A Dissertation

Entitled

Association between Parenting Behaviors, Social Skills, and Anxiety in Children with High-Functioning Autism Spectrum Disorders

by

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Submitted as partial fulfillment of the requirements for
the Doctor of Philosophy in Psychology

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August 2007
Recent studies have suggested that youth diagnosed with high-functioning autism spectrum disorders often suffer from a higher rate of anxiety compared to the general population and youth with other psychological disorders (e.g., Green, Gilchrist, Burton, & Cox, 2000). One hypothesis may be that a child’s level of social skills directly affects his/her anxiety. However, there is little theoretical or empirical evidence that explains the development of anxiety within this population. Studies from the anxiety literature suggest that parental anxiety and parental behaviors (i.e., acceptance, control, and modeling of anxious behaviors) are associated with the development of child anxiety.
In the current investigation of youth with high-functioning autism spectrum disorders, it was hypothesized that high parental anxiety and low child social skills would be directly related to more symptoms of child anxiety. Further, it was expected that the relationship between parental anxiety and child anxiety would be partially mediated by parenting behaviors of low acceptance, high control, and high modeling of anxious behaviors in the parent-child relationship. Given that theory suggests that these parenting behaviors may in part be related to children’s perceptions of control and threat, it was hypothesized that parental acceptance and control would be mediated by the child’s perception of control when predicting child anxiety symptomatology. Furthermore, parental modeling of anxious behaviors would be mediated by child’s perception of threat when predicting childhood anxiety symptomatology.

Participants were 62 children (50 males, 12 females) between the ages of 8 and 18 with a DSM-IV diagnosis of a high-functioning autistic spectrum disorder (ASD) and 43 primary caregivers of the children. Results partially supported the hypothesized model in explaining the development of childhood anxiety in a population with ASD but overall indices of fit suggested an inadequate fit of the data to the model.

It is suggested that future research focus on better understanding the factors that contribute to high rates of anxiety within the ASD population, epidemiological studies to document the rate of comorbid anxiety and behavioral problems, and developing alternative models to understand anxiety symptoms in children with ASD.
Acknowledgements

I would like to share my heartfelt thanks with a special group of people for their support and assistance in making my dissertation possible. I feel immensely blessed by all your contributions and encouragement that helped me envision, develop and complete this endeavor.

First, I want to extend my gratitude to Dr. Laura Seligman, my dissertation chair, advisor, and graduate career mentor. Your patience, devotion, wisdom, and leadership fostered my development as a scholar, a clinical psychologist, and an individual thinker over the past five years. Your knowledge and guidance have been invaluable, and I feel fortunate to have worked closely with you. Thank you for everything!

Second, I want to thank my dissertation committee members: Dr. Joseph Hovey, Dr. Peg Smith, Dr. Kamala London, and Dr. Wendy Cochrane. I greatly appreciate your dedication to my professional development through the enhancement of my dissertation. Thank you for sharing your extensive knowledge and individual expertise as you have encouraged my growth as a researcher. Your commitment to my dissertation is greatly appreciated.

I also want to thank the mental health providers, researchers, and schools who helped in the recruitment of study participants and the families who generously donated their time for participation. Your willingness to assist in data collection and your support of my work provided motivation to complete the project. I am thankful for all the opportunities to explore and develop my interest in helping youth with autistic spectrum disorders.
Finally, I want to thank my family and friends for your continued support. I know I am truly blessed to have such a wonderful and consistent foundation in my life. I appreciate your dependability and constant encouragement that saw me through this project and many other endeavors. Last, I want to extend a special thanks to my husband, Matthew, for his patience and intellectual inspiration!
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Chapter One
Introduction

Individuals with high-functioning autism spectrum disorders often present with a wide range of clinical features. Among the most evident and impairing characteristics are impairments in social interactions, including failure to develop friendships, impaired use of nonverbal behavior, lack of emotional empathy, and impaired ability to identify social cues. Another impairing characteristic is poor communication skills, including difficulties with conversation skills (Attwood, 2004).

Asperger’s Disorder (AD) and High-Functioning Autism (HFA) are often classified as specific diagnoses within the spectrum of autistic disorders. The term autism spectrum disorders (ASD) is used to describe all disorders that illustrate major impairments in at least two of the three areas: 1) reciprocal social interactions 2) reciprocal verbal and non-verbal communication and 3) imagination and behavior (Gillberg, 2002). This encompasses Asperger’s Disorder, Autistic Disorder, Childhood Disintegrative Disorder, Atypical Autism, and other autistic-like conditions (e.g., Pervasive Developmental Disorder). These disorders can range from severe to mild, with AD and HFA falling at the mild end of the spectrum.

As a result, researchers rarely separate children with AD from those with HFA (Mesibov, Shea, & Adams, 2001). Both are characterized by the inability to develop appropriate social skills with the preservation of average to above-average intelligence.
(Gutstein & Whitney, 2002). In fact, some research supports the grouping of these disorders. For example, Szatmari, Tuff, Allen, Finlayson, and Bartolucci (1990) compared the cognitive and language skills of individuals with AD, HFA, and an outpatient control group of non-diagnosed socially impaired children. The results indicated that children diagnosed with AD and HFA were impaired on all tests compared to the control group, but were not significantly different from one another, shedding doubt on whether these disorders are distinct.

Treatment studies in particular generally do not differentiate between AD and HFA. Individuals diagnosed with either disorder, that do not exhibit cognitive or language delays, often make similar degrees of progress in social skills intervention programs regardless of the specific diagnosis of the individual (Krasny, Williams, Provencal, & Ozonoff, 2003). Moreover, similar treatment methods are used regardless of the specific diagnosis of the participants (e.g., Gray, 2000; McAfee, 2002). Therefore, the current review necessarily includes studies of youth with both AD and HFA; these youth are referred to as autism spectrum disorders (ASD).

Social Skill Impairments

The social impairments observed in individuals with ASD have been described in the literature as “an extreme form of egocentrism with the resulting lack of consideration for others” (Frith, 2004, p. 676). It appears that the egocentrism seen in ASD is not intentional and often results in extreme difficulties developing successful long-term relationships. Family members often report being frustrated and upset because they are unable to make a connection with individuals with ASD. Moreover, individuals with
ASD frequently lack other significant relationships with peers or individuals in society (Frith, 2004).

Due to the impairments in social interactions, social skills training is often the preferred treatment for individuals with ASD. Social skills correspond to the ability to perform certain behaviors that are important in the development of social competence. Specific social skills may consist of both verbal (e.g., tone of voice, volume, clarity of speech, rate of speech) and non-verbal (e.g., eye contact, facial expressions, bodily positions, and gestures) responses that are important during social interactions. Social skills may vary both qualitatively and quantitatively depending on the specific social situation, and these detailed aspects of social skills are critical in determining the outcome of social interactions (Spence, 2003). Social skills can be measured directly or via social competency, which is the ability of an individual to obtain successful outcomes from social interactions with others (Spence & Donovan, 1998).

