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COMMUNICATIVE BEHAVIORS OF SIBLING DYADS WITH A CHILD WITH
AUTISM

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Bachelor of Arts in Communication Disorders

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May 2013

Submitted in partial fulfillment of requirements for the degree
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at the

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July 2015

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Dedication

I would like to dedicate this report to persons with autism spectrum disorder and their families. Persons with autism spectrum disorder see our world differently than anyone else does. It is now our job as professionals, parents, siblings, and friends to foster their gifts and make them functional within our society. New interventions will continue to be explored, in order to maximize the potential of persons with autism spectrum disorder.

Acknowledgment

My exploration of sibling dyads would not have been possible without the cooperation of the autism center and the willingness and flexibility of the six families who participated in this study. The autism center has been gracious in allowing me to work on the basis of my availability throughout graduate school. My work has fueled my passion for autism spectrum disorder by allowing me to be immersed in a caring, fun, and educational environment. The autism center provided me with access to recruit participants without making the recruitment process difficult or setting restrictions. The six families were incredible. They welcomed me into their homes, and offered their time, availability, and honesty to my study. I appreciate their unconditional support and their knowing that the only true benefit to them would be to contribute to the literature on autism spectrum disorder and assist me in completing my Master's degree in speech pathology and audiology. I would like to acknowledge my support system who was forever by my side when I needed them and quiet as mice when I had to work. If it were not for my loving family, wonderful boyfriend, and understanding friends, I would not have been able to complete this level of research. Thank you to the Cleveland State University faculty for the education and support which you provided me. Thank you to Dr. Monica Gordon Pershey, Dr. Myrita Wilhite, and Dr. Colleen Walsh who all served on my thesis committee. Your time and contributions were greatly appreciated. An enormous thank you to Dr. Monica Gordon Pershey for your ongoing encouragement and guidance throughout my thesis process. You helped me stay afloat when at times I thought I might drown.

COMMUNICATIVE BEHAVIORS OF SIBLING DYADS WITH A CHILD WITH
AUTISM

ASHLEY M. HODGE

ABSTRACT

The purpose of this study was to document the communicative behaviors exhibited by sibling dyads comprised of one typically developing child (TDC) and their sibling diagnosed with autism spectrum disorder (SibA). Six families (five families were Caucasian and one family was African American) participated in one 45-minute home observation, one semi-structured interview with the TDCs, and one semi-structured interview with the parents. Sibling dyads varied across birth order, ages, and genders. Observations revealed that the sibling dyads produced a variety of communicative behaviors. Observational data were coded to provide information on the types of communicative behaviors produced and their frequency of occurrence. Data were analyzed to reveal the types of communicative behaviors that both the TDCs and the SibAs produced, as well as the types of communicative behaviors produced only by the TDCs and only by the SibAs. The TDCs provided relevant answers to semi-structured interview questions about their interactions with their SibAs, and the parents provided relevant answers to semi-structured interview questions about their children's relationships. Four out of the six families provided strong evidence that suggested the possibility of sibling-mediated interventions for children with autism spectrum disorder. Two out of the six families provided some evidence that suggested the possibility of sibling-mediated interventions for children with autism spectrum disorder.

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CHAPTER I

INTRODUCTION

1.1 Defining Autism Spectrum Disorder

The Diagnostic and Statistical Manual of the American Psychological Association, fifth edition (DSM-5, 2015) defines autism spectrum disorder (ASD) as a developmental neurological disorder characterized by 1) persistent deficits in the areas of social communication and social interaction and 2) restrictive and repetitive patterns of behavior (American Psychological Association, 2013; Autism Speaks, 2015). Prevalence rates reported by the Centers for Disease Control (2015a) indicated that 1 in 68 children is affected by ASD, with the disorder affecting more males than females (Prelock, 2015). Social communication and social interaction deficits manifest as difficulties with social-emotional reciprocity (e.g., social approach, back-and-forth conversation), nonverbal communication (e.g., understanding facial expressions), and interpersonal relationships (e.g., developing and maintaining friendships) observed across a variety of environments. Restrictive and repetitive patterns of behavior include repetitive movements (e.g., hand flapping, rocking), ritualized behaviors (e.g., compulsions for maintaining uninterrupted routines), fixated interests (e.g., hyper-focus on areas of fascination), and hyporeactivity or hypereactivity to sensory input. To be diagnosed with ASD, the criteria for both deficit

areas must be apparent in the individual's behavioral history and/or on the date of the examination by a neurologist (American Psychological Association, 2013; Autism Speaks, 2015). These symptoms may cause persons with ASD to exhibit a multitude of challenging behaviors that they themselves and their caregivers have difficulty managing.

Underlying deficits in social communication and social interactions are deficits in social cognition. According to Moscovitz (2005), social cognition is defined as “mental processes involved in perceiving, attending to, remembering, thinking about, and making sense of the people in our social world” (p. 3). Persons with ASD demonstrate reduced social cognition, as evidenced by weaknesses in social communication and social interaction. Ultimately, social cognition enables people to acquire communicative behaviors from direct and indirect learning experiences. Every communicative behavior that will be described throughout this report derives from social cognition.

1.1.1 Attention to Social Stimuli

Atypical attention to social stimuli may compound the deficit areas of ASD, which may make it difficult for persons with ASD to communicate, interact, and alter their behaviors to meet their environmental demands. Attention to social stimuli is necessary for learning and interacting. When people diagnosed with ASD exhibit deficits in social communication and social interactions, it may be a byproduct of their inability to attend appropriately to relevant social stimuli. Some researchers have explored attention to social stimuli in persons with ASD. Hanley, Riby, McCormack, Carty, Coyle, Crozier, Robinson, and McPhillips (2014) suspected that individuals diagnosed with ASD experience difficulty processing social stimuli because of their increased attention to other persons' body regions (often the mouth), and to background stimuli and objects.

Hanley, McPhillips, Mulhern, and Riby (2012) presented participants with ASD images of faces in isolation and within a social scene. Participants exhibited typical attention to the eyes when viewing the faces in isolation. When the same faces were viewed within a social scene, the participants with ASD exhibited reduced attention to the eyes. These results suggested that the participants were not attending appropriately to the images of eyes when there were other social stimuli to regard. Hanley et al. (2014) and Hanley et al. (2012), taken together, revealed a tendency for persons with ASD to process social stimuli differently. Dawson, Meltzoff, Osterling, Rinaldi, and Brown (1998) found that individuals with ASD oriented more frequently to nonsocial stimuli (e.g., a jack-in-the-box) than to social stimuli (e.g., their name being called). These researchers proposed that individuals with ASD endure constant competition within their attentional systems to process social stimuli instead of nonsocial stimuli.

1.1.2 Social Eye Contact

Social eye contact is held to be an indicator of social communication and interaction. Social eye contact complements attention to social stimuli, however, persons with ASD may attend to social stimuli but not gaze at the eyes of the persons within their social field. In a study conducted by Hanley et al. (2012), children with ASD who presented with nonverbal social communication skills tended to direct their gaze toward peoples' mouths more so than to any other facial region. Other children with ASD who presented with social interaction skills tended to direct their gaze toward peoples' eyes more so than to any other facial region. These findings suggest that children with ASD rely on different facial regions (the mouth verses the eyes) to process social stimuli during interactions. All children with ASD do not process social stimuli the same way.

Nadig, Lee, Singh, Bosshart, and Ozonoff (2010) explored social eye contact from a functional standpoint as it occurs within conversation. Nadig et al. (2010) documented that persons with ASD exhibited more facial gaze time when discussing a topic of interest as opposed to when discussing a general topic of conversation. Therefore, the level of interest may influence whether persons with ASD exhibit typical gaze directed toward peoples' eyes or atypical eye gaze directed elsewhere.

1.2 Social Communication Skills and Interventions

Interventions that target social communication skills vary in their goals and techniques. Given the challenges that people with ASD experience when processing social stimuli, interventions for ASD specifically address teaching people with ASD how to regard and use social stimuli. There are differences in target skills (ASHA, 1993/2007; McGee, Feldman, & Morrier, 1997). Procedures for implementing therapy techniques can vary. For example, some programs teach social communication skills in isolation, but other programs teach social communication skills across contexts (Winner & Crooke, 2009). Some approaches use parents, peers, and/or siblings as social models. Professionals choose their approaches depending upon the age of the persons with ASD being treated. Interventions for preschool children with ASD often target prelinguistic skills in context in a linear progression, in order to build a foundation that follows typical development (Cornew, Dobkins, Akshoomoff, McCleery, & Carver, 2012; Kaale, Fagerland, Martinsen, & Smith, 2014). Interventions for school-age children with ASD may target linguistic skills in context in a functional progression, in order to increase their independence so that it is comparable to their stage of development (Casenhiser, Shanker, & Stieben, 2011; Raghavendra, Olsson, Sampson, McInerney, & Connell,

2012). The programs that may focus on teaching skills in isolation seek various means to help children with ASD generalize these skills across contexts (Winner & Crooke, 2009). Professionals utilize parent models, peer models, and sibling models to teach skills to people with ASD, with the hope that generalization will occur more easily across environments and across various social groups (Radley, Jenson, Clark, & O'Neill, 2014).

Social communication skills are challenging to teach to persons with ASD because true conversation is unstructured. Conversation builds from person to person in an exchange of verbal and nonverbal communicative messages. To interact socially and maintain a fluid conversational exchange, persons must actively adapt to the communicative messages (Hanley et al., 2014). A person utilizes automatic social cognitive processing of mental states and feelings to bring about conversational fluency (Hanley et al., 2014). Persons use these social cognition skills to change between the roles of listener and speaker. It is difficult to facilitate social intuition and social fluidity in persons with ASD.

Various interventions teach social communication skills to persons with ASD. The Developmental Social Pragmatic (DSP) approach is one method that teaches social communication skills to persons with ASD by using a developmental progression to guide target skills (Casenhiser et al., 2011). The DSP approach emphasizes communicative purposes over behavioral acts (Casenhiser et al., 2011). Professionals accustomed to the DSP approach reinforce children's communicative purposes in order to facilitate children's interactions across contexts. For example, language can serve the purpose of a greeting, maintaining a topic of conversation, or posing a question to gather

information. Children are taught to use the words they need to attain a communicative purpose.

The DSP approach is similar to the Hanen Method and the Preschool Autism Communication Trail (PACT) (Casenhiser et al., 2011). Both build upon attention to social stimuli and on observing and imitating social behaviors. The Hanen Method and the PACT require children to attain the attention and imitation skills that allow observational learning to occur. Observational learning involves the indirect act of acquiring skills by watching others and mimicking what is witnessed. Typically developing children (“TDCs”; henceforth referred to as TDCs in the plural form or “TDC” for a singular typically developing child) acquire social communication skills most commonly through observational learning (Cherry, 2015; Tampoepau & Reese, 2014). Observational learning requires attention to social stimuli as well as the ability to imitate (Cherry, 2015). Therefore, children must be able to attend to social stimuli and to then imitate the skills observed (Cherry, 2015). Some strategies that the Hanen Method and the PACT employ include 1) the adult joins the child’s focus of interest; 2) the adult arranges the environment to encourage initiations from the child; 3) a child’s communicative attempts are responded to as if they are purposeful; and 4) emotional expression and affect sharing are emphasized (Casenhiser et al., 2011). With both the Hanen Method and the PACT adhering to the DSP approach, children learn the purposes of their behavioral acts and pair the appropriate words to their actions.

Even though there is an assortment of interventions for professionals to choose from, researchers continue to explore additional avenues that may facilitate skill acquisition for persons with ASD across all settings. Persons with ASD encounter

difficulty generalizing learned skills across environments and people (Radley et al., 2014). Mastering skills within structured therapy, school, or home settings is noteworthy; however, application to real-life situations is necessary for independence and function (Radley et al., 2014). Two components that influence generalization are learning environments and teachers. Knott et al. (2007, p. 1994), cited Rogers (2000) who stated, “Interventions grounded firmly in existing interactions will therefore enhance naturally occurring patterns of interactions.” There is substantial research and clinical basis for endorsing that natural circumstances are effective contexts for teaching social communication skills to persons with ASD.

1.2.1 Learning Through Parents and Peers

Professionals facilitate parent-mediated and peer-mediated interventions for individuals diagnosed with ASD (Radley et al., 2014). Training parents encourages them to promote skill application within their home environments and during family outings. Training peers encourages them to serve as models across academic settings and during play activities. Increasing opportunities for individuals with ASD to practice skills across environments and with many different people may inspire the likelihood that generalization across social contexts would occur (Murdock, Cost, & Tiesco, 2007; Murphy, Faulkner, & Farley, 2014; Radley et al., 2014).

Parents and peers tend to be adequate models of typical social development because of their often continuous presence in the lives of their children. Parents exert guidance and instruction naturally, with stronger influences at different stages of their children’s lives. The first relationship a child establishes is one with his or her mother and/or father. Parent-child relationships strengthen when parents respond to their

children's communicative attempts that convey their basic needs and emotions (ASHA, 1993/2007). Often, parents learn to interpret their children's unique behaviors in ways that may be unclear to other people (Krammer & Kowal, 2005). Parents are known to adapt their language to meet the needs of their children and ensure the children's comprehension (Raghavendra et al., 2012). Children therefore, have to do little to self-mediate their learning, because parents are often very explicit teachers.

By the middle elementary years and on into adolescence, TDCs spend more time away from their parents to be with their peers. Peers are described as people of the same grade and/or in the same classroom (Gordon Pershey, 2001; Gordon Pershey & Visoky, 2000, 2002, 2003). Peers are present during school and extracurricular activities, which creates frequent opportunities for socialization to occur between children. Peer interactions require advanced interpersonal skills for both communicative partners in order to effectively change between the listener and the speaker (Guralnick & Groom, 1985, 1987, 1988; Krammer & Kowal, 2005). Some authors reported that peers are less likely to modify their language to facilitate their peers' understanding than parents are (Cutting & Dunn, 2006; Krammer & Kowal, 2005). Peers generally seek play and friendship with other children rather than teaching or guiding them (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Gordon Pershey, 2001; Gordon Pershey & Visoky, 2000, 2002, 2003; Visoky & Poe, 2000). This suggests that children who learn from peers are actually employing a certain amount of self-mediated learning because the children are not receiving direct teaching from their peers.

Parent-mediated and peer-mediated interventions are designed to build social communication skills in children with ASD, with the hope that the learned skills will

resurface when children are confronted with future occasions of similar circumstances. Studies showed that parent-mediated and peer-mediated interventions have both yielded mixed results. This suggests the need for further investigation of parent-mediated and peer-mediated interventions to determine the variables attributed to successful outcomes (Jones & Schwartz, 2004). It is important to continue this exploration because of the unavoidable demands that social systems (e.g., parents, peers, and siblings) place on persons with ASD, regardless of the desire or ability to participate that the person with ASD may have.

Jones and Schwartz (2004) compared the effectiveness of adult models, peer models, and sibling models by analyzing how three preschool children with ASD responded to the models. These researchers found that four characteristics cultivated the children's observational learning: 1) a child's attention to the model; 2) the model's competency; 3) the nature of the relationship of the child to the model; and 4) the length of the relationship of the child and the model (Jones & Schwartz, 2004). Results from this study did not show which model (adult, peer, or sibling) was most effective in teaching skills. Jones and Schwartz (2004), however, found that children with ASD responded correctly most often when observing a peer model or a sibling model. This study confirmed the importance of attention to social stimuli and imitation skills in order for a child to acquire skills from observing a model.

1.2.2 Learning Through Siblings

According to McHale, Updegraff, and Whiteman (2012), sibling influences are comparably stronger than parental influences and potentially just as strong as peer influences. Siblings experience life alongside one another and provide friendship and

support. Siblings generally remain in frequent contact with each other throughout their development. They bond from experiences that are distinct to siblings. Parents socialize siblings to love one another by settling quarrels, sometimes with consequences.

The four characteristics that cultivate observational learning, as proposed by Jones and Schwartz (2004) and summarized earlier in this chapter, can be easily applied to siblings. The third characteristic of an adequate model, that being the nature of the relationship of the child to the model, is descriptive of siblings because of their genetics and close bond. The fourth characteristic, the length of the relationship of the child and the model, is also descriptive of siblings because of their lifelong relationship (Jones & Schwartz, 2004). Two characteristics proposed by Jones and Schwartz (2004) cannot be guaranteed to be descriptors of siblings when one child has ASD. The first characteristic, a child's attention to the model, is uncertain because of the challenges that manifest in ASD, such as limited attention to social stimuli and social eye contact. The second characteristic, a child's interpretive competency, is also unsure because of the individualized complexities that are associated with each case of ASD. While considering these four characteristics proposed by Jones and Schwartz (2004), it is important to note that past literature has found that TDC siblings are effective in teaching positive behavior (Grindle, Kovshoff, Hastings, & Remington, 2009), and social communication skills and play skills (Tsao, Davenport, & Schmiede, 2012) to their siblings with ASD ("SibAs"; henceforth referred to as SibAs in the plural form or "SibA" for a singular sibling with ASD). There is a need for additional evidence to support the past findings about the effectiveness of siblings in teaching skills and modeling skills to their SibAs.

1.3 The Purpose and Significance of the Present Study

A review of the past literature revealed that many researchers who explored how TDCs influence their SibAs obtained their data from small sample sizes (Baker, 2000; Jones & Schwartz, 2004; Oppenheim-Leaf, Leaf, Dozier, Sheldon, & Sherman, 2012). In addition, past researchers recommended continued exploration of the TDCs' ages, genders, feelings toward their SibAs (Pilowsky, Yirmiya, Doppelt, Gross-Tsur, & Shalev, 2004), and understanding of ASD (Baker, 2000; Orsmond & Seltzer, 2007; Sage & Jegatheesan, 2010). Similarly, researchers recommended continued exploration of the SibAs' ages, the impact of their challenging behaviors on their sibling relationships, and their willingness to interact with their TDCs (Baker, 2000; Orsmond & Seltzer, 2007; Sage & Jegatheesan, 2010). To expand upon the literature to date, more information about sibling dyads where one child has ASD is necessary to appreciate the value of TDCs. This in turn lays the foundation for sibling-mediated interventions and offers a rationale for its benefits. New explorations in these areas may provide support for past findings about sibling relationships, specifically about whether there are explicit benefits derived from sibling-mediated interventions.

1.3.1 Rationale for the Present Study

Multiple considerations contributed to the rationale for the present study. First, each person with ASD is unique and requires individualized interventions. Parents and siblings are the persons closest to children with ASD, and studies of TDCs' awareness of and knowledge about ASD are crucial to helping families provide successful learning environments at home. Second, successful learning environments for children with ASD may help them learn to attend to social stimuli and acquire functional social communication skills. Sibling relationships provide opportunities for observational

learning. There needs to be further exploration of the ways that sibling dyads naturally interact. Sibling dyad research could describe the ways that observational learning for children with ASD naturally occurs. Third, studies of sibling dyads may suggest strategies for how parents and professionals could teach TDCs how to engage with their SibAs. Educating TDCs could reconcile some of the misconceptions, frustrations, jealousy, or hurt that some TDCs feel.

This study aims to document communicative behaviors exhibited by a sample of TDCs and their SibAs during common household interactions within one 45-minute home observation. The research to date provided the framework for this study of how sibling dyads interact and behave. Past research included parent-mediated interventions (Franco, Davis, & Davis, 2013; Ingersoll & Wainer, 2013; Radley et al., 2014), peer-mediated interventions (Gordon Pershey, 2001; Gordon Pershey & Visoky, 2000, 2002, 2003; Visoky & Poe, 2000), sibling-mediated interventions (Bass & Mulick, 2007; Toth, Dawson, Meltzoff, Greenson, & Fein, 2007), early intervention (Diener, Anderson, Wright, & Dunn, 2014; Kaale et al., 2014), and observational studies (Cornew et al., 2012; Van der Paelt, Warreyn, & Roeyers, 2014). Meyers' and Vipond's (2005) discussion of bi-directional interactions during play inspired this researcher to document the TDCs' and the SibAs' communicative behaviors. Documentation of communicative behaviors of both the TDCs and the SibAs can reflect the reciprocity commonly seen in social interactions. In addition, the communicative behaviors exhibited by only the TDCs can reflect the teaching and the reinforcement behaviors employed in sibling-mediated interventions. The communicative behaviors exhibited by only the SibAs can reflect the

behaviors that permit observational learning to occur or can illustrate the challenges that inhibit learning.

Another aim of this study is to obtain supplemental information from the TDCs and the parents through semi-structured interviews (“Semi-structured interview,” 2008). Semi-structured interviews with the TDCs will offer information about TDCs’ perceptions, behaviors, and knowledge about ASD (Baker, 2000). Semi-structured interviews with the parents will reveal the parents’ perceptions of their TDCs’ understanding of ASD, and will help describe their children’s relationship.

1.4 Research Questions

Data collection will ultimately answer the following research questions:

- 1) What communicative behaviors are observed to occur between TDCs and SibAs in their home settings?
- 2) Within the context of semi-structured interviews, how do TDCs describe their interactions with their SibAs?
- 3) Within the context of semi-structured interviews, how do parents describe the relationship of their TDC and their child with ASD?

CHAPTER II

LITERATURE REVIEW

The purpose of this chapter is to review the past literature that is pertinent to the present study. The topics that will be addressed in this literature review pertain to social and communicative skill development in children with ASD, sibling dyads where one child is atypical, parent perceptions of ASD, parent-mediated interventions for children with ASD, sibling-mediated interventions for children with ASD, and methods of past studies.

2.1 Social and Communicative Skill Development in Children With ASD

Observational learning is critical for the development of social and communicative behaviors. Persons diagnosed with ASD by definition have weaknesses in social communication and social interaction (American Psychological Association, 2013; Autism Speaks, 2015). Therefore, it comes as little surprise that Kaale et al. (2014) reported that children with ASD demonstrated joint engagement less often than TDCs. Joint attention is defined as two persons sharing focus on an object or event. Joint engagement is the duration for which attention to an event or social interaction is sustained. TDCs acquire language because their joint attention and joint engagement are optimal (Kaale et al., 2014), which increases the likelihood for observational learning to

occur. Joint attention and joint engagement are pivotal skills for increasing the rate of language acquisition and social skill enhancement of children with ASD (Kaale et al., 2014).

Social and communicative skill development is predicated upon direct and indirect learning from models. Baranek, Watson, Boyd, Poe, David, and McGuire (2013) proposed that children with ASD of a younger mental age rely more heavily on reflexive attentional processes (e.g., orienting their attention toward an unexpected stimulus) rather than observational learning (e.g., orienting their attention toward a social stimulus). As children with ASD mature, Baranek et al. (2013) concluded that reflexive attentional processes diminish and volitional mechanisms emerge. Children with ASD with young mental ages may not have adequate control over orienting their attentional processes to acquire social skills from models.

Observational learning is natural for TDCs who are capable of watching parents, siblings, and peers interact. TDCs are able to mimic observed behaviors witnessed during communicative interactions. Children with ASD need to build observational learning skills (e.g., attention to social stimuli and imitation of communicative behaviors). A diagnosis of ASD would be likely to suggest that these may be areas of need and may underlie deficits in social communication and social interaction. Learning through observation and imitation of parents, peers, and siblings, are essential for successful implementation of interventions such as the DSP approach, the Hanen Method, and the PACT.

A longitudinal study conducted by Geggel (2014) offered developmental trajectories for 106 children with ASD. A substantial number of children (58 participants) began the study with the lowest language skills and only progressed to skills similar to those of 2-year-olds when they reached age 19. Other children in this study were given labels of 1) late delay, 2) partial catch-up, and 3) near typical. The children classified as “late delay” began the study with near typical skills, followed by a slow progression of skill growth, and ended the study with skills similar to 8-year-olds when they reached age 19. The children classified as “partial catch-up” began the study with poor skills, exhibited a rapid growth at age 6, and ended the study with near typical skills by age 19. The children classified as “near typical” began the study with similar skills as TDCs, exhibited increased growth until age 3, continued to mature, and ended the study with diminished ASD symptoms at the age of 19. It would appear from these developmental trajectories that better outcomes occur in children who learn the joint attention, joint engagement, and observational learning skills necessary for social and communicative skill enhancement.

2.2 Sibling Dyads and the Development of Communicative Behaviors

A sibling is like no other companion. Siblings share genetics. Siblings are instilled with the same familial values and beliefs. Siblings go through life experiences together (Orsmond & Seltzer, 2007). Siblings offer one another friendship and support (Sage & Jegatheesan, 2010). These components make sibling relationships irreplaceable. Green (2013) stated that sibling relationships are the longest lasting relationships humans ever establish. Siblings are often present during childhood, adolescence, and adulthood. This

provides for extensive time spent with one another, making observational learning and imitation almost inevitable.

Dunn and Kendrick (1979) found that younger TDCs, age 14 months, imitated older siblings more frequently than older TDCs imitated their younger siblings. Dunn and Kendrick's (1979) findings suggested potential for observational learning to begin at a young age. Their results proposed that younger TDCs are more likely to learn from older TDCs because of the frequent opportunities for imitation of behaviors.

Another way that TDCs acquire skills is by learning through social interactions (Knott, Lewis, & Williams, 2007). Observations by Knott et al. (2007) revealed that older TDCs initiated social interactions with their younger siblings more often than younger siblings initiated social interactions with their older siblings. Other reports described how siblings offered positive and negative social interactions that resulted in acquisition of distinct skills. For instance, positive social interactions facilitated skills in turn taking, humor, and role-playing (ASHA, 1993/2007). On the other hand, negative social interactions, such as conflict, promoted skills in negotiation, problem solving, persuasion, and empathy (McHale et al., 2012; Kramer & Kowal, 2005). Sibling dyads where both children are typical provide a frame of reference for exploration of observational learning in sibling dyads where one child is atypical.

2.3 Sibling Dyads Where One Child is Atypical

Exploring sibling dyads where one child is atypical is common to the special education literature. Past literature described sibling dyads composed of TDCs and siblings with developmental disabilities (SibDDs). These studies offered information that may be comparable to sibling dyads composed of TDCs and SibAs. Developmental

disabilities (DD) are defined as a group of conditions resulting in physical, learning, language, and/or behavior impairment (Centers for Disease Control and Prevention, 2015b). The label DD is inclusive of Down syndrome, intellectual disability, cerebral palsy, communication disorders, hearing impairments, language impairments, orthopedic impairments, learning disabilities, vision impairments, and emotional disturbances (Meyers & Vipond, 2005). ASD is not included in the DD label. ASD is classified as a separate entity, as described in Chapter I.

Sibling dyads where one child is atypical present differently than sibling dyads where both children are typical. There are more supports needed for sibling dyads where one child is atypical and has deficits in social cognition skills. Despite deficits in social cognition skills, sibling dyads still share genetics, are instilled with family values and beliefs, spend time together, and experience life together in ways that are similar to sibling dyads where both children are typical.

In a study conducted by Knott, Lewis, and Williams (1995), SibAs verbally initiated social interactions with their TDC siblings more often than they verbally initiated social interactions with their parents (Meyers & Vipond, 2005). This study showed that children with ASD may be motivated to interact with their siblings more so than with their parents. In another study, Tsao et al. (2012) stated that SibAs benefited from observing typical social interactions. This implied that children with ASD may not have to directly participate in social interactions to reap the benefits. Both of these studies imply that skill acquisition for SibAs is accomplished by interaction with their siblings and by observational learning. The following paragraphs discuss role symmetry within sibling dyads where one child is atypical, the effects of the ages of TDCs, the effects of

the gender of TDCs, TDCs' feelings toward their SibAs, play within sibling dyads where one child is atypical, and TDCs' knowledge about ASD. All are considerations that influence skill acquisition by SibAs in sibling dyads with TDC siblings.

2.3.1 Role Symmetry Within Sibling Dyads Where One Child is Atypical

The first consideration is role symmetry within sibling dyads where one child is atypical. Role symmetry is described as an equal distribution of communicative responsibility among persons involved in a social interaction (Meyers & Vipond, 2005). To have equal distribution of communicative responsibility, both children should maintain, initiate, and respond throughout the social interaction (Meyers & Vipond, 2005). When one child assumes greater communicative responsibilities, the social interaction becomes asymmetrical. Asymmetry is the opposite of symmetry. This means there could be unequal communicative exchanges where one child appears more submissive than the other child does. Knott et al. (2007) found that sibling dyads composed of TDCs and SibAs exhibited role asymmetry. Across development, regardless of age, TDCs exhibited assertive communicative responsibilities when engaging with their SibAs (Knott et al., 2007; Meyers & Vipond, 2005) or SibDDs (Meyers & Vipond, 2005). A study conducted by Stoneman, Brody, Davis, and Crapps (1989) discovered that as TDCs matured, they exhibited more teaching roles toward their SibDDs than were seen in sibling dyads where both children were typical (Meyers & Vipond, 2005).

Role symmetry is critical for skill acquisition. Role symmetry requires children to alternate between the speaker and the listener. Meyers and Vipond (2005) recommend several strategies for caregivers to reduce role asymmetry and to promote role symmetry within sibling dyads where one child is atypical. These strategies include 1) having the

TDC wait for the SibA to respond, 2) having the TDC provide encouragement and positive feedback to the SibA, 3) encouraging turn taking, and 4) ensuring equal involvement throughout activities.

2.3.2 Age of TDCs

The second consideration is the age of the TDCs. Past literature offered mixed results regarding the influences of TDC siblings who are younger or who are older than their SibAs. Brewton, Nowell, Lasala, and Goin-Kochel (2012) explored the influence of younger TDCs. Meyers and Vipond (2005) investigated older TDCs teaching skills to their siblings who are developing atypically (SibAs or SibDDs). Stoneman, Brody, Davis, and Crapps (1987) found that all TDCs, regardless of birth order, were able to select games appropriate for their SibDDs' skill levels. Discrepancies across the literature leaves it as yet unknown whether age significantly affects SibAs' or SibDDs' ability to learn from their TDCs. Age is further discussed in the following paragraphs with regards to relationship quality, younger TDCs, and older TDCs.

2.3.2.A Relationship quality. Relationship quality may be influenced by the age of the TDCs and their SibAs or SibDDs. Relationship quality is similar to intimacy in that quality represents the bond between the two children. A strong relationship quality conveys a mutual understanding between the children that leads to reciprocal benefits. A weak relationship quality conveys a lack of mutual understanding between the children that does not lead to reciprocal benefits. Literature cited by Meyers and Vipond (2005) identified higher levels of intimacy expressed by TDCs toward their sibling who is atypical but who has stronger social cognition skills (El-Ghoroury & Romanczyk, 1999; Hoffman-Williamson, 1984; Stoneman et al., 1987, 1989). Dallas, Stevenson, and

McGurk (1993a, 1993b) documented instances of weaker relationship quality in sibling dyads where one child is atypical that stemmed from the children's high levels of frustration and reduced play equality. The children with special needs often resorted to solitary play away from the TDC. Additionally, Meyers and Vipond (2005) reviewed literature (Asione, Summers, & Summers, 1988; Dallas et al., 1993; Stoneman et al., 1989) that stated that sibling dyads where one child is atypical take longer to establish relationship quality. However, imitative and antagonistic communicative behaviors, such as physical aggression, object struggle, commanding, threatening, and teasing, remained consistent even as their relationship quality developed (Ascione et al., 1988). These studies suggest questions about possible barriers that inhibit sibling dyads where one child is atypical from developing relationship quality at the same rate as sibling dyads where both children are typical.

2.3.2.B Younger TDCs. Younger TDCs can offer positive benefits to SibAs for learning and social interaction. Younger TDCs may exhibit social cognition skills similar to those that SibAs exhibit. Meyers and Vipond (2005) concluded that younger TDCs could not teach new skills when they exhibited similar skills to their SibDDs. Instead of younger TDCs modeling new skills for SibDD to attain, they often reinforced the present level of skill exhibited by the SibDDs (Abramovitch, Stanhope, Pepler, & Corter, 1987; Dallas et al., 1993a, 1993b). Contrary to Meyers and Vipond (2005), a study conducted by Brewton et al. (2012) found that children with ASD were more likely to acquire social skills from younger TDCs than from older TDCs. This outcome prompts questions about how the SibAs participate in joint activity and how they pay attention to the younger TDCs' communicative behaviors. There may also be questions about the SibAs'

motivation to engage with their siblings. Although the younger TDCs may not exhibit social communication skill competency equal to that of older TDCs, SibAs may be intrigued by their younger TDCs' communicative behaviors and play style. If this is the case, there is potential for observational learning to occur when younger TDCs model skills.

2.3.2.C Older TDCs. Older TDCs can offer positive benefits to SibAs for learning social interaction skills. Meyers and Vipond (2005) argued that the older TDCs that they studied were more effective because they modeled higher-level skills and promoted structure within social interactions (McGillicuddy-De Lisi, 1993). Older TDCs offered corrective feedback and exhibited the persistence and attention to teach appropriate social skills. Meyers and Vipond (2005) reported past literature stating that older TDCs interpreted and responded to the behavioral cues exhibited by their younger SibDDs, whereas younger TDCs did not (Caro & Derevensky, 1997). Meyers and Vipond (2005) attributed such successes to the maturity and knowledge of the SibDDs. Even though it appears that more evidence supports that there is substantial guidance offered by the older TDCs, there is still reason to believe that younger TDCs could be effective in eliciting observational learning from their SibAs.

2.3.3 Gender of TDCs

The third consideration is the gender of the TDCs. The research regarding gender yields clearer distinctions than the research on age. Brewton et al. (2012) discovered that the TDC females were more effective than the TDC males were in teaching skills to their younger SibDDs. Orsmond and Seltzer (2007) found that the TDC females established strong bonds with their siblings regardless of their gender and developmental abilities.

Results also showed that the TDC males were greatly influenced by the gender of their SibDD. The TDC males exhibited greater levels of intimacy when their SibDD was male than when their SibDD was female.

Meyers and Vipond (2005) referenced a study by Lobato, Miller, Barbour, Hall, & Pezzullo (1991) that documented greater occurrences of social interactions between the TDC females and their SibAs than between the TDC males and their SibAs. Greater social interactions with the TDC females may have been a result of the TDC females assuming a teacher role and/or caregiver role more frequently than the TDC males had (Stoneman et al., 1987). Moreover, the TDC females' and the TDC males' preferences for certain play activities may elicit play specific communicative behaviors. For instance, Meyers and Vipond (2005) cited Stoneman et al. (1987), who noted that there were gender specific activities when observing play of TDCs. Stoneman et al. (1987) found that the TDC females often selected noncompetitive games characterized by minimal to no physical movement. The TDC males often selected competitive games characterized by high levels of physical movement. Communication during these noncompetitive games and competitive games was unknown. Presumably, there are differences. Noncompetitive games may elicit greater occurrences of verbal communicative exchanges between the children, whereas competitive games may elicit greater occurrences of nonverbal communicative exchanges between the children.

2.3.4 TDCs' Feelings Toward Their SibAs

In discussing sibling relationships, it is important to discuss the TDCs' feelings toward their SibAs as the fourth consideration that affects sibling dyads where one child is atypical. Orsmond and Seltzer (2007) interviewed TDCs to collect information about

their feelings toward their SibAs. Interview questions revealed that TDCs felt positively about their SibAs and wanted to engage with them frequently. In another study conducted by Green (2013), TDCs were more likely to be well adjusted and less negative toward SibAs when they were a part of a large family comprised of other TDCs. Large families with more than one TDC provided TDCs with outlets of escape when their SibAs exhibited aggressive or disruptive behaviors. Additionally, large families provided TDCs with other TDCs who were experiencing the same circumstances as they were and they could therefore confide in one another. Orsmond and Seltzer (2007) found that TDCs felt embarrassed when their SibAs engaged in disruptive behavior. Therefore, having other TDCs present may help alleviate embarrassing situations.

Green (2013) found that TDCs expressed mixed feelings toward their SibAs. On the negative side, TDCs shared feelings of disappointment when they were unable to communicate with their SibAs. TDCs reported feelings of discomfort when their SibAs were unable to communicate thoughts and when the TDCs were unable to interpret the SibAs' communicative attempts. On the positive side, TDCs reported that growing up with their SibAs afforded them less sibling conflict, greater family resilience, increased self-perceived competence, increased flexibility, and positive psychosocial and emotional development. Green (2013) found that TDCs felt greater admiration and acceptance and showed less verbal aggression toward their SibAs than was found in sibling dyads where both children were typical.

