed more total responses to prosocial behaviors than a no response.

Adam displayed variable frequencies of imitation ($M = 3.88$, $SD = 4.04$), though the frequency decreased over the course of nine months.

Bobby & Brad (a 2 year, 6 month old boy with autism and his 10 year, 3 month old typically developing brother). Bobby and Brad exhibited fewer behaviors when compared to the previous dyads (Figure 1). Frequency of total behaviors ranged from 29-64 ($M = 48.3$, $SD = 11.30$). Initially, Bobby displayed more responses than initiations, though this trend reversed in the fourth month of observation, and initiations become more frequent than did responses (Table 4c, Figure 2c). Of these initiations, Bobby exhibited on average, 8.66 agonistic initiations and 19.00 prosocial initiations per session. The most frequent agonistic initiation was verbal insult or disapproval ($M = 3.88$, $SD = 2.31$). There were no incidents of verbal threat or verbal tattle-tell, so these behaviors were not included in this analysis. Among prosocial initiations, give/share was the most frequent behavior ($M = 5.44$, $SD = 2.60$), followed by requests ($M = 5.33$, $SD = 3.42$) and laugh/smile ($M = 4.22$, $SD = 3.63$). Proportions and frequencies of agonistic and prosocial initiations can be found in Table 5c, and Figures 3, 4 and 5c.

In Bobby's response to agonistic initiations, he exhibited submitting behaviors most frequently ($M = 7.00$, $SD = 3.64$), though these behaviors decreased over time, while both counterattack and no response patterns stayed relatively stable. He displayed more total

SIBLING INTERACTIONS

responses to agonistic initiations as compared to no response, but this gap lessened over time (Figure 6). Among responses to prosocial behaviors, however, Bobby engaged in far greater frequencies of no response to prosocial initiations ($M = 24.77$, $SD = 14.16$) than positive and negative responses combined. Both positive and negative responses to prosocial initiations appeared to stay relatively static throughout the videotaped interactions, though negative responses seem to increase slightly towards the end of the nine-month period.

Imitation performed by Bobby, when present, occurred in very limited frequency throughout the course of observation ($M = 0.66$, $SD = 0.86$).

Discussion

At the beginning of the study, we anticipated significant changes in behavior over time. We found few systematic changes, but instead discovered that interactions between preschool children and their siblings were highly variable. The typically developing sibling dyad demonstrated a wider variation in total behaviors exhibited month to month when compared to the other two sibling dyads. These behaviors reflect an age-appropriate range of initiations and responses, where Tom displayed more initiations than responses on a consistent basis. Generally, older siblings initiate social interactions more frequently, displaying more dominance toward the younger sibling, but interactions become more reciprocal in nature as the younger child aged (McGillicuddy-De Lisi, 1993). However, during the sixth and seventh month of taping, frequency of all behavioral categories decreased drastically as Tom and Tara played next to each other for the full hour with very little interaction. This may reflect the growing asymmetry of play interests between male and female children or it may simply reflect the daily variation of mood and interest in engagement that is exhibited by typically developing children.

SIBLING INTERACTIONS

In contrast, Adam and Avery, the two siblings who both had autism spectrum disorders engaged in slightly fewer total behaviors, with far less variability. This may be a result of the repetitive behaviors common among children with autism, in that many of the same patterns appeared month to month. Despite slight differences in frequency of behaviors, many of the same games were repeated each month. For example, in each videotaped session, Adam and Avery expressed interest in playing 'Robot' with their mother. Similar patterns of requests and initiations were evidenced over the nine month observation. Though both Adam and Avery have verbal abilities, deficits in communication and interaction remain, limiting the range of activities that they can engage in.

Similarly, the third dyad exhibited fewer total behaviors with even less variability, reflective of Bobby's impaired communication. It is clear that the severity of the target child's deficits is central to the utility of sibling interactions. Despite efforts made by Brad to initiate interactions, Bobby was often unable to respond to either prosocial or agonistic initiations, as evidenced by the high frequency of no response behaviors. This is illustrated in the number of no response behaviors as compared to active responses to both agonistic and prosocial initiations made by Brad. During the fourth month of taping, over three quarters of the total behaviors were null response. In comparison, although both children in the second sibling dyad are on the autism spectrum, both have language ability and are thus able to engage with each other and respond to initiations in a reciprocal manner similar to that of the typically developing dyad.

It is also possible that the current findings are solely a result of the abilities of the non-target siblings, without taking into account the target sibling. For example, in the sibling dyad comprised of two children on the spectrum, the target child displayed far more initiations towards the non-target sibling, which may be due to the fact that Adam has more verbal skills

SIBLING INTERACTIONS

than Avery. Despite the age gap, it is clear that Adam, the younger child, took the dominant role in the sibling relationship. This provides new insight into the roles of “learner” and “teacher” among two children on the autism spectrum, as there is no available research pertaining to this topic.

A similar finding was also visible in the typically developing sibling dyad, evident in the proportion of initiations as compared to responses to initiations. Although the frequency was highly variable, the target child initiated interaction more frequently on a consistent basis. Conversely, there were far more initiations made by the non-target child in the third dyad, with one child with autism and one with typical development, when compared to the other two sibling pairs. As the non-target child was much older and more cognitively aware of the deficits related to autism, he demonstrated an understanding of intervention methods and attempted to use them to draw out communication from his younger brother much more actively than was visible in the two other dyads.

Each dyad consistently displayed higher proportions of prosocial initiations as compared to agonistic initiations. Among all three sibling dyads, Adam, from Dyad 2, exhibited the greatest number of incidences of give/share an object, cooperate/help, praise/approval, comfort/reassurance, laugh/smile and approach behaviors on average. Though there was moderate variation of cooperate/help, laugh/smile, and approach behaviors over time, most prosocial initiations appeared to either remain relatively stable. Among the typically developing dyad of Tom and Tara, this finding was both replicated and contrasted. Results indicated a similar tendency to engage in more prosocial initiations as compared to agonistic initiations. Tom engaged in increasing amounts of requesting, approach and laugh/smile over the nine

SIBLING INTERACTIONS

month observation. However, he did not display a single instance of either comfort/reassurance or physical affection in any session, which may reflect an age appropriate gendered dynamic.

It is also apparent that Tom displayed some dominant behaviors in his interactions with Tara. Among agonistic initiations, the most frequent behavior was a verbal command, followed by object struggle and verbal insult/disapproval. These frequencies remained relatively constant, while still recognizing the sixth and seventh months of taping where a significant decrease in all categories of behaviors occurred. Despite the difference in diagnoses between Dyads 1 and 2, it is clear that many similarities in behavioral frequency and interaction are present.

