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Relationship Quality of Typically Developing Children and Their Autistic Siblings: A Comparison by Functionality and Anxiety

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Relationship Quality of Typically Developing Children and Their Autistic Siblings: A Comparison by Functionality and Anxiety

by

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Abstract

This study focused on the impact of differences in functionality of a child with autism spectrum disorder (ASD) and the potential anxiety experienced by the typically developing (TD) child influencing the relationship quality of the pair. Previous research shows the importance of the relationships between TD children and a sibling with ASD. However, research that focuses on siblings' relationship quality outside of theory and influencing factors, such as anxiety, functionality, and aggression, is limited, and conclusions on the subject, are mixed. Based on the literature, four hypotheses were developed: (a) the general relationship quality between sibling pairs will significantly increase as the ASD child's functionality level increases; (b) lower functionality levels in ASD children will increase aggression levels of ASD children; (c) increases in aggression in the ASD child will directly and negatively impact relationship quality in the TD siblings' report of relationship quality; and (d) anxiety levels of the TD siblings will indirectly influence TD siblings' report of relationship quality. The study examined 13 pairs of parent/guardian and TD siblings who completed the ASD Assessment Scale/Screening Questionnaire, the modified overt aggression scale, the children's anxiety scale, and the Network of Relationships-Relationship Qualities Version. Although Spearman's rank order correlations matrix showed ASD functionality significantly correlated with NRI subcategories satisfaction and dominance, as well as anxiety with satisfaction, it did not support the hypotheses strongly enough. In addition, we ran an independent t-test between NRI subcategories and anxiety grouped from no to mild and moderate to high.

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Chapter I: Introduction

According to the Centers for Disease Control and Prevention (as cited in Hartley, Mihaila, Otalora-Fadner, & Bussanich, 2014), there has been a rise in the diagnosis of Autism Spectrum Disorder (ASD), estimated at 1 in 88 children in the United States . Because of this, it is important to understand how these children impact their families, specifically their siblings. Minimal research focuses on the importance of relationship quality between ASD children and their typically developing (TD) siblings. What can be found is mainly theoretical (McHale, Updegraff, & Feinberg, 2016; McHale, Updegraff, & Whiteman, 2012). Thus, it is important to pull from general research related to ASD and TD siblings' interactions.

Siblings' Relationship Quality

Symptoms of ASD, such as disruptive behavior, stereotyped or fixated interests, and poor social-emotional reciprocity (Rodgers et al., 2016), often show up in varying forms and strengths. This is particularly important when examining the relationship quality because it can have a high impact on the desirability of interaction between siblings. Multiple studies have found this to be a confounding variable when forgotten to be controlled for (Tomeny, Baker, Barry, Eldred, & Rankin, 2016; Hastings & Petalas, 2014). The confounding aspects of understanding the ASD sibling's impact on the TD sibling comes from limited information available on the attachment and relationships of TD children and their ASD siblings, leading researchers to rely on theoretical perspectives on the subject (McHale et al., 2016). Sibling relations have often been argued to be one of the strongest relationships among humans, second to the parent-child relationship (Pollard, Barry, Freedman, & Kotchick, 2013).

Research Implications

Pollard et al. (2013) explore the difference between relationship quality of children with ASD and their TD siblings in comparison to the sibling relationship of children with Down syndrome. The study found that there was a significant difference in the relationship quality between the two groups, with ASD children having poorer relationships. Importantly, they also found there was an extreme variation in the results of the ASD sample group, which they surmised was related to the variation of ASD behavior. For example, aggression can vary among children with ASD based on symptoms they display or IQ level. Being a sibling of an ASD child with several aggressive and tantrum behaviors may cause more anxiety than being a sibling of a child with mainly repetitive behaviors and poorly modulated eye contact (Pollard et al., 2013).

Research shows a surprising lack of clarity when it comes to choosing how to analyze the diverseness of the autism spectrum. Some studies (Pollard et al., 2013) do not discuss or organize data regarding functionality, which can lead to a mudding effect on the data, especially in comparison to other population groups (Pollard et al., 2013). For instance, due to such divisions, literature on the impact of anxiety on the TD sibling has both research for (Lovell & Wetherell, 2016; Rodgers et al., 2016; Shivers, Deisenroth, & Taylor, 2013; Tomeny et al., 2016) and against (Shivers et al., 2012) its significance. However, for the sake of simplicity, researchers sometimes divide the spectrum into categories of high and low functionality, as in Mayes et al.'s (2011) work to assess the validity of Gilliam Asperger's disorder scale in differentiating high and low functioning autism, which was tested by creating a range for IQ to determine high or low functioning. This is based on therapeutic research interventions that have been shown to more accurately target different functionality ends of the spectrum, like cognitive behavioral therapy-

based (CBT) interventions versus more behavioral interventions (Shivers & Plavnick, 2014). Generally, categorical measures lack some of the beneficial psychometric properties inherent in more dimensional scales (Gallitto & Leth-Steensen, 2015). Generally, categorical measures lack some of the beneficial psychometric properties inherent in more dimensional scales (Gallitto & Leth-Steensen, 2015), such as those that take into mind broader autism phenotype (BAP), a mild form of autism presenting sub-diagnosis expression of autistic symptoms. Autism must be reconceptualized from an all-or-nothing categorical approach to a dimensional classification that includes milder variants of the disorder. Suggestions have been made throughout literature to allow the data to be as specific as possible when examining ASD populations.

Much of what we do know about children with autism and their sibling relationships has come from research and publications designed to address concerns of parents about their children. Harris and Glasberg's (2003) book, *Siblings of Children with Autism: A Guide for Families*, answers a range of parents' questions, including how to explain autism to siblings, how to get siblings to share their feelings and concerns, how to master the family balancing act, and how to foster play between siblings. Originally published in 1994, new chapters were added with the second edition in 2003 concerning what siblings actually believe or understand about autism at different ages and how autism continues to impact adult sibling relationships, careers, and caregiver roles. Much of this information will be discussed throughout the paper in relation to similar theoretical findings.

Theoretical Implications

Because of the limited amount of studies that have investigated the relationship quality of TD and ASD siblings, researchers rely on theoretical implications. McHale et al. (2012, 2016)

did this by examining and applying theoretical perspectives and their application to sibling relationships. The first, McHale et al. (2012), studied general sibling relationships and came to three conclusions: (1) which siblings' roles and relationships vary in the extreme due to a multitude of factors; (2) "sibling influences on youth development and adjustment are unique in the sense that evidence of sibling influences emerges even after the effects of other significant relationships are taken into account" (p. 923); and (3) two individuals from the same family can be as different as unrelated individuals. This last point suggests the implications and impact of failing to bring siblings' relationships into the investigation of families.

McHale et al. (2016) added to previous work by focusing on the same sibling relationships discussed in this paper, children with ASD and their TD siblings. The authors focused on two main questions: *How do TD sand ASD siblings develop an involved and affectionate relationship?* and *How do relationship experiences shape the adjustment of both TD and ASD siblings?* The answers were based on theory and limited studies. From such theories, we can see how things like sibling conflict, importance of sibling knowledge and deviance training, rivalry, differentiation, emotional security and attachments, social comparison, self-esteem, behavioral intentions and attitudes, and everyday involvement make a significant impact on the variability in siblings' relationships. From these, six major factors have been identified that impact the relationships: companionship, satisfaction, emotional support, conflict, criticism, and dominance.