2.3.5 Play Within Sibling Dyads Where One Child is Atypical

The fifth consideration is play within sibling dyads where one child is atypical. Play is essential for the development of social cognition skills. Early on, children require

adult facilitation to teach them the linguistic and social pragmatic skills necessary for play. Adult facilitation does not occur as often when children mature. Older children learn on their own through frequent play encounters. Vygotsky (1976), as cited by Abendroth (2008), noted that children assume identities during role-play that allow for higher-level social cognition skills not commonly seen in other contexts. Play is essentially governed by children's internal desires.

Research has explored play in sibling dyads where one child is atypical. Knott et al. (1995) found that sibling dyads composed of TDCs and SibAs, ages 2 to 12 years, spent almost 40 minutes of every hour together. This length of time is substantial for social interactions and observational learning to occur. Part of that 40-minute time may have been spent by the TDC in caregiving. In another study, Orsmond and Seltzer (2007) documented that sibling dyads where one child is atypical engaged in various play types that are common to sibling dyads composed of typical children: rough and tumble play and pretend play. The need for sensory input may influence the kinds of play engaged in by sibling dyads where one child has ASD. Knott et al. (2007) stated that SibAs exhibited prosocial communicative behaviors (e.g., sharing an object, cooperating, requesting, praising, comforting, physical affection, laughing, and smiling) and several antagonistic communicative behaviors (e.g., physical aggression, object struggle, commanding, and threatening) when engaging with their TDC brothers and TDC sisters that they did not exhibit when they played with their typical peers.

Play between children may be dependent upon initiation and response. The frequency at which SibAs respond to their TDCs can either encourage or discourage communicative interactions. Presumably, when SibAs respond to their TDCs' initiations,

the TDCs are reinforced for their efforts and will continue to initiate communicative interactions. If SibAs do not respond, the frequency at which TDCs initiate may decrease. Knott et al. (2007) observed a variety of sibling dyads comprised of TDCs and SibAs, TDCs and siblings with Down syndrome, and TDCs and SibDDs. These researchers found that the SibAs responded to approximately half of their TDCs' initiations. It is unclear whether this 50% response rate is sufficient enough to encourage the TDCs to initiate communicative interactions. Additionally, Knott et al. (2007) found that the SibAs imitated their TDCs less often and responded positively to their TDCs less often than the other sibling dyads in the study. Siblings with Down syndrome and SibDDs imitated their TDC siblings and responded to them positively with greater frequency than the SibAs responded.

2.3.6 TDCs' Knowledge About ASD

The sixth consideration that affects sibling relationships is the TDCs' knowledge about ASD. The manner in which parents teach their TDCs about ASD is unique for every family. According to Glasberg (2000), parents often overestimate how much their TDCs understand about ASD. Glasberg (2000) interviewed TDCs, ages 5 to 17 years, to discover that these TDCs viewed their SibAs from a "preoperational standpoint." A preoperational standpoint means that the TDCs thought that their SibAs could see, feel, and hear the same way as they did (McLeod, 2010). In a study conducted by Sage and Jegatheesan (2010), many of their participating TDCs were unable to explain ASD or provide characteristics of the disorder.

2.4 Parent Perceptions of ASD

Parents may have some influence over how their children perceive one another. A study conducted by Sage and Jegatheesan (2010) explored two TDCs from two different families. Their respective parents had diametrically different types of views about ASD. Interviews and observations revealed that the parents' beliefs were reflected in how the TDCs perceived their SibAs. One family reported openness, pride, and hope for future endeavors when discussing their child with ASD. This TDC displayed a warm relationship with his SibA and demonstrated reasonable knowledge about ASD. The other family reported views that included shame, embarrassment, and their ancestors' sins. This TDC explained that his SibA had a short attention span and did not listen very well.

Other reports suggested that parents' perceptions influence their decision-making in terms of selecting ASD treatment (Danesco, 1997). If parents do not receive adequate knowledge about ASD and learn about options for effective treatments from their physicians, they may resort to alternative methods that are not evidence based. Harrington, Patrick, Edwards, and Brand (2006) recommend that greater efforts should be made to educate parents about ASD at the time of their child's diagnosis.

2.5 Parent-Mediated Interventions for Children With ASD

The research on parent-mediated interventions yields mixed results. Some studies show that parents improve language, imitation, and play skills for their children with ASD, while other studies do not report that parents are as successful (Ingersoll & Wainer, 2013; Radley et al., 2014). A child's home is a natural place for learning to occur. At home, children acquire skills from observational learning as well as from participating in social interactions. The philosophy of parent-mediated interventions is that parents can

incorporate specialized teaching and therapeutic techniques into natural everyday routines (Ingersoll & Wainer, 2013). Parent-mediated interventions tend to focus more heavily on teaching their children the early developmental social communication skills. Parent-mediated interventions are often taught to parents by therapists and other trainers. Trainers teach techniques for parents to implement when teaching their children with ASD. Professionals attribute ineffective outcomes of parent-mediated interventions to a disruption between any of the multi-level transfers: trainer to parent or parent to child (Ingersoll & Wainer, 2013). Examples of parent-mediated interventions include Project ImPACT (Ingersoll & Wainer, 2013), the Hanen More Than Words Program (Ingersoll & Wainer, 2013), Milieu Teaching (Franco et al., 2013), and TEACCH (Ichikawa, Takahashi, Ando, Anme, Ishizaki, Yamaguchi, & Nakayama, 2013; Kayoko, Yoshimitsu, Masahiko, Tokie, Tatsuro, Hinako, & Takeo, 2013).

Sage and Jegatheesan (2010) cited a study conducted by Strain and Danko (1995) investigating how parent-mediated interventions can improve the play skills of their children with disabilities. Strain and Danko (1995) trained parents on a classroom-based intervention that would foster positive behaviors between their TDCs and SibAs. Parents learned to facilitate social skills by prompting their TDCs and praising both of their children for playing nicely. Results revealed that parents were successful in increasing the frequency of positive initiations and positive responses between their children when one child was typical and the other had ASD.

2.6 Sibling-Mediated Interventions for Children With ASD

Past studies investigated TDCs' involvement in their SibAs' interventions. Grindle et al. (2009) interviewed TDCs and learned that 75% of the TDCs enjoyed

participating in applied behavior analysis (ABA) programs designed to reinforce their SibAs' appropriate behaviors and reduce their SibAs' maladaptive behaviors (Cebula, 2012). TDCs expressed fascination about ASD and appeared interested in learning how to interact with their SibAs. Most of the TDCs reported that they wanted to learn more about ASD.

Baker (2000) explored the frequency of social interactions between three sibling dyads comprised of one older TDC sister and one younger SibA. The aim of this study was to determine whether modified children's games (e.g., Bingo, Barnyard Bingo, Milk & Cookies, Tic-Tac-Tony, and Don't Wake Daddy) that incorporated the SibAs' repetitive behaviors and fixations could increase the amount of time that SibAs spend socializing with their TDC sisters. Results revealed that all three of the SibAs increased their frequencies of social interactions when playing the modified games with their TDC sisters. The higher frequencies of social interactions continued to be demonstrated by the three SibAs in the study's maintenance and follow-up phases. TDC sisters answered pre- and post interview questions to obtain information about their perceptions of their SibAs and the behaviors of their SibAs in relation to play. Baker (2000, p. 81) concluded that "perceptions and/or attitudes toward the child's disability may be a determinant of sibling interaction." Furthermore, Baker suggested that future studies should explore a variety of sibling pairs, as opposed to this study, which solely included older TDC sisters.

Oppenheim-Leaf et al. (2012) investigated how effective three TDCs were in promoting social play with their SibAs. Researchers taught the TDCs how to share, how to provide play instructions to their SibAs, and how to choose an engaging activity that was complementary with their SibAs' interests and skills. The three TDCs were trained

across levels. The levels began with role-playing with an assistant, then generalizing skills with their SibAs, and ending with free-play with their SibAs. To ensure that all of the TDCs understood their roles as facilitators, researchers trained the TDCs by using a highly motivating systematic procedure. Throughout the course of training, adults offered the TDCs visual, verbal, and tangible reinforcements (stickers) to motivate them to continue. Data collected during the generalization phase conveyed that all three of the TDCs mastered and maintained the facilitative strategies. TDCs were effective in increasing their SibAs' positive social behaviors.

Castorina and Negri (2011) conducted a pilot study to explore whether TDCs could improve the skills of their brothers with Asperger syndrome that had been previously learned in a social group. There were 21 TDC brothers, ages 8.42 to 11.92, who attended the social group with their brothers who had Asperger syndrome. The boys with Asperger syndrome were the active members of the social group and were learning social skills. The TDC brothers also participated as equals in the social group. The 21 TDC brothers were not trained in any particular strategies other than what their brothers with Asperger syndrome were taught. For homework, the TDC brothers were to reinforce and practice skills that were learned for that day with their brothers who had Asperger syndrome. Results showed that the boys with Asperger syndrome who had TDC brothers attend the social group along with them did not maintain or generalize skills more than the boys with Asperger syndrome who did not have a TDC brother attend the social group with them. This finding suggests that TDCs may need proper training to increase their effectiveness in improving their SibAs' skills, rather than mere group participation.

Ferraioli, Hansford, and Harris (2012) analyzed two research vignettes that described treatment plans for sibling-mediated interventions that taught social communication skills and play skills to SibAs. The first research vignette, by Ferraioli and Harris (2009), taught TDCs ages 6 to 8 years old how to increase their SibAs' joint attention. Joint attention was defined as:

alternating attention and demonstrating interest [by] responding to putting the child's hand on a toy, responding to tapping a toy, responding to showing a toy, establishing eye contact, following a distal point, following a gaze shift, initiating a gaze shift, and protodeclarative pointing. (Ferraioli & Harris, 2009, p. 415)

Similar to previous studies, these TDCs taught skills to their SibAs by using highly motivating toys. The TDCs were taught to prompt and to shape their SibAs' target behaviors. Results showed that the TDCs were effective in teaching eight of the targeted skills within a three-month span to their SibAs. Posttreatment probes evidenced carryover, where the SibAs exhibited greater frequencies of response to and initiation of joint attention.

Ferraioli et al. (2012) described a second research vignette that was conducted by Ceilberti and Harris (1993). Ceiberti and Harris (1993) trained TDCs in several behavioral techniques to improve the quality and quantity of their social interactions with their SibAs. The behavioral techniques that the TDCs implemented were elicitation of play and play-related language, reinforcement of appropriate responses, and successful prompting to overcome incorrect or noncompliant responses. When training these TDCs in the behavioral techniques, the researchers introduced one technique at a time to the TDCs. After a technique was mastered by the TDCs, the researchers would introduce another behavioral technique, while continuing to reinforce the mastered behavioral technique. Posttreatment measures revealed that the TDCs and the parents reported

greater comfort with the TDCs' and the SibAs' play. In addition, the TDCs reported that their SibAs exhibited a greater willingness to play.

From these two research vignettes, Ferraioli et al. (2012) offered recommendations to increase the likelihood of successful sibling-mediated interventions. First and foremost, Ferraioli et al. (2012) emphasized the importance of ASD education. Before initiating sibling-mediated interventions, TDCs must understand ASD, have an awareness of its manifestations, understand the behaviors that may arise, and have a sense of their role in therapy. Knowledge about ASD and their role in therapy enables the TDCs to use the strategies more persistently and to be more alert for potential teaching opportunities. The second recommendation that Ferraioli et al. (2012) offered was to teach and reinforce skills during naturalistic play settings. This reduces the demands placed on the TDCs and increases the likelihood of SibAs' success. It is imperative that the TDCs and the SibAs receive periodic breaks from implementing strategies. Implementing strategies constantly could easily result in both of the children being exhausted. The third recommendation is establishing a tangible reward system for the TDCs to reinforce their hard work. Sibling-mediated interventions require commitment from all of those involved. However, when the bulk of the responsibilities fall upon the TDCs, it is crucial that the TDCs maintain high spirits and are motivated to work with their SibAs.

2.7 Methods of Past Studies

Studies of sibling dyads have utilized qualitative research methods in order to obtain observational data. Lincoln and Guba (1985) and Malterud (2001) offered directions for qualitative inquiry. These recommendations require each study to develop

its rationale and keep an audit trail of all data that is collected. The present study borrowed procedures from past literature to develop qualitative methods that would allow the researcher to collect and analyze data gathered from home observations and semi-structured interviews. For the home observations, the researcher developed a list of communicative behaviors that could be exhibited by the TDCs and the SibAs. Communicative behaviors that were suggested by past studies include initiation (Malesa, Foss-Feig, Yoder, Warren, Walden, & Stone, 2012; Oppenheim-Leaf et al., 2012), response (Malesa et al., 2012), SibAs orienting to their TDCs (Baranek et al., 2013), imitation (Van der Paelt et al., 2014), eye contact (Van der Paelt et al., 2014), and pointing (Van der Paelt et al., 2014). Other communicative behaviors evolved from Bass and Mulick (2007, p. 733), who referenced a study conducted by Strain (1987). In this study, dyadic interactions were assessed by 10 behaviors: play organizer (e.g., “verbalizations that specify an activity, role, or other play”), share, assistance, assistance request, complimentary statement, affection, negative motor gestural, negative vocal verbal, initiation, and response. Similar interactive behaviors were observed by Gordon Pershey (2001) and Gordon Pershey and Visoky (2000, 2002, 2003) in a study of preschool peer models.

Knott et al. (2007) compared sibling dyads comprised of TDCs and SibAs verses TDCs and siblings with Down syndrome. Their observations of free play within the children’s homes provided the researcher with additional communicative behaviors. Knott et al. (2007, p. 1990) classified 12 prosocial behaviors, 10 antagonistic behaviors, 6 responses, and 1 imitation behavior that were exhibited by the sibling dyads. The 12 prosocial behaviors included “give or share an object, cooperate or help, request, praise

or approval, comfort or reassurance, physical affection, laugh and smile, approach, rough and tumble, clowning, establishing rules and establishing roles.” The 10 antagonistic behaviors were “physical aggression, object struggle, command, threat, command with reason, territorial claim, repeats parent’s commands, competitive statement, bribe/bargain and physical tease.” The 6 responses were described as prosocial, antagonistic, or null (Knott et al., 2007). All of these communicative behaviors and interactive behaviors form the basis for the communicative codes used in the present study to analyze the data (see Chapter III).

Questions for the TDCs’ semi-structured interviews and the parents’ semi-structured interviews evolved from past literature. For the TDCs’ semi-structured interviews, the researcher adopted the interview questions used by Baker (2000); however, the present study required minor changes to the question wording. For instance, the researcher instructed the TDCs to “Tell me...” instead of posing the question “What...” Another change the researcher made was to insert age appropriate language such as “play” when presenting questions to young TDCs (preschool age) and “hangout” when presenting questions to old TDCs (school age or teen). The researcher added four questions beyond Baker’s (2000) list, in order to obtain information about the TDCs’ knowledge about ASD. These four questions evolved from past studies that suggested that TDCs’ knowledge about ASD might influence their sibling relationships (Glasberg, 2000; Green, 2013; Grindle et al., 2009; Sage & Jegatheesan, 2010). For the parents’ semi-structured interview, the researcher generated questions based on the literature that discussed differential parenting as perceived by the TDCs (Tsao et al., 2012), parental influences regarding the etiology of ASD (Sage & Jegatheesan, 2010), and the

psychosocial effects of having a SibA (Green, 2013; Latta, Rampton, Rosemann, Peterson, Mandleco, Dyches, & Roper, 2014). Additional questions for the parents' semi-structured interview were developed with the intent to gain information about the interactions observed between the TDCs and the SibAs. Chapter III provides further details about the development of the semi-structured interview questions.

In summary, it is known that sibling-mediated interventions can be effective in teaching skills to SibAs if carried out correctly. TDCs require education about ASD and incentives to encourage them to persist in therapy when their SibAs are noncompliant, aggressive, or disruptive. TDCs are capable of learning about ASD and learning strategies that may improve their social interactions with their SibAs. It is unknown whether siblings are the most effective models for direct and indirect learning by their SibAs. There are mixed findings that suggest that certain characteristics of TDCs and of sibling dyads are more conducive to teaching skills to the SibAs. The present study will document the communicative behaviors of sibling dyads where one sibling has ASD and one sibling is a TDC. Information regarding the perspectives of the TDCs toward their SibAs and their parents' perspectives on their children's relationships will be gathered during the semi-structured interviews with the TDCs and the parents. Results will be triangulated in order to explore how these sources of data compare.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to report the methods used to conduct the present study. Upon completion of the preliminary review of the literature, the researcher developed the methods and the instruments to be used in this study. The researcher concurrently prepared a proposal for the use of human participation in research to be submitted to Cleveland State University's Institution Review Board (IRB). The IRB proposal required written consent from the clinical director of the autism center where the researcher intended to recruit participants. Consent from the clinical director of the autism center was critical for the execution of the study. Without a pool of participants, the researcher would not have children to observe and would therefore have to recruit elsewhere. The clinical director of the autism center consented to provide the researcher with email addresses and phone numbers of the parents whose children attended the center, allowed the researcher to send home an informational flyer with the children for their parents to read (Appendix A), and allowed the researcher to speak at a parent meeting. The IRB approved the thesis proposal shortly after the autism center's consent was obtained.

The following sections of this chapter explain:

- Recruitment of participants
- Procedures
- Data that will be obtained for all participants
- TDCs' semi-structured interviews
- Parents' semi-structured interviews

3.1 Recruitment of Participants

Recruitment and data collection did not begin until the IRB approved the thesis proposal. As described above, the researcher obtained written consent from the clinical director of an autism center located within a Midwestern metropolitan area to recruit participants who attended the center. Students ages 2.5 to 22 years old attend this autism center as their least restrictive educational environment. About 50 to 60 students from the surrounding communities attend this autism center. Teachers at the autism center implement applied behavior analysis (ABA) treatment and interest-based intensive instruction to teach academic and functional skills to students diagnosed with ASD or who demonstrate moderate to severe behavioral needs. The researcher previously worked at this facility as a full-time employee prior to graduate school, and then returned as a part-time or PRN (as needed) employee throughout graduate school. From working at this autism center, the researcher gained insight into how children with ASD interact with one another at school during group lessons and when at play. This led the researcher to be curious about how children with ASD interact with their siblings at home.

The researcher had prior knowledge of the students at the autism center because of her work there. The researcher offered all of the families with a child with ASD and another child (a sibling to the child with ASD) who did not have ASD equal opportunity

to participate in the study. The recruiting flyers were sent home with the students who attended the autism center who were known to their teachers to have siblings who are TDCs. The IRB required one written consent form for the parents to sign and two written assent forms, one for the TDCs to sign and one for the SibAs to sign. The consent form for the parents is titled Parent Informed Consent Form and is located in Appendix B. The assent form for the TDCs is titled TDC Assent Form and is located in Appendix C. The assent form for the SibAs is titled SibA Assent Form and is located in Appendix D.

3.1.1 Participant Selection Parameters

As a part of the IRB proposal, the researcher established participant selection parameters. Students from the autism center needed to have the diagnosis of ASD, be between the ages of 4 to 17 years old, and have a TDC sibling without the diagnosis of ASD. The TDC siblings had to be between the ages of 4 to 17 years old. The researcher excluded families as prospective participants if their child who attended the autism center did not have the diagnosis of ASD, if the family did not have a TDC, and if their children were outside of the age range of 4 to 17 years old.

The participant selection parameters evolved from clinical insight. For instance, the researcher thought that TDCs who were minors living at home with their SibAs would exhibit frequent social interactions, would have opportunities to help their SibAs acquire skills, and would be learning about acceptance of others. Recruiting TDC minors who were ages 4 to 17 seemed appropriate for providing a wide selection of children at various points in their development.

The researcher hoped to obtain a diverse sample of children representative of the national demographic of persons diagnosed with ASD. The Special Education

Elementary Longitudinal Study (SEELS) collected data in three waves starting with children who were 6 to 12 years old, and ending with children who were 10 to 17 years old (Sanford, Levine, & Blackorby, 2008). According to the SEELS, the demographic of school-age children with ASD who are Caucasian is 68% and the demographic of school-age children with ASD who are African American is 15%. At the time of the study, the autism center was primarily comprised of children who were Caucasian, at about 80% of the enrollment, and African American, at about 20% of the enrollment. Just a few Hispanic and Middle Eastern students were enrolled. The current literature states that ASD is prevalent among all races; however, non-Caucasian children tend to be diagnosed at later chronological ages as compared to Caucasian children (Burkette, Morris, Manning-Courtney, Anthony, & Shambley-Ebron, 2015).

When the recruitment flyer was sent home, two families responded. One family responded via email, and the other family responded in person when the researcher was working at the autism center. Next, 10 days later, the researcher emailed all of the families who had received a flyer to provide the first follow-up email. No families responded. Fifteen days later, the researcher emailed all of these families for a second time. Three families responded. The researcher then emailed two families who had received a flyer and who were known to the researcher to meet the selection parameters to further encourage their participation. One family responded. No other families responded, and recruitment was ceased. The respondents included five Caucasian families and one African American family. The sample obtained was about 84% Caucasian and 16% African American, which is close to the autism center's demographic and rather close to the national demographic of school-age children with ASD.

3.2 Procedures

The following sections describe the procedures of the study. The researcher's data collection procedures and planning for data analysis are described.

3.2.1 Observations, Field Notes, and Semi-Structured Interviews

The families who agreed to participate in the study permitted the researcher to conduct one home visit per family consisting of one 45-minute observation of the TDCs interacting with their SibAs while engaging in daily activities, followed by a 20-minute semi-structured interview with the TDC, and then a 25-minute semi-structured interview with the parent(s). The 45-minute home observation provided the researcher with time to obtain a snapshot of the communicative behaviors exhibited by the TDCs and the SibAs during common household interactions.

At the start of each home visit, the participants signed their consent and assent forms, and the researcher instructed the TDCs and the SibAs to engage in activities of their choosing (e.g., play, snack, a simple household chore, and/or a backyard outdoor activity) while the researcher stood nearby to observe. No audio or video recording was utilized, in order to maintain the naturalness of the environment as much as possible and to reduce any apprehension about confidentiality. The researcher documented field notes using a form titled Field Notes, which is located in Appendix E. The field notes consisted of a log that captured verbal and nonverbal communicative behaviors exhibited by the TDCs and by the SibAs for the entire 45-minutes. The form was divided into three 15-minute time intervals, in order to segment the total observation time and afford easier recording and display of field notes.

Immediately following the observations, the researcher conducted a semi-structured interview with the TDCs and then a second semi-structured interview with the parent(s). The researcher opted to interview the TDCs first, followed by the parents, so that each TDC could complete his or her final responsibility then return to his or her regular activities. The researcher also wanted to provide an opportunity during the parents' semi-structured interview for the parents to comment on the TDCs' semi-structured interview responses. The outline of the TDCs' semi-structured interview questions is titled TDC Semi-Structured Interview Questions and is located in Appendix F. The outline of the parents' semi-structured interview questions is titled Parent Semi-Structured Interview Questions and is located in Appendix G.

Before the semi-structured interview with the TDCs, the researcher asked each of the parents whether they wanted to be present for the TDC's semi-structured interview. Even if the parents chose not to be present, the researcher required them to remain within the home. The TDCs' semi-structured interviews discussed the TDCs' perceptions of their SibAs, the TDCs' behavior toward their SibAs, and the TDCs' knowledge about ASD. After the semi-structured interview with the TDCs was complete, the parents decided whether the TDCs were going to stay for the parents' semi-structured interview or could go about their usual activities. Next, the researcher conducted the second semi-structured interview with the parents. The parents' semi-structured interviews discussed their TDCs' understanding of ASD and their children's relationship. Responses to the semi-structured interview questions were written down to ensure fidelity, but verbatim transcripts of the semi-structured interviews were not written.

3.2.2 Communicative Codes

The researcher documented communicative behaviors exhibited by the TDCs and the SibAs during one 45-minute home observation. As described earlier in this description of the procedures of this study, during each home observation, the researcher prepared field notes by writing down each child's verbal and nonverbal communicative behaviors on the form found in Appendix E. The researcher then assigned communicative codes to all of the communicative behaviors documented in the field notes.

Communicative codes represented an array of subordinate categories and superordinate categories of communicative behaviors. All of the subordinate categories and all of the superordinate categories of communicative behaviors were operationally defined, in that the TDCs and the SibAs overtly demonstrated the behaviors. The communicative codes were reduced to abbreviations in the interest of speed during the field note documentation process and to save space on the data display tables. Tables 1 and 2 show the categories of communicative behaviors; however, the process of developing the categories requires lengthy explanation.

First, the researcher established the subordinate categories of communicative behaviors based on the literature reviewed and clinical insight. Often, the subordinate categories of communicative behaviors described close variations of similar communicative behaviors. For instance, rephrase (Rp), simplify steps (Ss), further explanation (Fe), verbal model (Vm) and motoric model (Mm) were all subordinate categories that described types of prompts (P). Next, the researcher grouped the subordinate categories together to form an inclusive group. Each group was given a label designating the superordinate categories of communicative behaviors. The rationale for

the superordinate categories of communicative behaviors was to provide the researcher with a more inclusive category of communicative behaviors exhibited by the TDCs and by the SibAs. To expand upon the previous example, rephrase (Rp), simplify steps (Ss), further explanation (Fe), verbal model (Vm) and motoric model (Mm) together formed the larger superordinate category of prompts (P).

3.2.2.A *A priori* coding and *a posteriori* coding. The researcher established subordinate categories and superordinate categories of communicative behaviors prior to the first home observation based on the literature reviewed and on clinical insight. All of the communicative codes could be ascribed to all of the participants. There were 52 subordinate categories of communicative behaviors (Table 1) and 20 superordinate categories of communicative behaviors (Table 2) identified prior to the data collection that are referred to as the *a priori* codes. The code identification process for the *a priori* codes was deductive because the literature and clinical insight provided a framework for deducing the communicative codes.

The researcher believed that she had established a sufficient number of communicative codes *a priori*. Yet, the researcher suspected that there would be additional communicative codes established after the home observations to code any unpredicted communicative behaviors exhibited by the TDCs and by the SibAs. Communicative codes established after the home observations are referred to as *a posteriori* codes. The code identification process for the *a posteriori* codes was to be inductive. Adding *a posteriori* codes would enable the researcher to code all of the communicative behaviors documented within each 45-minute home observation. Every

communicative code added after the home observations will be referred to as an *a posteriori* code.

During data analysis, the *a priori* and *a posteriori* codes will be ascribed to all of the participants (both the TDCs and the SibAs). Subsequent to the final home observation, the researcher will review all of the *a priori* codes to determine whether there were communicative codes not useful to the study. These *a priori* codes will be omitted altogether.

The following paragraphs describe the procedures for establishing the subordinate categories and the superordinate categories of communicative behaviors while considering that the development of communicative codes will require three steps: the *a priori* codes, the *a posteriori* codes, and then the omission of communicative codes not useful to the study. Table 1 shows the procedures for establishing *a priori* the subordinate categories of communicative behaviors. Table 2 shows the procedures for establishing *a priori* the superordinate categories of communicative behaviors.

3.2.2.B Procedures for establishing the *a priori* subordinate categories. Table 1 shows the procedures for establishing the *a priori* subordinate categories of communicative behaviors. There are three column headers. The left hand column describes the 52 subordinate categories of communicative behaviors that were established *a priori*. The middle column acts as a placeholder to show the potential for new subordinate categories to be established *a posteriori*. The right hand column acts as a placeholder to show the potential for omitted subordinate categories of communicative behaviors that were not useful to the study.

Table 1

Procedures for Establishing the A Priori Subordinate Categories of Communicative

Behaviors

Subordinate Categories Established <i>A Priori</i>	Subordinate Categories Established <i>A Posteriori</i>	Subordinate Categories Omitted
1. Pointing (Po)		
2. Sign language (Sl)		
3. Waving (W)		
4. Hugging (H)		
5. Smiling (Sm)		
6. Laughing (III)		
7. Compliments (Cc)		
8. Holding hands (Hh)		
9. Patting (Pa)		
10. Encouragement (E)		
11. Praise (Pr)		
12. Criticism (Crit)		
13. Rejection (R)		
14. Threats (Thr)		
15. Disapproval (Disa)		
16. Insults (In)		
17. Quarreling (Qu)		
18. High-five (H5)		

19. Thumbs-up (Th [^])
20. Nodding (Nod)
21. Sensory input (Sen)
22. Hitting (Hi)
23. Pinching (Pi)
24. Kicking (Ki)
25. Pushing (Pu)
26. Destroying toys (De)
27. Rephrase (Rp)
28. Simplify steps (Ss)
29. Further explanation (Fe)
30. Verbal model (Vm)
31. Motoric model (Mm)
32. Commands (C)
33. Questions (Q)
34. Initiation using language (L)
35. Initiation using motoric behavior (Mb)
36. Initiation using gesture (IG)
37. Eye contact (EC)
38. Giving (Gg)
39. Accepting (A)

40. Positive response (R+)
41. Directed vocalization to a person (Dvp)
42. Directed vocalization to an object (Dvt)
43. Random sounds not directed to a person (Rrv)
44. Repeat verbatim (Rv)
45. Partial repeats verbatim (Prr)
46. Attempt to repeat verbatim (Ar)
47. SibA copies motoric behavior of TDC (Mit)
48. Looking at sibling (Lat)
49. Looking at sibling's play material (Lam)
50. Looking at what sibling is doing but not engaging (Lap)
51. Parallel play (PP)
52. Avoidance (A)

3.2.2.C Procedures for establishing the *a priori* superordinate categories.

Table 2 shows the procedures for establishing the *a priori* superordinate categories of communicative behaviors. There are three column headers. The left hand column describes the 20 superordinate categories of communicative behaviors that were established *a priori*. The middle column acts as a placeholder to show the potential for

new superordinate categories to be established *a posteriori*. The right hand column acts as a placeholder to show the potential for omitted superordinate categories of communicative behaviors that were not useful to the study.

Table 2

Procedures for Establishing the A Priori Superordinate Categories of Communicative Behaviors

Superordinate Categories Established <i>A Priori</i>	Superordinate Categories Established <i>A Posteriori</i>	Superordinate Categories Omitted
1. Gesture (G)		
2. Signs of affection (SA)		
3. Negative nonverbal (NV)		
4. Negative verbal (V-)		
5. Questions (Q)		
6. Initiations (I)		
7. Eye contact (EC)		
8. Sharing (S)		
9. Response (R)		
10. Directed vocalization (DV)		
11. Verbal imitation (VI)		
12. Motoric imitation (MI)		
13. Avoidance (A)		
14. Positive verbal reinforcement (V+)		
15. Positive nonverbal		

(NV+)
16. Prompts (P)
17. Commands (C)
18. Undirected vocalizations (UDV)
19. Orientation (O)
20. Parallel play (PP)

3.2.3 Final Array of Anticipated Communicative Codes

The field notes, therefore, will have yielded a number of *a priori* codes and a *posteriori* codes that could be applied to all of the participants. Before the home observations occurred, and before applying the communicative codes to the field notes, the researcher anticipated that both the TDCs and the SibAs would exhibit certain communicative behaviors. However, the researcher anticipated that the coding might reveal some differences between the TDCs and the SibAs. Only the TDCs would exhibit certain other communicative behaviors. Only the SibAs would exhibit certain other communicative behaviors. Table 3, Table 4, and Table 5 describe the researcher's anticipations of which participant(s) would exhibit which communicative behaviors. There is a total of 52 subordinate categories and 20 superordinate categories of communicative behaviors on Tables 3, Table 4, and Table 5. In each table, the left hand column describes the subordinate categories of communicative behaviors established *a priori*. The right hand column describes the superordinate categories of communicative behaviors established *a priori*.

As shown in Table 3, the researcher anticipated that both the TDCs and the SibAs would exhibit 34 subordinate categories and 11 superordinate categories of communicative behaviors, based on prior reports of reciprocal communicative interactions between siblings (Knott et al., 2007; Meyers & Vipond, 2005). As shown in Table 4, the researcher anticipated that only the TDCs would exhibit 11 subordinate categories and 4 superordinate categories of communicative behaviors, based on the past literature that described teaching behaviors (Ferraioli et al., 2011; Oppenheim-Leaf et al., 2012). As shown in Table 5, the researcher anticipated that only the SibAs would exhibit 7 subordinate categories and 5 superordinate categories of communicative behaviors because of the symptoms of ASD that may permit or inhibit learning (American Psychiatric Association, 2013; Autism Speaks, 2015).

Table 3

Communicative Behaviors Anticipated for Both TDCs and SibAs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
A body movement used to convey a communicative message such as sign language or waving Pointing (Po), sign language (Sl), waving (W)	Gestures (G)
An action used to convey emotions Holding hands (Hh) hugging (H), smiling (Sm), laughing (III), comforting (Com), patting (Pa), compliments (Cc) (Bass & Mulick, 2007)	Signs of affection (SA)
A spoken message intended to cause discomfort Criticism (Crit), rejection (R), threats	Negative verbal (V-)

(Thr), disapproval (Disa), insults (In), quarreling (Qu) (Bass & Mulick, 2007)	
An unspoken message intended to cause discomfort Hitting (Hi), pinching (Pi), kicking (Ki), pushing (Pu), destroying toys (De) (Bass & Mulick, 2007)	Negative nonverbal (NV-)
All questions such as “Where did the dog go?” or “What sound does a cat make?” (Bass & Mulick, 2007) Questions (Q)	Questions (Q)
An invitation directed toward another to engage in a social interaction Initiation using language (L) (e.g., “Let’s play catch.”), initiation using motoric behavior (Mb) (e.g., rolling a ball, walking towards TDC, or holding up a toy to play with), and initiation using gesture (IG) (e.g., tapping a body part, pointing, taking someone’s hand) (Bass & Mulick, 2007)	Initiations (I)
Looking at person’s eyes Eye contact (EC)	Eye contact (EC)
Giving an object to another person by handing or pushing it closer (Oppenheim-Leaf et al., 2012) Accepting (A), giving (Gg) (Bass & Mulick, 2007)	Sharing (S)
To answer another person’s social behavior with a verbal or nonverbal reaction (Bass & Mulick, 2007) Positive response (R+)	Response (R)
Sound directed to an object instead of person	Directed vocalization (DV)

Direct sounds to a person (Dvp), directing sounds to an object (Dvt) (Toth et al., 2007)	
To say the same communicative message as another person Repeat verbatim (Rv), partial repeats verbatim (Prr), attempt to repeat verbatim (Ar)	Verbal imitation (VI)

Table 4

Communicative Behaviors Anticipated for Only TDCs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
Verbal language directed to another person to promote a certain behavior Encouragement (E) (e.g., “You’re doing it right, keep playing.”), praise (P) (e.g., “That’s beautiful!” “Great job!” “Good.”) (Oppehnhem-Leaf et al., 2012)	Positive verbal reinforcement (V+)
Body movements used to promote a certain behavior High-five (H5), sensory input (Sen) (e.g., including but not limited to reinforcing arm squeezes), nodding (Nod)	Positive nonverbal (NV+)
Supports used to assist another person in completing a task Rephrase (Rp), simplify steps (Ss), further explanation (Fe), verbal model (Vm), motoric model (Mm)	Prompts (P)
Statements that are directed towards a person to regulate actions (e.g., “Come play with me.” “Put the baby in the crib.”)	Commands (C)

(Ferraioli et al., 2012)	
Commands (C)	

Table 5

Communicative Behaviors Anticipated for Only SibAs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
Vocalization not directed to any person in particular Random sounds not directed to a person (Rrv)	Undirected vocalizations (UDV)
SibA demonstrates awareness of TDC by directing eyes toward them. SibA shifts his/her gaze in the direction of their TDC (Ferraioli et al., 2012) Looking at sibling (Lat), looking at sibling's play materials (Lam), looking at what sibling is doing but not engaging (Lap) (Bass & Mulick, 2007)	Orientation (O)
To play independently beside or near another child rather than interacting with him/her while simultaneously using the same play space or materials (Bass & Mulick, 2007) Parallel Play (PP)	Parallel play (PP)
Stops communicative interaction by walking away or not engaging Avoidance (A)	Avoidance (A)
To act the same way immediately following another person's behavior SibA copies motoric behavior of the TDC (Mit)	Motoric imitation (MI)

3.3 Data That Will be Obtained for All Participants

The researcher will use all of the *a priori* codes listed in Table 1 and Table 2 to code all of the communicative behaviors exhibited by the TDCs and by the SibAs during the home observations. The communicative codes will allow for determining the total frequencies of occurrence of each of the subordinate categories and each of the superordinate categories of communicative behaviors exhibited within each sibling dyad and across all six of the sibling dyads. Within each sibling dyad, the total frequencies of occurrence of communicative behaviors captured the unique communicative interactions exhibited by the TDCs and by the SibAs. Of note are the similarities and the differences in the communicative behaviors exhibited by the TDCs and by the SibAs within the sibling dyads.