Comparatively, the relationship between the third dyad varies highly from the first two for a number of reasons. First, the nature of the age difference creates a dynamic in which it would be very difficult for the younger sibling to take a dominant role in the relationship, regardless of level of functioning. This was visible among the agonistic initiations made by Bobby over the course of observation. He displayed very low frequencies of all agonistic behaviors, with the highest incidence evident in verbal disapproval. In this situation, Bobby was frequently expressing disapproval over the choice of activity made by Brad. This was generally evidenced by a vocalization, specifically a scream, when Brad would vary the current activity. Similarly, among prosocial behaviors, he engaged primarily in less dominant behaviors, such as requesting assistance or sharing an object. For example, if Bobby was playing with the toy food and Brad approached him, Bobby would allow Brad to play with the food as well. The gender of this sibling dyad may also reflect the differences between dyads. Bobby and Brad were the only same-sex dyad, which may allow for broader play behaviors. As previously mentioned, the gendered nature of Dyad 1, specifically, may have limited the range of interactions that was displayed. Among the third dyad, there were very low frequencies of praise or approval and

SIBLING INTERACTIONS

approach, and no instances of comfort or reassurance. While these results may appear similar to those exhibited by the first dyad, it is apparent that the findings are more likely to be a result of deficits in verbal ability. It is clear that the variables of age differential, gender and language ability are important to consider in the creation of a sibling-implemented intervention.

Limitations

However, other mediating variables such as severity of disability, birth order, family size, gender, and socioeconomic factors are difficult to control. As a result, outcomes of studies have not historically been generalized to other sibling dyads. Furthermore, it may not be feasible to address all possible mediating variables when designing interventions.

The current study also has a number of limitations that should be addressed in future research. First, a sample size of six individuals, comprised of three sibling dyads does not beget a representative sample of all sibling relationships. As a result, we were not able to get statistically significant results, and the findings may not be generalizable across all sibling dyads. Future research should utilize a larger sample of children who may be more representative of the general population.

Second, this study utilized a sample that was currently involved in a parent-implemented intervention, making it impossible to determine causality between the behaviors exhibited and the influence of the older sibling. While it is very likely that the older sibling did play a role in the presence of social and communicative play skills in interactions, it is also possible that these effects are a result of the concurrent intervention. Further examination of this topic should attempt to limit the presence of mediating variables.

A third limitation of this study is that it focused on the impact of one older sibling, and did not utilize data from the presence of any additional siblings. Some of the families who

SIBLING INTERACTIONS

participated in this study had other children who attended the play sessions or were present in the home, which may affect the behaviors exhibited during that observation. Future research should make all efforts to engage each member of the family, as the presence of multiple siblings and family members is more reflective of a natural environment and thus, the best practice of implementing interventions (Meadan et al., 2009). Similarly, the older sibling was not asked to provide any qualitative data on their own experiences, which may shed more light on their individual perceptions of the sibling relationship and their self-reported potential for implementing an intervention.

Future Research

There has been a paucity of research on sibling interactions in families with a child with autism, despite the increasing importance of viewing the entire family as a conduit for intervention. However, as diagnoses and intervention become increasingly standardized and comprehensive, this field of research is further able to develop interventions that address the myriad individual needs, including that of play behavior and the improvement of sibling dynamics. A sibling-implemented intervention appears to be the next step in creating a comprehensive intervention for young children with autism spectrum disorders. Teaching children in their natural environment is a recommended practice for early intervention approaches, and most children with autism spectrum disorders spend the majority of their time at home (Meadan et al., 2009). Currently, the majority of interventions focus on the role of parent as primary executor, while siblings are not called upon to implement strategies relevant to their abilities. However, as children with autism tend to display social communication deficits in their play style, parents may not be the best option in terms of engaging with children in a play style that may be generalized to peers. The relationship that exists between older and younger siblings

SIBLING INTERACTIONS

may be beneficial in addressing such deficits. The ability of a typically developing older sibling to model social, reciprocal and communicative behaviors should be utilized to best facilitate development, as well as to foster stronger sibling relationships. As sibling relationships are vital to the broader family dynamic, such interactions are worth further examination.

Clinical Implications

There are a number of strengths evident in this research. The findings of this study are promising for the future inclusion of siblings in intervention studies. Results indicate that the presence of an older sibling affects the number of initiations made by the younger child on the autism spectrum. This not only indicates that an older, typically developing sibling may influence behavior, but that modeling by a high functioning older sibling on the autism spectrum may be beneficial. Children develop social understanding among a wide array of experiences, leading to an autistic child's dynamic ability to develop despite the presence of other siblings on the autism spectrum (Knott et al., 2007). This is evidenced in the dyad in which both siblings were autistic, where the proband's responses to initiations made by the older sibling began to replicate the behaviors seen in the typically developing dyad. The findings also illustrate minimal increases in responses to prosocial and agonistic initiations among dyad 3 over time, despite consistently high frequencies of no response behaviors. It is possible that with more structured skills, such results would become more pronounced. Future research should attempt to further draw out this conclusion. However, given the high variability in the behavior of the typically developing dyad and the apparent lack of interest in the toys and activities towards the end of the observation, it may be wise to create an open-ended and child-driven intervention, so as to avoid burnout and boredom, specifically with children who have more verbal abilities. It may be also be beneficial, in families with no siblings, or in which all of the siblings are on the autism

SIBLING INTERACTIONS

spectrum that these children be given opportunities to interaction with typically developing peers or older children.

Given the paucity of data pertaining to sibling interactions in this field, this study adds valuable insight to the current literature. The researcher demonstrated an ability to examine three sibling relationships in depth over a long period of time, and to draw out patterns of behavior on a number of domains. The data presented in this study indicates the potential benefits of sibling interactions for providing learning opportunities for the younger sibling, specifically with children on the autism spectrum. Despite the social and communicative deficits characteristic of children with autism which may create a challenging environment for the facilitation of play interactions, the benefits of such relationships are apparent. It is clear that children with autism demonstrate skills in the initiation of prosocial interactions with their siblings in a way that is rarely reported among peer groups (McGee, Feldman, & Morrier, 1997). Similarly, among children with autism, the sibling relationship appears to foster reciprocal interactions (Knott et al., 2007). There is great potential to utilize sibling interactions to better benefit the social and communicative growth of children with autism. Interventions designed to fit within family's routines and schedules, including the presence and assistance from siblings, will enhance these naturally occurring patterns of behavior (Meadan et al., 2009). Sibling-implemented interventions, alongside a parent-implemented intervention will strengthen the range of play behaviors and situations that an autistic child can successfully engage in, which will arguably lead to more effective interventions.