Social learning theories. The most commonly utilized theory, this type of research utilizes ideas that positively reinforcing negative behavior (e.g., giving in to a tantrum) creates coercive cycles that escalate in intensity over time (McHale et al., 2016. pp. 591-592). Studies

have shown that TD siblings can shape social and adaptive behaviors and maintain the behavioral changes, resulting in intervention effects spilling over to affect TD siblings' evaluations of their sibling and the relationship. Thus, conflict can have a strong negative effect on the relationship. Observational learning, a social learning mechanism, dictates that learners are more likely to imitate models who are of higher status. It is important to focus on parental influence on sibling dynamics, as parents are important role models for TD siblings concerning how to relate to an ASD sibling.

Psychoanalytic/ethological theories. McHale et al. hold that emotions have deeper biopsychosocial underpinnings (2016, pp. 592-594). Theories often focus on the rivalry or security level of a relationship. An example of this is research on sibling de-identification or differentiation, where siblings distinguish from one another to establish a unique identity and place in the family niche and reduce sibling rivalry. ASD sibling relationships can be damaged when they pull from their TD siblings' identities to learn socially acceptable behaviors. As such, when this differentiation does not happen, it can build anxiety for the TD sibling. The idea of emotional security can also play a significant role in sibling relationships. Derived from attachment theory, the attachment of ASD children to siblings can give them comfort and increased autonomy, which is especially important if the parents' marriage is struggling. Another part of this attachment becomes the role of siblings as caregivers and nurtures, a part of the relationship that can remain when the siblings are adults. This extra expectation on a TD sibling has been shown to produce a wide range of emotions, including stress and frustration Harris and Glasberg (2003). If these attachments are not successful, rivalry may lead to

dominance and criticism within ASD children who are on the higher functioning end of the spectrum.

Cognition. *Social psychological theories*, how cognitions, including attitudes, expectations, and social comparisons that emerge in close relationships, have implications for both close relationships and individual well-being (McHale et al., 2016, pp. 594-597). Such research will be paramount in future intervention programing. *Social cognitive development* highlights how cognitions include attitudes, expectations, and social comparisons that come from relationships. This, highlights abilities such as emotional understanding and viewing perspectives, which are the basis for the ability to give emotional support. As much of these social processes are limited in ASD children because of developmental deficiencies, it can be expected that the emotional support of an older ASD sibling might be lacking to their younger sibling. *Social comparison theory* (social cognitive processing), equity and exchange theories (relationship continuity), theory of planned behavior (connection of cognition and behavioral attention), and even siblings' everyday involvement (how the spend their day together) are all important parts of the equation between siblings. *Equity and exchange theories* remind us to think about siblings' relationships in the mind of rewards and contributions to the relationship. For example, increasing the feelings of rewards and decreasing the feelings of costs can influence a TD sibling's willingness to play or interact with the ASD sibling. When the behavior of the ASD child is less violent, a TD sibling might find more pleasure in interacting with them. They gain more satisfaction from their relationships with their siblings. *Theory of planned behavior* illuminates "the links between individuals' cognitions—including attitudes and values, normative beliefs, perceived control, and behavioral intentions—and their objective, observable

behaviors" (McHale et al., 2016, p. 596). This is important when we look at how future intentions to stay connected with their sibling (possibly in a caretaker role), their value on such roles, and what control a child might perceive they have (in this case, less control over the need to do so depending on need level).

Everyday activities. Because ASD children spend most of their non-school time with their TD siblings compared to any other peer group, the everyday activities they participate in plays an important role in the growth of the relationship between siblings (McHale et al., 2016, pp. 597-598). *Social ecology* makes factors like parents' socialization and community norms significant factors in the meaning activities take on for TD youth. Congruency between activities and values lead to moderation of negative effects ASD siblings can have on the family. McHale (2016) found that closer relationships between ASD and TD pairs were connected to more time spent together. However, there is little known about the everyday ecology of ASD and TD siblings concerning what makes up this day. The ability for the ASD child to successfully build some sort of companionship with the TD sibling is a large step toward the quality of relationship the two will have. Harris and Glasberg (2003) confirmed this information when examining previous work on the process labeled *access* for creating bonds between siblings. Referenced is age, gender, and shared activities as highlights of the bond. Emphasized is how a bond is not always positive, and can be either a source of joy or pain.

Importance of Siblings

Although family size is decreasing, most people have at least one sibling (Feinberg, Sakuma, Hostetler, & McHale, 2013). Research has also shown that TD siblings have a huge impact on ASD siblings' lives in terms of sociability and behavior. Something as simple as

having an older sibling can dramatically help an ASD child's development both behaviorally and cognitively, improving, for instance, less severe social communication symptoms (Ben-Itzchak, Zukerman, & Zachor, 2016; Matthews, Goldberg, & Lukowski, 2013; Tomeny, Barry, & Bader, 2014). This developmental impact can occur with other siblings as well but is the strongest when the sibling is older or of a similar age (about 5 years difference). Birth order rank of the ASD siblings is not only a predictor of the siblings' externalized (expressed) behavior but also serves as a moderator between the expressed behaviors between the siblings, as the behavior of the TD sibling can help teach the ASD sibling (McHale et al., 2012). McHale (2012) noted this interaction when TD children who were younger than their ASD siblings were more likely to take on the behavior characteristics from the ASD sibling rather than teach their counterpart appropriate behavior.

These development enhancements are suggested to come from opportunities for social interaction and play in a child of a similar age range, particularly when it comes to certain kinds of play including pretend play (Matthews et al., 2013). This impact becomes increasingly important when we consider the longevity of a sibling's relationship compared to other playmates, especially when utilizing this within play therapy. Huskens, Palmen, Van der Werff, Lourens, and Barakova (2015) studied the benefits of using siblings to help boost their ASD siblings' social skills. Sibling involvement is promising because of the considerable length of the relationship compared to peers. Learned skills are more easily translated to peers than if they had been learned from an adult (Shivers & Plavnick, 2014). These skills and interventions are repeated into adulthood. Siblings may become active agents or co-recipients. As such their lives are changed because of their ASD sibling.

> Oftentimes [ASD siblings] may ignore their typically developing siblings and have little interest in being with them. Efforts by the sibling to engage the child with ASD in play may be met by ignoring, tantrums, or aggression. Siblings, by contrast, often yearn for a playmate, are frustrated by the lack of response of the child on the spectrum and may be frightened by their intensity of effort to avoid engagement (Ferraioli, Hansford, & Harris, 2012, p. 413).

Impacts of ASD-Related Stressors on TD Siblings

Impacts of stressors on TD siblings, such as participating in an ASD siblings' therapy, are mixed (Feinberg et al., 2013; Hastings & Petalas, 2014; Hesse, Danko, & Budd, 2013; Lovell & Wetherell, 2016). Although studies have found positive attitudes in TD siblings toward participating in the interventions, there are negative effects that must be considered.

In the long-term, levels of anxiety and depression in TD siblings match those who do not have ASD siblings (Rodgers et al., 2016; Shivers et al., 2013) and suggest no need for targeted intervention. However, having an ASD family is a risk factor for symptoms of anxiety and depression in the short-term in both siblings and parents of children with ASD (Lovell & Wetherell, 2016; Shivers et al., 2013; Tomeny et al., 2016). Siblings are more prone to anxiety and depression because of investment in family life, including helping with household chores. Though it is not clear what about the ASD relationship causes stress for the child, ASD severity (e.g., behavior problems) was correlated to the likelihood of increases in TD sibling's anxiety and depression. For example, Pollard et al. (2013) indicates that reporting more negative exchanges within the sibling relationship was related to higher levels of anxiety regardless of

sibling disability type (ASD vs. Down Syndrome). However, the sibling relationship quality moderated the relationship between sibling disability type and anxiety.