The communicative codes will allow for determining the total frequencies of occurrence of communicative behaviors of the TDCs across all of the sibling dyads, in order to show the aggregate for all the TDCs. Similarly, data will be grouped to show the communicative behaviors of the SibAs across all of the sibling dyads, to show the aggregate for all the SibAs.

3.3.1 Total Frequencies of Occurrence

The researcher will use the Field Notes form (Appendix E) to record all of the communicative behaviors observed. Then, the total frequencies of occurrence of communicative behaviors will be tallied. The Total Frequencies of Occurrence per Sibling Dyad (Appendix H), which is the first set of data, will be the researcher's worksheet for all raw data counts.

The data obtained for all participants will be tallied to show seven sets of data that provide various frequencies of occurrence. It is important to note that the *a priori* codes listed below will be marked with an “x” or “y” following the tallied frequencies. An “x” will indicate that the researcher anticipates that a total frequency of occurrence will be exhibited by only the TDCs. A “y” will indicate that the researcher anticipates that a total frequency of occurrence will be exhibited by only the SibAs. Each of the seven sets of data below will have a footnote to explain the “x” and “y.” The seven sets of data are as follows:

- Total Frequencies of Occurrence Per Sibling Dyad (Appendix H)
- The Total Frequencies of Occurrence of the Subordinate Categories Within Sibling Dyads (Table 13 in Appendix I)
- The Total Frequencies of Occurrence of the Superordinate Categories Within Sibling Dyads (Table 14 in Appendix J)
- The Total Frequencies of Occurrence of the Subordinate Categories Across All TDCs and All SibAs (Table 15 in Appendix K)
- The Total Frequencies of Occurrence of the Superordinate Categories Across All TDCs and All SibAs (Table 16 in Appendix L)
- The Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of the Subordinate Categories by Group: TDCs and SibAs (Table 17)
- The Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of the Superordinate Categories by Group: TDCs and SibAs (Table 18)

Second, the researcher will log the total frequencies of occurrence of the subordinate categories of communicative behaviors onto Table 13 titled Total Frequencies of Occurrence of the Subordinate Categories within Sibling Dyads, which is located in Appendix I. This table will show a side-by-side comparison of the subordinate categories of communicative behaviors exhibited by the six sibling dyads. Third, the researcher will combine the total frequencies of occurrence of the subordinate categories of communicative behaviors into the superordinate categories of communicative behaviors and log these onto Table 14 titled Total Frequencies of Occurrence of the Superordinate Categories within Sibling Dyads, which is located in Appendix J. This table will show a side-by-side comparison of the superordinate categories of communicative behaviors exhibited by the six sibling dyads. Fourth, the researcher will combine the total frequencies of occurrence of the subordinate categories of communicative behaviors across all six sibling dyads and log these onto Table 15 titled Total Frequencies of Occurrence of the Subordinate Categories across all TDCs and all SibAs, which is located in Appendix K. This table will show the subordinate categories of communicative behaviors exhibited by all of the TDCs together and all of the SibAs together. Fifth, the researcher will combine the total frequencies of occurrence of the subordinate categories of communicative behaviors into the superordinate categories of communicative behaviors and log these onto Table 16 titled Total Frequencies of Occurrence of the Superordinate Categories across all TDCs and all SibAs, which is located in Appendix L. This table will show the superordinate categories of communicative behaviors exhibited by all of the TDCs together and all of the SibAs together.

3.3.2 Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence

The tallied counts from the Total Frequencies of Occurrence of the Subordinate Categories across all TDCs and all SibAs (Table 15 in Appendix K) and from the Total Frequencies of Occurrence of the Superordinate Categories across all TDCs and all SibAs (Table 16 in Appendix L) will then be placed into two new sets of data. One set of data will show the total frequencies of occurrence and percentages of occurrence of the subordinate categories of communicative behaviors in descending order from the most frequently to least frequently occurring (Table 17). The other set of data will show the total frequencies of occurrence and percentages of occurrence of the superordinate categories of communicative behaviors in descending order from the most frequently occurring to the least frequently occurring (Table 18). To calculate the percentage of occurrence of communicative behaviors, the researcher will divide each communicative behavior by that group's (either TDCs' or SibAs') grand total of possible communicative behaviors. The percentage of occurrence of each communicative behavior will reveal how often that particular group produces a communicative behavior. The researcher will classify the communicative behaviors that exhibit a "sufficient" percentage of occurrence to warrant further analysis.

3.4 TDCs' Semi-Structured Interviews

The researcher will conduct a semi-structured interview with each TDC. The semi-structured interviews with each TDC will be based on a script of 17 semi-structured interview questions that are found in Appendix F. The semi-structured interview format will allow the researcher some freedom and latitude in wording semi-structured interview

questions. The researcher will ask only certain semi-structured interview questions if it appears necessary to omit some semi-structured interview questions. The researcher will provide follow-up semi-structured interview questions if the need arises to probe for further response. In general, the semi-structured interview questions will be about the TDCs' perceptions of their SibAs, the TDCs' behavior toward their SibAs, and the TDCs' knowledge of ASD.

The researcher will write down the TDCs' responses with fidelity but not necessarily verbatim. Shorthand documentation will enable the researcher to capture the TDCs' main idea while completing the semi-structured interview within 20 minutes. The researcher will transfer the TDCs' responses onto a table titled TDCs' Interview Responses, which is located in Appendix M. The table will provide easy analysis across TDCs.

3.5 Parents' Semi-Structured Interviews

The researcher will conduct a semi-structured interview with the parents. The list of 8 semi-structured interview questions is titled Parents' Semi-Structured Interview Questions and is located in Appendix G. The semi-structured interview format will allow the researcher freedom and latitude in wording semi-structured interview questions. The researcher may ask all of the semi-structured interview questions or may ask only certain semi-structured interview questions. The researcher may provide follow-up semi-structured interview questions if the need should arise. In general, the semi-structured interview questions will be about their TDCs' understanding of ASD and about their children's relationship.

The researcher will write down the parents' responses with fidelity but not necessarily verbatim. Shorthand documentation will enable the researcher to capture the parents' main idea while completing the semi-structured interview within 25 minutes. The researcher will transfer the parents' responses onto a table titled Parents' Interview Responses, which is located in Appendix N. The table will provide easy analysis across parents.

In summary, the researcher recruited families comprised of a child with ASD who attended the autism center and his/her TDC sibling who did not have ASD. Both children within the sibling dyad were within the age range of 4 to 17 years old. The researcher collected data from one 45-minute home observation of the TDC and the SibA engaging in common household activities, followed by two semi-structured interviews, one with the TDC and the other with the parent(s). The researcher tallied communicative behaviors to show seven sets of data that would allow the researcher to analyze the total frequencies of occurrences of communicative behaviors within sibling dyads and across sibling dyads. Semi-structured interviews with the TDCs and the parents would allow the researcher to obtain data supplemental to the data obtained from the home observations. A triangulated data analysis will convey whether the data was complementary or contradictory.

CHAPTER IV

RESULTS

Chapter IV provides an analysis of the data obtained and a description of the results of the study. The purpose of the data analysis is to answer the present study's three research questions:

- 1) What communicative behaviors are observed to occur between TDCs and SibAs in their home settings?
- 2) Within the context of semi-structured interviews, how do TDCs describe their interactions with their SibAs?
- 3) Within the context of semi-structured interviews, how do parents describe the relationship of their TDC and their child with ASD?

The researcher documented communicative behaviors exhibited by the TDCs and the SibAs during one 45-minute home observation. The researcher documented responses provided by the TDCs and the parents during the semi-structured interviews. The semi-structured interviews with the TDCs lasted for between 10 and 20 minutes, and semi-structured interviews with the parents lasted for between 20 and 30 minutes

4.1 Family Descriptions and Overview of the Home Observations

Six families participated in the present study. All of the families resided in the suburbs of a large Midwestern city and were estimated to be of similar socioeconomic statuses. The researcher identified all of the families by code numbers, as in family1, family3, and family5. In these three families, only the mothers were interviewed. Families where both the mother and the father participated in the semi-structured interviews are further identified with an “s” following their code number, as in family2s, family4s, and family6s.

4.1.1 Family1

Participants from family1 included the mother, TDC1, and SibA1. Family1 resided in a suburb where the 2013 median income per household was estimated at \$65,951 (United States Census, 2015). Family1 was Caucasian. The researcher observed a younger TDC sister, age 4, and an older SibA brother, age 9. SibA1 communicated using vocalizations of varying pitch but exhibited no functional language throughout the observation. Social interactions occurred in the family room, kitchen, and basement. The basement contained a trampoline, a swing, and additional toys. At the start of the observation, the mother suggested that TDC1 and SibA1 play together in the basement. Both children responded willingly. The children entered the basement while their mother remained upstairs in the kitchen. The children initially played with separate toys, appearing content and not concerned with one other. TDC1 jumped on the trampoline while SibA1 swung on the swing and paced the floor nearby. SibA1 eventually joined TDC1 on the trampoline after 10 minutes had passed, when many communicative behaviors took place.

4.1.2 Family2s

Participants from family2s included the mother, father, TDC2, and SibA2. Family2s resided in a suburb where the 2013 median income per household was estimated at \$49,654 (United States Census, 2015). Family2s was Caucasian. The researcher observed a younger TDC sister, age 12, and an older SibA sister, age 15. SibA2 was able to communicate using verbal language at the sentence level with varied sentence structure and verbal content. SibA2 spoke only one sentence at a time. She did not actually converse; however, she was able to use verbal language to express her wants and needs and to comment. SibA2 appeared frustrated at times when she was unable to convey her thoughts. She exhibited mild aggression toward TDC2 (a few forward lunges of her torso; placing her head against TDC2's head with some pressure for a few seconds, grabbing TDC2's arm, and a few hits). Social interactions occurred in the kitchen area and family room. An older TDC brother who did not participate, the father, and the mother remained in view, continuing about their day with household routines and normal social interactions. Documentation began as SibA2 finished eating her snack. TDC2 initiated an art activity consisting of beaded designs, lasting nearly 15 minutes. SibA2 played the piano for a short duration while TDC2 found an iron to melt the beads together. After completing the art activity, SibA2 selected a book to read with TDC2. Shared reading aloud was the last activity documented. Both children read aloud, with TDC2 assisting SibA2 as needed.

4.1.3 Family3

Participants from family3 included the mother, TDC3, and SibA3. Family3 resided in a suburb where the 2013 median income per household was estimated at

\$49,654 (United States Census, 2015). Family3 was Caucasian. The researcher observed a younger TDC brother, age 11, and an older SibA brother, age 15. SibA3 was able to communicate in single sentences using verbal language. He was echolalic and used vocalization to self-stimulate. With encouragement and cues, SibA3 produced a single sentence to convey his wants and needs. His language was not self-initiated. His supported language was functional at a simple basic level. The children's mother facilitated sibling social interaction by suggesting games to play, offering assistance in turn taking, and providing the children with a snack. Social interactions occurred in the kitchen area and family room. The children engaged in a simple tabletop game (pirates), a snack, and a floor game (marbles on a track). Near the end of the observation, the TDC3 played alone on his handheld video game device while SibA3 was hugged and rocked by his mother.

4.1.4 Family4s

Participants from family4s included the mother, father, TDC4, and SibA4. TDC4's friend, a male of similar chronological age to TDC4, remained seated with TDC4 watching television for the entire observation. The researcher did not collect data from TDC4's friend. Family4s resided in a suburb where the 2013 median income per household was estimated at \$49,654 (United States Census, 2015). Family4s was Caucasian. The researcher observed an older TDC brother, age 16, and a younger SibA sister, age 11. SibA4 was able to communicate with one word or with two word phrases. She was often silent but at times self-initiated language. The children's mother and father continued their household routine while the children sat in the family room. SibA4 stayed in the family room for approximately 15 minutes and then joined her mother in the

kitchen for a snack. The remainder of the observation involved SibA4 eating in the kitchen while TDC4 and his friend watched television in the family room.

4.1.5 Family5

Participants from family5 included the mother, TDC5, and SibA5. Family5 resided in a suburb where the 2013 median income per household was estimated at \$71,364 (United States Census, 2015). Family5 was Caucasian. The researcher observed an older TDC brother, age 12, and a younger SibA brother, age 10. SibA5 generated spontaneous language at the sentence level and often incorporated delayed echolalia as a form of functional expression. Social interactions occurred in the kitchen area, family room, and dining room. TDC5 assisted SibA5 with written homework for approximately 10 minutes. TDC5 then left SibA5 to engage in drawing and watching YouTube videos on his iPad. While SibA5 watched YouTube videos, he acted out the scenes with delayed echolalia and animated facial expressions. TDC5 remained nearby and in sight of SibA5 for the remainder of the observation. TDC5 checked-in by touching SibA5 occasionally and looking at him. TDC5 did not place any demands for conversing or playing.

4.1.6 Family6s

Participants from family6s included the mother, father, TDC6, and SibA6. Family6s resided in a suburb where the 2013 median income per household was estimated at \$49,654 (United States Census, 2015). Family6s was African American. The researcher observed an older TDC sister, age 12, and a younger SibA brother, age 7. SibA6 used verbal expression at the phrase level to convey wants and needs. SibA6 was able to self-initiate verbal expression to invite TDC6 to play. At times, SibA6 produced high-pitched vocalizations to express emotions, such as feeling extremely happy. Social

interactions occurred throughout the household in the kitchen, bedroom, family room, upstairs, and basement. The children engaged in chase, tickle, and a snack. The children's mother remained in the kitchen continuing about her household routine while the children played.

4.2 Characteristics of the Six Sibling Dyads

Table 6 shows the birth order, genders, and ages of the six sibling dyads. The column headers read across to represent the sibling dyads, and the row headers read down to indicate the birth order within the dyads. For example, sibling dyad1 was composed of a younger TDC who was a female, age 4, and an older SibA who was a male, age 9. Sibling dyad2 was composed of a younger TDC who was a female, age 12, and an older SibA who was a female, age 15. There was an equal number of TDCs who were older and who were younger. There was also an equal number of male TDCs and female TDCs.

Three sibling dyads were composed of older TDCs and younger SibAs (TDC4 and SibA4; TDC5 and SibA5; and TDC6 and SibA6), and three sibling dyads were composed of older SibAs and younger TDCs (TDC1 and SibA1; TDC2 and SibA2; and TDC3 and SibA3). Gender differences included three sibling dyads with TDC sisters (TDC1, TDC2, and TDC6) and three sibling dyads with TDC brothers (TDC3, TDC4, and TDC5). Four SibAs were male (SibA1, SibA3, SibA5, and SibA6) and two SibAs (SibA2 and SibA4) were female. Range of ages for TDCs was 4 to 16 years. Range of ages for SibAs was 7 to 15 years. Verbally competent sibling dyads included those with SibAs who could communicate using spontaneous verbal language, requiring no to minimal assistance (SibA2 and SibA6). Three sibling dyads included SibAs with lesser

verbal abilities, requiring assistance to initiate or structure expression (SibA3, SibA4, and SibA5). One sibling dyad contained a SibA who did not produce verbal language on the date of the observation (SibA1).

Table 6

Characteristics of Sibling Dyads

Birth Order	Sibling Dyad1	Sibling Dyad2	Sibling Dyad3	Sibling Dyad4	Sibling Dyad5	Sibling Dyad6
Younger TDC	Female 4 yrs.	Female 12 yrs.	Male 11 yrs.			
Older SibA	Male 9 yrs.	Female 15 yrs.	Male 15 yrs.			
Older TDC				Male 16 yrs.	Male 12 yrs.	Female 12 yrs.
Younger SibA				Female 11 yrs.	Male 10 yrs.	Male 7 yrs.

4.3 Communicative Codes

The researcher documented communicative behaviors exhibited by the TDCs and the SibAs during one 45-minute home observation. During each home observation, the researcher prepared field notes by writing down each child’s verbal and nonverbal communicative behaviors. The researcher then assigned communicative codes to all of the communicative behaviors documented in the field notes. Communicative codes represented the subordinate categories and the superordinate categories of communicative

behaviors. All of the subordinate categories and all of the superordinate categories of communicative behaviors were operationally defined, in that the TDCs and the SibAs overtly demonstrated a behavior.

Chapter III provided a description of the procedures used to determine the communicative codes *a priori*. Other procedures were used *a posteriori* after each observation. The following description brings together the *a priori* and *a posteriori* procedures. As stated in Chapter III, *a priori*, the researcher established subordinate categories of communicative behaviors based on the literature reviewed and clinical insight. Often, the subordinate categories of communicative behaviors described close variations of communicative behaviors. For instance, rephrase (Rp), simplify steps (Ss), further explanation (Fe), verbal model (Vm) and motoric model (Mm) were all subordinate categories that described types of prompts (P). Next, the researcher grouped the subordinate categories together to form a larger group of superordinate categories of communicative behaviors. The rationale for the superordinate categories of communicative behaviors was to provide the researcher with a more inclusive category of communicative behaviors exhibited by the TDCs and the SibAs. To expand upon the previous example, rephrase (Rp), simplify steps (Ss), further explanation (Fe), verbal model (Vm) and motoric model (Mm) together formed the larger superordinate category of prompts (Sup7P).

4.3.1 A Priori Coding and A Posteriori Coding

The researcher established subordinate categories and superordinate categories of communicative behaviors prior to the first home observation based on the literature reviewed and on clinical insight. There were 52 subordinate categories of communicative

behaviors and 20 superordinate categories of communicative behaviors identified prior to the data collection that are referred to as the *a priori* codes. The code identification process for the *a priori* codes was deductive because the literature provided a framework for deducing the communicative codes.

The researcher added subordinate categories and superordinate categories of communicative behaviors after each observation, based on the communicative behaviors observed in each of the TDCs and the SibAs. This resulted in adding 19 more subordinate categories of communicative behaviors and 5 more superordinate categories of communicative behaviors, which are referred to as the *a posteriori* codes. The code identification process for the *a posteriori* codes was inductive. Adding the *a posteriori* codes enabled the researcher to code all of the communicative behaviors documented within each 45-minute home observation. Every observation, including family1 through family6, was coded *a posteriori*. Every communicative code added after each observation occurred is referred to as an *a posteriori* code. The *a priori* and *a posteriori* codes were ascribed to all of the participants (both the TDCs and the SibAs).

The full *a posteriori* coding process is described below on a family-by-family basis. The researcher inductively established a total of 19 subordinate categories and 5 superordinate categories of communicative behaviors *a posteriori* following four of the six home observations.

4.3.1.A Family1. After coding family1's field notes according to all of the *a priori* codes, the researcher tallied 52 total frequencies of occurrence of communicative behaviors out of the 175 total observed communicative behaviors (29.71%) that could not be coded using the *a priori* codes available. The 52 communicative behaviors were

comprised of 29 communicative behaviors (23.58%) unaccounted for by TDC1 and 23 communicative behaviors (44.23%) unaccounted for by SibA1. The researcher established 7 subordinate categories and 1 superordinate category of communicative behaviors *a posteriori* to code the 52 communicative behaviors unaccounted for by TDC1 and SibA1.

4.3.1.A.1 TDC1. Six subordinate categories and 1 superordinate category of communicative behaviors were established *a posteriori* to account for the 29 unaccounted for communicative behaviors exhibited by TDC1. The 6 subordinate categories of communicative behaviors are as follows:

1. TDC copies motoric behavior of SibA (Sub40Mia) = 14 total frequencies of occurrence
2. Hand-over-hand prompt (Sub22Hohp) = 7 total frequencies of occurrence
3. Narrate (Sub44NAR) = 4 total frequencies of occurrence
4. Take a desired object (Sub16---) = 2 total frequencies of occurrence
5. Give a desired object (Sub15+++)= 1 total frequency of occurrence
6. Does not respond (Sub33R-) = 1 total frequency of occurrence

One superordinate category of communicative behaviors was established *a posteriori* to account for the 4 unaccounted for communicative behaviors exhibited by TDC1. The 1 superordinate category of communicative behavior is as follows:

1. Narrate (Sup20NAR) = 4 total frequencies of occurrence

4.3.1.A.2 SibA1. Two subordinate categories of communicative behaviors were established *a posteriori* to account for the 23 unaccounted for communicative behaviors

exhibited by SibA1. The 2 subordinate categories of communicative behaviors are as follows:

1. Does not respond (Sub33R-) = 14 total frequencies of occurrence
2. Sounds with motoric self-stimulation (Sub35Msst) = 9 total frequencies of occurrence

4.3.1.B Family2s. The communicative codes established *a posteriori* for after family1 were used *a priori* when observing family2s, family3, family4s, family5, and family6s. After coding family2s' field notes according to all of the *a priori* codes, the researcher tallied 57 total frequencies of occurrence of communicative behaviors out of the 327 observed communicative behaviors (17.43%) that could not be coded using the *a priori* codes available. The 57 unaccounted for communicative behaviors were comprised of 35 communicative behaviors (17.95%) unaccounted for by TDC2 and 22 communicative behaviors (16.67%) unaccounted for by SibA2. The researcher established 6 subordinate categories and 3 superordinate categories of communicative behaviors *a posteriori* to code the 57 communicative behaviors unaccounted for by TDC2 and SibA2.

4.3.1.B.1 TDC2. Two subordinate categories and one superordinate category of communicative behaviors were established *a posteriori* to account for the 35 unaccounted for communicative behaviors exhibited by TDC2. The 2 subordinate categories of communicative behaviors are as follows:

1. Teaching moments (Sub46TM) = 20 total frequencies of occurrence
2. Statement (Sub45STATE) = 15 total frequencies of occurrence

Two superordinate categories of communicative behaviors were established *a posteriori* to account for the 35 unaccounted for communicative behaviors exhibited by TDC2. The 2 superordinate categories of communicative behaviors are as follows:

1. Teaching moments (Sup22TM) = 20 total frequencies of occurrence
2. Statement (Sup21STATE) = 15 total frequencies of occurrence

4.3.1.B.2 SibA2. Five subordinate categories of communicative behaviors were established *a posteriori* to account for the 22 unaccounted for communicative behaviors exhibited by SibA2. The 5 subordinate categories of communicative behaviors are as follows:

1. Perseveration (Sub47PPP) = 10 total frequencies of occurrence
2. Grabbing (Sub17Gr) = 7 total frequencies of occurrence
3. Mad face (Sub20Mad) = 2 total frequencies of occurrence
4. Head-butting (Sub19Hb) = 2 total frequencies of occurrence
5. Statement (Sub45STATE) = 1 total frequency of occurrence

Two superordinate categories of communicative behaviors were established *a posteriori* to account for the 11 unaccounted for communicative behaviors exhibited by SibA2. The 2 superordinate categories of communicative behaviors are as follows:

1. Perseveration (Sup23PPP) = 10 total frequencies of occurrence
2. Statement (Sup21STATE) = 1 total frequency of occurrence

4.3.1.C Family3. The communicative codes established after family2s were used *a priori* when observing family3, family4s, family5, and family6s. After coding family3's field notes according to all of the *a priori* codes, the researcher tallied 49 total frequencies of occurrence of communicative behaviors out of the 160 observed

communicative behaviors (30.63%) that could not be coded using the *a priori* codes available. The 49 unaccounted for communicative behaviors were comprised of 3 communicative behaviors (7.89%) unaccounted for by TDC3 and 46 communicative behaviors (37.70%) unaccounted for by SibA3. The researcher established 3 subordinate categories *a posteriori* to code the 49 communicative behaviors unaccounted for by TDC3 and SibA3.

4.3.1.C.1 TDC3. Two subordinate categories of communicative behaviors were established *a posteriori* to account for the 3 unaccounted for communicative behaviors exhibited by TDC3. The 2 subordinate categories of communicative behaviors are as follows:

1. Tease remark (Sub11Te) = 2 total frequencies of occurrence
2. Taking turns (Sub30< >) = 1 total frequency of occurrence

4.3.1.C.2 SibA3. Two subordinate categories of communicative behaviors were established *a posteriori* to account for the 46 unaccounted for communicative behaviors exhibited by SibA3. The 2 subordinate categories of communicative behaviors are as follows:

1. Vocal self-stimulation (Sub37Vsst) = 45 total frequencies of occurrence
2. Taking turns (Sub30< >) = 1 total frequency of occurrence

4.3.1.D Family4s. The communicative codes established after family3 were used *a priori* when observing family4s, family5, and family6s. After coding family4s' field notes according to all of the *a priori* codes, the researcher did not tally any total frequencies of occurrence of communicative behaviors unaccounted for by the *a priori* codes. No *a posteriori* codes were established for family4s.

4.3.1.E Family5. After coding family5's field notes according to all of the *a priori* codes, the researcher tallied 6 total frequencies of occurrence of communicative behaviors out of the 162 observed communicative behaviors (3.70%) that could not be coded using the *a priori* codes available. The 6 unaccounted for communicative behaviors were comprised of 1 communicative behavior (1.79%) unaccounted for by TDC5 and 5 communicative behaviors (4.72%) unaccounted for by SibA5. The researcher established 2 subordinate categories *a posteriori* to code the 6 communicative behaviors unaccounted for by TDC5 and SibA5.

4.3.1.E.1 TDC5. One subordinate categories of communicative behaviors was established *a posteriori* to account for the 1 unaccounted for communicative behavior exhibited by TDC5. The 1 subordinate category of communicative behaviors is as follows:

1. Comforting (Sub6Com) = 1 total frequency of occurrence

4.3.1.E.2 SibA5. One subordinate category of communicative behaviors was established *a posteriori* to account for the 5 unaccounted for communicative behaviors exhibited by SibA5. The 1 subordinate category of communicative behaviors is as follows:

1. Crying (Sub12Cry) = 5 total frequencies of occurrence

4.3.1.F Family6s. The communicative codes established after family5 were used *a priori* when observing family6s. After coding family6's field notes according to all of the *a priori* codes, the researcher tallied 5 total frequencies of occurrence of communicative behaviors out of the 356 observed communicative behaviors (1.40%) that could not be coded using the *a priori* codes available. The 5 unaccounted for

communicative behaviors were comprised of 0 communicative behaviors (0%) unaccounted for by TDC6 and 5 communicative behaviors (2.70%) unaccounted for by SibA6. The researcher established 1 subordinate category *a posteriori* to code the 5 total frequencies of occurrence of communicative behaviors unaccounted for by SibA6

4.3.1.F.1 SibA6. The researcher established 1 subordinate category of communicative behaviors *a posteriori* to account for the 5 unaccounted for communicative behaviors exhibited by SibA6. The 1 subordinate category of communicative behaviors is as follows:

1. General signs of affection unaccounted for (Sub8Gsa) = 5 total frequencies of occurrence

4.3.2 Removing Unused Communicative Codes

The researcher then reviewed the 52 subordinate categories of communicative behaviors established *a priori*, which led to the omission of 26 subordinate categories of communicative behaviors identified as not useful to the study. The researcher then reviewed the 20 superordinate categories of communicative behaviors established *a priori*, which led to the omission of 2 superordinate categories of communicative behaviors (directed vocalizations [DV] and avoidance [A]) identified as not useful to the study. After the superordinate category of directed vocalizations (DV) was omitted, directed vocalizations to an object (Dvt) remained as a subordinate category without a superordinate category. To provide a superordinate category for every subordinate category, directed vocalizations to an object (Dvt) became the final superordinate category (Sup14DVT) established *a posteriori*. The data were reviewed to ensure that all of the *a posteriori* codes were applied to each sibling dyad.

The following paragraphs reiterate and expand upon the procedures just explained in order to show how the subordinate categories and the superordinate categories of communicative behaviors were finally determined. The information that follows does not differ. It merely leads into the final array of the communicative codes used. Table 7 shows the procedures for establishing the subordinate categories of communicative behaviors. Table 8 shows the procedures for establishing the superordinate categories of communicative behaviors.

4.3.3 Reiteration and Expansion of Procedures for Establishing Subordinate Categories

Table 7 shows the procedures for establishing the subordinate categories of communicative behaviors. There are three column headers. The left hand column describes the 52 subordinate categories of communicative behaviors that were established *a priori*. The middle column describes the 19 subordinate categories of communicative behaviors that were established *a posteriori*. The right hand column describes the 24 subordinate categories of communicative behaviors that were not useful to the study and were therefore omitted. There were 52 subordinate categories of communicative behaviors established *a priori*. In summary, $52 + 19 = 71$; $71 - 24 = 47$: the researcher used 47 subordinate categories of communicative behaviors to code every communicative behavior exhibited by the TDCs and the SibAs across all of the field notes.

Table 7

Procedures for Establishing Subordinate Categories of Communicative Behaviors

Subordinate Categories Established <i>A Priori</i>	Subordinate Categories Established <i>A Posteriori</i>	Subordinate Categories Omitted
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1. Pointing (Po)	1. Comforting (Com)	1. Sign language (Sl)
2. Sign language (Sl)	2. General signs of affection unaccounted for (Gsa)	2. Waving (W)
3. Waving (W)	3. Head-butting (Hb)	3. Compliments (Cc)
4. Hugging (H)	4. Take desired object (---)	4. Pinching (Pi)
5. Smiling (Sm)	5. Grabbing (Gr)	5. Kicking (Ki)
6. Laughing (III)	6. Tease remark (Te)	6. Pushing (Pu)
7. Compliments (Cc)	7. Crying (Cry)	7. Destroying toys (De)
8. Holding hands (Hh)	8. Taking turns (< >)	8. Criticism (Crit)
9. Patting (Pa)	9. Does not respond (R-)	9. Rejection (R)
10. Encouraging (E)	10. TDC copies motoric behavior of SibA (Mia)	10. Threats (Thr)
11. Praise (Pr)	11. Statement (STATE)	11. Disapproval (Disa)
12. Criticism (Crit)	12. Give a desired object (+++)	12. Insults (In)
13. Rejection (R)	13. Hand-over-hand prompt (Hohp)	13. Quarreling (Qu)
14. Threats (Thr)	14. Narrate (NAR)	14. Accepting (A)
15. Disapproval (Disa)	15. Teaching moment (TM)	15. Partial repeats verbatim (Prr)
16. Insults (In)	16. Sounds with motoric self-stimulation (Msst)	16. Attempt to repeat verbatim (Ar)
17. Quarreling (Qu)	17. Vocal-stimulation (Vsst)	17. Thumbs-up (Th^)
18. High-five (H5)	18. Perseveration (PPP)	18. Nodding (Nod)
19. Thumbs-up (Th^)	19. Mad face (Mad)	19. Rephrase (Rp)

20. Nodding (Nod)		20. Simplify steps (Ss)
21. Sensory input (Sen)		21. Further explanation (Fe)
22. Hitting (Hi)		22. Looking at what sibling is doing but not engaging (Lap)
23. Pinching (Pi)		23. Directed vocalization to a person (Dvp)
24. Kicking (Ki)		24. Avoidance (A)
25. Pushing (Pu)		
26. Destroying toys (De)		
27. Rephrase (Rp)		
28. Simplify steps (Ss)		
29. Further explanation (Fe)		
30. Verbal model (Vm)		
31. Motoric model (Mm)		
32. Commands (C)		
33. Questions (Q)		
34. Initiation using language (L)		
35. Initiation using motoric behavior (Mb)		
36. Initiation using gesture (IG)		
37. Eye contact (EC)		
38. Giving (Gg)		

39. Accepting (A)
40. Positive response (R+)
41. Directed vocalization to a person (Dvp)
42. Directed vocalization to an object (Dvt)
43. Random sounds not directed to a person (Rrv)
44. Repeat verbatim (Rv)
45. Partial repeats verbatim (Prr)
46. Attempt to repeat verbatim (Ar)
47. SibA copies motoric behavior of TDC (Mit)
48. Looking at sibling (Lat)
49. Looking at sibling's play material (Lam)
50. Looking at what sibling is doing but not engaging (Lap)
51. Parallel play (PP)
52. Avoidance (A)

4.3.4 Reiteration and Expansion of Procedures for Establishing Superordinate Categories

Table 8 shows the procedures for establishing the superordinate categories of communicative behaviors. There are three column headers. The left hand column describes the 20 superordinate categories of communicative behaviors that were established *a priori*. The middle column describes the 5 superordinate categories of communicative behaviors that were established *a posteriori*. The right hand column describes the 2 superordinate categories of communicative behaviors that were not useful to the study and were therefore omitted. In summary, $20 + 5 = 25$; $25 - 2 = 23$: the researcher used 23 superordinate categories of communicative behaviors to code every communicative behavior exhibited by the TDCs and the SibAs across all of the field notes.

Table 8

Procedures for Establishing Superordinate Categories of Communicative Behaviors

Superordinate Categories Established <i>A Priori</i>	Superordinate Categories Established <i>A Posteriori</i>	Superordinate Categories Omitted
1. Gesture (G)	1. Statement (STATE)	1. Avoidance (A)
2. Signs of affection (SA)	2. Narrate (NAR)	2. Directed vocalization (DV)
3. Negative nonverbal (NV)	3. Teaching moment (TM)	
4. Negative verbal (V-)	4. Perseveration (PPP)	
5. Questions (Q)	5. Directed vocalization to an object (DVT)	
6. Initiations (I)		
7. Eye Contact (EC)		
8. Sharing (S)		
9. Response (R)		

10. Directed vocalization (DV)
11. Verbal imitation (VI)
12. Motoric imitation (MI)
13. Avoidance (A)
14. Positive verbal reinforcement (V+)
15. Positive nonverbal (NV+)
16. Prompts (P)
17. Commands (C)
18. Undirected vocalizations (UDV)
19. Orientation (O)
20. Parallel play (PP)

4.3.5 Final Array of Communicative Codes Applied to Field Notes

The field notes, therefore, yielded a number of *a priori* codes and *a posteriori* codes. In total, the researcher utilized 70 communicative codes to define the communicative behaviors documented in the field notes. The 70 communicative codes were comprised of 47 subordinate categories and 23 superordinate categories of communicative behaviors. The 47 subordinate categories of communicative behaviors are as follows:

1. Pointing (Sub1Po)
2. Holding hands (Sub2Hh)

3. Hugging (Sub3H)
4. Smiling (Sub4Sm)
5. Laughing (Sub5III)
6. Comforting (Sub6Com)
7. Patting (Sub7Pa)
8. General signs of affection unaccounted for (Sub8Gsa)
9. Encouragement (Sub9E)
10. Praise (Sub10P)
11. Tease remark (Sub11Te)
12. Crying (Sub12Cry)
13. High-five (Sub13H5)
14. Sensory input (Sub14Sen)
15. Give a desired object (Sub15+++)
16. Take desired object (Sub16---)
17. Grabbing (Sub17Gr)
18. Hitting (Sub18Hi)
19. Head-butting (Sub19Hb)
20. Mad face (Sub20Mad)
21. Motoric model (Sub21Mm)
22. Hand-over-hand prompt (Sub22Hohp)
23. Verbal model (Sub23Vm)
24. Commands (Sub24C)
25. Questions (Sub25Q)

26. Initiation using language (Sub26L)
27. Initiation using motoric behavior (Sub27Mb)
28. Initiation using gesture (Sub28IG)
29. Eye contact (Sub29EC)
30. Taking turns (Sub30< >)
31. Giving (Sub31Gg)
32. Positive response (Sub32R+)
33. Does not respond (Sub33R-)
34. Directing sounds to an object (Sub34Dvt)
35. Sounds with motoric self-stimulation (Sub35Msst)
36. Random sounds not directed to a person (Sub36Rrv)
37. Vocal self-stimulation (Sub37Vsst)
38. Repeat verbatim (Sub38Rv)
39. SibA copies motoric behavior of TDC (Sub39Mit)
40. TDC copies motoric behavior of SibA (Sub40Mia)
41. Looking at sibling (Sub41Lat)
42. Looking at sibling's play materials (Sub42Lam)
43. Parallel play (Sub43PP)
44. Narrate (Sub44NAR)
45. Statement (Sub45STATE)
46. Teaching moment (Sub46TM)
47. Perseveration (Sub47PPP)

The 23 superordinate categories of communicative behaviors are as follows:

1. Gestures (Sup1G)
2. Signs of affection (Sup2SA)
3. Positive verbal reinforcement (Sup3V+)
4. Negative verbal (Sup4V-)
5. Positive nonverbal (Sup5NV+)
6. Negative nonverbal (Sup6NV-)
7. Prompts (Sup7P)
8. Commands (Sup8C)
9. Questions (Sup9Q)
10. Initiations (Sup10I)
11. Eye contact (Sup11EC)
12. Sharing (Sup12S)
13. Response (Sup13R)
14. Directed vocalization to object (Sup14DVT)
15. Undirected vocalizations (Sup15UDV)
16. Verbal imitation (Sup16VI)
17. Motoric imitation (Sup17MI)
18. Orientation (Sup18O)
19. Parallel play (Sup19PP)
20. Narrate (Sup20NAR)
21. Statement (Sup21STATE)
22. Teaching moment (Sup22TM)
23. Perseveration (Sup23PPP)

4.4 Establishing the *A Posteriori* Codes Used by Both TDCs and SibAs, by Only TDCs, and by Only SibAs

As shown in the Chapter III section titled Final Array of Anticipated Communicative Codes, the researcher anticipated that both the TDCs and the SibAs would exhibit certain communicative behaviors that, only the TDCs would exhibit other communicative behaviors, and that only the SibAs would exhibit other communicative behaviors. The researcher assigned the 52 subordinate categories of communicative behaviors to one of the three group(s). *A priori*, there were 34 subordinate categories and 11 superordinate categories of communicative behaviors assigned to both the TDCs and the SibAs. *A priori*, there were 11 subordinate categories and 4 superordinate categories of communicative behaviors assigned to only the TDCs. *A priori*, there were 7 subordinate categories and 5 superordinate categories of communicative behaviors assigned to only the SibAs.