SIBLING INTERACTIONS

References

- Abramovitch, A., Corter, C., Pepler, D.J., & Stanhope, L. (1986). Sibling and peer interaction: A final follow-up and a comparison. *Child Development, 57*(1), 217-229.
- Abramovitch, A., Stanhope, L., Pepler, D., & Corter, C. (1987). The influence of Down's syndrome on sibling interaction. *Journal of Child Psychology and Psychiatry, 28*, 865-879.
- Bägenholm, A., & Gillberg, C. (1991). Psychosocial effects on siblings of children with autism and mental retardation: a population-based study. *J Ment Defic Res, 35* (291-307).
- Brody, G.H. (2004). Siblings' direct and indirect contributions to child development. *Current Directions in Psychological Science, 13*(3), 124-126.
- Brown, W.H., Odom, S.L., & Conroy, M.A. (2001). An intervention hierarchy for promoting young children's peer interactions in natural environments. *Topics in Early Childhood Special Education, 21*(3), 162-175.
- Celiberti, D.A., & Harris, S.L. (1993). Behavioral intervention for siblings of children with autism: a focus on skills to enhance play. *Behavior Therapy, 24*(4), 573-599.
- Chakrabarti, S., & Fombonne, E. (2001). Pervasive developmental disorders in preschool children. *Journal of American Medical Association, 285*(24), 3093-3099.
- Charman, T., Baron-Cohen, S., Swettenham, J., Baird, G., Cox, A., & Drew, A. (2000). Testing joint attention, imitation, and play as infancy precursors to language and theory of mind. *Cognitive Development, 15*(4), 481-498.
- Charman, T., Swettenham, J., Baron-Cohen, S., Cox, A., Baird, G., & Drew A. (1997). Infants with autism: An investigation of empathy, pretend play, joint attention, and imitation. *Developmental Psychology, 33*(5), 781-789.

SIBLING INTERACTIONS

- Colleti, G., & Harris, S.L. (1977). Behavior modification in the home: Siblings as behavior modifiers, parents as observers. *Journal of Abnormal Child Psychology*, 5, 21-30.
- Cuskelly, M. (1999). Adjustment of siblings of children with a disability: Methodological issues. *International Journal for the Advancement of Counseling*, 21(2), 111-124.
- Dallas, E., Stevenson, J., & McGurk, H. (1993). Cerebral-palsied children's interactions with siblings-II: Influence of severity of disability, age, and birth order. *Journal of Child Psychology and Psychiatry*, 34, 621-647.
- Dallas, E., Stevenson, J., & McGurk, H. (1993). Cerebral-palsied children's interactions with siblings-II: Interactional structure. *Journal of Child Psychology and Psychiatry*, 34, 649-671.
- Dew, A., Balandin, S., & Llewellyn, G. (2008). The psychosocial impact on siblings of people with lifelong physical disability: A review of the literature. *Journal of Developmental and Physical Disabilities*, 20, 485-507.
- Donenberg, G., & Baker, B.L. (1993). The impact of young children with externalizing behaviors on their families. *Journal of Abnormal Child Psychology*, 21(2), 179-198.
- Dunn, J., & Kendrick, C. (1979). Interaction between young siblings in the context of family relationships. In M. Lewis & L. Rosenblum (Eds.), *The child and its family* (pp. 143-168). New York: Plenum.
- El-Ghoroury, N.H., & Romanczyk, R.G. (1999). Play interactions of family members towards children with autism. *Journal of Autism and Developmental Disorders*, 29, 249-258.
- Gotham, K., Pickles, A., & Lord, C. (2009). Standardizing ADOS scores for a measure of severity in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 39(5), 693-705.

SIBLING INTERACTIONS

- Gotham, K., Risi, S., Pickles, A., & Lord, C. (2007). The autism diagnostic observation scale: Revised algorithms for improved diagnostic validity. *Journal of Autism and Developmental Disorders, 37*(4), 613-627.
- Knott, F., Lewis, C., & Williams, T. (1995). Sibling interaction of children with learning disabilities: A comparison of autism and Down's syndrome. *Journal of Child Psychology and Psychiatry, 36*, 965-976.
- Knott, F., Lewis, C., & Williams, T. (2007). Sibling interaction of children with autism: Development over 12 months. *Journal of Autism and Developmental Disorders, 37*, 1987-1995.
- Krantz, P.J., & McClannahan, L.E. (1993). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis, 26*(1), 121-132.
- Landa, R., & Garrett-Mayer, E. (2006). Development in infants with autism spectrum disorders: A prospective study. *Journal of Child Psychology and Psychiatry, 47*(6), 629-638.
- Landa, R.J., Holman, K.C., & Garrett-Mayer, E. (2007). Social and communication development in toddlers with early and later diagnosis of autism spectrum disorders. *Archives of General Psychiatry, 64*(7), 853-864.
- Leet, H.E., & Dunst, C.J. (1987). Measuring the adequacy of resources in households with young children. *Child: Care, Health and Development, 13*(2), 111-125.
- Lord, C., & Hopkins, J.M. (1986). The social behavior of autistic children with younger and same-age nonhandicapped peers. *Journal of Autism and Developmental Disorders, 16*(3), 249-262.
- Lord, C., & Magill-Toms, J. (1995). Peer interactions of autistic children and adolescents.

SIBLING INTERACTIONS

- Development and Psychopathology*, 7(4), 611-626.
- Lord, C., Risi, S., Lambrecht, L., et al. (2000). The Autism Diagnostic Observation Schedule – Generic: a standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders*, 30, 205-223.
- Loveland, K.A., & Landry, S.H. (1986). Joint attention and language in autism and developmental delay. *Journal of Autism and Developmental Disorders*, 16(3), 335-349.
- Mandleco, B., Olsen, S.F., Dyches, T., & Marshall, E. (2003). The relationship between family and sibling functioning in families raising a child with a disability. *Journal of Family Nursing*, 9(4), 365-396.
- McGee, G.G., Feldman, R.S., & Morrier, M.J. (1997). Benchmarks of social treatment for children with autism. *Journal of Autism and Developmental Disorders*, 27(4), 353-364.
- McGillicuddy-De Lisi, A.V. (1993). Sibling interactions and children's communicative competency. *Journal of Applied Developmental Psychology*, 14, 365-383.
- Meadan, H., Ostrosky, M.M., Zaghawan, H.Y., & Yu, S. (2009). Promoting the social and communicative behavior of young children with autism spectrum disorders: A review of parent-implemented intervention studies. *Topics in Early Childhood Special Education*, 29(2), 90-104.
- Meyers, C., & Vipond, J. (2005). Play and social interactions between children and developmental disabilities. *Physical and Occupational Therapy in Pediatrics*, 25(1), 81-103.
- Mullen, E.M. (1997). *Mullen scales of early learning*. Los Angeles: Western Psychological Services.
- Orsmond, G.I., & Seltzer, M.M. (2007). Siblings of individuals with autism or Down syndrome:

SIBLING INTERACTIONS

- Effects on adult lives. *Journal of Intellectual Disability Research*, 51(682-696).
- Ozonoff, S., Rogers, S., & Sigman, M. (2005). Infants at risk of autism: A longitudinal study. Atlanta, GA: Paper presented at the biennial meeting of the Society for Research in Child Development.
- Piaget, J. (1962). *Play, dreams and imitation in childhood*. New York: Norton.
- Rice, C. (2009). Prevalence of autism spectrum disorders: Autism and developmental disabilities monitoring network, United States, 2006. *Morbidity and mortality weekly report. CDC surveillance summaries*, 58(SS-10).
- Rivers, J.W., & Stoneman, Z. (2003). Sibling relationships when a child has autism: Marital stress and support coping. *Journal of Autism and Developmental Disorders*, 33(4), 383-394.
- Schaefer, C.E., & DiGeronimo, T.F. (2000). *Ages and stages: A parent's guide to normal childhood development*. New York: John Wiley & Sons.
- Schreibman, L., O'Neill, R.E., Koegel, R.L. (1983). Behavioral training for siblings of autistic children. *Journal of Applied Behavior Analysis*, 16(2), 129-138.
- Sparrow, S. S., Balla, D., & Cicchetti, D. (1984). *Vineland Adaptive Behavior Scales*. Circle Pines, MN: American Guidance Service.
- Stoneman, Z., Brody, G.H., Davis, C.H., & Crapps, J.M. (1987). Mentally retarded children and their older same-sex siblings: Naturalistic in-home observation. *American Journal of Mental Retardation*, 92, 290-298.
- Stoneman, Z., Brody, G.H., & MacKinnon, C. (1984). Naturalistic observation of children's activities and roles while playing with their siblings and friends. *Child Development*, 55, 617-627.
- Toth, K., Dawson, G., Meltzoff, A.N., Greenson, J., & Fein, D. (2007). Early social, imitation,