Harris and Glasberg (2003, p. 13) suggest that although children with autism are more likely to experience these symptoms, they tend to learn to handle the experiences often with no ill effects in the long run, suggesting that TD siblings have a resilience factor. However, this does not explain the impact such events will have on the quality of the relationships between an ASD and TD pair. TD siblings, who can be quantified by the struggles of the ASD diagnosis, as frustration can lead to anger, anxiety, and depression symptoms. Harris and Glasberg (2003) suggest the importance of identifying what is typical sibling behavior and what is extra.

Parents' stress levels may be a resilience factor. Parents' levels of stress and support (as in the situation of single parents) were factors that added more stress and anxiety onto siblings (Shivers et al., 2013; Tomeny et al., 2016). This means the less stress the parents feel, the less they have to utilize the TD siblings to take on the role of caretaker. This has been identified as a potential problem for TD siblings, especially older siblings, who are more likely to take on more hours than their normative family counterparts (Harris and Glasberg, 2003, p. 18), which may inhibit adolescence, much-needed independence, and social development. When roles are reversed with age, it can be perplexing and have a negative impact on the TD child.

A family with a child with autism is by no means immune to the stress of labor division. Hartley et al. (2014) found that mothers are more likely to take on more of the housekeeping and specialized needs of the child with autism, while the father increases his role outside the home. Challenges in caring for a child with a psychological disorder take a toll on the family and can lead to chronic stress, social isolation, financial strain, stigma, and social judgement (Lovell &

Wetherell, 2016). Having a larger family reduces the stress levels of parents who have children with ASD because of parents' confidence in parenting style and skills gained by having raised more children. To avoid these negative effects, caution should be taken to avoid overutilizing TD siblings.

Research Question and Hypotheses

Few studies focus on the relationship between ASD and TD siblings. Research shows the importance and long-lasting effects of such a relationship on both siblings. However, we must take into account the variation in the literature, which suggests that it is important to analyze the differences in the quality of the sibling relationship between functioning levels of ASD children. Considering the functionality and subsequent varying aggression levels of ASD siblings, the following research also focused on the functionality and aggression of the ASD siblings (see Figure 1).

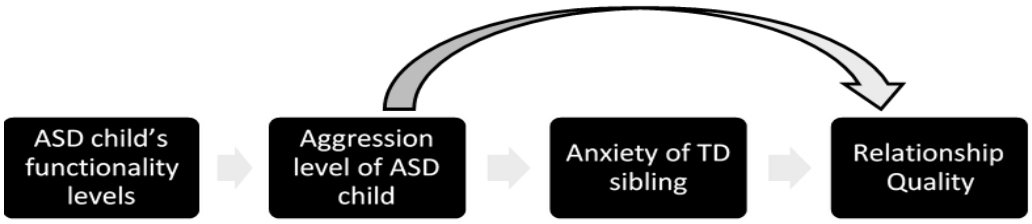

Figure 1. Research hypothesis.

Research Question: Will the variation of functionality levels of children with autism spectrum disorder (ASD) , through the aggression levels of the ASD child and the anxiety of the typically developing (TD) sibling, impact the relationship quality of ASD and TD sibling pairs?

Hypotheses: (1) The general relationship quality between the sibling pairs will significantly increase as the ASD child's functionality level increases; (2) Lower functionality levels in ASD children will increase aggression levels of ASD children; (3) Increases in

aggression in the ASD child will directly and negatively impact relationship quality in the TD siblings' report of relationship quality; and (4) Anxiety levels of the TD siblings will indirectly impact TD sibling's report of relationship quality. If the hypotheses are proven true, future research will include a deeper examination of some factors of relationship quality that have been previously shown to be important in sibling relationships, including companionship, satisfaction, emotional support, conflict, criticism, and dominance.

Chapter II: Method

Participants

The sample for this research consisted of families who have at least one child with ASD and a TD sibling. The survey design, required one parent or guardian as well as the typically developing sibling to complete a survey. Restrictions on participants include the survey being in English, a 5-year maximum age difference between siblings, and the age range for the typically developing between 8 and 18.

Recruitment of participants was done online through 27 ASD support groups for families through Facebook and Reddit communities. Links and specific groups are not listed in this paper to maintain the anonymity of the participants, as some groups are rather small. Protocol for finding groups was to search for the term ASD or ASD families within Facebook and Reddit. Permission was requested and received to post from all the communities utilized. Three other communities denied permission. The majority, 20, were closed Facebook support groups for families. Two were open Facebook Pages, and five were Reddit communities. Snowball sampling was encouraged in the advertisement for and introduction of the survey. Participants were given about a month to complete the survey before the link closed. The link was open from May 5 to May 31, 2019.

Research has shown that families with children who have ASD, especially those with major behavioral issues, have demonstrated to be less likely to respond due to time demands. Therefore, a small compensation was used to encourage participation. A $50 Amazon gift card was given away upon completion of gathering the survey information. This was completed by a

random number drawing, including participants who elected to add their emails to the bottom of the survey.

Twenty families responded to the survey. Seven were not qualified for the survey due to age restrictions (see Table 6). The 13 remaining participants qualified and gave consent. The gender of the TD sibling was close to normal expectations with 46% (6) being female. The ASD sibling gender ration is also in an appropriate range with 76.9% being male. This 4:1 ratio for male diagnosis of ASD aligns with research (American Psychiatric Association, 2013). The age of both the TD and ASD siblings were recorded. The mean for TD was 11.7 and ASD 11. Ages ranged from 5 to 18.

Children's ages ranged from 6 to 18 (with the 6-year-old being an ASD child, so the family still met the requirements). The majority of the TD children were older (38.5%) or the same age (30.8%). Note that this study did not specify the difference between twins, full blood siblings, half siblings, or stepsiblings. The standard deviation of age differences was 1.96 years and a mean of 1.6.

Participants scored their child's ASD severity, with the scores setting participants into categories of severity: 0 - 49 = no ASD, 50-100 = mild ASD, 100-150 = moderate ASD, > 150 = severe ASD. This means that as participants scored higher, their functionality would be lower. The mean score of participants was 108.8 (moderate, see Table 2). The majority of participants fell into mild (46.2%) and moderate (30.8) categories (see Table 1), indicating that the participants are not as dispersed as would be hoped for. The majority of participants were from Minnesota (seven) and three were from another country (Canada and the Netherlands). The majority of participants were White (10).

Table 1

ASD Categorical Frequencies

Category	Frequency	Percent	Valid Percent	Cumulative Percent
None	1	7.7	7.7	7.7
Mild	6	46.2	46.2	53.8
Moderate	4	30.8	30.8	84.6
Severe	2	15.4	15.4	100.0
Total	13	100.0	100.0	

Table 2

Descriptive Statistics of ASD Functionality Non-categorical

Mean	108.7692
Median	99.0000
Std. Deviation	36.15972
Minimum	47.00
Maximum	179.00

Procedure

The survey consisted of two main assessments sections, parent and TD child. The assessments can be found in the appendices.