The researcher's anticipations were affected when the researcher realized that *a posteriori* codes were needed. The *a posteriori* codes were evidenced by the data, and therefore the identity of participant(s) of the sibling dyads who exhibited the communicative behaviors was known. As such, the process of confirming the researcher's anticipations is confined only to the *a priori* codes. The *a posteriori* codes were all immediately attributed to the participant(s) of the sibling dyad who produced the communicative behaviors. The researcher examined the total frequencies of occurrence of the 47 subordinate categories and the total frequencies of occurrence of the 23 superordinate categories of communicative behaviors, in order to establish which communicative codes were exhibited by both the TDCs and the SibAs, which were

exhibited by only the TDCs, and which were exhibited by only the SibAs. *A posteriori*, there were 17 subordinate categories and 13 superordinate categories of communicative behaviors assigned to both the TDCs and the SibAs. *A posteriori*, there were 15 subordinate categories and 6 superordinate categories of communicative behaviors assigned to only the TDCs. *A posteriori*, there were 15 subordinate categories and 4 superordinate categories of communicative behaviors assigned to only the SibAs.

Having *a priori* and *a posteriori* codes for the subordinate categories and the superordinate categories of communicative behaviors necessitates a comparison of how these codes appeared for both the TDCs and the SibAs, for only the TDCs, and for only the SibAs. This comparison is shown in Table 9 below. Table 9 is a matrix that compares the number of *a priori* and *a posteriori* codes as noted for both the TDCs and the SibAs, for only the TDCs, and for only the SibAs. There are four row headers. The top two row headers describe the subordinate categories and the superordinate categories *a priori*. The bottom two row headers describe the subordinate categories and the superordinate categories *a posteriori*. There is one mathematical irregularity found in Table 9. It is important to note that there were 52 subordinate categories and 20 superordinate categories of communicative behaviors proposed *a priori*, but there ended up being 47 subordinate categories and 23 superordinate categories of communicative behaviors *a posteriori*. A double line in the matrix separates the *a priori* codes from the *a posteriori* codes. The *a priori* codes are given in the top two rows. The *a posteriori* codes are given in the bottom two rows.

The table columns read down in order to make comparisons between the *a priori* codes and the *a posteriori* codes. There are three column headers. The left hand column

describes the total number of categories of communicative behaviors that both the TDCs and the SibAs were expected to exhibit *a priori* and then the total number of categories of communicative behaviors that both the TDCs and the SibAs exhibited *a posteriori*. The middle column describes the total number of categories of communicative behaviors that only the TDCs were expected to exhibit *a priori* and then the total number of categories of communicative behaviors that only the TDCs exhibited *a posteriori*. The right hand column describes the total number of categories of communicative behaviors that only the SibAs were expected to exhibit *a priori* and then the total number of categories of communicative behaviors that only the SibAs exhibited *a posteriori*. For example, the researcher expected that both the TDCs and the SibAs would exhibit 29 subordinate categories and 13 superordinate categories of communicative behaviors *a priori*. Then the researcher found *a posteriori* that both the TDCs and the SibAs exhibited 17 subordinate categories and 13 superordinate categories of communicative behaviors.

Table 9

Comparison of A Priori and A Posteriori Communicative Codes

	Both the TDCs and the SibAs	Only the TDCs	Only the SibAs
Subordinate Categories <i>A Priori</i>	34	11	7
Superordinate Categories <i>A Priori</i>	11	4	5

Subordinate Categories <i>A Posteriori</i>	17	15	15
Superordinate Categories <i>A Posteriori</i>	13	6	4

4.4.1 Reiteration and Expansion of the *A Posteriori* Subordinate Categories

Table 10, Table 11, and Table 12 list all of the subordinate categories and all of the superordinate categories of communicative behaviors produced by both members of the sibling dyads. The purpose of these three tables is to show how the researcher's anticipations were played out during the course of the study. In each of three tables, Table 10, Table 11, and Table 12, there are two column headers. The left hand column describes the subordinate categories of communicative behaviors. The right hand column describes the superordinate categories of communicative behaviors. There are asterisks in the left hand column (described in the tables' footnotes) to show which subordinate categories of communicative behaviors were reassigned *a posteriori* to correspond with the data obtained.

Table 10

Communicative Behaviors Exhibited by Both TDCs and SibAs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
Pointing (Sub1Po)	Gestures (Sup1G)
Holding hands (Sub2Hh)	Signs of affection (Sup2SA)

Hugging (Sub3H) Smiling (Sub4Sm)*** Laughing (Sub5III) Comforting (Sub6Com)** Patting (Sub7Pa)** General signs of affection unaccounted for (Sub8Gsa)***	
Tease remark (Sub11Te)** Crying (Sub12Cry)***	Negative verbal (Sup4V-)
Take desired object (Sub16---) Grabbing (Sub17Gr)*** Hitting (Sub18Hi)*** Head-butting (Sub19Hb)*** Mad face (Sub20Mad)***	Negative nonverbal (Sup6NV-)
Questions (Sub25Q)	Questions (Sup9Q)
Initiation using language (Sub26L) Initiation using motoric behavior (Sub27Mb) Initiation using gesture (Sub28IG)	Initiations (Sup10I)
Eye contact (Sub29EC)	Eye contact (Sup11EC)
Taking turns (Sub30< >) Giving (Sub31Gg)**	Sharing (Sup12S)
Positive response (Sub32R+) Does not respond (Sub33R-)	Response (Sup13R)
Directing sounds to an object (Sub34Dvt)***	Directed vocalization to object (Sup14DVT)

Repeat verbatim (Sub38Rv)	Verbal imitation (Sup16VI)
SibA copies motoric behavior of TDC (Sub39Mit)*** TDC copies motoric behavior of SibA (Sub40Mia)**	Motoric imitation (Sup17MI)
Statement (Sub45STATE)	Statement (Sup21STATE)

Note. * = Reassigned *a posteriori* to Table 10 “titled Communicative Behaviors Exhibited by Both TDCs and SibAs; ** = Reassigned *a posteriori* to Table 11 titled Communicative Behaviors Exhibited Only by TDCs; *** = Reassigned *a posteriori* to Table 12 titled Communicative Behaviors Exhibited Only by SibAs

Table 11

Communicative Behaviors Exhibited by Only TDCs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
Encouragement (Sub9E) Praise (Sub10P)	Positive verbal reinforcement (Sup3V+)
High-five (Sub13H5) * Sensory input (Sub14Sen) Give a desired object (Sub15+++)	Positive nonverbal (Sup5NV+)
Motoric model (Sub21Mm) Hand-over-hand prompt (Sub22Hohp) Verbal model (Sub23Vm)	Prompts (Sup7P)
Commands (Sub24C)	Commands (Sup8C)
Narrate (Sub44NAR)	Narrate (Sup20NAR)
Teaching moment (Sub46TM)	Teaching moment (Sup22TM)

Note. * = Reassigned *a posteriori* to Table 10 “titled Communicative Behaviors Exhibited by Both TDCs and SibAs; ** = Reassigned *a posteriori* to Table 11 titled Communicative Behaviors Exhibited Only by TDCs; *** = Reassigned *a posteriori* to Table 12 titled Communicative Behaviors Exhibited Only by SibAs

Table 12

Communicative Behaviors Exhibited by Only SibAs

Subordinate Categories of Communicative Behaviors	Superordinate Categories of Communicative Behaviors
Sounds with motoric self-stimulation (Sub35Msst) Random sounds not directed to a person (Sub36Rrv) Vocal self-stimulation (Sub37Vsst)	Undirected vocalizations (Sup15UDV)
Looking at sibling (Sub41Lat) Looking at sibling's play materials (Sub42Lam)	Orientation (Sup18O)
Parallel play (Sub43PP)*	Parallel play (Sup19PP)
Perseveration (Sub47PPP)	Perseveration (Sup23PPP)

Note. * = Reassigned *a posteriori* to Table 10 “titled Communicative Behaviors Exhibited by Both TDCs and SibAs; ** = Reassigned *a posteriori* to Table 11 titled Communicative Behaviors Exhibited Only by TDCs; *** = Reassigned *a posteriori* to Table 12 titled Communicative Behaviors Exhibited Only by SibAs

4.4.2 Reiteration and Expansion of the *A Posteriori* Codes: Table-by-Table Basis

In summary, the researcher reassigned 16 subordinate categories of communicative behaviors out of the 47 possible subordinate categories of communicative behaviors. The 16 subordinate categories of communicative behaviors are identified in the lists below with asterisks to show which participant(s) exhibited the behavior *a posteriori*. The following sections explain how the subordinate categories of communicative behaviors shifted slightly table-by-table.

4.4.2.A Table 10. As shown in Table 10, the researcher reassigned 14 subordinate categories of communicative behaviors that were anticipated *a priori* for both the TDCs

and the SibAs to exhibit (Table 3). The 14 subordinate categories of communicative behaviors were comprised of 5 subordinate categories of communicative behaviors that were exhibited only by the TDCs *a posteriori* and 9 subordinate categories of communicative behaviors that were exhibited only by the SibAs *a posteriori*. The 5 subordinate categories of communicative behaviors exhibited by only the TDCs *a posteriori* rather than by both the TDCs and the SibAs (as was anticipated *a priori*) are as follows:

1. Comforting (Sub6Com)** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the TDCs exhibited the behavior
2. Patting (Sub7Pa)** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the TDCs exhibited the behavior
3. Tease remark (Sub11Te)** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the TDCs exhibited the behavior
4. Giving (Sub31Gg)** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the TDCs exhibited the behavior
5. TDC copies motoric behavior of SibA (Sub40Mia)** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the TDCs exhibited the behavior

The 9 subordinate categories of communicative behaviors exhibited by only the SibAs *a posteriori* rather than by both the TDCs and the SibAs (as was anticipated *a priori*) are as follows:

1. Smiling (Sub4Sm)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
2. General signs of affection unaccounted for (Sub8Gsa)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
3. Crying (Sub12Cry)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
4. Grabbing (Sub17Gr)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
5. Hitting (Sub18Hi)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
6. Head-butting (Sub19Hb)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior

7. Mad face (Sub20Mad)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
8. Directing sounds to an object (Sub34Dvt)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior
9. SibA copies motoric behavior of TDC (Sub39Mit)*** = anticipated *a priori* for both the TDCs and the SibAs to exhibit; however, *a posteriori* data revealed that only the SibAs exhibited the behavior

In summary, *a posteriori* data revealed that both the TDCs and the SibAs exhibited 17 subordinate categories of communicative behaviors out of the total 47 subordinate categories of communicative behaviors. The 17 subordinate categories of communicative behaviors exhibited by both the TDCs and the SibAs *a posteriori* are as follows:

1. Pointing (Sub1Po)
2. Holding hands (Sub2Hh)
3. Hugging (Sub3H)
4. Laughing (Sub5III)
5. Take desired object (Sub16---
6. Questions (Sub25Q)
7. Initiation using language (Sub26L)
8. Initiation using motoric behavior (Sub27Mb)
9. Initiation using gesture (Sub28IG)

10. Eye contact (Sub29EC)
11. Taking turns (Sub30< >)
12. Positive response (Sub32R+)
13. Does not respond (Sub33R-)
14. Repeat verbatim (Sub38Rv)
15. Statement (Sub45STATE)
16. High-five (Sub13H5) *
17. Parallel play (Sub43PP)*

4.4.2.B Table 11. As shown in Table 11, the researcher reassigned 1 subordinate category of communicative behavior that it was anticipated *a priori* that only the TDCs would exhibit (Table 4). The 1 subordinate category of communicative behavior exhibited by both the TDCs and the SibAs *a posteriori* rather than by only the TDCs (as was anticipated *a priori*) is as follows:

1. High-five (Sub13H5) * = anticipated *a priori* for only the TDCs to exhibit; however, *a posteriori* data revealed that both the TDCs and the SibAs exhibited the behavior

In summary, *a posteriori* data revealed that only the TDCs exhibited 15 subordinate categories of communicative behaviors out of the total 47 subordinate categories of communicative behaviors. The 15 subordinate categories of communicative behaviors exhibited by only the TDCs *a posteriori* are as follows:

1. Encouragement (Sub9E)
2. Praise (Sub10P)
3. Sensory input (Sub14Sen)

4. Give a desired object (Sub15+++)
5. Motoric model (Sub21Mm)
6. Hand-over-hand prompt (Sub22Hohp)
7. Verbal model (Sub23Vm)
8. Commands (Sub24C)
9. Narrate (Sub44NAR)
10. Teaching moment (Sub46TM)
11. Comforting (Sub6Com)**
12. Patting (Sub7Pa)**
13. Tease remark (Sub11Te)**
14. Giving (Sub31Gg)**
15. TDC copies motoric behavior of SibA (Sub40Mia)**

4.4.2.C Table 12. As shown in Table 12, the researcher reassigned 1 subordinate category of communicative behavior that it was anticipated *a priori* that only the SibAs would exhibit (Table 5). The 1 subordinate category of communicative behavior exhibited by both the TDCs and the SibAs *a posteriori* rather than by only the SibAs (as was anticipated *a priori*) is as follows:

1. Parallel play (Sub43PP)* = anticipated *a priori* for only the SibAs to exhibit; however, *a posteriori* data revealed that both the TDCs and the SibAs exhibited the behavior

In summary, *a posteriori* data revealed that only the SibAs exhibited 15 subordinate categories of communicative behaviors out of the total 47 subordinate

categories of communicative behaviors. The 15 subordinate categories of communicative behaviors exhibited by only the SibAs *a posteriori* are as follows:

1. Sounds with motoric self-stimulation (Sub35Msst)
2. Random sounds not directed to a person (Sub36Rrv)
3. Vocal self-stimulation (Sub37Vsst)
4. Looking at sibling (Sub41Lat)
5. Looking at sibling's play materials (Sub42Lam)
6. Perseveration (Sub47PPP)
7. Smiling (Sub4Sm)***
8. General signs of affection unaccounted for (Sub8Gsa)***
9. Crying (Sub12Cry)***
10. Grabbing (Sub17Gr)***
11. Hitting (Sub18Hi)***
12. Head-butting (Sub19Hb)***
13. Mad face (Sub20Mad)***
14. Directing sounds to an object (Sub34Dvt)***
15. SibA copies motoric behavior of TDC (Sub39Mit)***

4.5 Data Obtained for All Participants

Analyses explored the total frequency of occurrence for each of the subordinate categories and each of the superordinate categories of communicative behaviors exhibited within each sibling dyad and across all six of the sibling dyads (TDCs together verses SibAs together). Within each sibling dyad, analysis of the total frequency of occurrence of communicative behaviors exhibited within each sibling dyad captured the unique

social interactions exhibited by the TDCs and the SibAs who varied by birth order, ages, and genders. Of note are the similarities and the differences in the communicative behaviors exhibited by the TDCs and the SibAs within sibling dyads. Data were then grouped to show the communicative behaviors of the TDCs across all of the sibling dyads, in order to show the aggregate for all the TDCs together. Similarly, data were grouped to show the communicative behaviors of the SibAs across all of the sibling dyads, to show the aggregate for all of the SibAs together.

The grand total of frequency of occurrence of communicative behaviors exhibited by the TDCs together was 586. The grand total of frequency of occurrence of communicative behaviors exhibited by the SibAs together was 618. The totals are depicted in Table 13, Table 14, Table 15, Table 16, Table 17, and Table 18. The data obtained for all participants show six sets of frequencies of occurrence. It is important to note that the anticipations for the *a priori* codes, previously mentioned in Chapter III in the section titled Final Array of Anticipated Communicative Codes, are identified with an “x” and “y” following the tallied frequencies. An “x” indicates that the researcher anticipated that a total frequency of occurrence would be exhibited by only the TDCs. A “y” indicates that the researcher anticipated that a total frequency of occurrence would be exhibited by only the SibAs. Each of the six sets of data below have a footnote in their respective tables to explain the “x” and “y.” The six sets of data are as follows:

- The Total Frequencies of Occurrence of the Subordinate Categories Within Sibling Dyads (Table 13 in Appendix I)
- The Total Frequencies of Occurrence of the Superordinate Categories Within Sibling Dyads (Table 14 in Appendix J)

- The Total Frequencies of Occurrence of the Subordinate Categories Across All TDCs and All SibAs (Table 15 in Appendix K)
- The Total Frequencies of Occurrence of the Superordinate Categories Across All TDCs and All SibAs (Table 16 in Appendix L)
- The Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of the Subordinate Categories by Group: TDCs and SibAs (Table 17)
- The Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of the Superordinate Categories by Group: TDCs and SibAs (Table 18)

4.5.1 Total Frequencies of Occurrence of the Subordinate Categories Within Sibling Dyads

Table 13 shows the total frequencies of occurrence of the subordinate categories within sibling dyads. To maintain the integrity of the categories, the column headers in Table 13 extend across to display the superordinate categories of communicative behaviors, in row 1 of the table, underlined and in bold font. The subordinate categories of communicative behaviors are in row 2 of Table 13, in normal font. The row headers extend down to display the six sibling dyads: TDC1 and SibA1, TDC2 and SibA2, TDC3 and SibA3, TDC4 and SibA4, TDC5 and SibA5, and TDC6 and SibA6. The researcher tallied the total frequencies of occurrence of the subordinate categories of communicative behaviors during each 45-minute home observation beneath the corresponding subordinate category code. For instance, in sibling dyad1, composed of TDC1 and SibA1, TDC1 exhibited pointing (Sub1Po) for 0 total frequency of occurrence, holding hands (Sub2Hh) for 1 total frequency of occurrence, hugging (Sub3H) for 1 total frequency of

occurrence, and so forth. SibA1 of sibling dyad1 exhibited pointing (Sub1Po) for 0 total frequency of occurrence, holding hands (Sub2Hh) for 0 total frequency of occurrence, and hugging (Sub3H) for 0 total frequency of occurrence. Another example is sibling dyad2, composed of TDC2 and SibA2. TDC2 exhibited pointing (Sub1Po) for 1 total frequency of occurrence, holding hands (Sub2Hh) for 0 total frequency of occurrence, and hugging (Sub3H) for 0 total frequency of occurrence. SibA2 of sibling dyad2 exhibited pointing (Sub1Po) for 0 total frequency of occurrence, holding hands (Sub2Hh) for 0 total frequency of occurrence, and hugging (Sub3H) for 0 total frequency of occurrence.

4.5.2 Total Frequencies of Occurrence of the Superordinate Categories Within Sibling Dyads

Table 14 shows the total frequencies of occurrence of the superordinate categories within sibling dyads. The column headers in Table 14 extend across to display the superordinate categories of communicative behaviors, in row 1 of Table 14, underlined and in bold font. The row headers extend down to display the six sibling dyads: TDC1 and SibA1, TDC2 and SibA2, TDC3 and SibA3, TDC4 and SibA4, TDC5 and SibA5, and TDC6 and SibA6. The researcher tallied the total frequencies of occurrence of the superordinate categories of communicative behaviors during each 45-minute home observation beneath the corresponding superordinate category code. For instance, in sibling dyad1, composed of TDC1 and SibA1, TDC1 exhibited a gesture (Sup1G) for 0 total frequency of occurrence, signs of affection (Sup2SA) for 6 total frequencies of occurrence, and so forth. SibA1 of sibling dyad1 exhibited a gesture (Sup1G) for 0 total frequency of occurrence and signs of affection (Sup2SA) for 1 total frequency of

occurrence. Another example is sibling dyad2, composed of TDC2 and SibA2. TDC2 exhibited a gesture (Sup1G) for 1 total frequency of occurrence, signs of affection (Sup2SA) for 0 total frequency of occurrence, and so forth. SibA2 of sibling dyad2 exhibited a gesture (Sup1G) for 0 total frequency of occurrence and signs of affection (Sup2SA) for 1 total frequency of occurrence.

4.5.3 Total Frequencies of Occurrence of the Subordinate Categories Across All TDCs and All SibAs

Table 15 shows the total frequencies of occurrence of the subordinate categories across all of the TDCs and all of the SibAs. To maintain the integrity of the categories, the column headers in Table 15 extend across to display the superordinate categories of communicative behaviors, in row 1 of Table 15, underlined and in bold font. The subordinate categories of communicative behaviors are in row 2 of the table, in normal font. The row headers extend down to display TDCs and SibAs. The researcher tallied the total frequencies of occurrence of the subordinate categories that occurred across all of the TDCs and all of the SibAs within each 45-minute home observation beneath the corresponding subordinate category code. For instance, all of the TDCs together exhibited pointing (Sub1Po) for 1 total frequency of occurrence, holding hands (Sub2Hh) for 1 total frequency of occurrence, hugging (Sub3H) for 2 total frequencies of occurrence, and so forth. All of the SibAs together exhibited pointing (Sub1Po) for 1 total frequency of occurrence, holding hands (Sub2Hh) for 11 total frequencies of occurrence, and hugging (Sub3H) for 1 total frequency of occurrence.

The total frequencies of occurrence of the subordinate categories of communicative behaviors across the TDCs and the SibAs allowed for comparisons

between the TDCs and the SibAs. There were 21 subordinate categories of communicative behaviors where the TDCs exhibited higher total frequencies of occurrence for than the SibAs. There were 21 subordinate categories of communicative behaviors where the SibAs exhibited higher total frequencies of occurrence for than the TDCs. There were 5 subordinate categories of communicative behaviors where the TDCs and the SibAs exhibited the same total frequencies of occurrence.

The 21 subordinate categories of communicative behaviors where the TDCs exhibited higher total frequencies of occurrence than the SibAs are as follows:

1. Commands (Sub24C) = TDCs' 130 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
2. Initiation using motoric behavior (Sup27Mb) = TDCs' 47 total frequencies of occurrence to SibAs' 16 total frequencies of occurrence
3. Questions (Sub25Q) = TDCs' 44 total frequencies of occurrence to SibAs' 7 total frequencies of occurrence
4. Statement (Sup45STATE) = TDCs' 35 total frequencies of occurrence to SibAs' 4 total frequencies of occurrence
5. Praise (Sub10Pr) = TDCs' 30 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
6. Initiation using language (Sup26L) = TDCs' 29 total frequencies of occurrence to SibAs' 26 total frequencies of occurrence
7. Verbal model (Sub23Vm) = TDCs' 28 total frequencies of occurrence to SibAs' 0 total frequency of occurrence

8. Teaching moment (Sub46TM) = TDCs' 25 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
9. Sensory input (Sub14Sen) = TDCs' 23 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
10. TDC copies motoric behavior of SibA (Sub40Mia) = TDCs' 16 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
11. Encouragement (Sub9E) = TDCs' 15 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
12. Hand-over-hand prompt (Sub22Hohp) = TDCs' 8 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
13. Narrate (Sub44NAR) = TDCs' 7 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
14. Tease remark (Sub11Te) = TDCs' 7 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
15. Take desired object (Sub16---) = TDCs' 5 total frequencies of occurrence to SibAs' 1 total frequency of occurrence
16. Motoric model (Sub21Mm) = TDCs' 5 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
17. Giving (Sup31Gg) = TDCs' 5 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
18. Give desired object (Sub15+++)= TDCs' 4 total frequencies of occurrence to SibAs' 0 total frequency of occurrence

19. Hugging (Sub3H) = TDCs' 2 total frequencies of occurrence to SibAs' 1 total frequency of occurrence

20. Comforting (Sub6Com) = TDCs' 1 total frequency of occurrence to SibAs' 0 total frequency of occurrence

21. Patting (Sub7Pa) = TDCs' 1 total frequency of occurrence to SibAs' 0 total frequency of occurrence

The 21 subordinate categories of communicative behaviors where the SibAs exhibited higher total frequencies of occurrence than the TDCs are as follows:

1. Positive response (Sub32R+) = SibAs' 123 total frequencies of occurrence to TDCs' 42 total frequencies of occurrence

2. Sounds with motoric self-stimulation (Sub35Msst) = SibAs' 90 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

3. Does not respond (Sub33R-) = SibAs' 51 total frequencies of occurrence to TDCs' 21 total frequencies of occurrence

4. Random sounds not directed to a person (Sub36Rrv) = SibAs' 49 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

5. Vocal self-stimulation (Sub37Vsst) = SibAs' 45 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

6. Looking at sibling (Sub41Lat) = SibAs' 34 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

7. Laughing (Sub5III) = SibAs' 27 total frequencies of occurrence to TDCs' 4 total frequencies of occurrence

8. Smiling (Sub4Sm) = SibAs' 17 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
9. Repeat verbatim (Sub38Rv) = SibAs' 17 total frequencies of occurrence to TDCs' 8 total frequencies of occurrence
10. Holding hands (Sub2Hh) = SibAs' 11 total frequencies of occurrence to TDCs' 1 total frequency of occurrence
11. Perseveration (Sub47PPP) = SibAs' 11 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
12. Grabbing (Sub17Gr) = SibAs' 8 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
13. Crying (Sub12Cry) = SibAs' 7 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
14. General signs of affection unaccounted for (Sub8Gsa) = SibAs' 6 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
15. Hitting (Sub18Hi) = SibAs' 6 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
16. Looking at sibling's play materials (Sub42Lam) = SibAs' 6 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
17. Initiation using gesture (Sub28IG) = SibAs' 3 total frequencies of occurrence to TDCs' 1 total frequency of occurrence
18. Directed vocalization to an object (Sub34DVT) = SibAs' 3 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

19. SibA copies motoric behavior of TDC (Sub39Mit) = SibAs' 3 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
20. Head-butting (Sub19Hb) = SibAs' 2 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
21. Mad face (Sub20Mad) = SibAs' 2 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

The 5 subordinate categories of communicative behaviors where the TDCs and the SibAs exhibited the same total frequencies of occurrence are as follows:

1. Eye contact (Sub29EC) = TDCs' 37 total frequencies of occurrence to SibAs' 37 total frequencies of occurrence
2. High-five (Sub13H5) = TDCs' 2 total frequencies of occurrence to SibAs' 2 total frequencies of occurrence
3. Pointing (Sub1Po) = TDCs' 1 total frequency of occurrence to SibAs' 1 total frequency of occurrence
4. Taking turns (Sub30< >) = TDCs' 1 total frequency of occurrence to SibAs' 1 total frequency of occurrence
5. Parallel play (Sub43PP) = TDCs' 1 total frequency of occurrence to SibAs' 1 total frequency of occurrence

4.5.4 Total Frequencies of Occurrence of the Superordinate Categories Across All TDCs and All SibAs

Table 16 shows the total frequencies of occurrence of the superordinate categories across all of the TDCs and all of the SibAs. The column headers in Table 16 extend across to display the superordinate categories of communicative behaviors, in row 1 of

the table, underlined and in bold font. The row headers extend down to display TDCs and SibAs. The researcher tallied the total frequencies of occurrence of the superordinate categories that occurred across all of the TDCs and all of the SibAs within each 45-minute home observation beneath the corresponding superordinate category code. For instance, all of the TDCs together exhibited a gesture (Sup1G) for 1 total frequency of occurrence, signs of affection (Sup2SA) for 9 total frequencies of occurrence, negative verbal (Sup4V-) for 7 total frequencies of occurrence, and so forth. All of the SibAs together exhibited a gesture (Sup1G) for 1 total frequency of occurrence, signs of affection (Sup2SA) for 62 total frequencies of occurrence, and negative verbal (Sup4V-) for 0 total frequency of occurrence.

The total frequencies of occurrence of the superordinate categories of communicative behaviors across the TDCs and the SibAs allowed for comparisons between the TDCs and the SibAs. There were 12 superordinate categories of communicative behaviors where the TDCs exhibited higher total frequencies of occurrence for than the SibAs. There were 8 superordinate categories of communicative behaviors where the SibAs exhibited higher total frequencies of occurrence for than the TDCs. There were 3 superordinate categories of communicative behaviors where the TDCs and the SibAs exhibited the same total frequencies of occurrence.

The 12 superordinate categories of communicative behaviors where the TDCs exhibited higher total frequencies of occurrence than the SibAs are as follows:

1. Commands (Sup8C) = TDCs' 130 total frequencies of occurrence to SibAs' 0 total frequency of occurrence

2. Initiations (Sup10I) = TDCs' 77 total frequencies of occurrence to SibAs' 45 total frequencies of occurrence
3. Positive verbal reinforcement (Sup3V+) = TDCs' 45 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
4. Questions (Sup9Q) = TDCs' 44 total frequencies of occurrence to SibAs' 7 total frequencies of occurrence
5. Prompts (Sup7P) = TDCs' 41 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
6. Statement (Sup21STATE) = TDCs' 35 total frequencies of occurrence to SibAs' 4 total frequencies of occurrence
7. Positive nonverbal (Sup5NV+) = TDCs' 29 total frequencies of occurrence to SibAs' 2 total frequencies of occurrence
8. Teaching moment (Sup22TM) = TDCs' 25 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
9. Motoric imitation (Sup17MI) = TDCs' 16 total frequencies of occurrence to SibAs' 3 total frequencies of occurrence
10. Negative verbal (Sup4V-) = TDCs' 7 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
11. Narrate (Sup20NAR) = TDCs' 7 total frequencies of occurrence to SibAs' 0 total frequency of occurrence
12. Sharing (Sup12S) = TDCs' 6 total frequencies of occurrence to SibAs' 1 total frequency of occurrence

The 8 superordinate categories of communicative behaviors where the SibAs exhibited higher total frequencies of occurrence than the TDCs are as follows:

1. Undirected vocalizations (Sup15UDV) = SibAs' 184 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
2. Response (Sup13R) = SibAs' 174 total frequencies of occurrence to TDCs' 63 total frequencies of occurrence
3. Signs of affection (Sup2SA) = SibAs' 62 total frequencies of occurrence to TDCs' 9 total frequencies of occurrence
4. Orientation (Sup18O) = SibAs' 40 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
5. Negative nonverbal (Sup6NV-) = SibAs' 19 total frequencies of occurrence to TDCs' 5 total frequencies of occurrence
6. Verbal imitation (Sup16VI) = SibAs' 17 total frequencies of occurrence to TDCs' 8 total frequencies of occurrence
7. Perseveration (Sup23PPP) = SibAs' 11 total frequencies of occurrence to TDCs' 0 total frequency of occurrence
8. Directed vocalization to an object (Sup14DVT) = SibAs' 3 total frequencies of occurrence to TDCs' 0 total frequency of occurrence

The 3 superordinate categories of communicative behaviors where the TDCs and SibAs exhibited the same total frequencies of occurrence are as follows:

1. Eye contact (Sup1IEC) = TDCs' 37 total frequencies of occurrence to SibAs' 37 total frequencies of occurrence

2. Gesture (Sup1G) = TDCs' 1 total frequency of occurrence to SibAs' 1 total frequency of occurrence
3. Parallel play (Sup19PP) = TDCs' 1 total frequency of occurrence to SibAs' 1 total frequency of occurrence

4.5.5 Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of the Subordinate Categories by Group: TDCs and SibAs

Table 17 shows the total frequencies of occurrence and the percentages of occurrence of the subordinate categories exhibited by each group: the TDCs and the SibAs. There are four column headers in Table 17. The columns read left to right. First, the farthest left hand column lists the subordinate categories of communicative behaviors of the TDCs. Second, the middle left hand column identifies, for each subordinate category, the total frequencies of occurrence out of a total number of 586 communicative behaviors and the percentages of occurrence exhibited by the TDCs. Third, the middle right hand column lists the subordinate categories of communicative behaviors of the SibAs. Last, the farthest right hand column identifies, for each subordinate category, the total frequency of occurrence out of a total number of 618 communicative behaviors and the percentages of occurrence exhibited by the SibAs. The middle left hand column and the farthest right hand column display the total frequencies of occurrence and the percentages of occurrence of the subordinate categories of communicative behaviors in descending order from the most frequently occurring to the least frequently occurring as exhibited by the TDCs and the SibAs, respectively.

For every total frequency count, the percentage of occurrence is written beneath the total frequency of occurrence. The percentages of occurrence indicate how often a

group produced a subordinate category of communicative behaviors. For example, the TDCs exhibited the subordinate category of commands (Sub24C), with 130 total frequencies of occurrence divided by the TDCs' 586 possible communicative behaviors. This revealed that the percentage of occurrence of commands (Sub24C) exhibited by the TDCs was 22.18% ($130/586 = 22.18\%$). Another example is that the SibAs exhibited the subordinate category of positive response (Sub32R+), with 123 total frequencies of occurrence divided by the SibAs' 618 possible communicative behaviors. This revealed that the percentage of occurrence of a positive response (Sub32R+) exhibited by the SibAs was 19.90% ($123/618 = 19.90\%$).

In comparing the TDCs and the SibAs, the most frequently occurring subordinate category of communicative behaviors exhibited by the TDCs was commands (Sub24C), with 130 total frequencies of occurrence and 22.18% of occurrence. The least frequently occurring subordinate categories of communicative behaviors exhibited by the TDCs were pointing (Sub1Po), holding hands (Sub2Hh), comforting (Sub6Com), patting (Sub7Pa), initiation using a gesture (Sub28IG), turn taking (Sub30< >), and parallel play (Sub43PP), all with 1 total frequency of occurrence and 0.17% of occurrence per communicative behavior. The most frequently occurring subordinate category of communicative behaviors exhibited by the SibAs was a positive response (Sub32R+), with 123 total frequencies of occurrence and 19.90% of occurrence. The least frequently occurring subordinate categories of communicative behaviors exhibited by the SibAs were pointing (Sub1G), hugging (Sub3H), take desired object (Sub16---), taking turns (Sub30< >), and parallel play, all with 1 total frequency of occurrence and 0.16% of occurrence per communicative behavior.