*Comorbidity of Autism Spectrum Disorders with Anxiety Disorders*

Considering the extreme deficits in social functioning for individuals with ASD, it would be logical that these individuals would be susceptible to developing a comorbid anxiety disorder related to their social difficulties. For instance, if an individual continually worries about their social relationships and interactions with others, he/she may be more prone to develop an anxiety disorder due to his/her constant state of anxious arousal. In fact, Gillott, Furniss, and Walter (2001) compared children with HFA to a group of children with specific learning impairments and a group of typically developing children. Results suggested that the HFA group scored significantly higher on self-report measures of social anxiety symptoms compared to the two control groups. Furthermore,
about 50% of the children with HFA scored in the clinically significant range for social anxiety. Additionally, a study by Bellini (2004) examined the prevalence and types of anxiety displayed by high-functioning adolescents with ASD. Results suggested that individuals on the autism spectrum reported significantly more physical symptoms, social anxiety, separation/panic, and total anxiety compared to the general population. More specifically, 49% of the sample scored above the clinical range for social anxiety while previous research has suggested about 14% of the general population would score in the clinical range.

Another study by Kim, Szatmari, Bryson, Streiner, and Wilson (2000) measured anxiety symptoms in a sample of children diagnosed with AD or HFA and found that 13.6% of their sample was significantly elevated on a measure of overanxious symptoms, and 8.5% was significantly elevated on a measure of separation anxiety symptoms. These rates were compared to a random sample of community children, and the children diagnosed with AD or HFA displayed significantly more symptoms of anxiety. Another study by Green et al. (2000) indicated that around 70% of adolescents with AD meet criteria for a diagnosis of an anxiety disorder (i.e., generalized anxiety disorder, specific phobia, or obsessive-compulsive disorder). In this study, the sample of teenagers with AD was compared to a group of teenagers diagnosed with conduct disorder, and the teenagers with AD reported significantly higher levels of anxiety. However, both groups scored high on measures of chronic unhappiness and loneliness. Consistent with expectations, the study also reported that individuals with AD had more serious difficulties in social relationships and were more likely to have been teased by peers. Moreover, Tantam (2000) reported that high trait anxiety is a common feature for
individuals on the autism spectrum, especially when there is a family history of anxiety disorders. Overall, results from numerous studies suggest that high-functioning individuals with ASD are at a higher risk for developing anxiety and are more likely to suffer from anxiety in social situations than the rest of the population.

Some researchers have suggested that the greater prevalence of anxiety disorders in individuals on the autism spectrum may be a result of their social impairments. In other words, high-functioning individuals on the autism spectrum are at a higher risk for developing anxiety due to the association between social skills deficits and anxiety symptoms. Specifically, Bellini (2004) reported negative correlations between the social skill of assertiveness and social avoidance/anxiety for youth with ASD; that is, youth with lower levels of assertion skills reported greater social anxiety. Bellini also reported a curvilinear relationship between the social skill of empathy and social anxiety, suggesting that low and high empathy scores were related to low social anxiety symptoms, while median scores of empathy were related to the highest level of social anxiety symptoms. These findings suggest that children low in empathy may not be aware of how they are perceived socially or they may not be concerned with how others view this so they do not experience high levels of social anxiety symptoms. On the other hand, children high in empathy may be able to more effectively cope emotionally which results in more positive social interactions and lower social anxiety symptoms. However, the relationship between empathy and anxiety symptoms requires further evaluation before the relationship between the two variables is fully understood.

Green et al. (2000) further explored the hypothesis that social skills deficits may be a major contributor to anxiety symptoms for individuals with ASD. Green et al. found
that a group of adolescent males diagnosed with ASD demonstrated severe impairments in social functioning compared to a group of adolescent males with severe conduct disorder. Moreover, the group of adolescents with ASD also reported higher levels of generalized anxiety symptoms and obsessive-compulsive symptoms compared to the group diagnosed with conduct disorder. While the exact relationship between impairments in social functioning and anxiety was not examined in this study, this connection warrants further evaluation. It elicits the question, is it possible to predict which children with ASD will be anxious? Are social skills a contributing factor in the development of anxiety symptoms for high-functioning children with ASD? Based on the limited literature, it may be hypothesized that the social skills deficits observed in children with ASD may be a significant contributor in the development of anxiety symptoms.

*Parental Anxiety*

In addition to social skills potentially contributing to the development of anxiety, extensive literature within the anxiety realm suggests that parental anxiety has been associated with the development of childhood anxiety. Stein et al. (1998) found that first-degree relatives of 23 individuals with social anxiety disorder were ten times more likely to be diagnosed with social anxiety disorder compared to the first-degree relative of a control group of individuals without social anxiety disorder. Turner, Beidel, and Epstein (1991) found that children of anxious parents were seven times more likely to develop an anxiety disorder compared to children of non-anxious parents. Additionally, Mannuzza et al., (1995) suggested that children were three times more likely to develop social anxiety disorder if an immediate family member had the diagnosis.
Last, Hersen, Kazdin, Orvaschel, and Perrin (1991) examined lifetime psychiatric illness in first and second-degree relatives for a group of children diagnosed with an anxiety disorder, children with a diagnosis of Attention Deficit-Hyperactivity Disorder (used as a clinical control), and children who had never been diagnosed with a mental illness. Results suggested that significantly higher rates of anxiety disorders were found in first-degree relatives of children diagnosed with an anxiety disorder compared to both control groups. Beidel and Turner (1997) examined 129 children of parents diagnosed with an anxiety disorder, depressive disorder, or no psychiatric disorder. Results suggested that children of the anxiety group were 5.4 times more likely to have an anxiety disorder compared to children of the non-clinical parents.

A number of other studies have shown a higher rate of familial transmission of anxiety symptoms through the use of twins. Kendler, Heath, Martin, and Eaves (1987) found that genetic factors accounted for 27% of the variance of anxiety symptoms based on questionnaire response from over 3,700 pairs of twins in an Australian twin registry. Additionally, Kendler, Neale, Kessler, Heath, and Eaves (1992) also examined the heritability of generalized anxiety disorder (GAD) among 1,033 female-female twins from a population-based registry in Virginia. Results suggested that the risk of developing GAD for one twin while the other twin had the disorder was 1.8 times more for monozygotic twins compared to the general population and 1.2 times more for dizygotic twins.

Despite the evidence for familial transmission of anxiety, theoretical models are still unclear about the causation and directionality of anxiety; yet, it is most likely that children of anxious parents are more likely to experience anxiety symptoms than children
of non-anxious parents. Based on the anxiety literature, it would also be expected that children with ASD that have anxious parents would also be more likely to endorse anxious symptoms. However, no specific information was found in the ASD literature to suggest that this connection has been examined. Therefore, the connection between parental anxiety and child anxiety warrants further evaluation within the area of ASD to determine if parental anxiety is a significant contributor to the development of childhood anxiety in these youth. Based on the anxiety literature, it was hypothesized that parental anxiety would be directly related to child anxiety for children with ASD.