Parents. First, the section had a brief explanation of the survey followed by the qualifiers and mention of the monetary incentive. Also, a consent and assent statement for both the adult and child were used (see Appendix E). Second, parents completed a functionality assessment of the ASD sibling using the ASD Assessment Scale/Screening Questionnaire (see Appendix A). This questionnaire is an experimental screening tool based on the DSM-V criteria for ASD by Dr. Rami Grossmann (Child Neurology and Developmental Center, 2014). It includes three categories in the questionnaire (social interaction difficulties, speech and language delay, abnormal symbolic, or imaginary play) with 15 items. Examples of the items include *facial expressions don't fit situations* and *repeats heard words, parts of words or TV commercials*. These questions have a 5-choice rating scale with the following results: no, resolved, mild, moderate, and severe. Categories are rated by a point system that weighs each category differently. For example, scores for the general category are: No (0 points), Resolved (1 point), Mild (2 points), Moderate (3 points), Severe (4 points). This leads to a total between 0 and 150, which gives broad categories of 0–49 = no ASD, 50–100 = Mild ASD, 100–150 = Moderate ASD, > 150 = Severe ASD. For my purposes, I kept the raw score number rather than just the division into categorical data. As children should have had a previous diagnosis of ASD, they should all fall around >50 or so according to the assessment. Only one family's child screened under 50, at 47. However, because I have chosen to omit the section on behavior in the

assessment (to allow for no overlap with the Aggression Questionnaire), I have chosen to keep this family's data in the survey due to the proximity of the score.

I choose this experimental assessment tool, rather than one that has had more validity and reliability testing, due to the lack of simple and quick tools for assessing ASD levels. Most assessments and screening are complex, observation-based (Autism Speaks, 2017), are for specific age ranges (Brookes Publishing Company, 2018), and focus on evaluating if a child has ASD, not necessarily the delays in specific categories.

The next assessment is for aggression of the ASD sibling (see Appendix B), using the Modified Overt Aggression Scale (MOAS). Traditionally, this scale is used for measuring changes in behavior over time or in studies evaluating the effectiveness of interventions aimed at reducing aggressive challenging behavior in intellectually disabled groups. This is done by retaking the scale over a period of time, usually once a week. However, I used the assessment as a generalized measurement of aggressive behavior challenges over the time period of a month. The reason I chose this survey over the strengths and difficulties questionnaire, for instance, is because the questions cater directly to the type of behavior and aggression problems that ASD children are likely to have. It does this by breaking up aggression into four categories, verbal (shouts angrily, curses mildly, or makes personal insults), property aggression (slams door angrily, rips clothing, urinates on floor), auto-aggression (bangs head, hits fists into walls, throws self on the floor), and physical aggression (strikes, pushes, scratches, pulls hair of others without injury). It then takes these categories and ranks common responses of participants by weighing categories' aggressiveness (verbal aggression x 1, aggression against property x 2, auto-aggression x 3, physical aggression x 4), and makes a generalized score out of 40.

Past validity and reliability studies (Oliver, Crawford, Rao, Reece, & Tyrer, 2007) have indicated results on the level of agreement between raters is high for several of the subcategories of this scale, verbal aggression (intraclass correlation coefficient, ICC = 0.90) and physical aggression against others (ICC = 0.90). The other two subscales were lower but still in the *good/moderate* range, and the total for the MOAS averaged high as well (ICC = 0.93). Another study, Hui Chun et al. (2009) also displayed high inter-rater reliability also based on intraclass correlation coefficient (ICC = 0.94, P<0.001). This study also assed validity by using the Mann-Whitney test. The results exhibited the raters adequately differentiated ($z = -2.89$, $P = .002$) between the above-average and below-average scores of the MOAS, giving this scale modest validity results. An alpha test on my own data from this assessment came back with an alpha of 0.824 (see Table 3).

Table 3

Modified Overt Aggression Scale Alpha Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.824	.852	4

Typically developing child. The children completed two assessments. TD children filled out the Spence Children's Anxiety Scale (see Appendix C), developed to assess the severity of anxiety symptoms broadly in line with the DSM-IV. The scale covers six domains of Anxiety: generalized anxiety, panic/agoraphobia, social phobia, separation anxiety, obsessive compulsive disorder, and physical injury fears. Only separation anxiety, social phobia, panic, and generalized anxiety were used for this survey to closer asses domains related to ASD and TD relationships. This was designed to be quick and easy for children of all ages to use, and takes a

maximum of 10 minutes to complete. It is based on a 4-point frequency scale. Examples of items on the survey include *I worry what other people think of me* and *I feel afraid*. Specific questions that were not generalized or could not be related to anxiety related to the TD siblings were omitted. An example is *I am afraid of dogs*. This scale was shortened to be more appropriate for the TD sibling in the context of our study by eliminating questions related to obsessive compulsive disorders, physical injury fears, and agoraphobia (leaving in the panic questions). General validity and reliability of this scale (Essau, Muris, & Ederer, 2002) is shown to have high internal consistency (alpha = 0.92). This also holds true for this data set (0.921) (see Table 4). Structural support and acceptable internal consistency and convergent validity were found in three subscales, generalized anxiety, separation anxiety, panic and agoraphobia.

Table 4

Alpha Test SCAS Anxiety

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.918	.921	22

The second assessment completed by TD siblings was a relationship assessment tool (see Appendix D), the Network of Relationship Inventory (NRI), originally developed to focus on a wide variety of relationship characteristics across different types of personal relationships. There are three official versions of this assessment. This study utilized the NRI-Relationship Qualities Version (RQV), and was adjusted to focus on only the TD sibling's relationship with their ASD brother or sister rather than allowing the TD sibling to pick the relationship they report on. It is a 30-item survey with 10 scales, 3 items per scale. It assesses five positive features: companionship, disclosure, emotional support, approval, and satisfaction. It also assesses five

negative relationship features: conflict, criticism, pressure, exclusion, and dominance. These categories scored .804 for Cronbach's Alpha (Table 5). Companionship and dominance scores were determined by totaling the scores of the other features, resulting in a score between 15 and 75. All other scale scores fell between 3 and 15 (Buhrmester & Furman, 2008; Furman, 2002; Measurement Instrument Databases in the Social Sciences, n.d.). In addition to utilizing the full factors of the relationship quality, the plan, if the factors correlate and the hypotheses were proven correct, was to analyze some features of relationships, specifically companionship, satisfaction, emotional support, conflict, criticism, and dominance.

Table 5

Cronbach's Alpha of NRI Categories

Alpha	N
.804	13

Examples of the questions used in the NIR-RQV include *How often do you tell this person things that you don't want others to know?* (intimate disclosure), and *How often do you and this person get mad at or get in fights with each other?* (conflict). The NRI is an easily administered questionnaire that has been used in several longitudinal studies of children and adolescents, ages 8 through 18. Its validity and reliability have been specifically addressed in Furman and Buhrmester (2009). Also, another study utilizing an abridged version of the NRI reported a mean Cronbach's Alpha on .81 for the abridged version and scores corresponded to groupings used to identify peer withdrawn, peer-aggressive and sociable children (Buhrmester & Furman, 2008; East, 1991).

Chapter III: Results

To examine the hypothesis, Pearson's correlation matrix was intended originally to examine the variables. Due to the small participant size and uneven spread of participants in relation to ASD functionality scores, Spearman rank order correlation (Table 6) was used, as well as the data's frequencies and descriptive statistics. A 5% margin of error was used for the data.