Table 17

Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of Subordinate Categories by Group, as Exhibited by the TDCs and the SibAs

Subordinate Categories of Communicative Behaviors of the TDCs	Total Frequencies of Occurrence (586) and Percentages of Occurrence Exhibited by the TDCs	Subordinate Categories of Communicative Behaviors of the SibAs	Total Frequencies of Occurrence (618) and Percentages of Occurrence Exhibited by the SibAs
Commands (Sub24C)	130 22.18%	Positive response (Sub32R+)	123 19.90%
Initiation using motoric behavior (Sub27Mb)	47 8.02%	Sounds with motoric self-stimulation (Sub35Msst)	90 14.56%
Questions (Sub25Q)	44 7.51%	Does not respond (Sub33R-)	51 8.25%
Positive response (Sub32R+)	42 7.17%	Random sounds not directed to a person (Sub36Rrv)	49 7.93%
Eye contact (Sub29EC)	37 6.31%	Vocal self-stimulation (Sub37Vsst)	45 7.29%
Statement (Sub45STATE)	35 6.0%	Eye contact (Sub29EC)	37 5.99%
Praise (Sub10Pr)	30 5.12%	Looking at sibling (Sub41Lat)	34 5.50%
Initiation using language (Sub26L)	29 4.95%	Laughing (Sub5III)	27 4.37%

Verbal model (Sub23Vm)	28 4.78%	Initiation using language (Sub26L)	26 4.21%
Teaching moment (Sub46TM)	25 4.27%	Smiling (Sub4Sm)	17 2.75%
Sensory input (Sub14Sen)	23 3.92%	Repeat verbatim (Sub38Rv)	17 2.75%
Does not respond (Sub33R-)	21 3.58%	Initiation using motoric behavior (Sub27Mb)	16 2.59%
TDC copies motoric behavior of SibA (Sub40Mia)	16 2.73%	Holding hands (Sub2Hh)	11 1.78%
Encouragement (Sub9E)	15 2.56%	Perseveration (Sub47PPP)	11 1.78%
Hand-over-hand prompt (Sub22Hohp)	8 1.37%	Grabbing (Sub17Gr)	8 1.29%
Repeat verbatim (Sub38Rv)	8 1.37%	Crying (Sub12Cry)	7 1.13%
Tease remark (Sub11Te)	7 1.19%	Questions (Sub25Q)	7 1.13%
Narrate (Sub44NAR)	7 1.19%	General signs of affection unaccounted for (Sub8Gsa)	6 0.97%
Take desired object (Sub16---)	5 0.85%	Hitting (Sub18Hi)	6 0.97%

Motoric model (Sub21Mm)	5 0.85%	Looking at sibling's play material (Sub42Lam)	6 0.97%
Giving (Sub31Gg)	5 0.85%	Statement (Sub45STATE)	4 0.65%
Laughing (Sub5III)	4 0.68%	Initiation using gesture (Sub28IG)	3 0.49%
Give a desired object (Sub15+++)	4 0.68%	Directing sounds to an object (Sub34Dvt)	3 0.49%
Hugging (Sub3H)	2 0.34%	SibA copies motoric behavior of TDC (Sub39Mit)	3 0.49%
High-five (Sub13H5)	2 0.34%	High-five (Sub13H5)	2x 0.32%
Pointing (Sub1Po)	1 0.17%	Head-butting (Sub19Hb)	2 0.32%
Holding hands (Sub2Hh)	1 0.17%	Mad face (Sub20Mad)	2 0.32%
Comforting (Sub6Com)	1 0.17%	Pointing (Sub1Po)	1 0.16%
Patting (Sub7Pa)	1 0.17%	Hugging (Sub3H)	1 0.16%
Initiation using gesture (Sub28IG)	1 0.17%	Take desired object (Sub16---	1 0.16%

Taking turns (Sub30< >)	1 0.17%	Taking turns (Sub30< >)	1 0.16%
Parallel play (Sub43PP)	1y 0.17%	Parallel play (Sub43PP)	1 0.16%
Smiling (Sub4Sm)	0 0%	Comforting (Sub6Com)	0 0%
General signs of affection unaccounted for (Sub8Gsa)	0 0%	Patting (Sub7Pa)	0 0%
Crying (Sub12Cry)	0 0%	Encouragement (Sub9E)	0x 0%
Grabbing (Sub17Gr)	0 0%	Praise (Sub10Pr)	0x 0%
Hitting (Sub18Hi)	0 0%	Tease remark (Sub11Te)	0 0%
Head-butting (Sub19Hb)	0 0%	Sensory input (Sub14Sen)	0x 0%
Mad face (Sub20Mad)	0 0%	Give a desired object (Sub15+++)	0 0%
Directing sounds to an object (Sub34Dvt)	0 0%	Motoric model (Sub21Mm)	0x 0%
Sounds with motoric self- stimulation (Sub35Msst)	0 0%	Hand-over-hand prompt (Sub22Hohp)	0 0%

Random sounds not directed to a person (Sub36Rrv)	0y 0%	Verbal model (Sub23Vm)	0x 0%
Vocal self-stimulation (Sub37Vsst)	0 0%	Commands (Sub24C)	0x 0%
SibA copies motoric behavior of TDC (Sub39Mit)	0y 0%	Giving (Sub31Gg)	0 0%
Looking at sibling (Sub41Lat)	0y 0%	TDC copies motoric behavior of SibA (Sub40Mia)	0 0%
Looking at sibling's play material (Sub42Lam)	0y 0%	Narrate (Sub44NAR)	0 0%
Perseveration (Sub47PPP)	0 0%	Teaching moment (Sub46TM)	0 0%

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

4.5.6 Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of Superordinate Categories by Group: TDCs and SibAs

Table 18 shows the total frequencies of occurrence and the percentages of occurrence of superordinate categories of communicative behaviors exhibited by each group: the TDCs and the SibAs. There are four column headers. The columns read left to right. First, the farthest left hand column lists the superordinate categories of communicative behaviors of the TDCs. Second, the middle left hand column identifies, for each superordinate category, the total frequency of occurrence out of a total number of 586 communicative behaviors and the percentages of occurrence exhibited by the

TDCs. Third, the middle right hand column lists the superordinate categories of communicative behaviors of the SibAs. Last, the farthest right hand column identifies, for each superordinate category, the total frequency of occurrence out of a total number of 618 communicative behaviors and the percentages of occurrence exhibited by the SibAs. The middle left hand column and the farthest right hand column display the total frequencies of occurrence and the percentages of occurrence of the superordinate categories of communicative behaviors in descending order from the most frequently occurring to the least frequently occurring as exhibited by the TDCs and the SibAs, respectively.

For every total frequency count, the percentage of occurrence is written beneath the total frequency of occurrence. The percentages of occurrence indicate how often a group produced a superordinate category of communicative behaviors. For example, the TDCs exhibited the superordinate category of commands (Sup8C), with 130 total frequencies of occurrence divided by the TDCs' 586 possible communicative behaviors. This revealed that the percentage of occurrence of commands (Sup8C) exhibited by the TDCs was 22.18% ($130/586 = 22.18\%$). Another example is that the SibAs exhibited the superordinate category of undirected vocalizations (Sup15UDV), with 184 total frequencies of occurrence divided by the SibAs' 618 possible communicative behaviors. This revealed that the percentage of occurrence of undirected vocalizations (Sup15UDV) exhibited by the SibAs was 29.77% ($184/618 = 29.77\%$).

In comparing the TDCs and the SibAs, the most frequently occurring superordinate category of communicative behaviors exhibited by the TDCs was commands (Sub24C), with 130 total frequencies of occurrence and 22.18% of

occurrence. The least frequently occurring superordinate categories of communicative behaviors exhibited by the TDCs were gesture (Sup1G) and parallel play (Sup19PP), all with 1 total frequency of occurrence and 0.17% of occurrence per communicative behavior. The most frequently occurring superordinate category of communicative behaviors exhibited by the SibAs was undirected vocalization (Sup15UDV), with 184 total frequencies of occurrence and 29.77% of occurrence. The least frequently occurring superordinate category of communicative behaviors exhibited by the SibAs were gesture (Sup1G), sharing (Sup12S), and parallel play (Sup19PP), all with 1 total frequency of occurrence and 0.16% of occurrence per communicative behavior.

Table 18

Highest to Lowest Total Frequencies of Occurrence and Percentages of Occurrence of Superordinate Categories by Group, as Exhibited by the TDCs and the SibAs

Superordinate Categories of Communicative Behaviors of the TDCs	Total Frequencies of Occurrence (586) and Percentages of Occurrence Exhibited by the TDCs	Superordinate Categories of Communicative Behaviors of the SibAs	Total Frequencies of Occurrence (618) and Percentages of Occurrence Exhibited by the SibAs
Commands (Sup8C)	130 22.18%	Undirected vocalizations (Sup15UDV)	184 29.77%
Initiations (Sup10I)	77 13.14%	Response (Sup13R)	174 28.16%
Response (Sup13R)	63 10.75%	Signs of affection (Sup2SA)	62 10.03%
Positive verbal reinforcement (Sup3V+)	45	Initiations (Sup10I)	45 7.28%

	7.68%		
Questions (Sup9Q)	44 7.50%	Orientation (Sup18O)	40 6.47%
Prompts (Sup7P)	41 7.00%	Eye contact (Sup11EC)	37 5.99%
Eye contact (Sup11EC)	37 6.31%	Negative nonverbal (Sup6NV-)	19 3.07%
Statement (Sup21STATE)	35 5.97%	Verbal imitation (Sup16VI)	17 2.75%
Positive nonverbal (Sup5NV+)	29 4.95%	Perseveration (Sup23PPP)	11 1.78%
Teaching moment (Sup22TM)	25 4.26%	Questions (Sup9Q)	7 1.13%
Motoric imitation (Sup17MI)	16 2.73%	Statement (Sup21STATE)	4 0.65%
Signs of affection (Sup2SA)	9 1.54%	Directed vocalization to object (Sup14DVT)	3 0.49%
Verbal imitation (Sup16VI)	8 1.37%	Motoric imitation (Sup17MI)	3 0.49%
Negative verbal (Sup4V-)	7 1.19%	Positive nonverbal (Sup5NV+)	2x 0.32%

Narrate (Sup20NAR)	7 1.19%	Gestures (Sup1G)	1 0.16%
Sharing (Sup12S)	6 1.02%	Sharing (Sup12S)	1 0.16%
Negative nonverbal (Sup6NV-)	5 0.85%	Parallel play (Sup19PP)	1 0.16%
Gestures (Sup1G)	1 0.17%	Positive verbal reinforcement (Sup3V+)	0x 0%
Parallel play (Sup19PP)	1y 0.17%	Negative verbal (Sup4V-)	0 0%
Directed vocalization to object (Sup14DVT)	0 0%	Prompts (Sup7P)	0x 0%
Undirected vocalizations (Sup15UDV)	0 0%	Commands (Sup8C)	0x 0%
Orientation (Sup18O)	0y 0%	Narrate (Sup20NAR)	0 0%
Perseveration (Sup23PPP)	0 0%	Teaching moment (Sup22TM)	0 0%

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

4.6 Analysis of the Percentages of Occurrence by Group: TDCs and SibAs

Of note are the similarities and differences of communicative behaviors as described in the percentages of occurrence exhibited by the TDCs and the SibAs. There were some communicative behaviors found to be prevalent of both the TDCs and the

SibAs. Other communicative behaviors were found to be prevalent for only the TDCs or for only the SibAs. The researcher classified the subordinate categories (Table 17) and the superordinate categories (Table 18) of communicative behaviors exhibited at a 1% or greater percentage of occurrence by only the TDCs or by only the SibAs as showing a “sufficient percentage” to warrant further analysis. The researcher then classified the remaining subordinate categories and the superordinate categories of communicative behaviors exhibited below a 1% percentage of occurrence by only the TDCs or by only the SibAs as showing an “insufficient percentage” that does not warrant further analysis.

4.6.1 Prevalent Subordinate Categories Exhibited by the TDCs

The subordinate categories with 1% or greater percentages of occurrence included the 18 subordinate categories of communicative behaviors (Table 17) that accounted for 94.22% of all of the communicative behaviors exhibited by the TDCs. These subordinate categories with below 1% of occurrence included the 29 subordinate categories of communicative behaviors (Table 17) that accounted for 5.78% of all of the communicative behaviors exhibited by the TDCs.

The 18 subordinate categories of communicative behaviors exhibited by the TDCs at a 1% or greater percentage of occurrence show a “sufficient percentage” and are as follows:

1. Commands (Sub24C) = 22.18% of all the subordinate categories of communicative behaviors exhibited by the TDCs
2. Initiation using motoric behavior (Sub27Mb) = 8.02% of all the subordinate categories of communicative behaviors exhibited by the TDCs

3. Questions (Sub25Q) = 7.51% of all the subordinate categories of communicative behaviors exhibited by the TDCs
4. Positive response (Sub32R+) = 7.17% of all the subordinate categories of communicative behaviors exhibited by the TDCs
5. Eye contact (Sub29EC) = 6.31% of all the subordinate categories of communicative behaviors exhibited by the TDCs
6. Statement (Sub45STATE) = 6.0% of all the subordinate categories of communicative behaviors exhibited by the TDCs
7. Praise (Sub10Pr) = 5.12% of all the subordinate categories of communicative behaviors exhibited by the TDCs
8. Initiation using language (Sub26L) = 4.95% of all the subordinate categories of communicative behaviors exhibited by the TDCs
9. Verbal model (Sub23Vm) = 4.78% of all the subordinate categories of communicative behaviors exhibited by the TDCs
10. Teaching moment (Sub46TM) = 4.27% of all the subordinate categories of communicative behaviors exhibited by the TDCs
11. Sensory input (Sub14Sen) = 3.92% of all the subordinate categories of communicative behaviors exhibited by the TDCs
12. Does not respond (Sub33R-) = 3.58% of all the subordinate categories of communicative behaviors exhibited by the TDCs
13. TDC copies motoric behavior of SibA (Sub40Mia) = 2.73% of all the subordinate categories of communicative behaviors exhibited by the TDCs

14. Encouragement (Sub9E) = 2.56% of all the subordinate categories of communicative behaviors exhibited by the TDCs
15. Hand-over-hand prompt (Sub22Hohp) = 1.37% of all the subordinate categories of communicative behaviors exhibited by the TDCs
16. Repeat verbatim (Sub38Rv) = 1.37% of all the subordinate categories of communicative behaviors exhibited by the TDCs
17. Tease remark (Sub11Te) = 1.19% of all the subordinate categories of communicative behaviors exhibited by the TDCs
18. Narrate (Sub44NAR) = 1.19% of all the subordinate categories of communicative behaviors exhibited by the TDCs

4.6.2 Prevalent Subordinate Categories Exhibited by the SibAs

The subordinate categories with 1% or greater percentage of occurrence included the 17 subordinate categories of communicative behaviors (Table 17) that accounted for 93.20% of all of the communicative behaviors exhibited by the SibAs. These subordinate categories with below 1% of occurrence included the 30 subordinate categories of communicative behaviors (Table 17) that accounted for 6.8% of all of the communicative behaviors exhibited by the SibAs.

The 17 subordinate categories of communicative behaviors exhibited by the SibAs at a 1% or greater percentage of occurrence show a “sufficient percentage” and are as follows:

1. Positive response (Sub32R+) = 19.90% of all the subordinate categories of communicative behaviors exhibited by the SibAs

2. Sounds with motoric self-stimulation (Sub35Msst) = 14.56% of all the subordinate categories of communicative behaviors exhibited by the SibAs
3. Does not respond (Sub33R-) = 8.25% of all the subordinate categories of communicative behaviors exhibited by the SibAs
4. Random sounds not directed to a person (Sub36Rrv) = 7.93% of all the subordinate categories of communicative behaviors exhibited by the SibAs
5. Vocal self-stimulation (Sub37Vsst) = 7.29% of all the subordinate categories of communicative behaviors exhibited by the SibAs
6. Eye contact (Sub29EC) = 5.99% of all the subordinate categories of communicative behaviors exhibited by the SibAs
7. Looking at sibling (Sub41Lat) = 5.50% of all the subordinate categories of communicative behaviors exhibited by the SibAs
8. Laughing (Sub5III) = 4.37% of all the subordinate categories of communicative behaviors exhibited by the SibAs
9. Initiation using language (Sub26L) = 4.21% of all the subordinate categories of communicative behaviors exhibited by the SibAs
10. Smiling (Sub4Sm) = 2.75% of all the subordinate categories of communicative behaviors exhibited by the SibAs
11. Repeat verbatim (Sub38Rv) = 2.75% of all the subordinate categories of communicative behaviors exhibited by the SibAs
12. Initiation using motoric behavior (Sub27Mb) = 2.59% of all the subordinate categories of communicative behaviors exhibited by the SibAs

13. Holding hands (Sub2Hh) = 1.78% of all the subordinate categories of communicative behaviors exhibited by the SibAs
14. Perseveration (Sub47PPP) = 1.78% of all the subordinate categories of communicative behaviors exhibited by the SibAs
15. Grabbing (Sub17Gr) = 1.29% of all the subordinate categories of communicative behaviors exhibited by the SibAs
16. Crying (Sub12Cry) = 1.13% of all the subordinate categories of communicative behaviors exhibited by the SibAs
17. Questions (Sub25Q) = 1.13% of all the subordinate categories of communicative behaviors exhibited by the SibAs

4.6.3 Prevalent Superordinate Categories Exhibited by the TDCs

The superordinate categories with 1% or greater percentage of occurrence included the 16 superordinate categories of communicative behaviors (Table 18) that accounted for 98.70% of all of the communicative behaviors exhibited by the TDCs. These superordinate categories with below 1% of occurrence included the 7 superordinate categories of communicative behaviors (Table 18) that accounted for 1.3% of all of the communicative behaviors exhibited by the TDCs.

The 16 superordinate categories of communicative behaviors exhibited by the TDCs at a 1% or greater percentage of occurrence show a “sufficient percentage” and are as follows:

1. Commands (Sup8C) = 22.18% of all the superordinate categories of communicative behaviors exhibited by the TDCs

2. Initiation (Sup10I) = 13.14% of all the superordinate categories of communicative behaviors exhibited by the TDCs
3. Response (Sup13R) = 10.75% of all the superordinate categories of communicative behaviors exhibited by the TDCs
4. Positive verbal reinforcement (Sup3V+) = 7.68% of all the superordinate categories of communicative behaviors exhibited by the TDCs
5. Questions (Sup9Q) = 7.50% of all the superordinate categories of communicative behaviors exhibited by the TDCs
6. Prompts (Sup7P) = 7.00% of all the superordinate categories of communicative behaviors exhibited by the TDCs
7. Eye contact (Sup11EC) = 6.31% of all the superordinate categories of communicative behaviors exhibited by the TDCs
8. Statement (Sup21STATE) = 5.97% of all the superordinate categories of communicative behaviors exhibited by the TDCs
9. Positive nonverbal (Sup5NV+) = 4.95% of all the superordinate categories of communicative behaviors exhibited by the TDCs
10. Teaching moment (Sup22TM) = 4.26% of all the superordinate categories of communicative behaviors exhibited by the TDCs
11. Motoric imitation (Sup17MI) = 2.73% of all the superordinate categories of communicative behaviors exhibited by the TDCs
12. Signs of affection (Sup2SA) = 1.54% of all the superordinate categories of communicative behaviors exhibited by the TDCs

13. Verbal imitation (Sup16VI) = 1.37% of all the superordinate categories of communicative behaviors exhibited by the TDCs
14. Negative verbal (Sup4V-) = 1.19% of all the superordinate categories of communicative behaviors exhibited by the TDCs
15. Narrate (Sup20NAR) = 1.19% of all the superordinate categories of communicative behaviors exhibited by the TDCs
16. Sharing (Sup12S) = 1.02% of all the superordinate categories of communicative behaviors exhibited by the TDCs

4.6.4 Prevalent Superordinate Categories Exhibited by the SibAs

The superordinate categories with 1% or greater percentage of occurrence included the 10 superordinate categories of communicative behaviors (Table 18) that accounted for 96.70% of all of the communicative behaviors exhibited by the SibAs. These superordinate categories with below 1% of occurrence included the 13 superordinate categories of communicative behaviors (Table 18) that accounted for 3.3% of all of the communicative behaviors exhibited by the SibAs.

The 10 superordinate categories of communicative behaviors exhibited by the SibAs at a 1% or greater percentage of occurrence show a “sufficient percentage” and are as follows:

1. Undirected vocalizations (Sup15UDV) = 29.77% of all the superordinate categories of communicative behaviors exhibited by the SibAs
2. Response (Sup13R) = 28.16% of all the superordinate categories of communicative behaviors exhibited by the SibAs

3. Signs of affection (Sup2SA) = 10.03% of all the superordinate categories of communicative behaviors exhibited by the SibAs
4. Initiation (Sup10I) = 7.28% of all the superordinate categories of communicative behaviors exhibited by the SibAs
5. Orientation (Sup18O) = 6.47% of all the superordinate categories of communicative behaviors exhibited by the SibAs
6. Eye contact (Sup11EC) = 5.99% of all the superordinate categories of communicative behaviors exhibited by the SibAs
7. Negative nonverbal (Sup6NV-) = 3.07% of all the superordinate categories of communicative behaviors exhibited by the SibAs
8. Verbal imitation (Sup16VI) = 2.75% of all the superordinate categories of communicative behaviors exhibited by the SibAs
9. Perseveration (Sup23PPP) = 1.78% of all the superordinate categories of communicative behaviors exhibited by the SibAs
10. Questions (Sup9Q) = 1.13% of all the superordinate categories of communicative behaviors exhibited by the SibAs

4.7 Research Question 1 Answered

To answer research question 1, what communicative behaviors are observed to occur between TDCs and SibAs in their home settings, the researcher reflected on the six home observations and the data analyses. The TDCs exhibited a grand total of 586 communicative behaviors. The SibAs exhibited a grand total of 618 communicative behaviors. These grand totals rendered surprise, in that the researcher presumed that the TDCs would have exhibited a greater grand total of communicative behaviors, based on

the past literature and the researcher's clinical experiences that showed that TDCs demonstrate more communicative behaviors than SibAs. As expected, the researcher observed that the TDCs exhibited greater total frequencies of occurrence of verbal communicative behaviors. Data revealed that the TDCs exhibited a sufficient percentage of occurrence of verbal communicative behaviors used to initiate, maintain, and facilitate communicative interactions. The researcher observed that the SibAs exhibited greater total frequencies of occurrence of several nonverbal communicative behaviors. Data revealed that the SibAs exhibited a sufficient percentage of occurrence of nonverbal communicative behaviors used to respond, express emotions, and watch their TDCs during communicative interactions. Other communicative behaviors that elevated the SibAs' grand total of communicative behaviors to reach 618 were symptoms of ASD, as in, for example, self-stimulation.

4.8 Analysis of the Semi-Structured Interviews With TDCs and Parents

Analyses explored the semi-structured interviews with the TDCs and the semi-structured interviews with the parents. The researcher examined responses provided by the TDCs when asked about the TDCs' perceptions of their SibAs, the TDCs' behavior toward their SibAs, and the TDCs' knowledge of ASD. The researcher examined responses provided by the parents when asked about their TDCs' understanding of ASD and about their children's relationship with one another. Data analysis explored whether responses from the TDCs and the parents corresponded with the observed communicative behaviors.

Of note are the common trends and dissimilarities provided by the TDCs. Responses from the TDCs' semi-structured interviews were classified as "relevant" if the

TDCs provided an on target answer. The researcher noted common trends and dissimilarities across the parents' responses. Responses from the parents' semi-structured interviews were classified as "relevant" if the parents provided an on target answer. Data obtained from the semi-structured interviews with the TDCs and the semi-structured interviews with the parents provided the researcher with information to answer research questions 2 and 3.

4.8.1 TDCs' Responses During the Semi-Structured Interviews

During the semi-structured interviews with the TDCs, the researcher prepared field notes by using a list of 17 semi-structured interview questions that appear below and are located in Appendix F. Parents from the six families remained in ear shot of the TDCs' semi-structured interviews. The researcher documented responses given by each of the TDCs in long hand beneath the semi-structured interview questions. The interview questions were stated using the SibAs' names. The TDCs' semi-structured interview responses, are located in Appendix M, TDCs' Interview Responses, for easy analysis across the TDCs.

Semi-structured interview questions 1 to 5 inquired about their SibAs' ability to play. Responses are as follows (along with the TDCs' birth order, gender, and age):

1. Tell me what (SibA name) knows how to play?
 - TDC1 (younger, female, age 4): (not asked given TDC1's age and apparent lack of understanding)
 - TDC2 (younger, female, age 12): Dribbles basketball, put it in a hoop, catch
 - TDC3 (younger, male, age 11): Super Mario Brothers, wrestle

- TDC4 (older, male, age 16): Music, YouTube, I don't know
- TDC5 (older, male, age 12): Draw, iPad, roughhouse, piggy back, catch
- TDC6 (older, female, age 12): Playing with balls, catch, running, playground, swings, slides a lot

In relation to research question 2, semi-structured interview question 1 showed that 5/5 TDCs (100%) provided relevant responses containing a list of 2 to 6 activities that their SibAs' knew how to play. Four of the TDCs (TDC2, TDC3, TDC5, and TDC6) shared that their SibAs knew how to play physical activities. Three of the TDCs (TDC3, TDC4, and TDC5) shared that their SibAs knew how to play sit-down activities. The researcher did not ask TDC1 this semi-structured interview question because TDC1 seemed too young to understand.

2. Tell me what games you like to play?

- TDC1 (younger, female, age 4): Puzzles and babies
- TDC2 (younger, female, age 12): Capture the flag, basketball, football, run around, climb in trees, rock climbing
- TDC3 (younger, male, age 11): Video games, YouTube, reading books
- TDC4 (older, male, age 16): Video games, hangout with friends
- TDC5 (older, male, age 12): Sports, Xbox, Netflix
- TDC6 (older, female, age 12): Basketball, soccer, dodgeball, board games

In relation to research question 2, semi-structured interview question 2 showed that 6/6 TDCs (100%) provided relevant responses containing a list of 2 to 4 games. Three of the TDCs (TDC2, TDC5, and TDC6) stated that they enjoyed physical

activities. Five of the TDCs (TDC1, TDC3, TDC4, TDC5, and TDC6) stated they liked to play sit-down activities.

3. Which games does (SibA name) play with you?

- TDC1 (younger, female, age 4): Puppy
- TDC2 (younger, female, age 12): Catch, beads, violin “I don’t think SibA2 likes it,” Tic-Tac Toe, “I don’t think SibA2 likes to play with me much.”
- TDC3 (younger, male, age 11): Pretend games with dad, like when dad pretends to sleep and SibA3 has to wake him up
- TDC4 (older, male, age 16): SibA4 sits with me sometimes
- TDC5 (older, male, age 12): Roughhousing, sometimes draw. I will sit and play on the phone while SibA5 plays on his iPad
- TDC6 (older, female, age 12): Run around, catch, tickle fights

In relation to research question 2, semi-structured interview question 3 showed that 5/6 TDCs (83%) provided relevant responses to explain a variety of games SibAs play with their TDCs. Three of the TDCs (TDC2, TDC5, and TDC6) explained that their SibAs played physical activities with them. Three of the TDCs (TDC2, TDC4, and TDC5) explained that their SibAs played sit-down activities with them. Two of the TDCs (TDC1 and TDC3) explained that their SibAs played pretend play with them. TDC4 provided a response that did not describe play.

4. Tell me what (SibA name) plays and does?

- TDC1 (younger, female, age 4): Chase

- TDC2 (younger, female, age 12): Computer, piano, watches religious TV channel
- TDC3 (younger, male, age 11): YouTube, SpongeBob
- TDC4 (older, male, age 16): Plays on iPad
- TDC5 (older, male, age 12): iPad, drawing. Sometimes watch TV
- TDC6 (older, female, age 12): Computer, iPad, listening to music in SibA6's room, playing around with SibA6's stuff, SibA6 goes on his scooter

In relation to research question 2, semi-structured interview question 4 showed that 6/6 TDCs (100%) provided relevant responses to describe what their SibAs play. Two of the TDCs (TDC1 and TDC6) described their SibA as engaging in physical play. Five of the TDCs (TDC2, TDC3, TDC4, TDC5, and TDC6) described their SibAs as engaging in sit-down play.

5. Tell me what (SibA name) cannot play and do?

- TDC1 (younger, female, age 4): SibA1 is like me
- TDC2 (younger, female, age 12): I do not think SibA2 understands board games or capture the flag. I do not think SibA2 can really climb.
- TDC3 (younger, male, age 11): SibA3 cannot experiment with newer video games or board games
- TDC4 (older, male, age 16): Video games that are harder than anything on SibA4's iPad
- TDC5 (older, male, age 12): SibA5 does not play Xbox. That is it. I teach him sports

- TDC6 (older, female, age 12): Board games that have a lot of rules or games in general where SibA6 has to interact with other children

In relation to research question 2, semi-structured interview question 5 showed that 6/6 TDCs (100%) provided relevant responses to explain what their SibAs cannot play. Five of the TDCs (TDC2, TDC3, TDC4, TDC5, and TDC6) explained that their SibAs could not play complex games with many rules. One of the TDCs (TDC1) explained that her SibA1 could do anything she could.

Semi-structured interview questions 6 to 9 inquired about SibAs' cooperation and willingness to play. Responses are as follows (along with the TDCs' birth order, gender, and age):

6. Tell me, how do you invite (SibA name) to play with you?

- TDC1 (younger, female, age 4): I take SibA1's hand
- TDC2 (younger, female, age 12): "Hey! Do you want to play this?" SibA2 usually says "No."
- TDC3 (younger, male, age 11): I will start to pretend sleep without asking SibA3
- TDC4 (older, male, age 16): Ask
- TDC5 (older, male, age 12): Say, "Do you want to play with me?" or "What do you want to do?" Then do what SibA5 wants
- TDC6 (older, female, age 12): I will chase SibA6. If he runs and says, "Tickle me," I know he wants to play. If SibA6 does not respond, I know he does not want to play.

In relation to research question 2, semi-structured interview question 6 showed that 6/6 TDCs (100%) provided relevant responses to describe how they invite their SibAs to play. Three of the TDCs (TDC2, TDC4, and TDC5) described inviting their SibAs to play. Three of the TDCs (TDC1, TDC3, and TDC6) described inviting their SibAs to play with language. Three of the TDCs (TDC1, TDC3, and TDC6) described inviting their SibAs to play with motion or gesture.

7. How often do you play with (SibA name)?

- TDC1 (younger, female, age 4): A little bit of time
- TDC2 (younger, female, age 12): Not too often. Sometimes I help SibA2 read a book or whatever my mom needs help with.
- TDC3 (younger, male, age 11): Not often
- TDC4 (older, male, age 16): Couple times a week
- TDC5 (older, male, age 12): We have a busy schedule during the week. We still talk and hang a little. We mostly hangout on the weekend.
- TDC6 (older, female, age 12): Every other day. If SibA6 wants to play, it will be 20-30 minutes.

In relation to research question 2, semi-structured interview question 7 showed that 6/6 TDCs (100%) provided relevant responses to describe how often they play with their SibAs. Three of the TDCs (TDC1, TDC2, and TDC3) described not playing with their SibAs often. The other TDCs (TDC4, TDC5, and TDC6) provided responses open for interpretation relative to whether they play together often.

8. Tell me how often does (SibA name) play with you when you ask?

- TDC1 (younger, female, age 4): A lot
- TDC2 (younger, female, age 12): Not often

- TDC3 (younger, male, age 11): Sometimes SibA3 does not do it (TDC3 will keep trying)
- TDC4 (older, male, age 16): Half and half
- TDC5 (older, male, age 12): Mostly all the time unless SibA5 does not want to.
- TDC6 (older, female, age 12): 85% of the time, SibA6 will play when I invite him.

In relation to research question 2, semi-structured interview question 8 showed that 6/6 TDCs (100%) provided relevant responses to explain how often their SibAs played when asked. Three of the TDCs (TDC1, TDC5, and TDC6) explained that their SibAs played with them most of time (85% to 100% of the time) when they asked. Two of the TDCs (TDC3 and TDC4) explained that their SibAs played with them some of the time when they asked. One of the TDCs (TDC2) explained that her SibA2 did not play with her often when asked.

9. How long will (SibA) play with you?

- TDC1 (younger, female, age 4): 3 hours
- TDC2 (younger, female, age 12): 10-15 minutes
- TDC3 (younger, male, age 11): A few minutes
- TDC4 (older, male, age 16): 10-15 minutes
- TDC5 (older, male, age 12): We will play for 10-15 minutes then take a break. Roughhouse. We will play catch back and forth and stop if SibA5 gets frustrated.
- TDC6 (older, female, age 12): 20-30 minutes

In relation to research question 2, semi-structured interview question 9 showed that 6/6 TDCs (100%) provided relevant responses to describe how long their SibAs will play with them. Four of the TDCs (TDC2, TDC4, TDC5, and TDC6) described that their SibAs play with them for less than an hour (approximately 10-30 minutes). One of the TDCs (TDC1) described that her SibA1 played with her for 3 hours. TDC1's response was inconsistent with her previous responses, in that TDC1 is 4 years old and does not yet understand time. One of the TDCs (TDC3) described that his SibA3 played with him for a few minutes.

Semi-structured interview question 10 inquired about SibAs' interest in play. Responses are as follows (along with the TDCs' birth order, gender, and age):

10. Tell me how often does (SibA name) play with you and your friends?

- TDC1 (younger, female, age 4): No, SibA1 never plays with my friends.
- TDC2 (younger, female, age 12): Every time. SibA2 likes playing with them.
- TDC3 (younger, male, age 11): One time, SibA3 went on the trampoline with my friends.
- TDC4 (older, male, age 16): A little
- TDC5 (older, male, age 12): "Usually whenever I have friends over SibA5 is able to join in, unless he doesn't want to."
- TDC6 (older, female, age 12): Not very often. SibA6 keeps to himself when they come over.

In relation to research question 2, semi-structured interview question 10 showed that 6/6 TDCs (100%) provided relevant responses to describe how often their SibAs play

with the TDCs' friends. Two of the TDCs (TDC2 and TDC5) described that their SibAs always played with the TDCs' friends. Two of the TDCs (TDC4 and TDC6) described that their SibAs played a little or not very often with the TDCs' friends. Two of the TDCs (TDC1 and TDC3) described that their SibAs never played with the TDCs' friends or played with them once.

Semi-structured interview questions 11 to 13 inquired about TDCs' interest in play. Responses are as follows (along with the TDCs' birth order, gender, and age):

11. Tell me what games you like to play with (SibA name)?

- TDC1 (younger, female, age 4): Chase
- TDC2 (younger, female, age 12): Tickle SibA2. That's the one game SibA2 lets me play the longest.
- TDC3 (younger, male, age 11): Pretend game. Only game I play with SibA3
- TDC4 (older, male, age 16): Sit around, hangout, wrestle
- TDC5 (older, male, age 12): Roughhousing
- TDC6 (older, female, age 12): Chasing SibA6 around

In relation to research question 2, semi-structured interview question 11 showed that 6/6 TDCs (100%) provided relevant responses to describe the games they liked to play with their SibAs. Five of the TDCs (TDC1, TDC2, TDC4, TDC5, and TDC6) liked to play physical games with their SibAs. One of the TDCs (TDC3) liked to play pretend play with his SibA3. One of the TDCs (TDC4) liked to play sit-down games with his SibA4.

12. Tell me which games do you like to play that (SibA name) plays?

- TDC1 (younger, female, age 4): SibA1 walks with me and jumps with me.
- TDC2 (younger, female, age 12): Piano. I try to teach SibA2 songs on the piano.
- TDC3 (younger, male, age 11): I will sit by SibA3 sometimes while he watches SpongeBob.
- TDC4 (older, male, age 16): Games on the iPad
- TDC5 (older, male, age 12): Roughhousing
- TDC6 (older, female, age 12): Sometimes we play with SibA6's stuff in his room.

In relation to research question 2, semi-structured interview question 12 showed that 6/6 TDCs (100%) provided relevant responses to describe the games they like to play that their SibAs play. Two of the TDCs (TDC1 and TDC5) liked to play physical games that their SibAs played. Three of the TDCs (TDC2, TDC3, and TDC4) liked to play sit-down games that their SibAs played. One of the TDCs (TDC6) liked to play with toys from her SibA6's room.

13. Do you like to play with (SibA name)? Why or why not?

- TDC1 (younger, female, age 4): Yes
- TDC2 (younger, female, age 12): Yes, SibA2 is a good playmate when friends are not around.
- TDC3 (younger, male, age 11): (Not asked due to deference to prior statements made by the parent)
- TDC4 (older, male, age 16): Sometimes

- TDC5 (older, male, age 12): Yes! It is fun to teach SibA5 new stuff especially if he does not know how.
- TDC6 (older, female, age 12): Yeah. SibA6 is my younger brother. Why not? SibA6 can't always do complicated games.

In relation to research question 2, semi-structured interview question 13 showed that 5/5 TDCs (100%) provided relevant responses to explain whether they liked to play with their SibAs. Four of the TDCs (TDC1, TDC2, TDC5, and TDC6) reported that they enjoyed playing with their SibAs. One of the TDCs (TDC4) reported that he enjoyed playing with his SibA4 sometimes. The researcher did not ask TDC3 this semi-structured interview question because it appeared that it may have been inappropriate to ask this.

Semi-structured interview questions 14 to 17 inquired about TDCs' knowledge of ASD. Responses are as follows (along with the TDCs' birth order, gender, and age):

14. What is autism?

- TDC1 (younger, female, age 4): SibA1 plays with his chewy and wears different clothes.
- TDC2 (younger, female, age 12): SibA2's brain has some damage, makes it harder for her to think and do things.
- TDC3 (younger, male, age 11): A disease that stops the brainwaves from doing stuff like talking.
- TDC4 (older, male, age 16): Not talking
- TDC5 (older, male, age 12): People do not have the capability to do all of the things normal people can do.