*Parenting Behaviors with Anxious Children*

In addition to parental anxiety, an extensive amount of research within the anxiety literature has focused on parenting behaviors and its influence on the development of anxiety symptoms in children. For instance, behavioral genetic studies have suggested that the shared environment between parents and their children can account for a significant amount of the variance in childhood anxiety symptoms (Eley, 2001). This shared environment between parents and their children includes parental behaviors and childrearing experiences. Rapee (2001) suggested that the shared environment is partially responsible for the development and maintenance of anxiety disorders in children. According to Rapee’s model, children with a genetic vulnerability to anxiety are more likely to display levels of arousal and sensitivity. Parents often respond to their child’s sensitivity with increased protection and involvement in order to minimize and prevent the child’s suffering. The model also assumes that parents with anxious children are also more likely to be anxious, which could further intensify the parent’s involvement. This can develop into a pattern of parental overinvolvement, which serves to reinforce the
child’s vulnerability to anxiety by increasing the child’s perception of threat. When a child perceives a situation as threatening, he/she is more likely to display anxious symptoms. Similarly, when parents protect their children from stressful events by taking control of the situation, this teaches the child that they need to be protected from a dangerous world in which they have no control. Contrarily, when parents allow their children independence and encourage facing of stressful events, children are less likely to develop an anxiety disorder because they maintain a sense of control and may perceive the situation as less threatening.

In regards to parental anxiety, an extensive amount of research has focused on the difference in parenting behaviors between anxious and non-anxious parents and its influence on the development of anxiety symptoms in children. For example, Ginsburg, Grover, and Ialongo (2004) conducted a study to determine if there were differences in parenting behaviors between anxious and non-anxious mothers. The study also attempted to determine if specific parenting behaviors were associated with internalizing symptoms in children. Twenty-five mothers diagnosed with an anxiety disorder and 25 non-anxious mothers engaged in a videotaped challenging task with their children and seven parenting behaviors were coded. Results suggested that among the anxious mothers, maternal anxious behaviors were positively correlated with negative affect and overcontrol. Maternal anxious behaviors were also negatively correlated with granting of autonomy and positive affect. These findings suggested that the presence of a parental anxiety disorder elevated the frequency of negative parenting behaviors. Results also suggested that higher levels of negative parenting behaviors were associated with higher levels of child internalizing symptoms. Implications from this study suggest that anxious parents
are more likely to utilize negative parenting behaviors (i.e., overcontrol, less autonomy granting, criticism) which are hypothesized to result in an increase in anxiety symptoms in children.

The contribution of negative parenting behaviors to the development of childhood anxiety has been extensively researched in the literature (for reviews, see Masia & Morris, 1998; Rapee, 1997; Wood, McLeod, Sigman, Hwang, & Chu, 2003). Theoretical and empirical support has suggested that parental behaviors can account for a significant portion of the variance in the development of childhood anxiety. Most recent studies within the anxiety literature have focused on three parenting dimensions: acceptance (warmth), control, and modeling of anxious behaviors. These parenting dimensions have been measured via observational reports, child-report, and parental-report. It is believed that these dimensions contribute to the development and maintenance of anxiety in children, with these dimensions having substantial support in the literature (e.g., Wood et al., 2003). Furthermore, these parenting behaviors are hypothesized to directly affect a child’s emotional and behavioral control, thereby contributing to the development of anxiety symptoms in children (Darling & Steinberg, 1993).

The first parenting dimension of acceptance (warmth) refers to a general parenting approach consisting of interpersonal warmth, nurturance, and responsiveness towards the child’s behaviors and feelings. Occasionally in the literature, this dimension is evaluated on a continuum from acceptance/warmth to rejection (Parker, 1979). It has been suggested that low levels of parental warmth and responsiveness can lead to distress for the child because the child learns that his/her actions may not influence the environment. When the child feels helpless in their environment, the child will often fail
to respond to significant reinforcers due to the belief that nothing can be changed. Therefore, it is hypothesized that parental warmth will be mediated by child’s sense of control in the development of childhood anxiety.

Within the literature, acceptance has been associated with the development of child anxiety. For example, a study by Hudson and Rapee (2001) found that ratings of maternal negativity (lack of acceptance) accounted for 13% of the variance (a medium effect) in diagnosis between a group of children with an anxiety disorder and a control group. Additionally, a study examining trait-anxious preschoolers and normally developing preschoolers rated levels of maternal acceptance during a parent-child problem-solving task. Results suggested that 55% of the variance in group status could be explained by levels of maternal acceptance, with mothers of non-anxious preschoolers displaying significantly higher levels of acceptance compared to the mothers of anxious preschoolers (Dumas, LaFreniere, & Serketich, 1995). Furthermore, a study by Moore, Whaley, and Sigman (2004) found that mothers of anxious children were less warm toward their children, regardless of the mother’s anxiety level.

A review by Wood et al. (2003) analyzed the existing studies of parental acceptance and diagnosis of childhood anxiety, providing empirical evidence that parental acceptance is moderately associated with symptoms of childhood anxiety. This review also suggested that maternal anxiety could act as another variable in the equation, with maternal acceptance mediating the relationship between maternal anxiety and child anxiety. Results of the review suggest, contrary to the Moore et al. (2004) study, that parental warmth mediates the relationship between parental anxiety and child anxiety. In support of the review, a study by Whaley, Pinto, and Sigman (1999) examined behavioral
interactions during a conflict task and a 5-minute conversation about anxiety between anxious mothers and their children compared to non-anxious mothers and their children. Results suggested that anxious dyads were significantly lower in behavioral ratings of warmth compared to non-anxious dyads, indicating an association between parental anxiety and child anxiety. Furthermore, maternal anxiety status was the primary predictor of maternal warmth during interactions, also indicating an association between maternal anxiety and warmth. Therefore, overall results suggest that behaviors of warmth displayed by anxious mothers were potential mediators between maternal and child anxiety.