Sample Characteristics

All descriptive statistics can be found on Table 6 below. ASD scores ranged from 47 to 179 or from mild to severe. The mean score of participants was 108.8 (Moderate). The majority of participants fell into Mild (46.2%) and Moderate (30.8%) categories, indicating that the participants are not as dispersed as would be hoped for. The standard deviation for scores was 36.16 points. ASD aggression scores ranged from 0 to 21 out of 40, indicating low to moderate scores. Standard deviation was 7.49 and the mean of scores was 8.62. TD anxiety scores ranged from 25 to 60 out of a range of 22 to 88, indicating the scores fall between mild (76.9%) to moderate (23.1%). The standard deviation was 11.48 and the mean 39.31. The NRI closeness (positive attributes) scores ranged from 22 to 61 out of a possible range of 15 to 75. The mean was 39.85, with a standard deviation of 12.45. Scores show some positive skew with 46.1% of the data scored between 30 and 45. The NRI conflict (negative attributes) scores ranged from 21 to 60 out of a possible range of 15 to 75. The mean score was 37 and the standard deviation 11.56. Parallel to the NRI closeness NRI discord had a small positive skew with 46.2% of the data scored between 30 and 45.

Table 6

Distributive Statistics

	ASD Functionality	Aggression	Total SCAS	NRI Closeness	NRI Discord	NRI Dominance
Mean	108.77	8.62	39.307	39.85	37.08	8
Median	99.00	6.00	36.00	35.00	35.00	8
Std. Deviation	36.16	7.489	11.485	12.45	11.55	2.51
Minimum	47.00	0	25.00	22	21	5
Maximum	179.00	21	60.00	61	60	13

	NRI Emotional Support	NRI Companionship	NRI satisfaction	NRI Criticism	NRI Conflict
Mean	6.15	10.23	10.54	6.08	8.15
Median	6.00	11.00	10.00	6.00	8.00
Std. Deviation	2.577	3.370	3.152	3.06	2.85
Minimum	3	4	5	3	4.00
Maximum	11	15	15	11	14.00

Correlations

The Spearman rank order correlation matrices were not very significant (see Table 7). Besides the inter-assessment correlations between the subcategories of the NRI questionnaire, only three relationships that came up as moderately significant. ASD functionality and TD relationship satisfaction (NRI satisfaction) at $r = -.486$, $p < .046$, indicate that as functionality of the ASD sibling decreases (see procedure section for scoring explanation) the relationship satisfaction of the TD sibling will decrease. ASD functionality and dominance (NRI dominance) correlations ($r = .506$, $p < .039$) indicate that as functionality decreases reports of dominance increase from the TD sibling. TD relationship satisfaction was also moderately significant to TD

anxiety scores (SCAS) at $r = -.565$ $p < .022$, indicating that increases in anxiety for the TD sibling correlated with decreases in relationship satisfaction.

Table 7

Spearman's Correlations

		Aggression Total Weighted	Total SCAS	NRI Closeness	NRI Emotional Support	NRI Companionship	NRI Satisfaction	NRI Discord	NRI Criticism	NRI Conflict	NRI Dominance
ASD Functionality	Correlation Coefficient	.039	.402	-.242	.303	-.356	-.486*	.456	.193	.244	.506*
	Sig. (1-tailed)	.450	.087	.213	.157	.116	.046	.058	.264	.211	.039
Aggression Total Weighted	Correlation Coefficient		-.008	.459	.315	.261	.034	.339	.372	.362	.038
	Sig. (1-tailed)		.489	.057	.147	.194	.457	.129	.105	.112	.451
Total SCAS	Correlation Coefficient			-.415	-.064	-.343	-.565*	.008	-.146	-.026	.043
	Sig. (1-tailed)			.079	.418	.126	.022	.489	.317	.466	.444
NRI Closeness	Correlation Coefficient				.470	.886**	.794**	.293	.568*	.421	.272
	Sig. (1-tailed)				.052	.000	.001	.165	.022	.076	.184
NRI Emotional Support	Correlation Coefficient					.210	.165	.560*	.766**	.273	.402
	Sig. (1-tailed)					.246	.295	.023	.001	.183	.087
NRI Companionship	Correlation Coefficient						.864**	.007	.332	.132	.116
	Sig. (1-tailed)						.000	.491	.134	.333	.353
NRI Satisfaction	Correlation Coefficient							.067	.315	.164	.117
	Sig. (1-tailed)							.414	.147	.296	.352
NRI Discord	Correlation Coefficient								.776**	.837**	.776**
	Sig. (1-tailed)								.001	.000	.001
NRI Criticism	Correlation Coefficient									.695**	.649**
	Sig. (1-tailed)									.004	.008
NRI Conflict	Correlation Coefficient										.702**
	Sig. (1-tailed)										.004

** Correlation is significant at the .01 level (2-tailed) * Correlation is significant at the .05 level (2-tailed)

Hypothesis 1

The general relationship quality between the sibling pairs will significantly increase as the ASD child's functionality level increases. The significance of the Spearman rank order correlation between ASD functionality and closeness (positive relationship qualities) and discord (negative relationship qualities) were not at the 5% level. Interestingly, it seems discord came close $r = .456$, $p = .058$. This hypothesis thus fails to be accepted. Interestingly, NRI

subcategories of satisfaction and dominance in relationship quality did come up as significant in correlation to ASD functionality.

Hypothesis 2

Lower functionality levels in ASD children will increase aggression levels of ASD children. This hypothesis was rejected in favor of the null. The correlation was weak (.039), and the margin of error was large (.450).

Hypothesis 3

Increases in aggression in the ASD child will directly and negatively impact relationship quality in the TD sibling's report of relationship quality. This hypothesis can be rejected as well. Aggression was not found to have a significant correlation with either of the two categories of relationship quality. Interestingly, though, aggression had the opposite impact on NRI closeness than what would be expected ($r = .459$, $p < .057$). However, this may be due to error or the small sample size.

Hypothesis 4

Increases in aggression in the ASD child indirectly impact TD sibling's report of relationship quality through the anxiety levels of the TD siblings. This shows with aggression not correlating significantly to anxiety ($r = –.008$, $p < .489$). Anxiety also did not significantly correlate with closeness (positive relationship), at $r = –.415$, $p < .079$, or discord which is weaker still. Thus, this hypothesis fails to be accepted.

Further Analysis

Originally, as an extension of the hypothesis, the variables shown to be significantly correlated were to be put through a multiple regression analysis with some positive (closeness)

and negative (discord) factors of relationship qualities. The ones chosen to have been shown to be important in sibling relationships: companionship, satisfaction, emotional support, conflict, criticism, and dominance. However, due to small sample size, a regressions analysis is not appropriate.

Instead, an independent t-test of anxiety groups none to mild and moderate to severe were completed (Tables 8 and 9) with the NRI subcategories. The NRI factors that were highlighted were utilized as well as the final four factors originally not picked on being used: exclusion, pressure, intimate disclosure, and approval. Anxiety's median score (36) suggests, as previously discussed, that the majority of participants fell into the mild and moderate categories for anxiety. The split for the SCAS assessment *for mild (*second quartile) to moderate (third quartile) is 38 in comparison to the median, suggesting relatively little skew. The data was thus split between low to mild and moderate to severe. The split means independent t-tests between anxiety and the NRI relationship quality factors were not significant at the 5% level.