SIBLING INTERACTIONS

- play, and language abilities of young non-autistic siblings of children with autism. *Journal of Autism and Developmental Disorders*, 37, 145-157.
- Tsao, L., & Odom, S.L. (2006). Sibling-mediated social interaction intervention for young children with autism. *Topics in Early Childhood Special Education*, 26(2), 106-123.
- Werner, E., Dawson, G., Osterling, J., & Dinno, N. (2000). Brief report: Recognition of autism spectrum disorder before one year of age: A retrospective study based on home videotapes. *Journal of Autism and Developmental Disorders*, 30(2), 157-162.
- Wolk, L., & Giesen, J. (2000). A phonological investigation of four siblings with childhood autism. *Journal of Communication Disorders*, 33, 371-389.
- Woollett, A. (1986). The influence of older siblings on the language environment of young children. *British Journal of Developmental Psychology*, 4(3), 235-245.

SIBLING INTERACTIONS

Author Note

Alayna R. Schreier, Department of Psychology, University of Michigan, Ann Arbor.

I would like to express my deepest thanks to Dr. Catherine Lord for giving me the chance to write an Honors Thesis. This was a once in a lifetime opportunity that would not have been possible without her assistance. Her guidance, from conceptualization through the writing of this paper was invaluable. It has been an honor to work at UMACC, and I am incredibly grateful for this opportunity.

I would also like to thank Julie McCormick, for being a phenomenal resource. Her support in all phases of this project will forever be appreciated. She has been an exceptional mentor over the past three years, and I look forward to working with her in the future. My gratitude also goes out to Christa Rutkowski, who spent countless hours helping me code all 27 tapes. I understand how much time and effort she put into my study, and I cannot thank her enough.

I would like to express thanks to all those who stayed up late at night, writing their theses and doing work alongside me. The ability to share this process was more helpful than I can explain. Finally, I would like to extend a special thank you to my parents and sisters, who have been incredibly supportive and encouraging throughout my academic career. I would not be where I am today without your love and support.

SIBLING INTERACTIONS

Table 1

Participant Information

	Participant	Gender	Age	Ethnicity	Maternal Education	Paternal Education
Dyad 1	Tom	Male	3 yrs, 10 mo	Caucasian	Graduate	Bachelor
	Tara	Female	6 yrs, 0 mo			
Dyad 2	Adam	Male	3 yrs, 10 mo	Caucasian	Some college	Some college
	Avery	Female	5 yrs, 11 mo			
Dyad 3	Bobby	Male	2 yrs, 6 mo	Caucasian	Bachelor	High school
	Brad	Male	10 yrs, 3 mo			

SIBLING INTERACTIONS

Table 2

ADOS Scores

Participant	Age at Testing	Module	Social Affect	RRB	ADOS Total	Severity Score
Dyad 1	Tom	50 mos	Module 2	0	0	1
	Tara	--	--	--	--	--
Dyad 2	Adam	37 mos	Module 1	9	3	12
	Avery	73 mos	Module 1	11	6	17
Dyad 3	Bobby	31 mos	Module 1	20	5	25
	Brad	--	--	--	--	--

Note: ADOS = Autism Diagnostic Observation Scale; RRB = Restricted, repetitive behaviors

SIBLING INTERACTIONS

Table 3

Family Impact Questionnaire

Item	Not At All	Somewhat	Much	Very Much
The other children in our family help take care of him/her more	●	■ ▲		
My child prevents his/her siblings from participating in activities more	●	■ ▲		
The other children in the family complain about his/her behavior more	● ▲	■		
The other children in the family feel more embarrassed by his/her behavior	● ▲	■		
My child is more rejected by his/her siblings	● ■	▲		
The other children in the family invite friends over to the house less because of his/her behavior	● ■	▲		
The other children in the family enjoy spending time with him/her more		● ▲	■	
My child uses his/her siblings' toys without asking permission more	● ▲	■		
My child breaks or loses his/her siblings' toys more	● ▲		■	

Note: ● indicates Dyad 1; ■ indicates Dyad 2; ▲ indicates Dyad 3

SIBLING INTERACTIONS

Table 4

A. *Frequency of Initiations and Responses to Initiations made by the Proband compared to Total Behaviors (Dyad 1)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Initiations	14(77.8)	41(75.9)	33(64.7)	86(53.8)	34(53.1)	10(83.3)	11(64.7)	80(71.4)	84(51.9)
Responses	4(22.2)	13(24.1)	18(35.3)	74(46.2)	30(46.9)	2(16.7)	6(35.3)	32(28.6)	78(48.1)
Total Behaviors	18	54	51	160	64	12	17	112	162

Note: Numbers in parentheses indicate percentage of total; Total does not include No Response behaviors or Imitations

B. *Frequency of Initiations and Responses to Initiations made by the Proband compared to Total Behaviors (Dyad 2)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Initiations	60(83.3)	75(92.6)	44(72.1)	45(76.3)	28(87.5)	41(77.4)	77(72.6)	59(72.0)	53(76.8)
Responses	12(16.7)	6(7.4)	17(27.9)	14(23.7)	4(12.5)	12(22.6)	29(27.4)	23(28)	16(23.2)
Total Behaviors	78	84	77	87	36	47	123	93	74

Note: Numbers in parentheses indicate percentage of total; Total does not include No Response behaviors or Imitations

C. *Frequency of Initiations and Responses to Initiations compared to Total Behaviors (Dyad 3)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Initiations	22(41.5)	23(51.1)	33(44.6)	28(63.6)	15(51.7)	28(65.1)	34(63.0)	48(78.7)	18(50.0)
Responses	31(58.5)	22(48.9)	41(55.4)	16(36.4)	14(48.3)	15(34.9)	20(37.0)	13(21.3)	18(50.0)
Total Behaviors	89	79	92	106	56	63	76	82	51

Note: Numbers in parentheses indicate percentage of total; Total does not include No Response behaviors or Imitations