All of the studies mentioned above utilized lab-based observational methods in the documentation of parental acceptance; however, lab-based observations only document behavior at one point in time in an artificial environment, when parents would be most likely to monitor their behaviors. To avoid this potential limitation, child-ratings of parental behavior can be obtained. For example, a study by Siqueland, Kendall, and Steinberg (1996) compared a group of children diagnosed with an anxiety disorder to a group of matched controls and discovered that children’s ratings of maternal acceptance for the anxiety disorder group accounted for 21% of the variance (a large effect) in the status of their diagnosis. However, when maternal acceptance was coded during a 15-minute interaction between mother and child, no differences were found between maternal warmth for two groups of children. This may suggest that the child’s perception of parental warmth may be more representative of actual behavior instead of a one-time behavioral observation of parental warmth. As a result, children’s perceptions of parental warmth were examined in the current study.
The second parenting dimension of control refers to a parental pattern of over-regulating a child’s activities and routines without regard to the child’s feelings. This may also be referred to as overprotection in the literature and represented on a continuum from overprotection/control to permissiveness (Mattanah, 2001). Chorpita and Barlow (1998) suggest that high parental control encourages a child’s dependency on parents, which is believed to reduce a child’s perception of mastery. A general lack of mastery is believed to contribute to high trait anxiety due to the child perceiving events as out of their control. Therefore, the child’s perception of control may serve as a mediator between parental control and child anxiety; that is, parents who are highly controlling reduce a child’s sense of his/her own control which results in greater anxiety symptoms in children. Contrarily, parents who are less controlling allow their children ample opportunities to develop new skills and gain a sense of control over their environment through exploration which results in less anxiety in childhood.

Specifically, a study by Mattanah (2001) found that children’s ratings of paternal control accounted for 9% of the variance of teacher’s ratings of childhood anxiety, suggesting an association between childhood anxiety and high paternal control. Greco and Morris (2002) also suggested that fathers of children with high social anxiety displayed more control during a 10-minute interactional task compared to fathers of children with low social anxiety. These results are similar to research found with mothers, which suggest mothers of anxious children displayed a high level of controlling behavior during a puzzle task (Krohne & Hock, 1991). Moreover, a study by Hudson and Rapee (2001) found that mothers of anxious children were more controlling and intrusive during a challenging cognitive task than mothers of non-clinical children. Additionally,
Whaley et al. (1999) reported that maternal granting of autonomy accounted for 12% of the variance in predicting the child’s level of anxiety. These studies suggest that both paternal and maternal levels of control can account for a significant portion of the variance in levels of childhood anxiety, supporting the theory of parental control in the development of childhood anxiety.

In relation to long-term outcome, a study by Chambers, Power, and Durham (2004) examined children’s ratings of parental control post-treatment for children previously diagnosed with generalized anxiety, panic disorder, or post-traumatic stress disorder. Children were interviewed between 3 and 14 years post-treatment, and results suggested that the group of individuals who still met criteria for an anxiety disorder diagnosis reported significantly higher levels of parental control compared to a group of individuals that no longer met clinical criteria. These findings suggest that children’s report of parental control continues to be associated with the report of anxiety symptoms in the long-term, even after treatment and may even be related to the efficacy of psychotherapeutic interventions.

Furthermore, studies that have examined interactions between anxious parents and their children compared to non-anxious parents and their children suggest that anxious mothers tend to display more controlling behaviors than non-anxious mothers. Whaley et al. (1999) suggested that anxious mothers were significantly more controlling than non-anxious mothers regardless of the child’s anxiety status. This suggests an association between parental anxiety and parental controlling behaviors.

In summary, a growing body of evidence suggests a link between parental anxiety and parental control behaviors and also between parental control behaviors and child
anxiety. Further, numerous studies support a link between parent and child anxiety that appears to be only partially mediated by genetic or biological factors. Moreover, existing theory in the child anxiety literature suggests that parental control may play an etiological role in the development of child anxiety. Therefore, it was hypothesized that, in children with ASD, the relationship between parental anxiety and child anxiety may also be partially mediated by high parental control behaviors.

In terms of methodological issues for measuring parental control, it appears that both child ratings of parental control and observational studies have found a connection between parental control and childhood anxiety; however, parental ratings of their own controlling behaviors have not been significantly connected to childhood anxiety. For example, a study by Siqueland et al. (1996) suggested no difference between anxious and non-anxious children in regards to maternal self-report measures of control. This suggests that parents may not be valid reporters of their own behaviors due to the inability to view their own behavior objectively. Therefore, child-report measures or observational coding may provide the most beneficial and accurate information when measuring parental behaviors. The current study used a child-report measure of parental behavior based on the theory that these measures may be more representative across time instead of ratings based on a one-time behavioral observation.

The third parenting behavior, modeling of anxious behaviors, has been less studied than the previously mentioned constructs. It refers to a parents’ tendency to describe problems to children as unsolvable, encouraging catastrophic views of problems, and extinguishing or punishing problem-solving behaviors by children (Whaley et al., 1999). It was hypothesized that children may believe there is no effective way to cope
with problems if their parents model anxious behaviors. As a result, children do not develop coping strategies to reduce anxiety which results in an increase in anxiety symptoms. For example, a study by Muris and Merckelback (1998) suggests that child reports of maternal and paternal anxious rearing behaviors were significantly correlated to child anxiety symptomatology. Another study by Muris, Meesters, Merckelback, and Hulsenbeck (2000) found that child reports of maternal and paternal anxious rearing behaviors were positively correlated with reports of childhood worry. Moreover, this study found that ratings of anxious maternal rearing styles predicted 18% of the variance in child ratings of worry. This study sought to extend previous findings to a non-clinical sample of children by measuring worry symptoms instead of anxiety disorder symptoms. Additionally, a study by Grüner, Muris, and Merckelbach (1999) examined children’s perceptions of parental anxious rearing behaviors and the association between anxiety symptoms. Results suggested that maternal anxious rearing behaviors accounted for 8% of the variance in total anxiety symptoms in the child while paternal anxious rearing behaviors accounted for 10% of the variance. However, one limitation with the previous three studies is that most of the research with significant results using child’s perception of parental modeling of anxious behaviors has been conducted by the same group of professionals in the Netherlands, suggesting that these results should be replicated by independent researchers.

In regards to observational methodology, a study by Whaley et al. (1999) found that anxious mothers of anxious children were more likely to discuss problems in catastrophic terms, thereby emphasizing the lack of ability to cope with problems, compared to a non-anxious control group of mothers and children. Moreover, 47% of the
variance in the child’s diagnosis could be explained by maternal catastrophizing. This suggests that parents who model anxious behaviors (e.g., catastrophizing, avoidance) are more likely to have children who are deficient in their ability to effectively cope with stressors thus resulting in high anxiety.

This concept can be extended further with research by Barrett, Rapee, Dadds, and Ryan (1996) that suggests parents of anxious children often reinforce avoidant behaviors when interpreting ambiguous situations. In this study, a group of anxious, oppositional, and non-clinical children and their parents were separately asked to interpret and give a plan of action for 12 ambiguous situations (e.g., “You see a group of students from another class playing a game. As you walk over, you notice they are laughing. What do you think is happening/more likely?”). After providing independent responses, children and their parents were asked to discuss their responses to two of the situations and provide a joint response. Results suggested that anxious children were more likely to interpret the ambiguous situations as threatening and choose avoidant plans of action. For example, prior to the discussion with their parents, anxious children provided avoidant solutions approximately 30% of the time. However, after the family discussions this figure rose dramatically to almost 70%. This is compared to non-clinical children providing avoidant solutions approximately 18% of the time prior to family discussion and 6% of the time after the family discussion. The results of this study suggest that anxious children may interpret ambiguous situations as more threatening as a result of parental modeling of anxious behaviors and reinforcement of avoidant behaviors. Additionally, a study by Chorpita, Albano, and Barlow (1996) also suggests that children with high trait anxiety tended to provide anxious responses to ambiguous situations.
However, this study was limited by small group of participants (N = 4 anxious children, N = 8 non-anxious children). Therefore, low statistical power limited the ability to further analyze the data presented in this study.