- TDC6 (older, female, age 12): A disability where they cannot speak or develop as quickly as other people.

In relation to research question 2, semi-structured interview question 14 showed that 6/6 TDCs (100%) provided relevant responses to explain ASD. Two of the TDCs (TDC4 and TDC6) explained that ASD affected verbal language where their SibAs could not talk. Two of the TDCs (TDC2 and TDC3) explained that ASD affected the brain where there is damage and brainwaves are affected. Two of the TDCs (TDC5 and TDC6) explained that ASD caused slower development and fewer capabilities. One of the TDCs (TDC1) is too young to know what ASD was, so TDC1 mentioned what she saw SibA1 doing.

15. Who taught you about autism?

- TDC1 (younger, female, age 4): Mom
- TDC2 (younger, female, age 12): Mom
- TDC3 (younger, male, age 11): Mom
- TDC4 (older, male, age 16): Mom
- TDC5 (older, male, age 12): Mom when he was diagnosed
- TDC6 (older, female, age 12): Parents

In relation to research question 2, semi-structured interview question 15 showed that 6/6 TDCs (100%) provided relevant responses to state who taught them about ASD. Five of the TDCs (TDC1, TDC2, TDC3, TDC4, and TDC5) shared that their mothers educated them about ASD. One of the TDCs (TDC6) shared that both of her parents educated her about ASD.

16. How does your SibA act? Why?

- TDC1 (younger, female, age 4): Chewy, plays with balls
- TDC2 (younger, female, age 12): Goofy. Sometimes SibA2 gets angry when we try to get her to do stuff. Sometimes she hits. Occasionally she will sit and cry. Most times SibA2 is playful and goofy.
- TDC3 (younger, male, age 11): “Yee” when SibA3 is happy or angry. He can speak a little [Note “Yee” is a vocal self-stimulation noise that SibA3 makes.]
- TDC4 (older, male, age 16): Active. Does not like to sit down. Always wanting to do something. SibA4 does not like to sit still.
- TDC5 (older, male, age 12): SibA5 acts pretty normal compared to some people with autism who cannot speak or listen.
- TDC6 (older, female, age 12): SibA6 likes to be alone.

In relation to research question 2, semi-structured interview question 16 showed that 6/6 TDCs (100%) provided relevant responses to describe how their SibAs act. Two of the TDCs (TDC1 and TDC4) described their SibAs as being active by moving around a lot or playing with toys. Two of the TDCs (TDC2 and TDC3) described their SibAs as being goofy or making noises. Two of the TDCs described their SibAs as being angry at times. One of the TDCs (TDC5) described his SibA5 as being almost normal. One of the TDCs (TDC6) described her SibA6 as being alone.

17. How do you think your SibA feels when he/she plays? Why?

- TDC1 (younger, female, age 4): Happy

- TDC2 (younger, female, age 12): Sometimes annoyed if SibA2 is doing something she does not want to. Most times, she has fun. I also think SibA2 understands things. It's just hard for her to say.
- TDC3 (younger, male, age 11): What the heck is this guy doing?
- TDC4 (older, male, age 16): Happy. Sometimes SibA4 will not walk away.
- TDC5 (older, male, age 12): Happy because SibA5 has a play pal and someone to talk to and a friend.
- TDC6 (older, female, age 12): I think SibA6 understands that I am his sister and playing around is what we are supposed to do.

In relation to research question 2, semi-structured interview question 17 showed that 6/6 TDCs (100%) provided relevant responses to describe how they thought their SibAs felt when playing with them. Three of the TDCs (TDC1, TDC4, and TDC5) thought that their SibAs felt happy when playing with them. One of the TDCs (TDC6) thought that her SibA6 knew he was supposed to play with her. One of the TDCs (TDC3) thought his SibA3 felt unsure of what he was doing. One of the TDCs (TDC2) thought her SibA2 felt annoyed at times.

4.9 Research Question 2 Answered

To answer research question 2, within a context of semi-structured interviews, how do TDCs describe their interactions with their SibAs, the researcher reflected on the semi-structured interviews with the TDCs and the data analyses. The TDCs provided a greater number of responses that were direct than responses that were ambiguous and required interpretation. Many of the TDCs' responses were given in lists that did not

offer extensive detail to supplement or explain their responses. This may be due to the nature of the semi-structured interview questions. The researcher paused between semi-structured interview questions and allowed wait time for responses. Some semi-structured interview questions appeared too abstract for TDC1 to answer, where TDC1 provided simple responses that were commensurate with her young age. Other semi-structured interview questions appeared delicate, where the parents reacted to their TDCs' responses or the TDCs seemed to mitigate their responses slightly, as revealed by their body language. Overall, the TDCs provided relevant responses without hesitation. TDCs' responses that were particularly honest were when the TDCs disclosed emotions, such as confusion and uncertainty about their SibAs engaging in play.

4.9.1 Parents' Responses During the Semi-Structured Interviews

During the interviews, the researcher prepared field notes by using a list of 8 semi-structured interview questions that appear below and are located in Appendix G. None of the TDCs from the six families stayed for their parents' semi-structured interview. The six TDCs went about their usual activities. The researcher documented the responses given by each of the parents in long hand beneath the interview questions. The researcher did not transcribe conversational remarks, social politeness, and general chat. The parents' semi-structured interview responses are located in Appendix N, Parents' Interview Responses, for easy analysis across the parents.

Responses are as follows (along with the parents' relation to the TDCs as indicated by the TDCs' birth order, gender, and age):

1. What have you told your TDC about autism?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4):
Described ASD as some people are blind, deaf, etc. Everyone's different.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Explain behaviors as they happen. By kids living it, it is obvious. TDC2 can see and experience it.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): Used stories to explain. When TDC3 was young, he seemed interested. Sometimes TDC3 asks why SibA3 has autism. We discuss studies.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Never sat him down. Through the years, explained how SibA4 cannot communicate things. Told TDC4 to be understanding.
- Family5 (mother of TDC5 who is an older sibling, male, age 12): ASD is a developmental delay; not sure how it happened. SibA5 is the same as you and me; he just has a hard time communicating. Be patient and kind.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): A lot. Used incidental teaching. Talk through situations as they occur. Told TDC6 that SibA6 is not less, just different. We love him the way he is. It's no one's fault. It is the way God intended it.

In relation to research question 3, semi-structured interview question 1 showed that 6/6 families (100%) provided relevant responses. Four families (family1, family3, family5, and family6s) explained to the TDCs that their SibAs were different but not less, and that their SibAs had developmental delays. Two families (family4s and family5) emphasized to their TDCs to be kind and understanding toward their SibAs. Two families

(family2s and family6s) explained ASD to their TDCs as situations occurred. Family2s and family6s believed that the TDCs learned about ASD through experiencing it.

2. When did you talk to your TDC about autism?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): No plan to sit TDC1 down and talk about autism. Open to answering any of TDC1's questions.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Did not promote ASD. Did not advertise it. We dealt with it.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): TDC3 always went to therapies and participated in home programs. Gave TDC3 more and more information about autism as he grew older. TDC3 involved in therapies starting at 3 years.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Told TDC4 right away. Explained situations as they happened. TDC4 did not ask many questions. Parent had TDC4 watch educational videos (the Son-Rise Program)¹.
- Family5 (mother of TDC5 who is an older sibling, male, age 12): Eased into it. SibA5 was diagnosed at 3 years old. TDC5 was 6 years old when SibA5 was diagnosed. When TDC5 was 6 years old, I began educating TDC5 that SibA5 learns a little slower.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): Explained autism to TDC6 when SibA6 was diagnosed at 30 months.

¹The Son-Rise Program, Autism Treatment Center of America, <http://www.autismtreatmentcenter.org>

In relation to research question 3, semi-structured interview question 2 showed that 6/6 families (100%) provided relevant responses. Three families (family4s, family5, and family6s) reported discussing ASD with the TDCs at the time of SibAs' diagnosis. Two families (family3 and family4s) reported using videos, literature, or stories to supplement ASD education. One family (family2s) reported not "promoting" the ASD diagnosis and just dealing with it. One family (family1) reported no plan to offer ASD education but intended to answer any of TDC1's questions that may arise.

3. Do you think your TDC understood your explanation about autism?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): TDC will ask "Is SibA1 younger? Why doesn't he talk?"
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Kids understand what autism is from witnessing and experiencing autism. They see other kids with autism.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): TDC3 brings up misconceptions. TDC3 was jealous in the past. TDC3 did not know why he could not play at first; then he got more involved with therapies.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Parents do not think that TDC4 understands all the components of autism. TDC4 says SibA4 knows more than SibA4 lets on. TDC4 thinks that parents "baby" SibA4. TDC4 assumes SibA4 has intelligence. TDC4 views SibA4 as typical and wants to treat her like everyone else.

- Family5 (mother of TDC5 who is an older sibling, male, age 12): TDC5 was always interested in autism. TDC5 wrote a paper about it. Yes. TDC5 was sad in a caring way. TDC5 always wanted to protect and help SibA5. Sometimes TDC5 gets mad, wondering why SibA5 has to have autism.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): TDC6 took some time to understand. TDC6 still has some things to grasp. TDC6 is sad that SibA6 does not have friends like TDC6 has.

In relation to research question 3, semi-structured interview question 3 showed that 6/6 families (100%) provided relevant responses. Four families (family3, family4s, and family6s) believed that the TDCs did not understand ASD fully. Two families (family5 and family2s) reported that the TDCs had a good grasp of ASD. Two families (family5 and family6s) reported that the TDCs felt sad or mad because their SibAs had ASD. One family (family1) reported that TDC1 asked questions about SibA1, which reflects TDC1's young age.

4. Where did you get your information about autism?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): Defeat Autism Now! (DAN)² doctor; visit DAN doctor 3-4 times per year and the doctor directs the parents to websites, read books.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): From other parents at the same preschool, and DAN² doctor
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): Started

²Defeat Autism Now! (DAN), Autism Today.com, <http://www.autismtoday.com>

³Milestones Conference, Milestones Autism Resources, <http://www.milestones.org>

⁴Autism Society of Greater Cleveland, <http://www.asgc.org>

with DAN² doctor, but did not see results; went to Milestones Conference³ 2 weeks after SibA3's diagnosis; joined parent group called Autism Society of Greater Cleveland⁴; looked online.

- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Internet, books, research all over, DAN² doctor, ignore Autism Speaks⁵ website, researches biomedicine.
- Family5 (mother of TDC5 who is an older sibling, male, age 12): Researched on the internet. I believe that everyone has to go through his or her own exploration. Talk to people. Spoke to DAN² doctor. Explored options. Tried many different treatments to then rule out ineffective treatments.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): Online. Achievement Centers for Children⁶. Tutor came to show mom how to play. Took time for SibA6 to be diagnosed. Formal diagnosis was in 2014 when SibA6 was around 6 years old.

In relation to research question 3, semi-structured interview question 4 showed that 6/6 families (100%) provided relevant responses. Five families (family1, family2s, family3, family4s, and family5) reported consulting Defeat Autism Now (DAN)² doctors. All six families reported independently researching books, articles, and websites, and consulting other organizations to gain knowledge.

⁵Autism Speaks, <http://www.autismspeaks.org>

⁶Achievement Centers for Children, <http://www.achievementcenters.org>

5. How do your children typically play? Describe.

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): They will jump on the trampoline together. They will play chase and swim outside. SibA1 likes to be by himself.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): SibA2 does not play. She has to be forced. SibA2 would rather play with her games. She likes to be by others to watch. SibA2 does not want to participate. She just wants to be near others.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): They do not play together.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): TDC4 acts like a father by bossing SibA4 around, and telling her what to do. TDC4 is protective of SibA4. TDC4 takes care of SibA4, but is unwilling to get into her world.
- Family5 (mother of TDC5 who is an older sibling, male, age 12): Parallel play (e.g., TDC5 will bike while SibA5 is on his scooter). Roughhousing once a week. TDC5 never shuts SibA5 out; TDC5 is always inviting. They will watch movies together. They even share a room to sleep although their beds are in separate rooms.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): Minimal. They get along with each other. There is an age gap causing different interests.

In relation to research question 3, semi-structured interview question 5 showed that 5/6 families (83%) provided relevant responses. Three families (family2s, family3, and family6s) stated that their children did not play together or that their children spent a minimal amount of time playing together. Two families (family1 and family5) reported that their children played together. Family4 did not describe how their children play.

6. Do your TDC and child with autism participate in activities together? What kinds?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): SibA1 usually complies with TDC1. TDC1 will direct play.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Books, beads, basketball, piano.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): Used to do karate together with one-on-one instructors. They do family activities at the park, and go to restaurants.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Sometimes SibA4 will sit in TDC4's room to watch him play video games; they will wrestle. TDC4 likes to throw her in the pool.
- Family5 (mother of TDC5 who is an older sibling, male, age 12): They do things as a family. TDC5 and SibA5 will draw, roughhouse, play catch, play basketball, scooter, bike, and swim.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): Swimming. Play in the snow.

In relation to research question 3, semi-structured interview question 6 showed that 5/6 families (83%) provided relevant responses. Four families (family2s, family4s, family5, and family6s) described their children engaging in physical activity together such as wrestling, swimming, roughhousing, playing in the snow, catch, basketball, bike, and scooter. Three families (family2s, family4s, and family5) described their children engaging in sit-down play together such as drawing, piano, art, video games, books, and sitting. Two families (family3 and family5) described their children engaging in extracurricular activities together, such as karate, and family outings. Family1 did not offer a list of activities that her children play together.

7. How do your TDC(s) and child with autism get along?

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): They get along. SibA1 will sometimes try to escape. They do not fight. TDC1 annoys SibA1 in a little sister way.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Excellent because TDC2 is patient.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): TDC3 sometimes gets bossy. TDC3 acts like the dad. TDC3 always thought he was the older brother. They never fight. They have a good relationship.
- Family4s (mother and father of TDC who is an older sibling, male 4, age 16): Sometimes SibA4 gets really annoyed with TDC4. SibA4 will yell at TDC4. SibA4 tolerates TDC4. SibA4 likes to watch what people do and then do what they do.

- Family5 (mother of TDC5 who is an older sibling, male, age 12): They love each other immensely. TDC5 told mom he would always take care of SibA5 and that she would never have to worry about SibA5.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): They get along. They do not fight.

In relation to research question 3, semi-structured interview question 7 showed that 6/6 families (100%) provided relevant responses. Three families (family1, family3, and family6s) reported that their children never fight. Two families (family1 and family4s) described their children as “getting along.” Two families (family2s and family5) described their children as having a close relationship.

8. Did I observe a typical social interaction? Explain why or why not.

- Family1 (mother of TDC1 who is a younger sibling, female, age 4): Yes, TDC1 initiates and engages with SibA1 on her own.
- Family2s (mother and father of TDC2 who is a younger sibling, female, age 12): Yes, typical. TDC2 babysits so parents are able to work and go on dates.
- Family3 (mother of TDC3 who is a younger sibling, male, age 11): No, near the end yes. Usually SibA3 is on YouTube while TDC3 is playing video games.
- Family4s (mother and father of TDC4 who is an older sibling, male, age 16): Yes, SibA4 tends to hangout with parents more so than TDC4. We have family game nights. TDC4 will watch SibA4 when we go out.

- Family5 (mother of TDC5 who is an older sibling, male, age 12):
Absolutely. TDC5 helps SibA5 with homework. SibA5 used to hate homework. Now that TDC5 helps, SibA5 completes homework and likes doing it.
- Family6s (mother and father of TDC6 who is an older sibling, female, age 12): Longer than usual. Play is on SibA6's terms of when he wants to play. Often times, SibA6 will initiate.

In relation to research question 3, semi-structured interview question 8 showed that 6/6 families (100%) provided relevant responses. Four families (family1, family2s, family4s, and family5) stated "Yes" regarding the entire observation. One family (family6s) stated "Yes" but explained that their children did not usually play together for as long as they had during the home observation. One family (family3) stated "Yes" to indicate that the communicative interactions near the end of the home observation were typical.

4.10 Research Question 3 Answered

To answer research question 3, within the context of semi-structured interviews, how do parents describe the relationship of their TDC and their child with ASD, the researcher reflected on the semi-structured interviews with the parents and the data analyses. Overall, the parents provided relevant responses without hesitation. The parents disclosed their beliefs about ASD, explained their TDCs' understanding of ASD, and described their children's relationship. Many of the parents' responses were several sentences in length, to offer detail. Some of the parents conveyed their emotions,

displayed body language, and exhibited vocal intonation while answering the semi-structured interview questions that suggested feelings of peace, love, guilt, and hope.

CHAPTER V

CONCLUSIONS

Triangulated analyses explored the data obtained from the six home observations, the six semi-structured interviews with the TDCs, and the six semi-structured interviews with the parents, in order to make connections between the three research questions. This chapter discusses each family's triangulated analysis to ascertain whether the three sources of data were complementary or contradictory. Next, this chapter compares past literature to the present study in order to support, refute, or provide new knowledge about how TDCs can influence how SibAs learn communicative behaviors and develop social interaction skills. This chapter concludes with final remarks that explain whether the families' provided evidence of the possibility of sibling-mediated interventions based on the triangulated data obtained.

5.1 Family Analyses

The following paragraphs review the triangulated data family-by-family. For every family, the following analyses provide a detailed narrative of the 45-minute home observation of the TDC and the SibA. Next, these analyses highlight the TDC's and the parents' responses during the semi-structured interviews, revealing the information that

was distinctive for their family. Last, there is a brief explanation of whether or not the triangulated data were complementary or contradictory. Family analyses are as follows:

5.1.1 Family1

Participants included a younger TDC sister, age 4 years old (TDC1), and an older SibA brother, age 9 years old (SibA1). TDC1 was persistent when engaging with her older SibA1. TDC1 pursued play with SibA1 without parent facilitation. TDC1 exhibited initiation using motoric behavior 17 times and exhibited initiation using language 5 times. TDC1 provided a hand-over-hand prompt on 7 occasions to encourage participation (e.g., TDC1 took SibA1 by both hands and commanded, “Jump.”). TDC1 offered a variety of communicative behaviors directed to SibA1. TDC1 narrated situations (e.g., TDC1 took SibA1’s hands and said, “Clap clap clap”) 4 times, produced a statement (e.g., “We will do want you know”) 3 times, and exhibited a teaching moment (e.g., TDC1 introduced a game by saying “I want to show you something new: crisscross”) 4 times. SibA1 did not always appear interested in playing with TDC1. SibA1 responded to TDC1 13 out of 27 times (48.15%). SibA1 attempted to leave the trampoline but TDC1 did not let him. TDC1 did not acknowledge SibA1’s disinterest and continued to place demands on her SibA1. TDC1 exhibited 45 commands to instruct SibA1 to act a certain way, such as, “Don’t let go until I’m done. Put your hands together. Snap.” TDC1 offered 12 prompts and 3 total frequencies of occurrence of praise to facilitate SibA1’s success. TDC1 and SibA1 changed communicative roles, where one would lead and the other would follow, then vice versa. Both children took turns imitating. On 14 occasions, TDC1 imitated SibA1’s behavior and then on 3 occasions SibA1 imitated TDC1’s behavior. At times, it appeared that TDC1 imitated SibA1’s

motoric behavior when SibA1 did not respond to her. TDC1 and SibA1 appeared happy while playing. TDC1 exhibited signs of affection 6 times (holding hands 1 time, hugging 1 time, laughing 3 times, and patting 1 time) directed toward her SibA1. SibA1 smiled 1 time. The duration of play on the trampoline appeared substantial in that both children exhibited many communicative behaviors. TDC1 exhibited 123 total frequencies of occurrence of communicative behaviors and SibA1 exhibited 52 total frequencies of occurrence of communicative behaviors.

The semi-structured interviews with TDC1 and family1 suggested that TDC1 did not yet understand SibA1 was different from her. TDC1 stated that SibA1 had different hair, different clothes, liked different games, and played with his chewy. TDC1 was enrolled in a preschool program for TDCs and children with special needs. Family1 reported that TDC1 perceived SibA1 as normal. Family1 disclosed that TDC1 would ask why SibA1 did not talk, and whether SibA1 was younger than she was. Family1 did not plan to educate TDC1 about ASD at a certain age. However, family1 stated that she was willing to answer any questions that TDC1 may have. Family1 reported explaining ASD to TDC1 thus far as “Everyone is different; some people are blind, others are deaf, your brother is different.”

The triangulated analysis was complementary in that TDC1 played in a way that was consistent with the information reported during the semi-structured interviews with TDC1 and the parent. TDC1 did not seem aware of her SibA1’s deficits or sensory needs. TDC1 did attempt to modify games to gain SibA1’s interest, as revealed by her prompts and encouraging actions. TDC1 acted similar to how any typical sister would when playing with her brother.

5.1.2 Family2s

Participants included a younger TDC sister, age 12 years old (TDC2), and an older SibA sister, age 15 years old (SibA2). TDC2 was patient when engaging with her older SibA2. TDC2 initiated communicative behaviors 22 times, where SibA2 initiated on 2 occasions. TDC2's communicative behaviors maintained structure for TDC2 by explaining instructions, offering assistance, and informing SibA2 when SibA2 was behaving inappropriately. TDC2 exhibited commands 63 times (e.g., "Come on. Keep reading"), asked questions 25 times (e.g., "Are you all done?"), made statements 15 times, and taught skills 20 times (TDC2 provided an explanation of several words in the book. e.g., "It's a doll"). TDC2 offered SibA2 choices throughout their activities. For instance, TDC2 said, "Do you want to read this book or that book?" TDC2 redirected SibA2 to keep "nice hands" when she exhibited mild aggressions on 17 occasions. SibA2 responded to TDC2 55 out of 79 times (69.62%). TDC2 encouraged SibA2 10 times (e.g., "Keep going") and praised her 15 times (e.g., "You're doing so well") while completing a task. TDC2 demonstrated good awareness of SibA2's feelings. When SibA2 became agitated, TDC2 offered expectations, "Only three more pages then we'll be done."

The semi-structured interviews with TDC2 and both of the parents suggested that TDC2 understands ASD and her SibA2's needs. TDC2 stated that SibA2 gets annoyed when SibA2 is forced to do something she does not want to do. TDC2 disclosed that SibA2 acts goofy, but also hits at times. Family2s described TDC2 as a great helper who assists SibA2 with homework and daily activities and watches SibA2 when the parents are away. Family2s reported explaining ASD to TDC2 as she experienced it. Family2s

felt TDC2 learned about ASD from witnessing her SibA2's behaviors and development. Family2s described SibA2 as social and wanting to be around others, but stated that SibA2 preferred to watch people instead of directly participating in activities.

The triangulated analysis was complementary in that TDC2 engaged with her SibA2 in a fashion that was similar to the way that their relationship was described during the semi-structured interviews with TDC2 and both of the parents. TDC2 assisted and taught SibA2 for the majority of the observation. These communicative behaviors suggested that TDC2 assumes a caregiver role, perhaps even more so than the role of playmate. The semi-structured interview with TDC2 revealed her uncertainty about how SibA2 felt when playing with her. The semi-structured interview with both of the parents revealed that TDC2 assisted her parents in attending to SibA2's needs.

5.1.3 Family3

Participants included a younger TDC brother, age 11 years old (TDC3), and an older SibA brother, age 15 years old (SibA3). For the first half of the observation, the mother facilitated social interactions between TDC3 and his older SibA3. The mother suggested activities and assisted with SibA3's initial participation. Often the mother redirected SibA3 when he engaged in sounds with motoric self-stimulation (Sub35Msst) 45 times and vocal self-stimulation (Sub37Vsst) 45 times. TDC3 offered rather minimal language during their social interactions, as characterized by 10 commands (e.g., "Come back"), 11 initiations (e.g., TDC3 calls SibA3 by name), 1 narration (e.g., when playing a tabletop game, TDC3 said, "This guy is so hard to put in"), and 2 statements (e.g., "Last turn"). Every so often, TDC3 structured the social interaction by telling SibA3, "Your turn." TDC3 did not exhibit positive verbal reinforcement or positive nonverbal

behaviors toward his SibA3. SibA3 demonstrated awareness of TDC3 by looking at him 7 times and looking at TDC3's play materials 6 times. Despite SibA3's apparent curiosity in watching TDC3, TDC3 did not respond to SibA3 on 3 occasions and continued to engage in his solo play with video games.

The semi-structured interviews with TDC3 and family3 suggested that TDC3 might not fully understand ASD. TDC3 defined ASD as "A disease that stops the brainwaves from doing stuff like talking." Family3 reported that TDC3 would express misconceptions and act bossy at times toward SibA3. Family3 shared that TDC3 always thought he was older than SibA3. Family3 described her children's relationship as good. Family3 reported that her children never fight, but TDC3 was jealous of SibA3 when TDC3 was young. Therefore, TDC3 began to participate in home interventions with his SibA3. Family3 reported that TDC3 and SibA3 mostly engage with one another during family outings to the park, the market, or a restaurant. They rarely interact at home. One child plays video games while the other one watches YouTube; both of the children play with these two activities.

The triangulated analysis was complementary in that TDC3 interacted with SibA3 in a manner that was consistent with the information shared during the semi-structured interviews with TDC3 and the parent. TDC3 engaged with SibA3 when the mother facilitated SibA3's participation. SibA3 exhibited many self-stimulatory behaviors that may have made it difficult for TDC3 to structure communicative interactions and maintain play.

5.1.4 Family4s

Participants included an older TDC brother, age 16 years old (TDC4), and a younger SibA sister, age 11 years old (SibA4). For the first 10 minutes, TDC4 sat on the couch with his friend watching television while SibA4 sat on another couch playing with her iPad. SibA4 appeared aware of her TDC4 and maybe curious about what he was doing with his friend. SibA4 looked up from her iPad 14 times to look at her TDC4 and his friend when they spoke or laughed. TDC4 did not offer any language to his SibA4 during the observation. SibA4 eventually walked into the kitchen to eat a snack. SibA4 stayed in the kitchen near her mother for the remainder of the observation. SibA4 exhibited directed vocalizations (including true words) to her mother while TDC4 continued to watch television with his friend in the adjacent room.

The semi-structured interviews with TDC4 and both of the parents suggested that TDC4 did not fully understand ASD. TDC4 defined ASD as “Not talking.” TDC4 described playing with SibA4 as sitting around, hanging out, and wrestling. Family4s reported that TDC4 assumes that his SibA4 has intelligence and that TDC4 perceives his SibA4 as typical. Family4s said that TDC4 believes people “baby” SibA4. Family4s stated that TDC4 bosses SibA4 around, and that TDC4 is not willing to “get into her world.” Family4s reported educating TDC4 about ASD right away. They also explained situations to TDC4 as they occurred. In addition, family4s presented educational videos to TDC4 to offer supplemental information about ASD.

The triangulated analysis was fairly consistent in that TDC4 did not engage with SibA4 during the home observation. The semi-structured interviews with TDC4 and both of the parents reported very little sibling play and interaction. TDC4 offered simple responses during the semi-structured interview. Family4s reported that most of the time

SibA4 would engage with both of the parents instead of with TDC4. The gender difference and age discrepancy between TDC4 and SibA4 may influence their communicative behaviors with one another.

5.1.5 Family5

Participants included an older TDC brother, age 12 years old (TDC5), and a younger SibA brother, age 10 years old (SibA5). TDC5 assisted SibA5 with homework for 10-15 minutes while exhibiting 12 occurrence of commands (e.g., “Recount”). TDC5 provided short sentences with an even tone to explain homework directions. TDC5 instructed, “Count this. Now match.” SibA5 became frustrated and cried out 5 times when completing his homework. TDC5 encouraged SibA5 to “Keep going” on 5 occasions and praised SibA (e.g., “You’re doing great!”) 12 times. SibA5 responded well to TDC5. SibA5 responded 14 out of 17 times (82.35% of the time) to TDC5. TDC5 seemed to understand when SibA5 reached his limit and allowed him time to play on his iPad. TDC5 checked in with SibA5 by ruffling his hair 2 times. TDC5 sporadically asked questions (“What are you doing? What did you draw?”) 4 times while SibA5 engaged in solo play.

The semi-structured interviews with TDC5 and family5 suggested that TDC5 had a good understanding of ASD. TDC5 reported that he only plays with his SibA5 for 10-15 minutes because SibA5 needs a break. TDC5 said that he stops playing with SibA5 when SibA5 gets frustrated. TDC5 stated that he always tries to invite SibA5 to play, even when his friends are over. Family5 reported educating TDC5 about ASD a little at a time, while instructing him to “Be patient and kind.” TDC5 recently researched ASD on his own to write a paper for school. Family5 shared that TDC5 feels sad and angry.

Family5 reported that TDC5 and SibA5 never fight. TDC5 and SibA5 “love each other immensely.” TDC5 wonders why his SibA5 had to have ASD. Family5 described TDC5 as a teacher.

The triangulated analysis was complementary in that TDC5 interacted with SibA5 in a fashion that was consistent with the information provided during the semi-structured interviews with TDC5 and the parent. TDC5 engaged directly with SibA5 for a short time then allotted SibA5 a break due to SibA5’s emotions rising. TDC5 demonstrated good understanding of ASD and his SibA5’s needs throughout the observation. The semi-structured interviews with TDC5 revealed his feelings of understanding for SibA5 and his strong emotions about SibA5’s diagnosis of ASD.

5.1.6 Family6s

Participants included an older TDC sister, age 12 years old (TDC6), and a younger SibA brother, age 7 years old (SibA6). TDC6 and SibA6 played chase and tickle for nearly 40 minutes while running around throughout their home. Both children demonstrated reciprocal communicative roles where both took turns initiating play with the other. TDC6 initiated play 29 times while SibA6 initiated play 39 times. SibA6 used a combination of one-word utterances (e.g., “Run!”) and short phrases (e.g., “Tickle please!”) paired with motions to initiate play. TDC6 responded to SibA6 31 out of 39 times (79%). This seemed to motivate SibA6 to continue engaging with TDC6. SibA6 responded to TDC6 31 out of 36 times (86%) to maintain play. SibA6 looked directly at TDC6 35 times, smiled at TDC6 15 times, and laughed 27 times. There were instances when TDC6 appeared done with play. SibA6, however, followed TDC6 and was able to persuade her back to play.

The semi-structured interviews with TDC6 and both of the parents suggested that TDC6 understood aspects of ASD but still required additional education. Family6s explained ASD to TDC6 as, “SibA6 is not less. He is just different. We love him the way he is. It’s no one’s fault. It’s the way God intended it.” Family6s shared that TDC6 feels sad because TDC6 wants SibA6 to have friends like her. When the researcher asked, “How do you think SibA6 feels when he plays?” TDC6 responded with “I think he understands that I am his sister and playing around is what we are supposed to do.” Family6s reported that TDC6 plays with SibA6 on SibA6’s terms. If SibA6 does not want to play, he will not. Family6s stated that TDC6 and SibA6 get along well and that they never fight.

The triangulated analysis was complementary in that TDC6 interacted with SibA6 in a fashion that corresponds with the information that was shared during the semi-structured interviews with TDC6 and both of the parents. SibA6 demonstrated a desire to play with TDC6, as evidenced by his high total frequencies of occurrence of initiation and affection. TDC6 demonstrated some understanding of SibA6’s needs by engaging in play (chase, tickle) that was appealing to SibA6. TDC6 did not attempt to engage in sit-down play with SibA6. TDC6 appeared comfortable playing with SibA6 and in knowing that SibA6 wanted to be chased and tickled.

5.2 A Comparison Between Past Literature and the Present Study

Past reports (Brewton et al., 2012; Glasberg, 2000; Green, 2013; Meyers & Vipond, 2005; Knott et al., 2007; Orsmond & Seltzer, 2007; Sage & Jegatheesan, 2007) guided the researcher to formulate six considerations pertaining to the communicative behaviors of the TDCs and the SibAs. The six considerations included role symmetry

within sibling dyads where one child is atypical (Meyers & Vipond, 2005; Knott et al., 2007), age of TDCs (Brewton et al., 2012; Meyers & Vipond, 2005), gender of TDCs (Brewton et al., 2012; Meyers & Vipond, 2005), TDCs' feelings toward their SibAs (Green, 2013; Orsmond & Seltzer, 2007), play within sibling dyads where one child is atypical (Knott et al., 2007; Orsmond & Seltzer, 2007), and TDC's knowledge about ASD (Glasberg, 2000; Sage & Jegatheesan, 2007). Data from the home observations, the semi-structured interviews with the TDCs, and the semi-structured interviews with the parents allow for expansion upon the findings of prior studies, particularly in terms of similarities and differences between the past literature and the present study.

5.2.1 Role Symmetry Within Sibling Dyads Where One Child is Atypical

The present study revealed similar findings about role symmetry as the past literature (Meyers & Vipond, 2005; Knott et al., 2007). Home observations showed that six out of six sibling dyads demonstrated role asymmetry, where the TDCs assumed greater communicative responsibility than the SibAs. SibAs appeared more submissive, in that they did not use as much language to direct play. Instead, the SibAs exhibited high total frequencies of occurrence of receptive communicative behaviors, such as response (Sup13R), eye contact (Sup11EC), and signs of affection (Sup2SA). TDCs directed play with high total frequencies of occurrence of commands (Sup8C), with 130, prompts (Sup7P), with 41, positive verbal reinforcement (Sup3V+), with 45, questions (Sup9Q), with 44, and teaching moments (Sup22TM), with 25. In comparison, SibAs performed total frequencies of occurrence of these directive communicative behaviors in the single digits or not at all. SibAs appeared more submissive, with high total frequencies of

occurrence of positive response (Sub23R+), with 123, undirected vocalizations (Sup15UDV), with 184, and orientation (Sup18O), with 40.

Despite these findings, there were sibling dyads that demonstrated instances of role symmetry, where the SibA lead communicative interactions. In sibling dyad1, the researcher tallied 14 total frequency of occurrence of TDC1 imitating SibA1's motoric behavior (Sub40Mia). In sibling dyad2, TDC2 offered SibA2 options to choose from in deciding an activity, in order to facilitate independence. In sibling dyad6, SibA6 initiated (Sup10I) play more often than TDC6 did, with SibA6 producing 39 total frequencies of occurrence of initiation and TDC6 producing 29 total frequencies of occurrence of initiation.

Responses from the semi-structured interviews with the TDCs and the parents revealed role asymmetry between the TDCs and the SibAs. Three parents (family3 and family4s) reported that the TDCs were bossy toward their SibAs while one parent (family1) reported that the SibA complied with whatever the TDC said. Other parents (family2s, family4s, and family5) reported that the TDCs helped, guided, taught, and watched their SibAs. Both responses, bossy and helpful, imply role asymmetry. The semi-structured interviews with the TDCs revealed that five of the TDCs (all but TDC1) believed that their SibAs could not play games of high complexity and skill level. Once again, this response insinuated role asymmetry because the TDCs believed they had to assist their SibAs in play.

5.2.2 Age of TDCs

The present study revealed mixed findings about age, as did the past literature (Brewton et al., 2012; Meyers & Vipond, 2005). Three younger TDCs (TDC1, TDC2,

and TDC3) exhibited a combined total frequency of occurrence of communicative behaviors of 356. Three older TDCs (TDC4, TDC5, and TDC6) exhibited a combined total frequency of occurrence of communicative behaviors of 230. This suggests that the younger TDCs may have stimulated their SibAs more often than the older TDCs did. A closer examination of the combined total frequency of occurrence of communicative behaviors produced by the younger TDCs showed that TDC1 and TDC2 exhibited most of the combined total frequency of occurrence, with 318 of the 356 communicative behaviors. Similarly, TDC5 and TDC6 contributed 227 of the combined total frequency of occurrence of communicative behaviors produced by the older TDCs. TDC3 (younger TDC) and TDC4 (older TDC) did not exhibit many communicative behaviors directed toward their SibAs during the home observations.