SIBLING INTERACTIONS

Table 5

A. *Frequency of Agonistic Initiations and Prosocial Initiations compared to Total Initiations (Dyad 1)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Agonistic Initiations	5(35.7)	24(58.5)	24(72.7)	24(27.9)	13(38.2)	5(50.0)	0(0.0)	33(41.2)	25(29.8)
Prosocial Initiations	9(64.3)	17(41.5)	9(27.3)	62(72.1)	21(61.8)	5(50.0)	11(100.0)	47(58.8)	59(70.2)
Total Initiations	14	41	33	86	34	10	11	80	84

Note: Numbers in parentheses indicate percentage of total

B. *Frequency of Agonistic Initiations and Prosocial Initiations compared to Total Initiations (Dyad 2)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Agonistic Initiations	23(38.3)	18(48.0)	10(22.7)	23(11.1)	5(14.3)	13(56.1)	28(36.4)	23(39.0)	24(45.3)
Prosocial Initiations	37(61.7)	39(52.0)	34(77.3)	40(88.9)	24(85.7)	18(43.9)	49(63.6)	36(61.0)	29(54.7)
Total Initiations	60	57	44	45	28	41	77	59	53

Note: Numbers in parentheses indicate percentage of total

C. *Frequency of Agonistic Initiations and Prosocial Initiations compared to Total Initiations (Dyad 3)*

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Agonistic Initiations	5(22.7)	7(30.4)	7(21.2)	10(35.7)	5(33.3)	4(14.3)	14(41.2)	19(39.6)	7(38.9)
Prosocial Initiations	17(77.3)	16(69.6)	26(78.8)	18(64.3)	10(66.7)	24(85.7)	20(58.8)	29(60.4)	11(61.1)
Total Initiations	22	23	33	28	15	28	34	48	18

Note: Numbers in parentheses indicate percentage of total

SIBLING INTERACTIONS

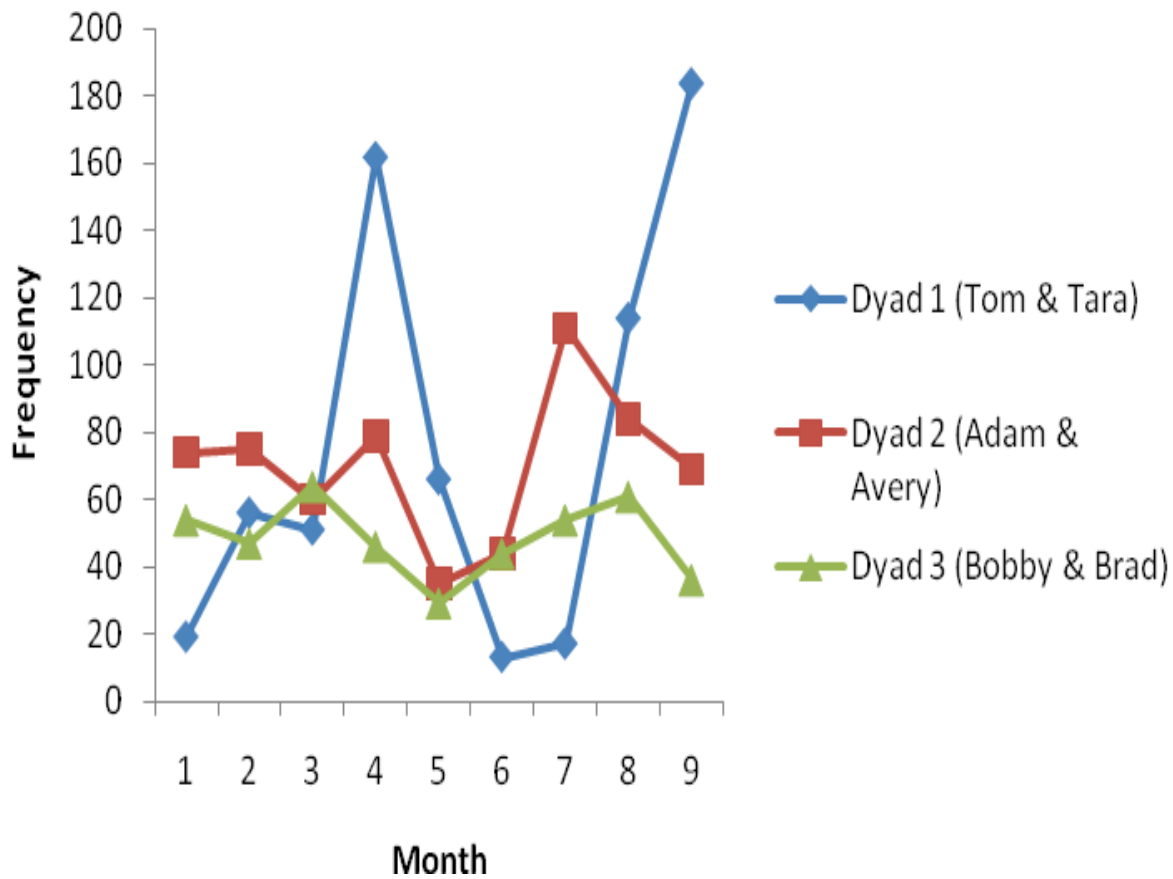
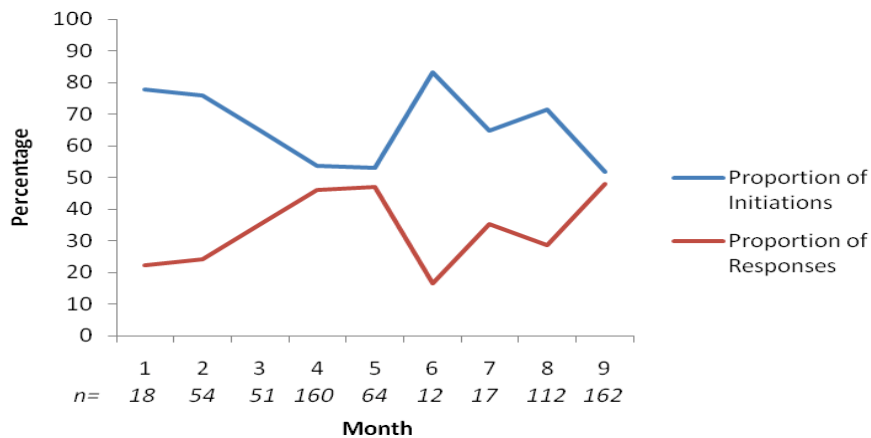
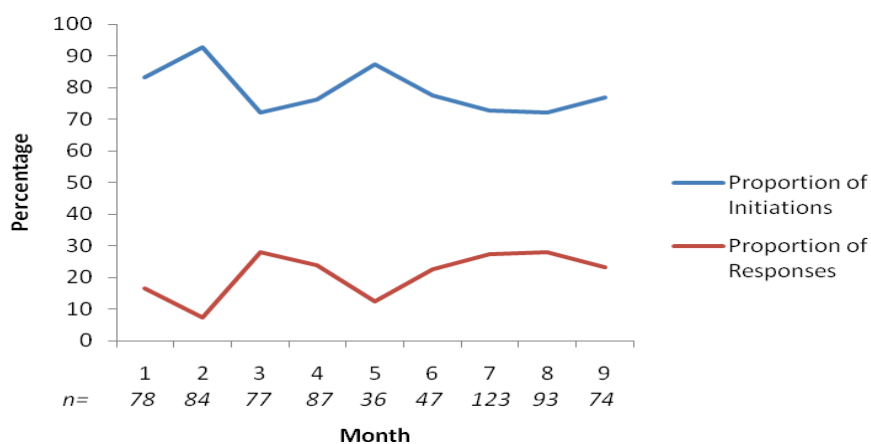


Figure 1. Frequency of Total Active Behaviors across Dyads.