Overall, a number of studies suggest an association between parental anxiety and child anxiety. It was hypothesized that, in children with ASD, parental modeling of anxious behaviors would serve as a partial mediator between parental anxiety and childhood anxiety. More specifically, it was hypothesized that a child’s perception of threat, as measured via ambiguous situations, would serve as a mediator between parental modeling of anxious behaviors and childhood anxiety.

*A Model Explaining the Development of Anxiety for Children with ASD*

Various models of anxiety have attempted to explain the development of childhood anxiety in terms of single main effects, such as parental control; however, these past models have not accounted for the majority of variance based on a single main effect, but rather a small fraction of the variance (Wood et al., 2003). For example, parental control and genetic factors have been associated with childhood anxiety yet neither can account for the majority of the variance in childhood anxiety symptoms. As a result, more complex models have developed to account for both external and internal contributors to anxiety. Craske (1999) proposed a theoretical model that helps explain the role of parenting in the development and maintenance of childhood anxiety. Specifically, the combination of certain parenting behaviors (i.e., low acceptance, high control, and modeling of behaviors) reinforce a child’s beliefs of anxiety in specific situations which contribute to the development of anxiety in those specific situations. For example, parenting behaviors may reinforce the negative beliefs (i.e., increase the child’s
perceptions of threat and decrease perceptions of control) and anxious behaviors in social situations for a child with ASD, which would contribute to the development of anxiety for children.

With Craske’s model in mind, the purpose of the current study was to examine the influence of parenting factors (i.e., acceptance, control, and modeling of anxious behaviors) on the development of anxiety in children with ASD. The three parenting dimensions described above have been significantly correlated with anxiety symptoms in children. Various studies have offered empirical evidence that each parenting factor contributes a significant amount of variance in the display of childhood anxiety symptoms. While this has been primarily studied in anxious children, perhaps these examples in the literature can offer additional insight into the process by which children with ASD develop anxiety disorders. As discussed earlier, individuals with autistic spectrum disorders have a high rate of comorbid anxiety symptoms; therefore, it was believed that these parenting behaviors may also significantly contribute to the development of anxiety symptoms for children with ASD. Furthermore, as alluded to earlier, it was believed that social skills deficits also significantly contribute to the development of anxiety in children with autism spectrum disorders. Remember that children with ASD have higher levels of social impairments and anxiety compared to clinical and non-clinical control groups (Gillott et al., 2001; Green et al., 2000). Therefore, it was believed that social skills would be associated with child anxiety for children diagnosed with high-functioning ASD.
Hypothesis

Given the findings discussed above, a path model (see Figure 1) was derived leading from parental anxiety symptoms and child social skills to child anxiety symptoms for children diagnosed with high-functioning ASD. It was hypothesized that parental anxiety would be directly related to child anxiety and child social skills would be inversely related to child anxiety. Additionally, parenting behaviors (i.e., low acceptance, high control, and high frequency of modeling of anxious behaviors) would serve as partial mediators between parental anxiety and childhood anxiety. It was also hypothesized that the effect of the child’s social skills would be partially mediated by parental control when predicting childhood anxiety symptomatology. That is, a child with low social skills would evoke high parental control.

Given that theory suggests parenting behaviors may in part be related to children’s perceptions of control and threat, it was hypothesized that the effects of parental acceptance and control would be mediated by the child’s perception of control when predicting child anxiety symptomatology. That is, a child reporting a higher external locus of control was hypothesized to be positively associated with low parental acceptance, high parental control, and high childhood anxiety symptomatology. Furthermore, parental modeling of anxious behaviors was hypothesized to be mediated by child’s perception of threat when predicting childhood anxiety symptomatology. Specifically, it was hypothesized that youth who interpret ambiguous situations as more threatening would be positively associated with high levels of parental modeling of anxious behaviors and high childhood symptomatology.
Chapter Two

Method

Participants

Participants were 62 children (50 males, 12 females) between the ages of 8 and 18 years (M = 11.84, SD = 2.74) with a DSM-IV diagnosis in the autism spectrum. The primary caregiver of the 62 participants provided consent for their children to participate in the current study; however, only 43 of the caregivers completed the additional parental measures. For the child participants, 35 (57%) were diagnosed with Asperger’s Disorder, 15 (24%) with High Functioning Autism, and 12 (19%) with Pervasive Developmental Disorder, Not Otherwise Specified. In this sample, 37 (60%) participants were diagnosed with only an autism spectrum disorder, 18 (29%) were diagnosed with one comorbid diagnosis, and seven (11%) were diagnosed with more than two comorbid psychiatric diagnoses. Twenty (32%) children had a secondary diagnosis of Attention-Deficit/Hyperactivity Disorder, five (8%) with Obsessive-Compulsive Disorder, four (6%) with Oppositional Defiant Disorder, three (5%) with Bipolar Disorder, two (3%) with Tourette’s Disorder, and two (3%) with depression. In addition, 31 (50%) participants indicated that they currently were receiving treatment, seven (11%) indicated

\[1\] A\textsuperscript{[0]} pilot study was conducted including five participants to determine the feasibility of the children to complete the measures independently. These five children were able to complete the measures independently without any difficulties reading items or understanding the content and purpose of the study. It was also determined that the measures were within the cognitive and developmental capabilities of the children; therefore, data collected proceeded as expected.
they only had treatment in the past, 16 (26%) indicated they had never received
treatment, and eight (13%) failed to respond to this item.

Forty-three (69.4%) of the child participants were Caucasian, two (3.2%) were
African-American, three (4.8%) were Hispanic, one (1.6%) was Native American, one
(1.6%) was Asian, four (6.5%) identified “other” for ethnicity, and eight (12.9%) did not
report their ethnicity.

**Measures**

*Demographics Information.* Parents were asked to complete a demographics form
which included variables of child’s age, birthday, gender, ethnicity, parental occupation
and education level, psychiatric diagnoses, treatment, and current medications (Appendix
A).