The high total frequencies of occurrence of communicative behaviors exhibited by two of the younger TDCs (TDC1 and TDC2) and two of the older TDCs (TDC5 and TDC6) allowed for comparisons between the TDCs' ages. The researcher sorted superordinate categories of communicative behaviors shown in Table 14 into three lists based on who (the two younger TDCs or the two older TDCs) exhibited a higher total frequency of occurrence. List 1, below, shows the superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the younger TDCs (TDC1 and TDC2). List 2, below, shows the superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the older TDCs (TDC5 and TDC6). List 3, below, shows the superordinate categories of communicative behaviors with a similar total frequency of occurrence exhibited by the two younger TDCs (TDC1 and TDC2) and the two older TDCs (TDC5 and TDC6). All

but 5 of the superordinate categories of communicative behaviors found in Table 14 were included. These five superordinate categories of communicative behaviors (sharing [Sup12S], directed vocalizations to an object [Sup14DVT], undirected vocalizations [Sup15UDV], perseveration [Sup23PPP], and orientation [Sup18O]) were not included because both the younger TDCs and the older TDCs exhibited a total frequency of occurrence of zero.

5.2.2.A List 1. List 1 revealed that the younger TDCs (TDC1 and TDC2) exhibited a greater total frequency of occurrence than the older TDCs (TDC5 and TDC6) for 6 superordinate categories of communicative behaviors. The 6 superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the younger TDCs (TDC1 and TDC2) as opposed to the older TDCs (TDC5 and TDC6) are as follows:

1. Commands (Sup8C) = younger TDCs' (TDC1 and TDC2) 108 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 12 total frequencies of occurrence
2. Prompts (Sup7P) = younger TDCs' (TDC1 and TDC2) 39 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 2 total frequencies of occurrence
3. Positive verbal reinforcement (Sup3V+) = younger TDCs' (TDC1 and TDC2) 28 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 17 total frequencies of occurrence
4. Questions (Sup9Q) = younger TDCs' (TDC1 and TDC2) 26 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 18 total frequencies of occurrence

5. Teaching moment (Sup22TM) = younger TDCs' (TDC1 and TDC2) 24 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 1 total frequency of occurrence
6. Motoric imitation (Sup17MI) = younger TDCs' (TDC1 and TDC2) 14 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 1 total frequency of occurrence

These superordinate categories of communicative behaviors show that these two younger TDCs (TDC1 and TDC2) provided more verbal communicative behaviors than the older TDCs (TDC5 and TDC6), as evidenced by the younger TDCs' high total frequencies of occurrence of commands (Sup8C), prompts (Sup7P), positive verbal reinforcement (Sup3V+), questions (Sup9Q), and teaching moments (Sup22TM). The two younger TDCs took turns following the lead of their older SibAs, as evidenced by total frequencies of occurrence of motoric imitation (Sup17MI) and questions (Sup9Q). Two instances exemplified the insistence of the younger TDCs. TDC1 continued to draw SibA1 into play even when SibA1 tried to end certain play interactions, like getting off the trampoline. TDC2 encouraged SibA2 to complete tasks despite her increase in noncompliance. TDC2 eventually reduced her demands to meet SibA2's frustrations. TDC1 and TDC2 demonstrated control and structure throughout the home observations despite being younger than their SibAs.

5.2.2.B List 2. List 2 revealed that the older TDCs (TDC5 and TDC6) exhibited a greater total frequency of occurrence than the younger TDCs (TDC1 and TDC2) for 5 superordinate categories of communicative behaviors. The 5 superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the

older TDCs (TDC5 and TDC26) as opposed to the younger TDCs (TDC1 and TDC2) are as follows:

1. Respond (Sup12R) = older TDCs' (TDC5 and TDC26) 49 total frequencies of occurrence to younger TDCs' (TDC1 and TDC2) 6 total frequencies of occurrence
2. Eye contact (Sup11EC) = older TDCs' (TDC5 and TDC26) 35 total frequencies of occurrence to younger TDCs' (TDC1 and TDC2) 2 total frequencies of occurrence
3. Positive nonverbal (Sup5NV+) = older TDCs' (TDC5 and TDC26) 25 total frequencies of occurrence to younger TDCs' (TDC1 and TDC2) 4 total frequencies of occurrence
4. Verbal imitation (Sup16VI) = older TDCs' (TDC5 and TDC26) 7 total frequencies of occurrence to younger TDCs' (TDC1 and TDC2) 1 total frequency of occurrence
5. Negative verbal (Sup4V-) = older TDCs' (TDC5 and TDC26) 5 total frequencies of occurrence to younger TDCs' (TDC1 and TDC2) 0 total frequency of occurrence

These superordinate categories of communicative behaviors show that the two older TDCs were more apt to respond to their SibAs than the two younger TDCs, as evidenced by respond (Sup12R), eye contact (Sup11EC), positive nonverbal (Sup5NV+), and verbal imitation (Sup16VI). The two older TDCs acted rather similar to typical older siblings by teasing their younger SibAs, as seen in negative verbal (Sup4V-). Two instances represented the older TDCs honoring their SibAs' feelings. When SibA5 cried

out in frustration, TDC5 initially provided comfort and instruction to finish the task. Then, upon SibA5's completion of his homework, TDC5 allowed SibA5 to engage in solo play for substantial time (approximately 15 minutes of direct contact followed by 30 minutes solo play). TDC6 responded to SibA6's request to play chase and tickle repeatedly and in turn increased SibA6's happiness, as evidenced by SibA6's constant smiling, laughing, and high frequencies of occurrence of initiation.

5.2.2.C List 3. List 3 revealed that the younger TDCs (TDC1 and TDC2) and the older TDCs (TDC5 and TDC6) exhibited similar total frequencies of occurrence of 7 superordinate categories of communicative behaviors. The 7 superordinate categories of communicative behaviors with similar total frequencies of occurrence exhibited by the younger TDCs (TDC1 and TDC2) and the older TDCs (TDC5 and TDC6) are as follows:

1. Initiations (Sup10I) = younger TDCs' (TDC1 and TDC2) 34 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 32 total frequencies of occurrence
2. Statement (Sup21STATE) = younger TDCs' (TDC1 and TDC2) 18 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 15 total frequencies of occurrence
3. Signs of affection (Sup2SA) = younger TDCs' (TDC1 and TDC2) 6 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 3 total frequencies of occurrence
4. Narrate (Sup20NAR) = younger TDCs' (TDC1 and TDC2) 4 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 2 total frequencies of occurrence

5. Negative nonverbal (Sup6NV-) = younger TDCs' (TDC1 and TDC2) 2 total frequencies of occurrence to older TDCs' (TDC5 and TDC6) 3 total frequencies of occurrence
6. Parallel play (Sup19PP) = younger TDCs' (TDC1 and TDC2) 1 total frequency of occurrence to older TDCs' (TDC5 and TDC6) 0 total frequency of occurrence
7. Gesture (Sup1G) = younger TDCs' (TDC1 and TDC2) 1 total frequency of occurrence to older TDCs' (TDC5 and TDC6) 0 total frequency of occurrence

These superordinate categories of communicative behaviors show that both the younger TDCs (TDC1 and TDC2) and the older TDCs (TDC5 and TDC6) had a desire to engage with their SibAs, as seen in similar total frequencies of occurrence of initiation (Sup10I). Both the younger TDCs (TDC1 and TDC2) and the older TDCs (TDC5 and TDC6) demonstrated their love and friendship toward their SibAs with signs of affection (Sup2SA).

5.2.2.D SibAs learning from younger TDCs. In comparison with past studies reviewed by Meyers and Vipond (2005) that found that the older TDCs were more effective in teaching skills to their SibAs, the present study showed that the younger TDCs (TDC1, TDC2, and TDC3) exhibited greater total frequencies of occurrence of communicative behaviors suggestive of learning environments. All three of the younger TDCs (TDC1, TDC2, and TDC3) structured communicative interactions with their older SibAs by informing their SibAs about what to do in order to participate. Two of the three younger TDCs (TDC1 and TDC2) exhibited greater total frequencies of occurrence of verbal communicative behaviors such as prompts (Sup7P), commands (Sup8C), and teaching moments (Sup22TM) than the older TDCs (TDC4, TDC5, and TDC6).

Studies reviewed by Meyers and Vipond (2005) suggested that some younger TDCs reinforced the present level of skills of their SibDDs and that some older TDCs taught new skills to their SibDDs (Abramovitch et al., 1987; Dallas et al., 1993a, 1993b). Contrary to Meyers and Vipond (2005), a study conducted by Brewton et al. (2012) found that SibAs were more likely to acquire skills from their younger TDCs siblings. The present study yielded contradictory findings, as did past studies (Abramovitch et al., 1987; Brewton et al., 2012; Dallas et al., 1993a, 1993b). The present study showed that younger TDCs taught skills of varying levels to their SibAs. TDC1 taught her older SibA1 a combination of motor movements (e.g., clapping and snapping fingers) that were at or slightly below her SibA1's present skill level due to their patterned combinations. This teaching moment that involved TDC1 and SibA1 supported findings from past studies (Abramovitch et al., 1987; Dallas et al., 1993a, 1993b). In another case, the younger TDC2 taught her older SibA2 new vocabulary words that were at or above her SibA2's present skill level when reading a picture book. This teaching moment that involved TDC2 and SibA2 refuted some past literature (Abramovitch et al., 1987; Dallas et al., 1993a, 1993b) but supported other past literature (Brewton et al., 2012).

5.2.2.E Older TDC siblings responding to the feelings of SibAs. Another study reviewed by Meyers and Vipond (2005) discovered that older TDCs were more apt to respond to the behavioral cues exhibited by their SibDDs than younger TDCs were apt to (Caro & Derevensky, 1997). The present study confirmed the Caro and Derevensky (1997) finding, in that two out of the three older TDCs (TDC5 and TDC6) appeared visibly aware of their SibAs' feelings. In both cases, TDC5 and TDC6 honored their SibAs' feelings by providing their SibAs' with their desired activities. For example,

TDC5 responded to his SibA5's frustration over homework by encouraging SibA5 to complete his homework, and then he allowed his SibA5 time to engage in solo play. In another example, TDC6 responded to her SibA6's happiness when playing chase and tickle by continuing to give her SibA6 the play he desired for nearly 40 minutes.

5.2.3 Gender of TDCs

The present study revealed similar findings about gender as did the past literature (Brewton et al., 2012; Meyers & Vipond, 2005) while offering new insight. Three TDC sisters (TDC1, TDC2, and TDC6) exhibited a combined total frequency of occurrence of all communicative behaviors of 489. Three TDC brothers (TDC3, TDC4, and TDC5) exhibited a combined total frequency of occurrence of all communicative behaviors of 97. This suggests that the TDC sisters (TDC1, TDC2, and TDC6) verbally stimulated their SibAs more often than the TDC brothers did (TDC3, TDC4, and TDC5).

The researcher sorted the superordinate categories of communicative behaviors found in Table 14 into three lists based on which participants (TDC sisters or TDC brothers) exhibited the higher total frequency of occurrence of communicative behaviors. List 4, below, shows the superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the TDC sisters (TDC1, TDC2, and TDC6). List 5, below, shows the superordinate categories of communicative behaviors with a higher total frequency of occurrence exhibited by the TDC brothers (TDC3, TDC4, and TDC5). List 6, below, shows the superordinate categories of communicative behaviors with a similar total frequency of occurrence exhibited by the TDC sisters (TDC1, TDC2, and TDC6) and the TDC brothers (TDC3, TDC4, and TDC5). The researcher did not include 4 of the superordinate categories of communicative behaviors

found in Table 14 (directed vocalizations to an object [Sup14DVT], undirected vocalizations [Sup15UDV], perseveration [Sup23PPP], and orientation [Sup18O]) because both the TDC sisters and the TDC brothers exhibited a total frequency of occurrence of zero.

5.2.3.A List 4. List 4 revealed that the TDC sisters (TDC1, TDC2, and TDC6) exhibited higher total frequencies of occurrence of 14 superordinate categories of communicative behaviors. The 14 superordinate categories of communicative behaviors with higher total frequencies of occurrence exhibited by the TDC sisters (TDC1, TDC2, and TDC6) as opposed to the TDC brothers (TDC3, TDC4, and TDC5) are as follows:

1. Commands (Sup8C) = TDC sisters' (TDC1, TDC2, and TDC6) 108 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 22 total frequencies of occurrence
2. Initiation (Sup10I) = TDC sisters' (TDC1, TDC2, and TDC6) 63 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 14 total frequencies of occurrence
3. Response (Sup13R) = TDC sisters' (TDC1, TDC2, and TDC6) 45 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 18 total frequencies of occurrence
4. Questions (Sup9Q) = TDC sisters' (TDC1, TDC2, and TDC6) 40 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 4 total frequencies of occurrence

5. Prompts (Sup7P) = TDC sisters' (TDC1, TDC2, and TDC6) 39 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 2 total frequencies of occurrence
6. Eye contact (Sup11EC) = TDC sisters' (TDC1, TDC2, and TDC6) 37 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 0 total frequency of occurrence
7. Statement (Sup21STATE) = TDC sisters' (TDC1, TDC2, and TDC6) 32 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 3 total frequencies of occurrence
8. Positive verbal reinforcement (Sup3V+) = TDC sisters' (TDC1, TDC2, and TDC6) 28 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 17 total frequencies of occurrence
9. Positive nonverbal (Sup5NV+) = TDC sisters' (TDC1, TDC2, and TDC6) 26 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 3 total frequencies of occurrence
10. Teaching moment (Sup22TM) = TDC sisters' (TDC1, TDC2, and TDC6) 24 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 1 total frequency of occurrence
11. Motoric imitation (Sup17MI) = TDC sisters' (TDC1, TDC2, and TDC6) 15 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 1 total frequency of occurrence

12. Signs of affection (Sup2SA) = TDC sisters' (TDC1, TDC2, and TDC6) 8 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 1 total frequency of occurrence

13. Verbal imitation (Sup16VI) = TDC sisters' (TDC1, TDC2, and TDC6) 8 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 0 total frequency of occurrence

14. Narrate (Sup20NAR) = TDC sisters' (TDC1, TDC2, and TDC6) 6 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 1 total frequency of occurrence

These total frequencies of occurrence of communicative behaviors show that the TDC sisters (TDC1, TDC2, and TDC6) were more apt to respond to their SibAs than the TDC brothers (TDC3, TDC4, and TDC5) were, as evidenced by the TDC sisters' (TDC1, TDC2, and TDC6) response (Sup13R), eye contact (Sup11EC), positive nonverbal (Sup5NV+), motoric imitation (Sup17MI), and verbal imitation (Sup16VI). These superordinate categories of communicative behaviors show that the TDC sisters (TDC1, TDC2, and TDC6) provided more verbal communicative behaviors than the TDC brothers (TDC3, TDC4, and TDC5) did, as proven by the TDC sisters' (TDC1, TDC2, and TDC6) commands (Sup8C), prompts (Sup7P), positive verbal reinforcement (Sup3V+), questions (Sup9Q), and teaching moments (Sup22TM). These superordinate categories of communicative behaviors exhibited by the TDC sisters (TDC1, TDC2, and TDC6) suggest a learning environment conducive to teaching SibAs. The TDC sisters (TDC1, TDC2, and TDC6) provided structure during the communicative interactions and exhibited high total frequencies of occurrence of positive verbal reinforcement (Sup3V+),

positive nonverbal (Sup5NV+), and signs of affection (Sup2SA) to reward their SibAs for appropriate behavior. In summary, TDC sisters (TDC1, TDC2, and TDC6) initiated communicative interactions, responded to their SibAs, maintained communicative interactions, reinforced their SibAs' appropriate behavior, and provided achievable goals for their SibAs (TDC2).

5.2.3.B List 5. List 5 revealed that the TDC brothers (TDC3, TDC4, and TDC5) exhibited a higher total frequency of occurrence of 1 superordinate category of communicative behavior. The only superordinate category of communicative behaviors with a higher total frequency of occurrence exhibited by the TDC brothers (TDC3, TDC4, and TDC5) as opposed to the TDC sisters (TDC1, TDC2, and TDC6) is as follows:

1. Sharing (Sup12S) = TDC brothers' (TDC3, TDC4, and TDC5) 6 total frequencies of occurrence to TDC sisters' (TDC1, TDC2, and TDC6) 0 total frequency of occurrence

Even though sharing (Sup12S) was the only superordinate category of communicative behaviors with a higher total frequency of occurrence exhibited by the TDC brothers (TDC3, TDC4, and TDC5), the TDC brothers demonstrated subtle behaviors that the TDC sisters did not. For instance, the TDC brothers respected their SibAs' feelings to be alone, whereas the TDC sisters persisted to engage with their SibAs even after the SibAs expressed disinterest. Another subtle behavior demonstrated by the TDC brothers was providing fewer verbal communicative behaviors than the TDC sisters provided. Fewer verbal communicative behaviors means that the SibAs were not as

bombarded by the TDCs' language. Less language could make the communicative messages easier to comprehend.

5.2.3.C List 6. List 6 revealed that the TDC sisters (TDC1, TDC2, and TDC6) and the TDC brothers (TDC3, TDC4, and TDC5) exhibited a similar total frequency of occurrence of 4 superordinate categories of communicative behaviors. The 4 superordinate categories of communicative behaviors with a similar total frequency of occurrence exhibited by the TDC sisters (TDC1, TDC2, and TDC6) and the TDC brothers (TDC3, TDC4, and TDC5) are as follows:

1. Negative verbal (Sup4V-) = TDC sisters' (TDC1, TDC2, and TDC6) 5 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 2 total frequencies of occurrence
2. Negative nonverbal (Sup6NV-) = TDC sisters' (TDC1, TDC2, and TDC6) 3 total frequencies of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 2 total frequencies of occurrence
3. Gesture (Sup1G) = TDC sisters' (TDC1, TDC2, and TDC6) 1 total frequency of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 0 total frequency of occurrence
4. Parallel play (Sup19PP) = TDC sisters' (TDC1, TDC2, and TDC6) 1 total frequency of occurrence to TDC brothers' (TDC3, TDC4, and TDC5) 0 total frequency of occurrence

These superordinate categories of communicative behaviors show that the TDC sisters (TDC1, TDC2, and TDC6) and the TDC brothers (TDC3, TDC4, and TDC5) exhibited low total frequencies of occurrence of negative verbal (Sup4V-), negative

nonverbal (Sup6NV-) and parallel play (Sup19PP). Two instances exemplified playful teasing by a TDC sister and a TDC brother. TDC6 (TDC sister) exhibited teasing for 5 total frequencies of occurrence and TDC3 (TDC brother) exhibited teasing for 2 total frequencies of occurrence. Neither of the TDCs' (TDC6 and TDC3) teasing evolved into quarrels with their SibAs.

Responses from the semi-structured interviews with the TDCs and the semi-structured interviews with the parents did not mention gender specific activities. The TDC sisters, TDC brothers, and the parents reported that the children played physical (e.g., soccer, basketball, roughhousing, and chase) and sit-down games (e.g., YouTube, video games, and musical instruments) together. Five parents (family2s, family4s, and family5) reported that their TDC sons (TDC4 and TDC5) and TDC daughter (TDC2) care for their SibAs by helping their SibAs with homework and watching their SibAs when their parents are away.

5.2.3.D TDC sisters. Past literature (Meyers & Vipond, 2005; Orsmond & Seltzer, 2007) showed that TDC sisters were more effective in teaching skills to their SibDDs and were more likely to engage in less physically active games with their SibDDs. The present study revealed that the TDC sisters (TDC1, TDC2, and TDC6) engaged in similar activities with their SibAs as did the TDC brothers (TDC3, TDC4, and TDC5). Both the TDC sisters (TDC1, TDC2, and TDC6) and the TDC brothers (TDC3, TDC4, and TDC5) engaged in physical activities (e.g., trampoline, chase, and tickle) and sit-down activities (e.g., art, television, board games, snack, reading, and academics) with their SibAs.

A study conducted by Lobato et al. (1991) documented greater occurrences of communicative interactions between the TDC sisters and their SibAs than between TDC brothers and their SibAs. Similarly to Lobato et al. (1991), the present study revealed that the TDC sisters (TDC1, TDC2, and TDC6) exhibited more communicative behaviors than the TDC brothers (TDC3, TDC4, and TDC5) exhibited. The TDC sisters (TDC1, TDC2, and TDC6) exhibited a combined total frequency of occurrence of communicative behaviors of 489, as compared to the TDC brothers' (TDC3, TDC4, and TDC5) combined total frequency of occurrence of communicative behaviors of 97. The TDC sisters (TDC1, TDC2, and TDC6) also exhibited higher total frequencies of occurrence of verbal communicative behaviors, as evidenced by List 4 above.

5.2.4 TDCs' Feelings Toward Their SibAs

The present study revealed similar findings about feelings as did the past literature (Green, 2013; Orsmond & Seltzer, 2007). The TDCs expressed feelings of happiness and uncertainty when asked about how their SibAs felt when playing with them. Three TDCs (TDC1, TDC4, and TDC5) reported that their SibAs felt "happy." Other TDCs (TDC2, TDC3, and TDC6) were uncertain how their SibAs felt. TDC2 stated that her SibA2 gets angry, is sometimes sad, but also acts goofy and playful when playing with TDC2. TDC3 stated that he believes his SibA3 thinks, "What the heck is this guy doing?" when playing with TDC3. TDC6 explained that she believes that her SibA6 understands that they are supposed to play together because they are siblings.

The semi-structured interviews with the parents offered rather similar perceptions of their children's relationships as the TDCs previously expressed during their semi-structured interviews. Family2s, family3, family5, and family6s reported that their

children had good relationships that did not involve fighting. Family1 and family4s described that their children's relationships involved tolerating one another like typical brothers and sisters do. Family4s, family5, and family6 shared that their TDCs felt strongly about their SibAs' diagnosis of ASD. Family4s stated that TDC4 felt that people "babied" his SibA4. Family5 stated that TDC5 felt angry at times and wondered why SibA5 had to have ASD. Family6s stated that TDC6 recently began to feel sad that SibA6 did not have friends like TDC6 has.

5.2.5 Play Within Sibling Dyads Where One Child is Atypical

The present study revealed findings about play similar and dissimilar to the past literature (Knott et al., 2007; Orsmond & Seltzer, 2007). Knott et al. (1995) documented that sibling dyads where one child was atypical spent nearly 40 minutes of every hour together. To compare the present results with Knott et al. (1995), the sibling dyads in the present study spent an average of 30 minutes together during the 45 minute observations. Four of the six sibling dyads (family2s, family3, family5, and family6s) supported Knott et al. (1995) by spending 30 or more minutes together. Two sibling dyads (family1 and family4s) refuted Knott et al. (1995) by not spending 30 minutes together.

A second comparison with past literature (Knott et al., 2007) is regarding the SibAs' percentage of response to their TDCs' initiations for communicative interactions. Knott et al. (2007) found that SibAs responded to their TDCs' initiations for communicative interactions approximately 50% of the time. The present study found that four out of the six SibAs (SibA2, SibA3, SibA5, and SibA6) responded to their TDCs' communicative behaviors greater than 50% of the time. SibA1 responded to his TDC1's communicative behaviors 48.15% of the time, which excluded SibA1 from the 50% and a

greater percentage of response. SibA4 was excluded with a 0 total frequency of occurrence of positive response (Sub32R+) because there were no opportunities for SibA4 to respond to during the home observation. The four SibAs (SibA2, SibA3, SibA5, and SibA6) who responded greater than 50% of the time to their TDCs did not demonstrate strong commonalities across the sibling dyads. There were two SibAs (SibA2 and SibA6) who were given a many opportunities to respond to their TDCs. SibA2 responded to her TDC2 69.62% of the time. SibA6 responded to his TDC6 86.11% of the time. There were also two SibAs (SibA3 and SibA5) who were not given many opportunities to respond to their TDCs. SibA3 responded to his TDC3 66.67% of the time. SibA5 responded to his TDC5 82.35% of the time. However, no matter the number of opportunities, all four of these SibAs (SibA2, SibA3, SibA5, and SibA6) responded to their TDCs greater than 50% of the time.

Responses from the semi-structured interviews with the TDCs and the parents offered supplemental information regarding SibAs' response to their TDCs' initiation of play and describing how often the SibAs and TDCs play. Four TDCs (TDC1, TDC4, TDC5, and TDC6) reported that their SibAs responded to approximately 50% or more of the TDCs' invitations to play. Five out of the six TDCs (TDC2, TDC3, TDC4, TDC5, and TDC6) stated that their SibAs tended to play with them for 10-30 minute intervals. TDC1 was only 4 years old and did not yet understand time, which presumably contributed to TDC1's inconsistent answer that SibA1 plays with her for "3 hours" and then stating "a little bit of time" when asked how often TDC1 plays with her SibA1. Four of the TDCs (TDC1, TDC2, TDC5, and TDC6) reported that they enjoyed playing with their SibAs. TDC3 stated that TDC3 liked to play with his SibA3 sometimes.

5.2.6 TDCs' Knowledge About ASD

The present study revealed similar findings about knowledge as did the past literature (Glasberg, 2000; Sage & Jegatheesan, 2007) while offering new insight. Two TDCs (TDC2 and TDC5) demonstrated their knowledge about ASD, as evidenced by the communicative behaviors exhibited during the home observations. TDC2 redirected her SibA2 when SibA2 exhibited mild aggressions, perseverated on a topic, or became noncompliant. TDC5 provided clear expectations for his SibA5 by explaining SibA5's homework in simple sentences and then reinforced SibA5's completion of his homework by giving SibA5 time to engage in desired solo play. The other TDCs (TDC1, TDC3, TDC4, and TDC6) played nicely with their SibAs, but did not exhibit communicative behaviors that suggested understanding ASD.

Responses from the semi-structured interviews with the TDCs and the parents offered supplemental information about the TDCs' knowledge about ASD. Four of the TDCs (TDC2, TDC3, TDC5, and TDC6) provided responses that suggested greater understanding of ASD than two of the TDCs (TDC1 and TDC4) provided. These four TDCs (TDC2, TDC3, TDC5, and TDC6) explained ASD as a neurological impairment that affected development and skills. The ages of these four TDCs (TDC2, TDC3, TDC5, and TDC6) were between 11 to 12 year olds. The two TDCs (TDC1 and TDC4) who provided simple responses that did not mention neurology or development instead provided responses that described their SibAs' overt deficits, such as not speaking. TDC1 and TDC4 provided preoperational standpoints of their SibAs, similar to those documented by Glasberg (2000) of TDCs ages 5 to 17 years old who felt that their SibAs could see, feel, and hear just like they did. Family1, family3, family4s, and family6s

reported that their TDCs did not yet grasp all there is to know about ASD. Family2s and family5 believed that their TDCs understood their SibAs' needs.

5.3 Final Remarks

All six of the families provided evidence of the possibility of sibling-mediated interventions for children diagnosed with ASD. Four of the families (family1, family2s, family5, and family6s) provided strong evidence of the possibility of sibling-mediated interventions, as shown by the triangulated analyses and by comparisons of these data with the past literature. Two of the families (family3 and family4) provided some evidence of the possibility of sibling-mediated interventions, as shown by the triangulated analyses and by comparisons of these data with the past literature. The following paragraphs describe how all six of the families provided evidence of the possibility of sibling-mediated interventions for children diagnosed with ASD.

5.3.1 Strong Evidence of the Possibility of Sibling-Mediated Interventions: Four Families

Four of the six families (family1, family2s, family5, and family6s) provided strong evidence of the possibility of sibling-mediated interventions. Home observations revealed that these four TDCs (TDC1, TDC2, TDC5, and TDC6) engaged with their SibAs independently, without parent facilitation. These four TDCs (TDC1, TDC2, TDC5, and TDC6) exhibited verbal communicative behaviors that structured their joint play, facilitated their SibAs' participation, and maintained communicative interactions. Semi-structured interviews with these four TDCs (TDC1, TDC2, TDC5, and TDC6) and their parents revealed that these children had good sibling relationships that involved some caregiving and no fighting.

There were four communicative behaviors exhibited by all four of these TDCs (TDC1, TDC2, TDC5, and TDC6) that suggested their potential for facilitating learning environments for their SibAs. The total frequencies of occurrence of response (Sup13R), initiation (Sup10I), positive verbal reinforcement (Sup3V+), and positive nonverbal (Sup5NV+) for these four TDCs (TDC1, TDC2, TDC5, and TDC6) indicate facilitating learning. Prompts (Sup7P), teaching moments (Sup22TM), and signs of affection (Sup2SA) are communicative behaviors that also enable potential learning environments for their SibAs; however, only three of the four TDCs (TDC1, TDC2, and TDC5) exhibited those communicative behaviors, where TDC6 did not.

The first communicative behavior that these four TDCs (TDC1, TDC2, TDC5, and TDC6) have in common was their SibAs' response (Sub32R+) to the TDCs. The researcher documented percentages of positive response (Sub32R+) near 50% or greater across all four of these SibAs (SibA1, SibA2, SibA5, and SibA6). The list below details each SibA's percentage of positive response (Sub32R+), each SibA's total frequency of occurrence of positive response (Sub32R+), and each SibA's total frequency of occurrence of does not respond (Sub33R-). These tallies for response (Sup13R) are as follows:

- SibA6 = responded to TDC6 86.11 % of the time, exhibited a positive response (Sub32R+) for 31 total frequencies of occurrence, and does not respond (Sub33R-) for 5 total frequencies of occurrence
- SibA5 = responded to TDC5 82.35% of the time, exhibited a positive response (Sub32R+) for 14 total frequencies of occurrence, and exhibited does not respond (Sub33R-) for 3 total frequencies of occurrence

- SibA2 = responded to TDC2 69.62% of the time, exhibited a positive response (Sub32R+) for 55 total frequencies of occurrence, and exhibited does not respond (Sub33R-) for 24 total frequencies of occurrence
- SibA1 = responded to TDC1 48.15% of the time, exhibited a positive response (Sub32R+) for 13 total frequencies of occurrence, and exhibited does not respond (Sub33R-) for 14 total frequencies of occurrence

The second communicative behavior that these four TDCs (TDC1, TDC2, TDC5, and TDC6) have in common was initiating (Sup10I) play with their SibAs. The TDCs' (TDC1, TDC2, TDC5, and TDC6) total frequency of occurrence of initiation (Sup10I) is as follows:

- TDC6 = 29 total frequencies of occurrence of initiation (Sup10I) directed toward her SibA6
- TDC1 = 22 total frequencies of occurrence of initiation (Sup10I) directed toward her SibA1
- TDC2 = 12 total frequencies of occurrence of initiation (Sup10I) directed toward her SibA2
- TDC5 = 3 total frequencies of occurrence of initiation (Sup10I) directed toward his SibA5

The third communicative behavior that these four TDCs (TDC1, TDC2, TDC5, and TDC6) have in common was positive verbal reinforcement (Sup3V+). The TDCs' (TDC1, TDC2, TDC5, and TDC6) total frequency of occurrence of positive verbal reinforcement (Sup3V+) is as follows:

- TDC2 = 57 total frequencies of occurrence of positive verbal reinforcement (Sup3V+)
- TDC5 = 17 total frequencies of occurrence of positive verbal reinforcement (Sup3V+)
- TDC1 = 3 total frequencies of occurrence of positive verbal reinforcement (Sup3V+)
- TDC6 = 0 total frequency of occurrence of positive verbal reinforcement (Sup3V+)

The fourth communicative behavior that these four TDCs (TDC1, TDC2, TDC5, and TDC6) have in common was positive nonverbal (Sup5NV+). The TDCs' (TDC1, TDC2, TDC5, and TDC6) total frequencies of occurrence of positive nonverbal (Sup5NV+) are as follows:

- TDC6 = 22 total frequencies of occurrence of positive nonverbal (Sup5NV+)
- TDC1 = 3 total frequencies of occurrence of positive nonverbal (Sup5NV+)
- TDC5 = 3 total frequencies of occurrence of positive nonverbal (Sup5NV+)
- TDC2 = 1 total frequency of occurrence of positive nonverbal (Sup5NV+)

5.3.2 Some Evidence of the Possibility of Sibling-Mediated Interventions: Two Families

Two of the six families (family3 and family4s) provided some evidence of the possibility of sibling-mediated interventions. Home observations revealed that these two TDCs (TDC3 and TDC4) required parental facilitation to initiate, maintain, and structure their joint play with their SibAs. Semi-structured interviews with the parents (family3 and family4s) revealed that these TDCs were educated about ASD, yet the parents

believed that their TDCs (TDC3 and TDC4) still did not fully grasp ASD. Although TDC3 and TDC4 did not exhibit as many communicative behaviors as did the four other TDCs (TDC1, TDC2, TDC5, and TDC6), the researcher observed one communicative behavior shared between the two TDCs (TDC3 and TDC4) and their SibAs (SibA3 and SibA4). The two SibAs (SibA3 and SibA4) exhibited total frequencies of occurrence of orientation (Sup18O) (i.e., looking at their sibling) in both sibling dyads, which is a component necessary for observational learning (Cherry, 2015; Tampoepeau & Reese, 2014). The SibAs' (SibA3 and SibA4) total frequencies of occurrence of orientation (Sup18O) are as follows:

- SibA4 = 14 total frequencies of occurrence of orientation (Sup18O)
- SibA3 = 13 total frequencies of occurrence of orientation (Sup18O)

5.4 Closing

In closing, the researcher documented triangulated data that provided evidence of the possibility of sibling-mediated interventions. Four families (family1, family2s, family5, and family6s) provided strong evidence of the possibility of sibling-mediated interventions. Semi-structured interviews with these four TDCs and their parents revealed that the TDCs (TDC1, TDC2, TDC5, and TDC6) assisted with caring for their SibAs, engaged in play with their SibAs on a regular basis, and were known to teach skills to their SibAs.

Two families (family3 and family4s) provided some evidence of the possibility of sibling-mediated interventions. Semi-structured interviews with these two TDCs (TDC3 and TDC4) and their parents suggested that the TDCs (TDC3 and TDC4) may benefit from additional education about ASD, in order to increase their understanding of their

SibAs' needs. These three parents (family3 and family4s) reported that their children interacted mostly during family outings, as opposed to during one-on-one communicative interactions.

5.5 Limitations of the Present Study

Several limitations may have affected the data obtained in the present study, with the most pervasive limitation being the Hawthorne effect. The Hawthorne effect is defined as a theory that causes a person's performance to improve when under scrutiny ("The Hawthorne Effect," 2015). Presumably, all of the participants were on their best behaviors when being watched and then interviewed. However, the researcher observed a variety of communicative interactions across the six sibling dyads that appeared authentic and unscripted. There were instances of the SibAs' being noncompliant, the SibAs exhibiting mild aggressions, and the sibling dyads engaging in minimal to no communicative interactions.

The second limitation of the present study was that the researcher did not use video recording. The researcher attempted to document every communicative behavior exhibited by the TDCs and the SibAs within their home observations. This task was unachievable, in that the magnitude of communicative behaviors exhibited by both of the children was so great at times and presented at such a rapid rate that the researcher seemingly missed several communicative behaviors. Even though the data obtained during the home observations were not flawless, the researcher collected substantial data to depict the communicative interactions observed. The data provided total frequencies of occurrence that yielded sufficient analyses and conclusions. Similarly, semi-structured interviews with the TDCs and the parents were not video recorded. Therefore, the

researcher documented a limited number of direct quotations from the participants because of the specific syntax of the TDCs' and the parents' responses and the extent of the parents' responses that diverged slightly from the questions asked.

The third limitation of the present study was the small sample size. The researcher recruited as many participants as possible, but was unable to attain a number larger than six families. Among the six families, the sibling dyads varied by birth order, genders, and ages. The researcher hoped that the recruited participants would represent the national demographic of persons diagnosed with ASD (Sanford et al., 2008). The researcher came close to achieving this, in that there were five Caucasian families and one African American family. There was a wide range of ages of the TDCs (4 to 16 years old) and the SibAs (7 to 15 years old), and there were more male SibAs (SibA1, SibA3, SibA5, and SibA6) than female SibAs (SibA2 and SibA4). The characteristics of the sibling dyads coincidentally split in half by birth order of the TDCs (three TDCs were the older siblings and three TDCs were the younger siblings) and genders of the TDCs (three TDC sisters and three TDC brothers). However, a larger sample size could have still been a better representation of the national demographic of persons diagnosed with ASD.

The fourth limitation of the present study was that the researcher did not have another rater or coder to confirm reliability of the data obtained. Despite this, the researcher checked and rechecked the field notes, codes for communicative behaviors, and frequencies of occurrence for accuracy. A faculty advisor also assisted the researcher in discussing possible errors while overseeing the data analyses. Any errors found were corrected immediately to ensure fidelity.

The fifth limitation of the present study was that the data reflects one home visit. The TDCs and the SibAs may have behaved differently on that day, for the better or for the worse, than what typically occurs on a day-to-day basis. The emotions of the TDCs and of the parents on the day of the home visit could very well have influenced their responses during the semi-structured interviews, for the better or for the worse. Therefore, it is important to note that additional home visits would have contributed to the reliability and validity of the study.