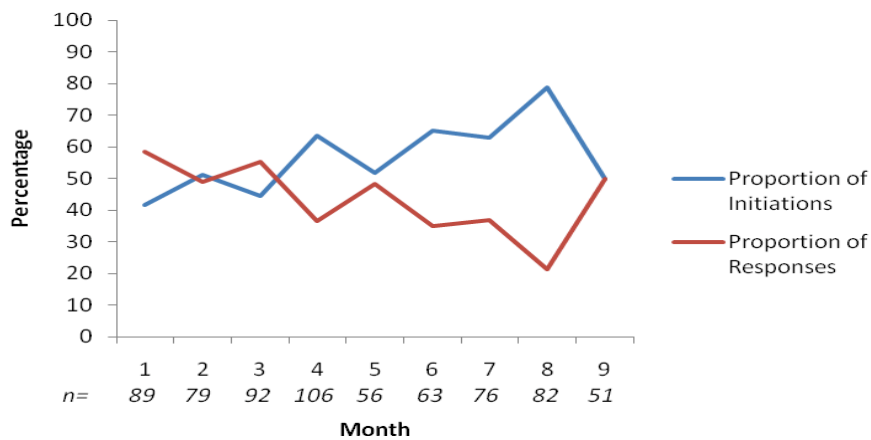
SIBLING INTERACTIONS



a. Initiations and Responses to Initiations (Dyad 1). *Note:* n indicates total behaviors.



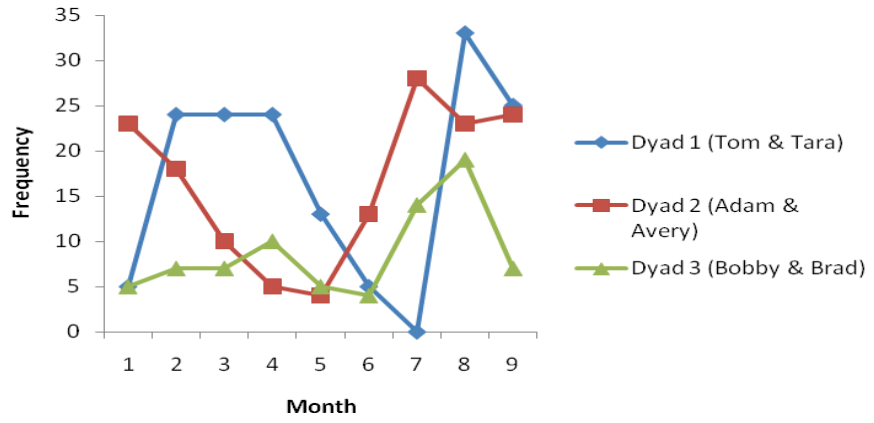
b. Initiations and Responses to Initiations (Dyad 2). *Note:* n indicates total behaviors.



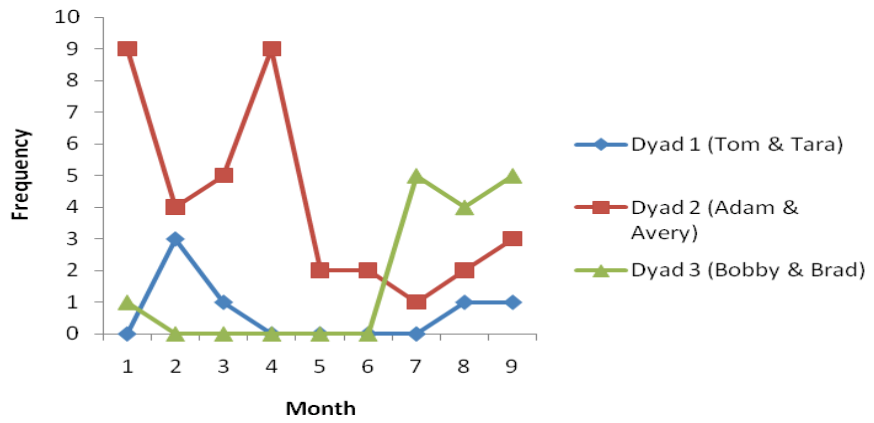
c. Initiations and Responses to Initiations (Dyad 3). *Note:* n indicates total behaviors.

Figure 2. Proportion of Initiations to Response to Initiations.

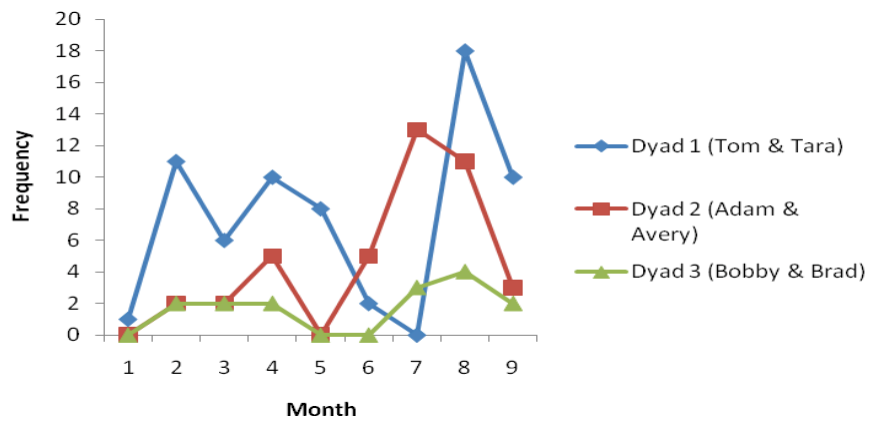
SIBLING INTERACTIONS



a. Agonistic Initiations.



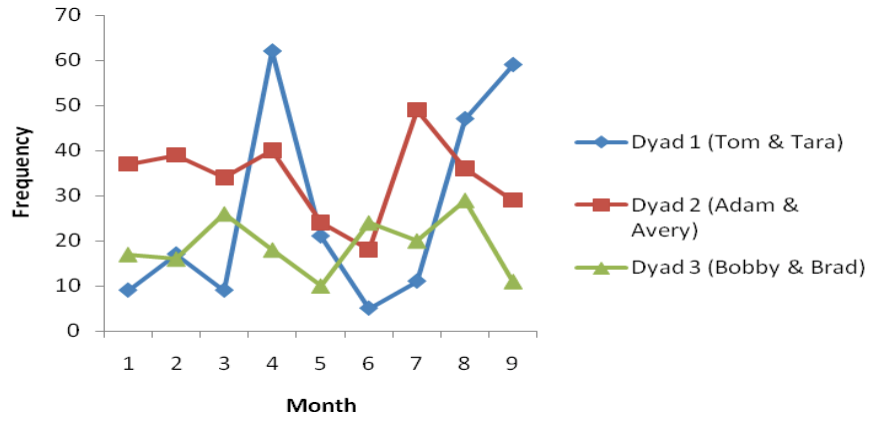
b. Physical Aggression.