*State-Trait Anxiety Inventory (STAI).* The STAI (Spielberger, Gorusch, &
Lushene, 1970) is 40-item questionnaire that measures state and trait-anxiety symptoms
in adults. Each item is scored on a 4-point Likert-scale (1 = almost never, 2 = sometimes,
3 = often, 4 = almost always). In the current study, the 20-item questionnaire was used
that measures trait-anxiety symptoms in the primary caregivers. The STAI-trait scores
range from 20 (almost never anxious) to 80 (almost always anxious). Parents (i.e.,
primary caregiver) were asked to complete the measure in order to determine the level of
parental anxiety symptoms. Numerous research studies have demonstrated good validity
and internal consistency (α = .83) (Spielberger et al., 1970). In the current study, the
internal consistency of the items on the STAI-trait scale was excellent (α = .89).

*Social Skills Rating System (SSRS).* The SSRS (Gresham & Elliott, 1990) is a
questionnaire that measures social behavior of children aged 3 to 18 years with different
questionnaires for parents, teachers, and children. The SSRS was standardized on a normative sample of 4,170 children (Gresham & Elliott, 1990) but has also been used when examining the social skills of children with autism spectrum disorders (e.g. Bellini, 2004; Koning & Magill-Evans, 2001; Ozonoff & Miller, 1995). The measure consists of two scales: social skills and problem behaviors. For the current study, only the social skills subscale, completed by the parents, was examined to measure the child’s social skills. The parents’ version of the social skills subscale consists of four subscales: cooperation, assertion, self-control, and responsibility. Two versions of the social skills subscale were used based on the grade level of the child, one for 6th grade and below and another for 7th through 12th grade. The total social skills score consisting of all four subscales was used in the analysis. Internal consistency of the social skills scale is good, ranging from .83 to .94. The internal consistency of the SSRS in the current study was acceptable (6th grade and below, \( \alpha = .87 \); 7th through 12th grade, \( \alpha = .71 \)).

The Parental Bonding Instrument (PBI). The Parental Bonding Instrument (Parker, Tupling, & Brown, 1979) is a 25-item self-report measure that assesses children’s perceptions of parental care (acceptance) and overprotection (control). While originally developed for adults retrospectively reporting on their childhood experiences, the measure has been adapted for children to report current parenting behaviors (Greco & Morris, 2002). Children completed the measure, regarding their primary caregiver, to assess the child’s perception of parental acceptance and control. Each item described a parenting behavior, and children were asked to rate the degree to which the item described their parent on a 4-point Likert scale from 1 (very much like my mother/father) to 4 (very unlike my mother/father). The PBI consists of two subscales: care (i.e.,
acceptance) and overprotection (i.e., control). The care subscale consists of 12 items that measure care/involvement versus indifference/rejection (Parker et al., 1979). Low scores on the care subscale suggest a parent that is warm and accepting while high scores suggest a parent that is not warm or accepting. The overprotection subscale consists of 13 items that measure control/overprotection versus encouragement of independence (Parker et al., 1979). Low scores on the overprotection subscale suggest a very controlling and overprotective parent while high scores suggest more permissive and less controlling parenting. The PBI has been shown to have good reliability and validity in several studies, including significant correlations between children’s reports of their parent’s behaviors and the reports of judges that interviewed their mothers (Bachar, Canetti, Galilee-Weisstub, Kaplan-DeNour, & Shalev, 1998). In a study by Cohen and Finzi-Dottan (2005), the internal consistency for each of the subscales was overprotective ($\alpha = .86$) and caring ($\alpha = .91$). In the current study, the internal consistency of the subscales was lower than expected for overprotection ($\alpha = .67$) and caring ($\alpha = .77$).

*My Memories of Upbringing for Children (Swedish acronym, EMBU-C).* The EMBU-C (Grüner et al., 1999) is a 40-item questionnaire completed by children that measures four dimensions of perceived parental rearing: emotional warmth, rejection, overprotection, and anxious rearing. Each item is answered on a 4-point Likert-scale (1 = no, never; 2 = yes, but seldom; 3 = yes, often; 4 = yes, most of the time). For the current study, only the subscale of anxious rearing was utilized, consisting of 10 items. Children completed the measure in regards to their primary caregiver’s modeling of anxious rearing behaviors. The reliability analysis of the EMBU-C anxious rearing scale, English version, showed that it was the most reliable scale of the measure with $\alpha = 0.80$. Because
the other dimensions of the measure did not have as high reliability compared to the anxious rearing scale, it was decided to only use the anxious rearing scale of the EMBU-C. The PBI questionnaire offered higher reliability in order to measure the dimensions of acceptance and control. In the current study, the internal consistency of the EMBU-C anxious rearing scale was excellent ($\alpha = .83$).

Nowicki-Strickland Locus of Control Scale for Children (NSLOC). The NSLOC (Nowicki & Strickland, 1973) is a 40-item measure that assesses internal and external locus of control for children. Abbreviated scales based on the original measure were provided for younger children in grades 1-6 consisting of 19 items and older children grades 7-12 consisting of 21 items (Nowicki & Strickland, 1973). Children completed the measure to assess for their perception of control. Children were asked to respond by circling yes or no to each item. Total scores range from 0 to 19 for children in grade 1st through 6th or 0 to 21 for children in grade 7th through 12th. Low scores are associated with an internal locus of control, or individuals attributing events to their own control, while high scores are associated with an external locus of control, or attributing events to external circumstances. Adequate internal consistency ($\alpha = .68$) and concurrent validity ($r = .31$ to .61) with other measures of locus of control were reported (Nowicki & Strickland, 1973). In the current study, in internal consistency of the abbreviated NSLOC for grades 1st through 6th was low ($\alpha = .58$) and slightly higher for grades 7th through 12th ($\alpha = .72$).

Ambiguous Situations Questionnaire (ASQ). The ASQ (Barrett et al., 1996) consists of 12 ambiguous situations that could be interpreted as either threatening or non-threatening. Half of the ambiguous situations refer to physical threats and half to social
threats. Each situation consists of two forced-choice interpretations of the situation, with one threat interpretation and one neutral interpretation. Children were asked to choose the interpretation that they believed to be correct. This questionnaire was completed by child participants to measure their perceptions of threat. Cronbach’s alpha levels for the ASQ were not available due to the measure not being published with standardized norms. In the current study, the internal consistency of the ASQ was low ($\alpha = .62$).

Revised Children’s Manifest Anxiety Scale (RCMAS). The RCMAS (Reynolds & Richmond, 1978) is a 37-item (28 anxiety items, 9 social desirability items) measure designed to measure a variety of anxiety symptoms in children aged 6 to 19 years. Children were asked to respond to each item by circling yes or no, depending on if the item was true about the child (yes) or not true about the child (no). Child participants completed the measure in order to determine the level of child anxiety symptoms. The RCMAS can differentiate between children with anxiety disorders and psychiatric controls (Mattison, Bagnato, & Brubaker, 1988; Seligman, Ollendick, Langley, & Baldacci, 2004). Overall, the RCMAS has been shown to have good internal consistency ($\alpha = .83$; Reynolds & Richmond, 1978). In the current study, the internal consistency of the RCMAS total score was adequate ($\alpha = .74$).