The negative NRI relationship quality factor of discord had an original mean of 37 and a split mean of 39.86 (mild) and 33.83 (medium). Equal variances are not assumed (.031), and t = .983 and p = .352, meaning that the difference between the means was not significant enough. Conflict's original mean was 8.15 and, when split, 9.14 and 7. Equal variance was assumed and difference between means was not significant (t = 1.4 and p = .188). Criticism's original mean was 6 and the split was 6.86 and 5.17. Equal variance was assumed, and the difference between means was not significant (t = .99 and p = .344). Dominance's original mean was 8 and the split was 8.7 and 7.17. Equal variance was assumed, and equality of means was not significant, at t = 1.12 and p = .288. Exclusion**'s** original mean was 8.08 and its split was

7.86 and 8.33. Equal variance was assumed. It was not significant at $t = –.24$ and $p = .81$. Pressure's original mean was 6.77 and its split mean was 7.29 and 6.17. Equal variance was assumed and the difference between the means was not significant ($t = .647$ and $p = .531$).

Table 8

Anxiety's Grouped Statistics

	Anxiety	N	Mean	Std. Deviation	Std. Error Mean
NRI Dominance	None to mild	7	8.71	2.752	1.04
	Moderate to severe	6	7.17	2.137	.872
NRI Conflict	None to mild	7	9.1429	3.24	1.22
	Moderate to severe	6	7.0000	2.00	.816
NRI Criticism	None to mild	7	6.86	3.49	1.32
	Moderate to severe	6	5.17	2.48	1.01
NRI Discord	None to mild	7	39.86	14.47	5.47
	Moderate to severe	6	33.83	6.77	2.76
NR Exclusion	None to mild	7	7.86	3.13	1.18
	Moderate to severe	6	8.33	3.98	1.63
NRI Pressure	None to mild	7	7.29	3.64	1.37
	Moderate to severe	6	6.17	2.32	.946
NRI Satisfaction	None to mild	7	11.86	2.41	.911
	Moderate to severe	6	9.00	3.41	1.390
NRI Companionship	None to mild	7	11.29	2.22	.837
	Moderate to severe	6	9.00	4.24	1.732
NRI Emotional Support	None to mild	7	6.43	3.31	1.251
	Moderate to severe	6	5.83	1.60	.654
NRI Closeness	None to mild	7	44.29	12.55	4.744
	Moderate to severe	6	34.67	11.09	4.529
NRI Approval	None to mild	7	9.00	5.20	1.96
	Moderate to severe	6	6.00	3.10	1.26
NRI Disclosure	None to mild	7	5.71	2.36	.892
	Moderate to severe	6	4.83	2.23	.910

Table 9

Anxiety Independent T-tests

Equality	Levene's Test for of Variances	F	Sig.	t	Sig.	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
NRI Dominance	Equal variances assumed	.340	.571	1.12	.288	1.55	-1.50	4.60
	Equal variances not assumed			1.14	.279	1.55	-1.44	4.54
NRI Conflict	Equal variances assumed	2.44	.147	1.40	.188	2.14	-1.22	5.50
	Equal variances not assumed			1.46	.175	2.14	-1.13	5.41
NRI Criticism	Equal variances assumed	1.76	.212	.990	.344	1.69	-2.07	5.45
	Equal variances not assumed			1.02	.332	1.69	-1.98	5.36
NRI Discord	Equal variances assumed	6.15	.031	.932	.372	6.02	-8.21	20.26
	Equal variances not assumed			.983	.352	6.02	-7.90	19.94
NRI Exclusion	Equal variances assumed	.484	.501	-.241	.814	-.476	-4.82	3.86
	Equal variances not assumed			-.237	.818	-.476	-4.99	4.04
NRI Pressure	Equal variances assumed	1.12	.312	.647	.531	1.12	-2.69	4.92
	Equal variances not assumed			.670	.517	1.12	-2.59	4.82
NRI Satisfaction	Equal variances assumed	.208	.657	1.77	.105	2.86	-.701	6.41
	Equal variances not assumed			1.72	.120	2.86	-.913	6.63
NRI Companionship	Equal variances assumed	7.55	.019	1.25	.238	2.286	-1.75	6.32
	Equal variances not assumed			1.19	.272	2.286	-2.23	6.80
NRI Emotional Support	Equal variances assumed	5.475	.039	.400	.697	.595	-2.68	3.87
	Equal variances not assumed			.422	.683	.595	-2.60	3.79
NRI Closeness	Equal variances assumed	.672	.430	1.45	.175	9.62	-4.97	24.21
	Equal variances not assumed			1.47	.171	9.62	-4.82	24.06
NRI Approval	Equal variances assumed	3.23	.100	1.23	.243	3.00	-2.35	8.35
	Equal variances not assumed			1.28	.228	3.00	-2.21	8.20
NRI Disclosure	Equal variances assumed	.252	.625	.688	.506	.881	-1.94	3.70
	Equal variances not assumed			.691	.504	.881	-1.93	3.69

For positive NRI relationship quality factors, closeness's original mean was 39.8 and the split was 44.29 and 34.67. Equal variance was assumed, and equality of means was not significant **(***t* = 1.45 and *p* = .175). Emotional support's original mean was 6.13 and the split 6.43 and 5.83. Equal variance was not assumed (.039), but the equality of means was not significant **(***t* = .422 and p = .683). Companionship's original mean was 10.23 and the split was 11.29 and 9.

Equal variance was not assumed (.019) and was not significant (t = 1.188 and p = .272). Satisfaction's original mean was 10.54 and the split was 11.86 and 9. Equal variance was assumed but was not significant (t = 1.768 and p = .105). Approval's original mean was 7.62 and its split mean was 9 and 6. Equal variance was assumed and the difference between the means was not significant (*t* = 1.23 and *p* = .243). Disclosure's original mean was 5.41 and its split mean was 5.71 and 4.83. Equal variance was assumed and difference between means was not significant (*t* = .647 and *p* = .531).

Chapter IV: Discussion

The results discussed above unfortunately show that this study fails to strongly support the hypotheses of the impact of anxiety and aggression on relationship quality of ASD sibling pairs due to functionality variances. This study indicates that functionality and anxiety potentially play a small role in the relationship quality of ASD and TD sibling pairs; however, this study was not strong in its conclusions, as can be seen with both the Spearman rank order correlations and the independent t-tests. Part of this may be due to the small sample size and the majority of participants falling into the mild and medium categories for the SCAS anxiety testing, and the lack of spread with functionality of the ASD siblings.

Theoretical implications and previous analysis from research did match, showing some significance for anxiety on relationship but with mixed conclusions about the strength of its impact. For example, McHale et al. (2012, 2016) reported positive and strong results regarding the influence of functionality on anxiety, and anxiety on companionship and satisfaction in relationships. Also, Pollard et al. (2013) showed increases in anxiety correlating with negative interactions within relationships. This study only shows a moderately significant correlation of anxiety to satisfaction. However, it did show a weaker significance to general positive relationship qualities at less than a 10% level, indicating that potentially with a stronger study more results may have been seen. Moderate and strong correlations at the 1% and 5% level of significance between subcategories of the NRI also compliment this.

Similar to anxiety, ASD functionality scores correlation with satisfaction and dominance is likewise paired with a weaker correlation to closeness. Interestingly, there are correlations at the 10% level from ASD functionality to anxiety, and anxiety to closeness. There was also a poor

significance correlation (at less than 10%) between aggression and closeness. Unfortunately, this study showed no significant correlations to aggression. Functionality's correlation with dominance reports in TD siblings does hint that there might be more correlation to other forms of relationship disharmony and discord rather than the types of aggression tested (verbal aggression, aggression against property, auto-aggression, and physical aggression). Harris and Glasberg (2003) also suggest that children growing up in a family with a child with ASD tend to learn to handle the negative experiences, suggesting a resilience factor, which may explain the variation in the data.