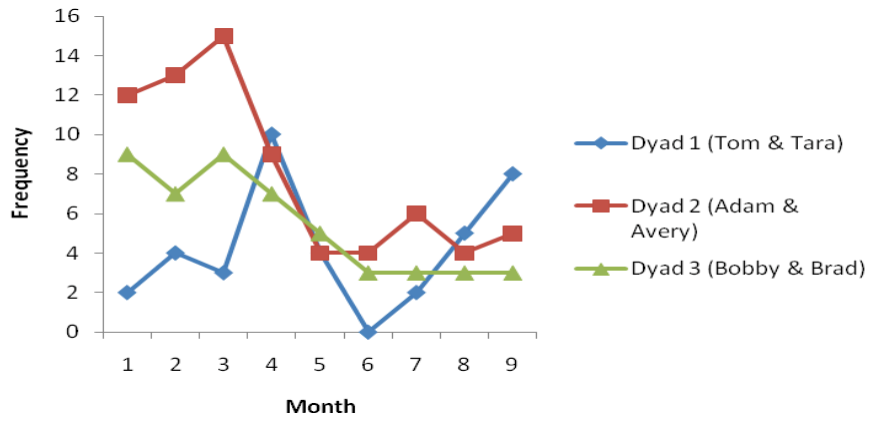
c. Verbal Command.

Figure 3. Agonistic Initiations.

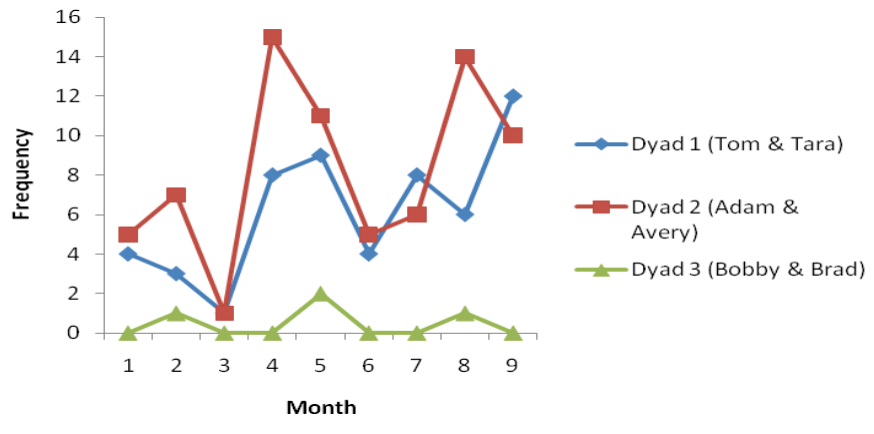
SIBLING INTERACTIONS



a. Prosocial Initiations.



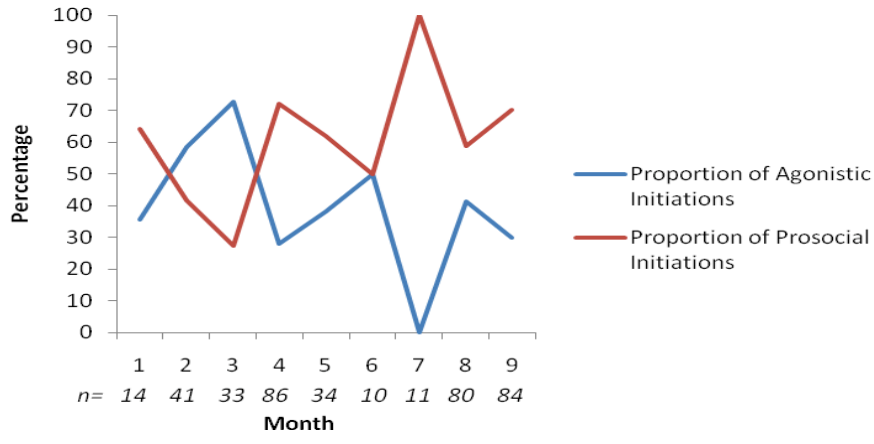
b. Give/Share.



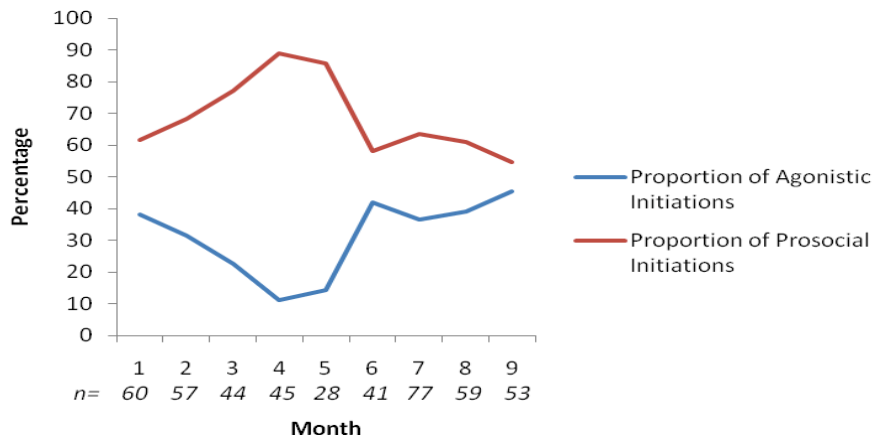
c. Approach.

Figure 4. Prosocial Initiations.

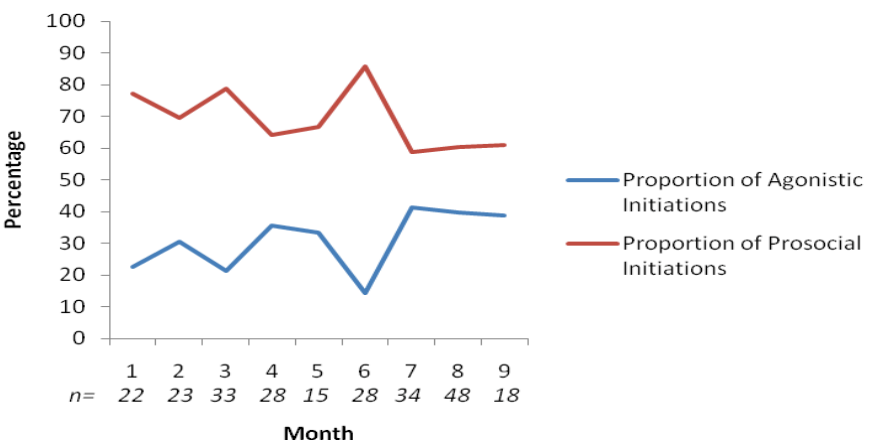
SIBLING INTERACTIONS



a. Agonistic and Prosocial Initiations (Dyad 1). Note: n indicates total initiations.