Procedures

Children and their caregivers were recruited to participate in the study through various agencies that specialize in treating ASD, such as local schools, non-profit organizations, private practices, local and national listserves for children with ASD, and community mental health centers in Ohio and Michigan. A letter explaining the criteria for the study and study procedures was given to over 15 mental health professionals in
the Toledo and surrounding areas in order to help recruit participants (Appendix B). The letter included a form asking for permission to contact parents regarding their potential participation (Appendix C). Another letter explaining the criteria for the study and study procedures was given directly to parents or sent home with children within the school system. This letter asked parents for permission to participate in the study (Appendix D) and was attached to a parental consent form (Appendix E) and child assent form (Appendix F). Around 200 letters were disturbed to children and families within two school districts throughout Ohio that specialized in the education of children with ASD. After receiving both consent forms, parents and children were given written directions and a packet of measures to complete and return in person or by mail to the researcher. As an incentive to participate in the study, children were entered into a drawing for a $25 gift certificate if they completed the packet of questionnaires. Included with the directions was a form for the child to complete with their name and contact number if they win the drawing (Appendix G).

Parents were asked to complete a number of measures including the demographics information form, State-Trait Anxiety Inventory: Trait-Version, and Social Skills Rating System – Parent Version. Children were asked to complete a packet of measures including the Parental Bonding Instrument, EMBU-C measure for anxious rearing, the Nowicki-Strictland Locus of Control Scale for Children, the Ambiguous Situations Questionnaire, and the Revised Children’s Manifest Anxiety Scale. The order of the questionnaires was counterbalanced within the packets. Participants were asked to complete the measures as accurately as possible and parents were also informed of the importance of children completing the measures without parental influence. Families
were given the contact information of the researcher in case they had additional questions or if they wished to be informed of the final results of the study.
Chapter Three

Results

The primary caregiver of the 62 participants provided consent for their children to participate in the current study; however, only 43 of the caregivers completed the additional parental measures. Although it was not possible to collect data on the reasons for missing responses it appeared that parents’ failure to respond was due to a number of factors such as busy parental schedules, moving, parents losing the measures, and stressful family events. Lost or incomplete measures accounted for the majority of the missing responses. Most families were contacted to follow-up on incomplete measures, and several measures were re-mailed to parents; however, few responded to the multiple prompts to complete the measures. Missing data were imputed using the regression imputation feature of the statistical program Amos 6.0. More specifically, the missing values were imputed using maximum likelihood estimates and linear regression in order to predict the unobserved values. The predicted values were then substituted for the missing values and the complete dataset was analyzed.

Means and standard deviations were calculated using the complete dataset for each measure. As can be seen in Table 1, the overall sample reported mild elevations of child anxiety symptoms, which is consistent with other studies that report mild to moderate elevations in anxiety symptoms within the ASD youth population (i.e., Bellini, 2004; Gillott et al., 2001; Green et al., 2000; Russell & Sofronoff, 2004). Results of the
measures completed by the parents suggested lower than average childhood social skills and occasional symptoms of parental anxiety. Means scores for the measures completed by the child participants suggested that they viewed their parents as high for parental acceptance/warmth, less controlling/more permissive, and sometimes observed parental modeling of anxious behaviors. Further, children’s responses suggested a balance between internal and external locus of control (i.e., they are likely to attribute events to internal and external circumstances) and that they tended to perceive situations as mildly or somewhat threatening. See Table 1 for means and standard deviations of each measure.

Bivariate Associations between Variables

The model consisted of two exogenous variables: parental anxiety symptoms and child’s social skills. The model also consisted of six endogenous variables: acceptance, control, modeling of anxious behaviors, child’s control, child’s threat, and child anxiety symptoms. Pearson’s correlations were computed between all eight variables for a total of 28 correlations (see Table 1). A Bonferroni correction was calculated on the alpha level to adjust for Type I error. As can be seen in Table 1, the predicted correlations between parental anxiety with child anxiety and child’s social skills with child anxiety were not found.

Path Analysis

Path analysis was used to test the model depicted in Figure 1 using Amos 6.0 statistical software. Standardized path coefficients from the analysis can be seen in Figure 2. Results suggested a significant path coefficient ($\beta = .30; p < .05$) between the child’s perception of control and child anxiety, suggesting that children who report more external
locus of control are likely to report more symptoms of anxiety. In addition, a significant path coefficient ($\beta = -.43; p < .001$) between parental control and child’s perception of control suggests that children who perceive their parents as more controlling are also likely to endorse more external locus of control, which was consistent with the hypothesis. Furthermore, the path coefficient ($\beta = .27; p < .05$) between child’s perception of threat and child anxiety suggests that children who perceive situations as more threatening are likely to endorse more symptoms of anxiety.

Results suggested non-significant path coefficients between parental anxiety and the following variables: child anxiety ($\beta = -.11$), parental acceptance ($\beta = .07$), parental control ($\beta = -.07$), and parental modeling of anxious behaviors ($\beta = .12$). The pathway from child’s social skills to child anxiety ($\beta = -.09$) and child’s social skills to parental control ($\beta = .23$) were also not significant. Furthermore, the path coefficient from parental acceptance to child’s perception of control ($\beta = .09$) and parental modeling of anxious behavior to child’s perception of threat ($\beta = .15$) were not significant.

Several fit indices were calculated to determine how closely the data fit the proposed model. Fit indices included the chi-square test, the root mean-squared error of approximation (RMSEA), the Bentler-Bonett normed fit index (NFI), the comparative fit index (CFI), and the Tucker-Lewis Index (TLI; also known as the Bentler-Bonett non-normed fit index, NNFI). The chi-square test demonstrates adequate fit if the obtained test statistic is not significant at the .05 level. The RSMEA values were judged using criteria set by Brown and Cudeck (1993), where values less than .05 indicate a close fit (preferred), values between .05 and .08 indicate a reasonable fit, values above .08 indicate mediocre fit, and values above .10 indicate unacceptable fit. Common use of the
NFI, CFI, and TLI have suggested a value of .90 as an adequate model with values closest to 1 indicating a very good fit (see Table 2). As can be seen from examination of these fit indices, the hypothesized model did not provide a good fit.

Mediational Regression Analyses

Linear regression analysis was calculated to evaluate specific aspects of the path model and to further understand the mediating effect of children’s perceptions of control on the relationship between parental control and child anxiety. Results suggested that the direct relationship of parental control on child anxiety was not significant ($\beta = -.074, p = .57$). This finding implies that the child’s perception of control does not serve as a mediating variable between parental control and child anxiety. Therefore, no further mediational analyses were conducted.
Chapter Four

Discussion

The primary goal of this study was to test the theoretical model explaining the development of anxiety symptoms for children diagnosed with high-functioning ASD. Based on the anxiety literature, it was proposed that children with ASD develop anxiety symptoms in a similar fashion to clinically anxious children due to the influence of parental anxiety, acceptance, control, parental modeling of anxious behaviors, and the child’s social skills, as depicted in Figure 1. Overall, results suggest that the hypothesized model does not adequately explain the development of anxiety symptoms in the current sample of children with ASD. Although the hypothesized model was designed to explain the relationship between parental anxiety and child anxiety as well as that between social skills and the development of child anxiety, no evidence of a correlation between these variables was found. However, certain hypothesized relationships within the model were supported as discussed below.