The sixth and final limitation of the present study was that the researcher was unable to prove that the TDC siblings were in fact typically developing. The participant selection parameters specified that the only credential for TDCs was that the TDC siblings could not have ASD. Therefore, the researcher was unaware of other deficit areas, if any, that the TDCs may have. One parent disclosed that her TDC was recently evaluated for attention deficit hyperactivity disorder (ADHD), but did not receive a diagnosis. No other parent(s) disclosed any special needs of their TDCs.

5.6 Delimitations of the Present Study

There were a few delimitations planned for the present study. The first delimitation of the present study was that the researcher did not explore variations across the families that were not meaningful to the study. For instance, every family has a unique dynamic that requires its own approach to parenting and to educating their TDCs about ASD. Therefore, the children's communicative behaviors and the responses from the semi-structured interview questions could not be labeled as correct or incorrect. There is not one correct way of raising a family. Instead of labeling families as correct or

incorrect, the researcher focused the data analysis on the relevance, or the irrelevance of the data obtained, and the relatedness of the present data to the reported in prior studies.

The second delimitation of the present study was that the study used a sample of convenience. The participants were not selected at random. The researcher knew the participants prior to the study from working at the autism center. The researcher had different levels of relationships with all of the participants. There were four SibAs who the researcher worked closely with at the autism center and two SibAs that were acquaintances of the researcher. There were three families where the researcher knew the parents briefly from engaging in short conversations at the autism center. Even though these relationships were present, the researcher remained as objective as possible throughout the study.

5.7 Future Research

The present study provided some avenues for future research. There is a need for more research into the area of sibling dyads and sibling-mediated interventions. One avenue for future research is to explore sibling dyads where one child has ASD and the other child is typical using a larger sample size to better represent the national demographic. A second avenue for future research is to compare sibling dyads where both children are typical to sibling dyads where one child has ASD.

Comparisons between sibling dyads can contribute to designing the procedures for sibling-mediated interventions. Studies can reveal the communicative behaviors to target for SibAs, can identify the sibling characteristics that are most conducive to learning, and can support the reinforcements that are needed to motivate the TDCs. Studies can examine the ways that family intimacy and understanding between siblings

influence effective treatment using sibling-mediated interventions. Lastly, future research must replicate this study in order to better understand the communicative behaviors produced by TDCs and SibAs in their home contexts. TDCs' knowledge about ASD and their relationships with their SibAs can also be explored further. More evidence is necessary to confirm the findings of this study.

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Appendix A

Informational Flyer

**RECRUITING RESEARCH PARTICIPANTS FOR A STUDY
OF HOW CHILDREN WITH AUTISM AND THEIR SIBLINGS
INTERACT TOGETHER AT HOME**

For my Master's Thesis in Speech Pathology and Audiology

Ashley Hodge

(Name of autism center) Employee

Hello Families,

I am a part-time/as needed employee of (name of autism center). I am currently working towards completing my Master's degree in speech pathology and audiology at Cleveland State University. This research is not related to my work at (name of autism center) and (name of autism center) is not involved, other than to allow me to ask (name of autism center) families to participate.

I am asking for families (parent[s], typically developing child, and child who attends [name of autism center]) to participate in my observational study. My study will investigate the communicative behaviors typically developing children and siblings diagnosed with autism exhibit during common household interactions. Recent literature has studied how siblings contribute to the development of children with autism. Therefore, my hope is to contribute to the growing research on siblings of children with autism.

I am requesting that you allow me to visit you at your home while your children are interacting or playing. The date and time will be scheduled at your convenience, later in 2014 and in early 2015. I will need about 1 hour and 30 minutes of your time. I will observe your children playing, interview the sibling of the child with autism, and interview the parent(s). Siblings and children with autism should be between the ages of 4 to 17 years of age.

If you are willing to participate in my study, please email me at xxxxxx@xxxx.xxxxx.xxx. I will send an email to follow-up with this flyer in 1 week.

Thank you for all of your support. I greatly appreciate it!

Sincerely,

Ashley Hodge

Appendix B

Parent Informed Consent Form

Dear Parent or Guardian:

We are Dr. Monica Gordon Pershey, Associate Professor, and Ashley Hodge, graduate student, in the Speech and Hearing Program in the School of Health Sciences, Cleveland State University (CSU). We are asking you to participate in this research study, which is the basis of Ms. Hodge's Master's thesis. We are researching the communicative behaviors that typically developing children (TDC) and siblings diagnosed with autism (sib-A) exhibit during common household interactions. This study will contribute to the growing literature on sibling-mediated interventions and their effectiveness for children diagnosed with autism.

We will ask you allow Ashley Hodge to do the following:

- Visit your home and observe your child without autism interacting or playing with your child with autism (about 45 minutes)
- Interview your child without autism (about 20 minutes)
- Interview one or both parents (about 25 minutes)

Every possible effort will be made to minimize risks and discomforts to you. Participants may take breaks during the observations and interviews at any time they wish, and Ms. Hodge will offer breaks. You may discontinue your participation at any time during the session with no penalties. You can withdraw from the study at any time with no penalties. Risks involved in participation are no greater than those of daily living. Benefits of participation include the opportunity for your children to engage in household interactions and to contribute to the study of siblings of children with autism.

Every possible effort will be made to minimize any potential risks to participants' confidentiality. No name will be linked to your participation. Your name will appear only on your consent form and a master log. Ms. Hodge will take notes during the observation and interviews. Participants will be given code numbers that will be used on all documents. Data will be reported under assigned code numbers. Dr. Monica Gordon Pershey and Ashley Hodge will be the only people with access to paper documents and computer records used in this study. Their computers are password protected and your consent form and Ms. Hodge's written notes will be kept in a locked cabinet in Dr. Gordon Pershey's locked office at CSU.

For further information regarding this research, please contact Dr. Monica Gordon Pershey at (216) 687-4534, email: m.pershey@csuohio.edu; or Ashley Hodge at (xxx) xxx-xxxx, email: xxxxxx@xxxx.xxxxx.xxx.

There are two copies of this letter. After signing them, please keep one copy for your records and return the other one to Ms. Hodge. Thank you in advance for your

cooperation and support for this research. Please indicate your agreement by initialing each line, then signing below.

_____ *I consent to a visit to my home and observation of my child without autism interacting or playing with my child with autism.*

_____ *I consent to allow my child without autism to participate in a semi-structured interview conducted by Ashley Hodge for the purposes of this study.*

_____ *I consent to participate in a semi-structured interview conducted by Ashley Hodge for the purposes of this study.*

I understand that my participation in this study is voluntary and that I may withdraw my participation at any time, without penalty. I understand the risks and benefits of this research, and agree to voluntarily participate.

I understand if I have any questions about my rights as a research participant, I can contact the Cleveland State University Institutional Review Board at (216) 687-3630.

Participant's Printed Name

Participant's Signature

Name of Child without Autism

Date

Email Address

Phone Number

The readability of this consent form is grade 12.0

Appendix C

TDC Assent Form

Dear Brother or Sister:

My name is Ashley Hodge. I am a college student and I work at (name of autism center). I am asking that you allow me to watch you play with your brother or sister with autism for 45 minutes at your home. After you play, I am asking that you talk with me for about 20 minutes. I am doing this because I want to help people learn about how brothers and sisters can help children with autism.

You do not have to let me watch you play or talk to me if you do not want to. Nothing will happen to you if you decide not to participate.

I will be writing down what you do and say on my papers, but I will not write down your name or tell anyone your name. I keep my papers locked in a cabinet where no one can see them.

I understand that:

- If I don't want to be observed or interviewed that's okay and I won't get into trouble
- Anytime that I want to stop participating that's okay
- My name will not be told to anyone

Signature: _____

Name: _____ (Please Print)

Date: _____

There are two copies of this letter. After signing them, keep one copy for your parents and return the other one. Thank you for your help.

The readability of this Assent form is grade 4.6

Appendix D

SibA Assent Form

Dear Student of (name of autism center):

I will play with my brother or sister. Ashley will watch me play.

I don't have to play if I don't want to. I can stop when I want to.

Name: _____

Readability of this assent Form is grade 0.3.

Appendix E

Field Notes

DATE _____

START TIME _____ END TIME _____

TDC CODE # _____

SIBA CODE # _____

AGE _____

AGE _____

Describe all observed behaviors between TDC and SibA

Time Interval	Field Notes
1 (0-15 minute time frame)	

Note. Appendix E, Field Notes continues onto next page (p. 216)

2 (15-30 minute time frame)	
3 (30-45 minute time frame)	

Appendix F

TDC Semi-Structured Interview Questions

Adapted from Baker (2000)

TDC Perception of SibA

SibA Ability to play

1. Tell me what (SibA name) knows how to play?
2. Tell me what games you like to play.
3. Which games does (SibA name) play with you?
4. Tell me what (SibA name) plays and does?
5. Tell me what (SibA name) can't play and do?

SibA Cooperation/Willingness to Play

6. Tell me, how do you invite (SibA name) to play with you?
7. How often do you play with (SibA name)?
8. Tell me how often does (SibA name) play with you when you ask?
9. How long will (SibA) play with you?

SibA Interest in Play

10. Tell me how often does (SibA name) play with you and your friends?

TDC Behavior Toward SibA

TDC's Interest in Play

11. Tell me, what games you like to play with (SibA name)?
12. Tell me which games do you like to play that (SibA name) plays?
13. Do you like to play with (SibA name)? Why or why not?

TCD's Knowledge About Autism (Ferraioli, Hansford, Harris, 2012; Sage & Jegatheesan, 2010)

14. What is autism?
15. Who taught you about autism?
16. How does your SibA act? Why?
17. How do you feel about your SibA?

Appendix G

Parent Semi-Structured Interview Questions

1. What have you told your TDC about autism?
2. When did you talk to your TDC about autism?
3. Do you think your TDC understood your explanation about autism?
4. Where did you get your information about autism?
5. How do your children typically play? Describe.
6. Do your TDC and child with autism participate in activities together? What kinds?
7. How do you think they feel about each other?
8. Did I observe a typical interaction? Explain why or why not.

Appendix H

Total Frequencies of Occurrence per Sibling Dyads

Time Interval	G	SA	V+	V-	NV-	NV+	P	C	Q	I	EC	S	R	DVT	UDV	VI	MI	O	PP	NAR	STATE	TM	PPP	
1 (0-15mins)																								
2 (15-30mins)																								
3 (30-45mins)																								

Appendix I

Table 13

Total Frequencies of Occurrence for the Subordinate Categories Within Sibling Dyads

Sibling Dyads	<u>Sup1G</u>	<u>Sup2SA</u>						
	Sub1Po	Sub2Hh	Sub3H	Sub4Sm	Sub5III	Sub6Com	Sub7Pa	Sub8Gsa
TDC1	0	1	1	0	3	0	1	0
SIBA1	0	0	0	1	0	0	0	0
TDC2	1	0	0	0	0	0	0	0
SIBA2	0	0	0	0	0	0	0	1
TDC3	0	0	0	0	0	0	0	0
SIBA3	0	0	0	0	0	0	0	0
TDC4	0	0	0	0	0	0	0	0
SIBA4	1	0	0	0	0	0	0	0
TDC5	0	0	0	0	0	1	0	0
SIBA5	0	0	0	1	0	0	0	0
TDC6	0	0	1	0	1	0	0	0
SIBA6	0	11	1	15	27	0	0	5

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Note. Appendix I, Table 13 continues onto next page (p. 222-226)

Sibling dyads	<u>Sup3V+</u>		<u>Sup4V-</u>		<u>Sup5NV+</u>		
	Sub9E	Sub10Pr	Sub11Te	Sub12Cry	Sub13H5	Sub14Sen	Sub15+++
TDC1 SIBA1	0 0x	3 0x	0 0	0 0	1 1x	1 0x	1 0
TDC2 SIBA2	10 0x	15 0x	0 0	0 0	1 1x	0 0x	0 0
TDC3 SIBA3	0 0x	0 0x	2 0	0 0	0 0x	0 0x	0 0
TDC4 SIBA4	0 0x	0 0x	0 0	0 0	0 0x	0 0x	0 0
TDC5 SIBA5	5 0x	12 0x	0 0	0 5	0 0x	2 0x	1 0
TDC6 SIBA6	0 0x	0 0x	5 0	0 2	0 0x	20 0x	2 0

Note. Appendix I, Table 13 continues onto next page (p. 223-226)

Sibling dyads	<u>Sup6NV-</u>					<u>Sup7P</u>		
	Sub16---	Sub17Gr	Sub18Hi	Sub19Hb	Sub20Mad	Sub21Mm	Sub22Hohp	Sub23Vm
TDC1	2	0	0	0	0	5	7	0
SIBA1	0	0	0	0	0	0x	0	0x
TDC2	0	0	0	0	0	0	1	26
SIBA2	0	7	6	2	2	0x	0	0x
TDC3	0	0	0	0	0	0	0	0
SIBA3	1	0	0	0	0	0x	0	0x
TDC4	0	0	0	0	0	0	0	0
SIBA4	0	0	0	0	0	0x	0	0x
TDC5	2	0	0	0	0	0	0	2
SIBA5	0	0	0	0	0	0x	0	0x
TDC6	1	0	0	0	0	0	0	0
SIBA6	0	1	0	0	0	0x	0	0x

Note. Appendix I, Table 13 continues onto next page (p. 224-226)

Sibling dyads	<u>Sup8C</u>	<u>Sup9Q</u>	<u>Sup10I</u>			<u>Sup11EC</u>	<u>Sup12S</u>		<u>Sup13R</u>	
	Sub24C	Sub25Q	Sub26L	Sub27Mb	Sub28IG	Sub29EC	Sub30< >	Sub31Gg	Sub32R+	Sub33R-
TDC1	45	1	5	17	0	2	0	0	0	1
SIBA1	0x	0	0	2	0	2	0	0	13	14
TDC2	63	25	7	4	1	0	0	0	5	0
SIBA2	0x	6	0	0	1	0	0	0	55	24
TDC3	10	0	2	9	0	0	1	5	2	3
SIBA3	0x	0	0	1	0	0	1	0	10	5
TDC4	0	0	0	0	0	0	0	0	0	3
SIBA4	0x	0	0	2	0	0	0	0	0	0
TDC5	12	4	1	2	0	0	0	0	4	6
SIBA5	0x	0	0	0	0	0	0	0	14	3
TDC6	0	14	14	15	0	35	0	0	31	8
SIBA6	0x	1	26	11	2	35	0	0	31	5

Note. Appendix I, Table 13 continues onto next page (p. 225-226)

Sibling dyads	<u>Sup14DVT</u>	<u>Sup15UDV</u>			<u>Sup16VI</u>	<u>Sup17MI</u>		<u>Sup18O</u>	
	Sub34Dvt	Sub35Msst	Sub36Rrv	Sub37Vsst	Sub38Rv	Sub39Mit	Sub40Mia	Sub41Lat	Sub42Lam
TDC1	0	0	0y	0	0	0y	14	0y	0y
SIBA1	0	9	5	0	0	3	0	1	0
TDC2	0	0	0y	0	1	0y	0	0y	0y
SIBA2	2	1	1	0	11	0	0	1	0
TDC3	0	0	0y	0	0	0y	1	0y	0y
SIBA3	0	45	0	45	1	0	0	7	6
TDC4	0	0	0y	0	0	0y	0	0y	0y
SIBA4	1	0	3	0	0	0	0	14	0
TDC5	0	0	0y	0	0	0y	0	0y	0y
SIBA5	0	35	38	0	2	0	0	8	0
TDC6	0	0	0y	0	7	0y	1	0y	0y
SIBA6	0	0	2	0	3	0	0	3	0

Note. Appendix I, Table 13 continues onto next page (p. 226)

Sibling dyads	<u>Sup19PP</u>	<u>Sup20NAR</u>	<u>Sup21STATE</u>	<u>Sup22TM</u>	<u>Sup23PPP</u>
	Sub43PP	Sub44NAR	Sub45STATE	Sub46TM	Sub47PPP
TDC1 SIBA1	1y 1	4 0	3 0	4 0	0 0
TDC2 SIBA2	0y 0	0 0	15 1	20 0	0 10
TDC3 SIBA3	0y 0	1 0	2 0	0 0	0 0
TDC4 SIBA4	0y 0	0 0	0 0	0 0	0 0
TDC5 SIBA5	0y 0	0 0	1 0	1 0	0 0
TDC6 SIBA6	0y 0	2 0	14 3	0 0	0 1

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

Appendix J

Table 14

Total Frequencies of Occurrence for the Superordinate Categories Within Sibling Dyads

Sibling Dyads	<u>Sup1G</u>	<u>Sup2SA</u>	<u>Sup3V+</u>	<u>Sup4V-</u>	<u>Sup5NV+</u>	<u>Sup6NV-</u>	<u>Sup7P</u>	<u>Sup8C</u>	<u>Sup9Q</u>	<u>Sup10I</u>
TDC1	0	6	3	0	3	2	12	45	1	22
SIBA1	0	1	0x	0	1x	0	0x	0x	0	2
TDC2	1	0	25	0	1	0	27	63	25	12
SIBA2	0	1	0x	0	1x	17	0x	0x	6	1
TDC3	0	0	0	2	0	0	0	10	0	11
SIBA3	0	0	0x	0	0x	1	0x	0x	0	1
TDC4	0	0	0	0	0	0	0	0	0	0
SIBA4	1	0	0x	0	0x	0	0x	0x	0	2
TDC5	0	1	17	0	3	2	2	12	4	3
SIBA5	0	1	0x	0	0x	0	0x	0x	0	0
TDC6	0	2	0	5	22	1	0	0	14	29
SIBA6	0	59	0x	0	0x	1	0x	0x	1	39

Note. Appendix J, Table 14 continues onto next page (p. 228-229)

Sibling Dyads	<u>Sup11EC</u>	<u>Sup12S</u>	<u>Sup13R</u>	<u>Sup14DVT</u>	<u>Sup15UDV</u>	<u>Sup16VI</u>	<u>Sup17MI</u>	<u>Sup18O</u>	<u>Sup19PP</u>	<u>Sup20NAR</u>
TDC1	2	0	1	0	0y	0	14	0y	1y	4
SIBA1	2	0	27	0	14	0	3	1	1	0
TDC2	0	0	5	0	0y	1	0	0y	0y	0
SIBA2	0	0	79	2	2	11	0	1	0	0
TDC3	0	6	5	0	0y	0	1	0y	0y	1
SIBA3	0	1	15	0	90	1	0	13	0	0
TDC4	0	0	3	0	0y	0	0	0y	0y	0
SIBA4	0	0	0	1	3	0	0	14	0	0
TDC5	0	0	10	0	0y	0	0	0y	0y	0
SIBA5	0	0	17	0	73	2	0	8	0	0
TDC6	35	0	39	0	0y	7	1	0y	0y	2
SIBA6	35	0	36	0	2	3	0	3	0	0

Note. Appendix J, Table 14 continues onto next page (p. 229)

Sibling Dyads	<u>Sup21STATE</u>	<u>Sup22TM</u>	<u>Sup23PPP</u>		Sibling dyads	Total Frequencies of Occurrence for all Communicative Behaviors
TDC1 SIBA1	3 0	4 0	0 0		TDC1 SIBA1	123 52
TDC2 SIBA2	15 1	20 0	0 10		TDC2 SIBA2	195 132
TDC3 SIBA3	2 0	0 0	0 0		TDC3 SIBA3	38 122
TDC4 SIBA4	0 0	0 0	0 0		TDC4 SIBA4	3 21
TDC5 SIBA5	1 0	1 0	0 0		TDC5 SIBA5	56 106
TDC6 SIBA6	14 3	0 0	0 1		TDC6 SIBA6	171 185

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

Appendix K

Table 15

Total Frequencies of Occurrence for the Subordinate Categories Across All TDCs and All SibAs

	<u>Sup1G</u>	<u>Sup2SA</u>						
	Sub1Po	Sub2Hh	Sub3H	Sub4Sm	Sub5III	Sub6Com	Sub7Pa	Sub8Gsa
TDCs	1	1	2	0	4	1	1	0
SIBAs	1	11	1	17	27	0	0	6

	<u>Sup3V+</u>		<u>Sup4V-</u>		<u>Sup5NV+</u>		
	Sub9E	Sub10Pr	Sub11Te	Sub12Cry	Sub13H5	Sub14Sen	Sub15+++
TDCs	15	30	7	0	2	23	4
SIBAs	0x	0x	0	7	2x	0x	0

Note. Appendix K, Table 15 continues onto next page (p. 231-232)

	Sup6NV-					Sup7P		
	Sub16---	Sub17Gr	Sub18Hi	Sub19Hb	Sub20Mad	Sub21Mm	Sub22Hohp	Sub23Vm
TDCs	5	0	0	0	0	5	8	28
SIBAs	1	8	6	2	2	0x	0	0x

	Sup8C	Sup9Q	Sup10I			Sup11EC	Sup12S		Sup13R	
	Sub24C	Sub25Q	Sub26L	Sub27Mb	Sub28IG	Sub29EC	Sub30< >	Sub31Gg	Sub32R+	Sub33R-
TDCs	130	44	29	47	1	37	1	5	42	21
SIBAs	0x	7	26	16	3	37	1	0	123	51

	Sup14DVT	Sup15UDV			Sup16VI	Sup17MI		Sup18O	
	Sub34Dvt	Sub35Msst	Sub36Rrv	Sub37Vsst	Sub38Rv	Sub39Mit	Sub40Mia	Sub41Lat	Sub42Lam
TDCs	0	0	0y	0	8	0y	16	0y	0y
SIBAs	3	90	49	45	17	3	0	34	6

Note. Appendix K, Table 15 continues onto next page (p. 232)

	<u>Sup19PP</u>	<u>Sup20NAR</u>	<u>Sup21STATE</u>	<u>Sup22TM</u>	<u>Sup23PPP</u>
	Sub43PP	Sub44NAR	Sub45STATE	Sub46TM	Sub47PPP
TDCs	1y	7	35	25	0
SIBAs	1	0	4	0	11

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

Appendix L

Table 16

Total Frequencies of Occurrence for the Superordinate Categories Across All TDCs and All SibAs

Participants	<u>Sup1G</u>	<u>Sup2SA</u>	<u>Sup3V+</u>	<u>Sup4V-</u>	<u>Sup5NV+</u>	<u>Sup6NV-</u>	<u>Sup7P</u>	<u>Sup8C</u>	<u>Sup9Q</u>	<u>Sup10I</u>
TDCs	1	9	45	7	29	5	41	130	44	77
SIBAs	1	62	0x	7	2x	19	0x	0x	7	45

	<u>Sup11EC</u>	<u>Sup12S</u>	<u>Sup13R</u>	<u>Sup14DVT</u>	<u>Sup15UDV</u>	<u>Sup16VI</u>	<u>Sup17MI</u>	<u>Sup18O</u>
TDCs	37	6	63	0	0y	8	16	0y
SIBAs	37	1	174	3	184	17	3	40

	<u>Sup19PP</u>	<u>Sup20NAR</u>	<u>Sup21STAT</u> <u>E</u>	<u>Sup22TM</u>	<u>Sup23PPP</u>
TDCs	1y	7	35	25	0
SIBAs	1	0	4	0	11

Note. x = Anticipated *a priori* for only the TDCs to exhibit; y = Anticipated *a priori* for only the SibAs to exhibit

Appendix M

TDCs' Interview Responses

<p>Question Topics</p> <p>A. TDC's perception of SibA</p> <p>B. TDCs Behavior Toward SibA</p> <p>C. TDC's knowledge of ASD</p>	TDC1	TDC2	TDC3
<p>A. SibA's ability to play</p>	<p>1. (not asked given TDC1's age and apparent lack of understanding)</p> <p>2. Puzzles and babies</p> <p>3. Puppy</p> <p>4. Chase</p> <p>5. SibA1 is like me</p>	<p>1. Dribbles basketball, put it in a hoop, catch</p> <p>2. Capture the flag, basketball, football, run around, climb in trees, rock climbing</p> <p>3. Catch, beads, violin "I don't think SibA2 likes it," Tic-Tac Toe, "I don't think SibA2 likes to play with me much."</p> <p>4. Computer, piano, watches religious TV channel</p> <p>5. I do not think SibA2 understands board games or capture the flag. I do not think SibA2 can really climb.</p>	<p>1. Super Mario Brothers, wrestle</p> <p>2. Video games, YouTube, reading books</p> <p>3. Pretend games with dad, like when dad pretends to sleep and SibA3 has to wake him up</p> <p>4. YouTube, SpongeBob</p> <p>5. SibA3 cannot experiment with newer video games or board games</p>
<p>A. SibA's Cooperation/Willingness to Play</p>	<p>6. I take SibA1's hand</p> <p>7. A little bit of time</p>	<p>6. "Hey! Do you want to play this?" SibA2</p>	<p>6. I will start to pretend sleep without asking SibA3</p>

	8. A lot 9. 3 hours	usually says “No.” 7. Not too often. Sometimes I help SibA2 read a book or whatever my mom needs help with. 8. No 9. 10-15 minutes	7. Not often 8. Sometimes SibA3 does not do it (TDC3 will keep trying) 9. Few minutes
A. SibA’s interest in Play	10. No, SibA1 never plays with my friends.	10. Every time. SibA2 likes playing with them.	10. One time, SibA3 went on the trampoline with my friends.
B. TDC’s Interest in Play	11. Chase 12. SibA1 walks with me and jumps with me. 13. Yes	11. Tickle SibA2. That’s the one game SibA2 lets me play the longest. 12. Piano. I try to teach SibA2 songs on the piano. 13. Yes, SibA2 is a good playmate when friends are not around.	11. Pretend game. Only game I play with SibA3 12. I will sit by SibA3 sometimes while he watches SpongeBob. 13. (Not asked due to deference to prior statements made by the parent)
C. TDC’s Knowledge of ASD	14. SibA1 plays with his chewy and wears different clothes. 15. Mom 16. Chewy, plays with balls 17. Happy	14. SibA2’s brain has some damage, makes it harder for her to think and do things. 15. Mom 16. Goofy. Sometimes SibA2 gets angry when we try to get her to do stuff. Sometimes she hits. Occasionally she will sit and cry. Most times SibA2 is playful and goofy.	14. A disease that stops the brainwaves from doing stuff like talking. 15. Mom 16. “Yee” when SibA3 is happy or angry. He can speak a little [Note “Yee” is a vocal self- stimulation noise that SibA3 makes.] 17. What the heck is this guy doing?

		17. Sometimes annoyed if SibA2 is doing something she does not want to. Most times, she has fun. I also think SibA2 understands things. It's just hard for her to say.	
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Note. Appendix M, TDCs' Interview Responses continues onto next page to show TDC4-TDC6 (p. 237-239)

<p>Question Topics</p> <p>A. TDC's perception of SibA</p> <p>B. TDCs Behavior Toward SibA</p> <p>C. TDC's knowledge of ASD</p>	TDC4	TDC5	TDC6
<p>A. SibA's ability to play</p>	<p>1. Music, YouTube, I don't know</p> <p>2. Video games, hangout with friends</p> <p>3. SibA4 sits with me sometimes</p> <p>4. Plays on iPad</p> <p>5. Video games that are harder than anything on SibA4's iPad</p>	<p>1. Draw, iPad, roughhouse, piggy back, catch</p> <p>2. Sports, Xbox, Netflix</p> <p>3. Roughhousing, sometimes draw. I will sit and play on the phone while SibA5 plays on his iPad</p> <p>4. iPad, drawing. Sometimes watch TV</p> <p>5. SibA5 does not play Xbox. That is it. I teach him sports</p>	<p>1. Playing with balls, catch, running, playground, swings, slides a lot</p> <p>2. Basketball, soccer, dodgeball, board games</p> <p>3. Run around, catch, tickle fights</p> <p>4. Computer, iPad, listening to music in SibA6's room, playing around with SibA6's stuff, SibA6 goes on his scooter</p> <p>5. Board games that have a lot of rules or games in general where SibA6 has to interact with other children</p>
<p>A. SibA's Cooperation/Willingness to Play</p>	<p>6. Ask</p> <p>7. Couple times a week</p> <p>8. Half and half</p> <p>9. 10-15 minutes</p>	<p>6. Say, "Do you want to play with me?" or "What do you want to do?" Then do what SibA5 wants</p> <p>7. We have a busy schedule during the week. We still talk and hang a</p>	<p>6. I will chase SibA6. If he runs and says, "Tickle me," I know he wants to play. If SibA6 does not respond, I know he does not want to play.</p>

		<p>little. We mostly hangout on the weekend.</p> <p>8. Mostly all the time unless SibA5 does not want to.</p> <p>9. We will play for 10-15 minutes then take a break. Roughhouse. We will play catch back and forth and stop if SibA5 gets frustrated.</p>	<p>7. Every other day. If SibA6 wants to play, it will be 20-30 minutes.</p> <p>8. 85% of the time, SibA6 will play when I invite him.</p> <p>9. 20-30 minutes</p>
A. SibA's interest in Play	10. A little	10. "Usually whenever I have friends over SibA5 is able to join in, unless he doesn't want to."	10. Not very often. SibA6 keeps to himself when they come over.
B. TDC's Interest in Play	11. Sit around, hangout, wrestle 12. Games on the iPad 13. Sometimes	11. Roughhousing 12. Roughhousing 13. Yes! It is fun to teach SibA5 new stuff especially if he does not know how.	11. Chasing SibA6 around 12. Sometimes we play with SibA6's stuff in his room. 13. Yeah. SibA6 is my younger brother. Why not? SibA6 can't always do complicated games.
C. TDC's Knowledge of ASD	14. Not talking 15. Mom 16. Active. Does not like to sit down. Always wanting to do something. SibA4 does not like to sit still. 17. Happy. Sometimes SibA4	14. People do not have the capability to do all of the things normal people can do. 15. Mom when he was diagnosed 16. SibA5 acts pretty normal compared to some people with	14. A disability where they cannot speak or develop as quickly as other people. 15. Parents 16. SibA6 likes to be alone. 17. I think SibA6 understands that I am his sister and playing around is

	will not walk away.	autism who cannot speak or listen. 17. Happy because SibA5 has a play pal and someone to talk to and a friend.	what we are supposed to do.
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Appendix N

Parents' Interview Responses

Family1	Family 2s	Family 3
1. Described ASD as some people are blind, deaf, etc. Everyone's different.	1. Explain behaviors as they happen. By kids living it, it is obvious. TDC2 can see and experience it.	1. Used stories to explain. When TDC3 was young, he seemed interested. Sometimes TDC3 asks why SibA3 has autism. We discuss studies.
2 No plan to sit TDC1 down and talk about autism. Open to answering any of TDC1's questions.	2. Did not promote ASD. Did not advertise it. We dealt with it.	2. TDC3 always went to therapies and participated in home programs. Gave TDC3 more and more information about autism as he grew older. TDC3 involved in therapies starting at 3 years.
3. TDC will ask "Is SibA1 younger? Why doesn't he talk?"	3. Kids understand what autism is from witnessing and experiencing autism. They see other kids with autism.	3. TDC3 brings up misconceptions. TDC3 was jealous in the past. TDC3 did not know why he could not play at first; then he got more involved with therapies.
4. Defeat Autism Now (DAN) doctor; visit DAN doctor 3-4 times per year and the doctor directs the parents to websites, read books.	4. From other parents at the same preschool, and DAN doctor	4. Started with DAN doctor, but did not see results; went to Milestones conference 2 weeks after SibA3's diagnosis; joined parent group called Autism Society of Greater Cleveland; looked online.
5. They will jump on the trampoline together. They will play chase and swim outside. SibA1 likes to be by himself.	5. SibA2 does not play. She has to be forced. SibA2 would rather play with her games. She likes to be by others to watch.	5. They do not play together.

	SibA2 does not want to participate. She just wants to be near others.	
6. SibA1 usually complies with TDC1. TDC1 will direct play.	6. Books, beads, basketball, piano.	6. Used to do karate together with one-on-one instructors. They do family activities at the park, and go to restaurants.
7. They get along. SibA1 will sometimes try to escape. They do not fight. TDC1 annoys SibA1 in a little sister way.	7. Excellent because TDC2 is patient.	7. TDC3 sometimes gets bossy. TDC3 acts like the dad. TDC3 always thought he was the older brother. They never fight. They have a good relationship.
8. Yes, TDC1 initiates and engages with SibA1 on her own.	8. Yes, typical. TDC2 babysits so parents are able to work and go on dates.	8. No, near the end yes. Usually SibA3 is on YouTube while TDC3 is playing video games.

Note. Appendix N, Parents' Interview Responses continues onto next page to show Family4s-Family6s (p. 242-243)

Family 4s	Family 5	Family 6s
<p>1. Never sat him down. Through the years, explained how SibA4 cannot communicate things. Told TDC4 to be understanding.</p>	<p>1. ASD is a developmental delay; not sure how it happened. SibA5 is the same as you and me; he just has a hard time communicating. Be patient and kind.</p>	<p>1. A lot. Used incidental teaching. Talk through situations as they occur. Told TDC6 that SibA6 is not less, just different. We love him the way he is. It's no one's fault. It is the way God intended it.</p>
<p>2. Told TDC4 right away. Explained situations as they happened. TDC4 did not ask many questions. Parent had TDC4 watch educational videos (SonRise).</p>	<p>2. Eased into it. SibA5 was diagnosed at 3 years old. TDC5 was 6 years old when SibA5 was diagnosed. When TDC5 was 6 years old, I began educating TDC5 that SibA5 learns a little slower.</p>	<p>2. Explained autism to TDC6 when SibA6 was diagnosed at 30 months.</p>
<p>3. Parents do not think that TDC4 understands all the components of autism. TDC4 says SibA4 knows more than SibA4 lets on. TDC4 thinks that parents "baby" SibA4. TDC4 assumes SibA4 has intelligence. TDC4 views SibA4 as typical and wants to treat her like everyone else.</p>	<p>3. TDC5 was always interested in autism. TDC5 wrote a paper about it. Yes. TDC5 was sad in a caring way. TDC5 always wanted to protect and help SibA5. Sometimes TDC5 gets mad, wondering why SibA5 has to have autism.</p>	<p>3. TDC6 took some time to understand. TDC6 still has some things to grasp. TDC6 is sad that SibA6 does not have friends like TDC6 has.</p>
<p>4. Internet, books, research all over, DAN doctor, ignore AutismSpeaks website, researches biomedicine.</p>	<p>4. Researched on the internet. I believe that everyone has to go through his or her own exploration. Talk to people. Spoke to DAN doctor. Explored options. Tried many different treatments to then rule out ineffective treatments.</p>	<p>4. Online. Achievement Centers for Children. Tutor came to show mom how to play. Took time for SibA6 to be diagnosed. Formal diagnosis was in 2014 when SibA6 was around 6 years old.</p>

<p>5. TDC4 acts like a father by bossing SibA4 around, and telling her what to do. TDC4 is protective of SibA4. TDC4 takes care of SibA4, but is unwilling to get into her world.</p>	<p>5. Roughhousing once a week. TDC5 never shuts SibA5 out; TDC5 is always inviting. They will watch movies together. They even share a room to sleep although their beds are in separate rooms.</p>	<p>5. Minimal. They get along with each other. There is an age gap causing different interests.</p>
<p>6. Sometimes SibA4 will sit in TDC4's room to watch him play video games; they will wrestle. TDC4 likes to throw her in the pool.</p>	<p>6. They do things as a family. TDC5 and SibA5 will draw, roughhouse, play catch, play basketball, scooter, bike, and swim.</p>	<p>6. Swimming. Play in the snow.</p>
<p>7. Sometimes SibA4 gets really annoyed with TDC4. SibA4 will yell at TDC4. SibA4 tolerates TDC4. SibA4 likes to watch what people do and then do what they do.</p>	<p>7. They love each other immensely. TDC5 told mom he would always take care of SibA5 and that she would never have to worry about SibA5.</p>	<p>7. They get along. They do not fight.</p>
<p>8. Yes, SibA4 tends to hangout with parents more so than TDC4. We have family game nights. TDC4 will watch SibA4 when we go out.</p>	<p>8. Absolutely. TDC5 helps SibA5 with homework. SibA5 used to hate homework. Now that TDC5 helps, SibA5 completes homework and likes doing it.</p>	<p>8. Longer than usual. Play is on SibA6's terms of when he wants to play. Often times, SibA6 will initiate.</p>