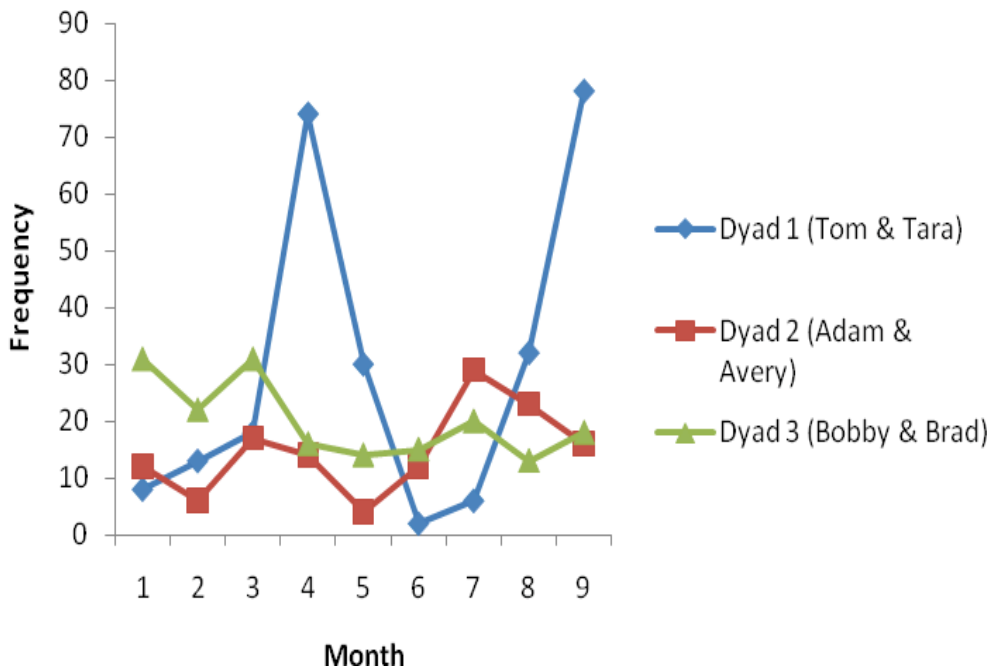
b. Agonistic and Prosocial Initiations (Dyad 2). Note: n indicates total initiations.



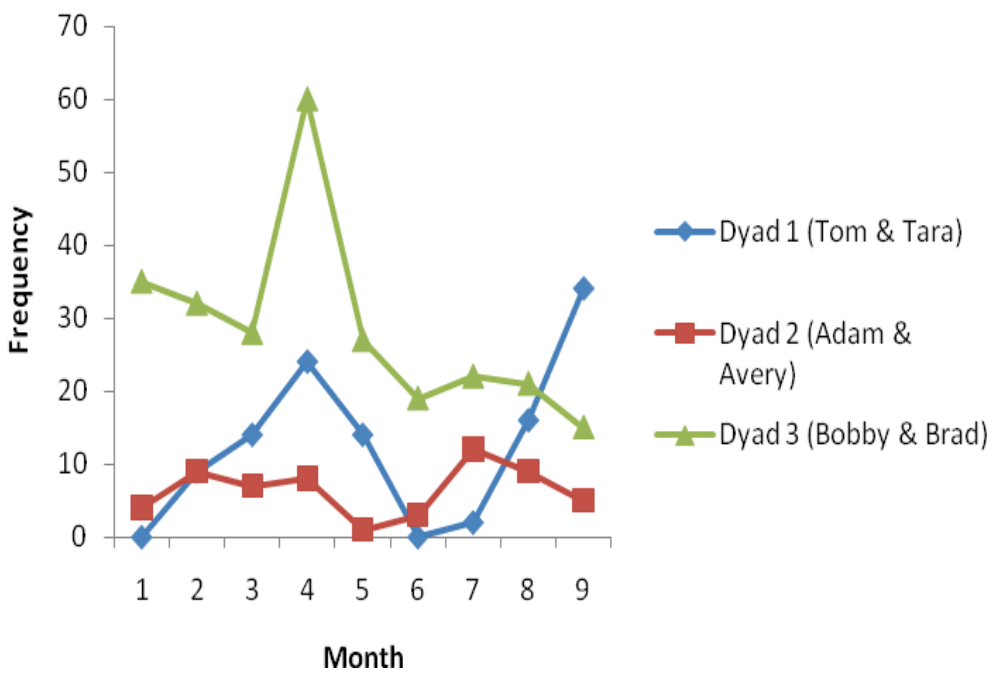
c. Agonistic and Prosocial Initiations. Note: n indicates total initiations.

Figure 5. Proportion of Agonistic Initiations to Prosocial Initiations.

SIBLING INTERACTIONS



a. Active Responses to Initiations.



b. No Response to Initiations.

Figure 6. Responses to Initiations.

SIBLING INTERACTIONS

Appendix

Coding Scale (Abramovitch et al., 1987)

Category	Definition
<i>Agonistic</i>	
Physical aggression	Assertive physical contact, specifically: hit, push, pull, shove, kick, bite, pinch, pull hair
Object struggle	A fight over an object
Verbal command	An order or demand stated with authority in a loud tone of voice, may be accompanied by threatening facial expressions or gestures
Verbal insult/disapproval	Teasing, name-calling, unfavorable judgments
Verbal threat	Statements of intent to harm, take toys away
Verbal tattle-tell	Telling the mother about the other sibling's "wrong-doing"
<i>Prosocial</i>	
Give/share an object	Give an object spontaneously or on request; let other sibling share an object with which child is already playing – spontaneously or on request
Cooperate/help	Engaging in behaviors which require two individuals; explanations or physical aid
Request	Asking for something (e.g. a toy, help) in a polite manner – low tone of voice often accompanied by a positive facial expression
Praise/approval	Verbal statements of approval or admiration of sibling or his/her behavior
Comfort/reassurance	Verbal or physical consolation when sibling is in some way distressed
Physical affection	Positive physical contact, specifically: hug, kiss, hold hands, pat
Laugh/smile	Facial expression of laughter or smiling directed at the sibling
Approach	Moving to within .5 m of sibling with no evidence of agonistic intent
<i>Responses to Agonism</i>	
Submit	Cry, scream, whine, withdraw, request cessation, give up object, obey
Counterattack	Any direct physical or verbal agonism (following agonistic categories above)
No response	No change occurs in ongoing behavior as a result of agonistic act
<i>Responses to Prosocial</i>	
Positive	Positive acceptance (following prosocial categories above)
Negative	Physical or verbal rejection – hit, push, etc., "no," "go away," etc. (following agonistic categories above)
No response	No change occurs in ongoing behavior as a result of prosocial act
<i>Imitation</i>	
	Following sibling to another room or another area in room; performing the same behavior as sibling within 10 sec (imitation was not recorded if an act was apparently elicited by the environment – e.g., bouncing a ball); i.e., only instances of imitating relatively "novel" behaviors were recorded