Such resilience factors were not taken into account fully in this study due to the time required for the participants to complete the survey. The research suggests parents, social isolation, chronic stress (non-related), family size, and children's birthing order are resilience factors that potentially need to be taken into account (Harris & Glasberg, 2003; Hartley et al., 2014; Lovell & Wetherell, 2016; Shivers et al., 2014; Tomeny et al., 2016). For example, the majority of TD participants in this study were older than or equal in age to their siblings. This can mean more caretaker responsibilities for TD siblings, as well as a potentially better understanding of ASD as a disorder, which is likely to have influenced their perception of behaviors seen and their anxiety scores.

Another resilience factor to take into consideration for the ASD child rather than just the TD sibling is the implications that therapy has on ASD children's aggressive behaviors that are associated more with lower functionality levels. A communication method is critical when children at lower functionality levels lack more traditional methods like verbal or emotional expression (Rispoli, Camargo, Machalicek, Lang, & Sigafoos, 2014), which may help to prevent

an unintentional outcome of sensory processing issues, such as meltdowns (National Autistic Society, 2018). The participation in, type, or frequency of therapeutic services that target these focuses are likely to influence the behavior levels or perception of behavior levels of the ASD children. The results of this study, along with the implications of resilience factors, suggest that the overall impact of functionality on anxiety and relationship quality may be due more to factors like lack of emotional connection, psychological impacts of aggression, or other forms of discord rather than purely physical aggression.

The weakness and limitations of the study are clear in the lack of participants, in numbers as well as spread of location and ethnicity. The lack of spread with participants as far as the functionality scores of ASD siblings, and the skew of the majority of TD siblings being older or the same age, should also be taken into account. As discussed, other resilience factors and demographics which could have been ruled out were not due to the length and time required for the survey. The lack of significance found in this study could also be due to the particular aggression analysis used, which was not specifically designed to target ASD behavior, but more generalized special needs behavior. Another weakness of this data includes the possibility that significance found between anxiety and satisfaction in relationship quality may be due to the assessments being completed by the same reporter.

Future research is needed to draw any strong conclusions due to the size of the sample of this study. Some implications may be utilized in comparison to other research on the subject, but should not be drawn upon without further study. Repeating this study should not, however, be ruled out completely. Rather, with a larger sample size, the study could potentially show stronger results, less error, and less deviation. Further analysis is also needed to examine anxiety's

connection to particular factors in relationship qualities, exploring if and why there is significance for specific factors, as this study's findings suggest, with its correlation with only acceptance. Also needed is a better understanding of what qualities of discord, such as dominance, impact relationships more for ASD sibling pairs rather than aggression.

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Appendix A: ASD Assessment Scale/ Screening Questionnaire

Please put a circle around the description that relates the most with your child's skill level in specific categories, examples are provided for the general sections of each category.

Social Interaction Difficulties

- **No**: Normal.
- **Resolved**: Anyone who qualified for the below descriptions but now has completely normal social skills.
- **Mild**: Are people (or children) who appear almost normal in their interaction with others yet do have some subtle "strange behavior" or an inability to "read" social cues. For example, not understanding when they are boring to others, continuously perseverating about the same subject or thinking that others like them when it's clear to all that this is not the case. (Frequently being made fun of.)
- **Moderate**: Have significant, very noticeable problems interacting. May be interested in social interaction, but will appear awkward, extremely shy, or eccentric. They may stand too close during conversation, touch others inappropriately or speak in a tone that doesn't fit the situation.
- **Severe**: Is reserved to those who have no interest to interact with others and seem irritated or anxious when coming in social contact. For younger children 2-3 this will manifest with a desire to play on their own, cry, have tantrums or seem upset around other kids.

Social Interaction Difficulties	No	Resolved	Mild	Moderate	Severe	
1. **General Social Interaction Difficulties**	0	0	8	12	16	
2. Poor eye contact, or staring from unusual angle	0	1	2	3	4	
3. Ignores when called, pervasive ignoring, not turning head to voice	0	1	2	3	4	
4. Excessive fear of noises (vacuum cleaner); covers ears frequently	0	1	2	3	4	
5. In his/her own world (aloof)	0	1	2	3	4	
6. Lack of curiosity about the environment	0	1	2	3	4	
7. Facial expressions don't fit situations	0	1	2	3	4	
8. Inappropriate crying or laughing	0	1	2	3	4	
9. Temper tantrums, overreacting when not getting his/her way	0	1	2	3	4	
10. Ignores pain (bumps head accidentally without reacting)	0	1	2	3	4	
11. Doesn't like to be touched or held body, head)	0	1	2	3	4	
12. Hates crowds, difficulties in restaurants and supermarkets	0	1	2	3	4	
13. Inappropriately anxious, scared	0	1	2	3	4	
14. Inappropriate emotional response (not reaching to be picked up)	0	1	2	3	4	
15. Abnormal joy expression when seeing parents	0	1	2	3	4	
16. Lack of ability to imitate	0	1	2	3	4	
Totals (leave blank)						

Speech and Language Delay

- No: Normal.
- Resolved: Perfectly normal but used to belong to one of the below categories.
- Mild: Almost normal, but some comprehension of speech difficulties persists.
- Moderate: A very significant delay in speech (40-70% from age required skills).
- Severe: Nonverbal, or single words in an adult. If dealing with a young child (1-4 years), this may be evaluated with a developmental assessment by a behavioral or medical professional. If no language is present then all the questions in this section need to be rated as severe.

Speech and Language Delay	No	Resolved	Mild	Moderate	Severe	
1. **General speech and Language Delay**	0	0	8	12	16	
2. Loss of acquired speech	0	1	2	3	4	
3. Produces unusual noises of infantile squeals	0	1	2	3	4	
4. Voice louder than required	0	1	2	3	4	
5. Frequent gibberish or jargon	0	1	2	3	4	
6. Difficulties understanding things (“I just can’t get it”)	0	1	2	3	4	
7. Pulls parents around when wants something	0	1	2	3	4	
8. Difficulties expressing needs or desires, using gestures	0	1	2	3	4	
9. No spontaneous initiation of speech and communication	0	1	2	3	4	
10. Repeats heard words, parts of words or TV commercials	0	1	2	3	4	
11. Repetitive language (same word or phrase over and over	0	1	2	3	4	
12. Can’t sustain conversation	0	1	2	3	4	
13. Monotonous speech, wrong pausing	0	1	2	3	4	
14. Speaks same to kids, adults, objects (can’t differentiate)	0	1	2	3	4	
15. Using language inappropriately (wrong words or phrases)	0	1	2	3	4	
Totals (leave blank)						

Abnormal Symbolic or Imaginary Play

- No: Perfectly normal, never had such problem.
- Resolved: Perfectly normal but used to belong to one of the below categories.
- Mild: Plays almost normally but has subtle inappropriateness and "clumsiness" in using imagination or being "creative" while playing.
- Moderate: May be interested in toys, or even want to play with them, but has a clearly abnormal or inappropriate use of the toys. Doesn't understand to feed the doll and has no ability to use imagination or make believe as part of playing.
- Severe: No interest in age-appropriate toys. If interested in something, may be in order to bang it, twist it, hold or arrange it.

Abnormal Symbolic or Imaginary Play	No	Resolved	Mild	Moderate	Severe
1. **General Abnormal Symbolic or Imaginary Play**	0	0	8	12	16
2. Hand or finger flapping; self-stimulation	0	1	2	3	4
3. Head banging	0	1	2	3	4
4. Self-mutilation, inflicting pain or injury	0	1	2	3	4
5. Toe walking, clumsy body posture	0	1	2	3	4
6. Arranging toys in a row	0	1	2	3	4
7. Smelling, banging, licking or other inappropriate use of toys	0	1	2	3	4
8. Interest in toy parts, such as car wheels	0	1	2	3	4
9. Obsessed with objects or topics (trains, weather, numbers, dates)	0	1	2	3	4
10. Spinning objects, self, or fascination with spinning objects	0	1	2	3	4
11. Restricting interest (watching the same video over and over)	0	1	2	3	4
12. Difficulty stopping repetitive “boring” activity or conversations	0	1	2	3	4
13. Attachment to unusual objects (stickers, stones, strings, or hair)	0	1	2	3	4
14. Stubborn about rituals and routines; resists to change	0	1	2	3	4
15. Restricted taste by consistency, shape or form (refuses solids)	0	1	2	3	4
16. Savant ability, restricted skill superior to age group (reads early, memorizes books)	0	1	2	3	4
Totals (leave blank)					

Appendix B : MOAS Aggression Scale

For this next section, please rate your ASD child's aggressive behavior over the past month for each subsection. Select as many items as are appropriate.

Verbal Aggression

___ No verbal aggression

___ Shouts angrily, curses mildly, or makes personal insults

___ Curses viciously, is severely insulting, has temper outbursts

___ Impulsively threatens violence towards self and others

___ Threatens violence toward others or self repeatedly or deliberately

Aggression Against Property

___ No aggression against property

___ Slams door, rips clothing, urinates on floor

___ Throws objects down, kicks furniture, defaces walls

___ Breaks objects, smashes windows

___ Sets fires, throws objects dangerously

Auto-Aggression

___ No auto-Aggression

___ Picks or scratches skin, pulls hair out, hits self (without injury)

___ Bangs head, hits firsts into walls, throws self onto floor

___ Inflicts minor cuts, bruises, burns, or welts on self

___ Inflicts major injury on self or makes a suicide attempt

Physical Aggression

___ No physical aggression

___ Makes menacing gestures, swings at people, grabs at clothing

___ Strikes, pushes, scratches, pulls hair or others (without injury)

___ Attaches others, causing mild injury (bruises, sprain, welts, ect.)

___ Attacks others, causing serious injury

Appendix C: SCAS (Anxiety) Assessment

Please select the word that shows how often each of these things happen to you. There are no right or wrong answers.

Questions	Never	Sometimes	Often	Always
1. I worry about things	1	2	3	4
2. When I have a problem, I get a funny feeling in my stomach	1	2	3	4
3. I feel afraid	1	2	3	4
4. I would feel afraid of being on my own at home	1	2	3	4
5. I feel scared when I have to take a test	1	2	3	4
6. I feel afraid if I have to use public bathrooms or toilets	1	2	3	4
7. I worry about being away from my parents	1	2	3	4
8. I feel afraid that I will make a fool of myself in front of people	1	2	3	4
9. I worry that something awful will happen to someone in my family	1	2	3	4
10. I suddenly feel as if I can't breathe when there is no reason for this	1	2	3	4
11. I feel scared if I have to sleep on my own				
12. I have trouble going to school in the morning because I feel nervous or afraid	1	2	3	4
13. When I have a problem, my heart beats really fast	1	2	3	4
14. I suddenly start to tremble or shake when there is no reason for this	1	2	3	4
15. I worry that something bad will happen to me	1	2	3	4
16. When I have a problem, I feel shaky	1	2	3	4
17. I worry what other people think of me	1	2	3	4
18. All of a sudden, I feel really scared for no reason at all	1	2	3	4
19. I suddenly become dizzy or faint when there is no reason for this	1	2	3	4
20. My heart suddenly starts to beat too quickly for no reason	1	2	3	4
21. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of	1	2	3	4
22. I would feel scared if I had to stay away from home overnight	1	2	3	4

Appendix D: The Network of Relationships—Relationship Quality Version

Description. The NRI-RQV is a combination of the Network of Relationships Inventory (Furman & Buhrmester, 2009) and a family relationship measure developed by Buhrmester, Camparo, and Christensen (1991). This 30-item survey has 10 scales with three items per scale. It assesses five positive features, including companionship, disclosure, emotional support, approval, and satisfaction, and five negative relationship features including, conflict, criticism, pressure, exclusion, and dominance.

Companionship (COM)

1. How often do you spend fun time with this person?

11. How often do you and this person go places and do things together?

21. How often do you play around and have fun with this person?

Intimate Disclosure (DIS)

2. How often do you tell this person things that you don't want others to know?

12. How often do you tell this person everything that you are going through?

22. How often do you share secrets and private feelings with this person?

Pressure (PRE)

3. How often does this person push you to do things that you don't want to do?

13. How often does this person try to get you to do things that you don't like?

23. How often does this person pressure you to do the things that he or she wants?

Satisfaction (SAT)

4. How happy are you with your relationship with this person?

14. How much do you like the way things are between you and this person?

24. How satisfied are you with your relationship with this person?

Conflict (CON)

5. How often do you and this person disagree and quarrel with each other?

15. How often do you and this person get mad at or get in fights with each other?

25. How often do you and this person argue with each other?

Emotional Support (SUP)

6. How often do you turn to this person for support with personal problems?

16. How often do you depend on this person for help, advice, or sympathy?

26. When you are feeling down or upset, how often do you depend on this person to cheer things up?

Criticism (CRI)

7. How often does this person point out your faults or put you down?

17. How often does this person criticize you?

27. How often does this person say mean or harsh things to you?

Approval (APP)

8. How often does this person praise you for the kind of person you are?

18. How often does this person seem really proud of you?

28. How much does this person like or approve of the things you do?

Dominance (DOM)

9. How often does this person get their way when you two do not agree about what to do?

19. How often does this person end up being the one who makes the decisions for both of you?

29. How often does this person get you to do things their way?

Exclusion (EXC)

10. How often does this person not include you in activities?

20. How often does it seem like this person ignores you?

30. How often does it seem like this person does not give you the amount of attention that you want?

Appendix E: IRB Approval Letter

ST. CLOUD STATE UNIVERSITY
EDUCATION FOR LIFE.

Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Sarah Wolter

Email: wosa1104@stcloudstate.edu

IRB PROTOCOL DETERMINATION: Expedited Review-1

Project Title: The Relationship Quality between Typically Developing and Autistic Siblings

Advisor Kathryn Mayhew

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).

- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.

-Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.

- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.

- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-4932 or email ResearchNow@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Chair:

Dr. Benjamin Witts
Associate Professor- Applied Behavior Analysis
Department of Community Psychology,Counseling, and Family Therapy

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

OFFICE USE ONLY

SCSU IRB# 1900 - 2441	**Type:** Expedited Review-1	**Today's Date:** 5/2/2019
1st Year Approval Date: 5/1/2019	**2nd Year Approval Date:**	**3rd Year Approval Date:**
1st Year Expiration Date: 4/30/2020	**2nd Year Expiration Date:**	**3rd Year Expiration Date:**