Results suggested that parental anxiety was not significantly related to anxiety symptoms in children with ASD contrary to the hypothesis. Additionally, it was hypothesized that parenting behaviors (i.e., low acceptance, high control, and high frequency of modeling of anxious behaviors) would serve as partial mediators between parental anxiety and childhood anxiety; however, results suggested that parenting behaviors of acceptance, control, and modeling of anxious behaviors were not
significantly related to parental anxiety. Therefore, findings suggest that parental anxiety was neither directly nor indirectly related to the development of child anxiety symptoms using the proposed model. This non-significant finding may suggest that parenting behaviors and parental symptoms of anxiety, while important factors in clinically anxious population, may not be relevant in explaining the development of childhood anxiety within the ASD population. This finding was quite surprising given the numerous studies in the anxiety literature that supports the connection between parental anxiety and child anxiety (i.e., Mannuzza et al., 1995; Turner, Beidel, & Epstein, 1991). Therefore, additional research needs to be conducted to clarify whether this is a reliable finding.

Additionally, the direct pathway from child’s social skills to child anxiety symptoms was not significant as originally hypothesized. This finding was contrary to some studies that suggest social skills deficits are a significant contributor to anxiety symptoms for individuals with ASD (e.g., Bellini, 2004; Green et al., 2000). However, another possible explanation may be that child anxiety symptoms are better accounted for by another variable such as peer interactions. For example, Russell and Sofronoff (2005) suggest that children’s perceptions of peer interactions (rather than actual social skills) may be an important factor in predicting anxiety symptoms. This study suggested that younger children with ASD may be too young to recognize their lack of social skills so this does not directly contribute to the development of anxiety symptoms. Instead, young children may experience anxiety upon social rejection from failed social attempts and poor peer interactions. Therefore, children are not anxious prior to a social interaction and may approach others in play or conversations; however, the anxiety arises upon rejection from the social attempt and the child develops a poor perception of peer
interactions. In sum, the child’s perceptions of peer interactions may be a significant factor in predicting anxiety rather than the child’s actual level of social skills. This new theory would be consistent with studies that report significant problems with peer relationships in children with Asperger’s Disorder (i.e., Green et al., 2000; Myles & Simpson, 2002).

Despite the inadequate fit of the original model, certain hypothesized relationships from the model were supported. Specifically, a significant path coefficient was revealed between child’s perception of control and child anxiety suggesting that children who display a high external locus of control (i.e., attribute events in their life to external circumstances) are likely to endorse more symptoms of anxiety. This is consistent with previous studies that indicate children who perceive environmental changes as uncontrollable and believe they can do little to change circumstances are more likely to be anxious (e.g., Chorpita & Barlow, 1998). This finding also suggests that children who display more internal locus of control (i.e., attribute events to their own control) are more likely to endorse fewer symptoms of anxiety. This pathway suggests an important piece in the development of anxiety in children with ASD, suggesting that the child’s perception of control may be a significant contributor to child anxiety symptomatology within the ASD population.

Results also suggest a significant inverse pathway between parental control and child’s perception of control, which suggests that highly controlling parents are more likely to have children who display more external locus of control. This finding was consistent with the hypothesis and supports findings from the anxiety literature that suggest the child’s perception of control is an important factor when examining the
relationship between parental control and child anxiety (e.g., Chorpita & Barlow, 1998; Hudson & Rapee, 2001; Mattanah, 2001). Overall, this finding highlights the impact that parental control can have on the child’s own perception of control and the likelihood of developing symptoms of anxiety. To further understand this relationship in terms of mediational effects, a regression analyses was conducted between parental control and child anxiety to determine if a direct relationship existed. Results suggested a non-significant relationship from parental control directly to child anxiety, providing evidence that the child’s perception of control does not serve as a mediator between parental control and child anxiety because these variables are not significantly related. Therefore, current findings support a linear theory that parents who are highly controlling may reduce the child’s sense of his or her own control which results in greater anxiety symptoms in the child; however, the parental control does not directly affect the child’s anxiety symptoms. This may be better understood by thinking about the inherent deficits of children with ASD. For example, this population may be especially susceptible to parental control due to their limited social skills and difficulties with peer relationships. Since children with ASD are characterized by poor social skills and difficulties interacting with peers, this deficit may cause them to rely on their parents for guidance to navigate the social world. In time, this dependency on parents slowly develops into parental control as the parent naturally makes many decisions for the child. However, the parent’s level of control only increases the child’s anxiety symptoms if the child perceives situations as out of their control. In sum, findings from the current study support the linear theory in which parents who are highly controlling may reduce the
child’s sense of his or her own control which results in greater anxiety symptoms in the child.

As hypothesized, the pathway between the child’s perception of threat and child anxiety was positively related. These results are consistent with previous studies that suggest anxious children are more likely to interpret ambiguous situations as threatening (e.g., Barrett et al., 1996; Chorpita, Albano, & Barlow, 1996). However, results of the current study did not support the hypothesis that the child’s perception of threat served as a mediator between parental modeling of anxious behavior and symptoms of childhood anxiety. The partial support of the original hypothesis suggests that children’s perceptions of threat may be an important piece in better understanding the development of anxiety in children with ASD, but its connection to parental modeling of anxious behaviors does not fit the current sample. Perhaps the child’s perception of threat may be learned through a mechanism other than the one hypothesized here.

Additionally, the pathway between child’s social skills and parental control approached significance in the current study. This suggests that the relationship between these variables may need more power to clearly define the relationship. Therefore, the current study offers preliminary findings suggesting that the child’s social skills may contribute to the development of child anxiety symptoms but additional research is needed to more clearly define this relationship.

In sum, despite a few significant path coefficients, the hypothesized model did not adequately explain the development of anxiety symptoms in children with ASD within the current sample. The poor fit of the hypothesized model was quite surprising given that numerous studies that have shown higher rates of anxiety within the ASD population
Therefore, while it is clear that the ASD population has similar rate of anxiety compared to clinically anxious children, it may be that children with ASD do not pick up on the parental anxiety and parenting behaviors because they are not as sensitive or easily influenced by parental anxiety due to their inherent social skills deficits. The development of anxiety within the ASD population may be better explained with a different model of anxiety than a clinically anxious population. For example, Russell and Sofronoff (2005) suggested that children with ASD reported similar anxiety scores to a clinically anxious population yet the nature of their worries were varied so as to not fit the same model of anxiety development as a clinically anxious population. In the study, the parents of the children with ASD endorsed significantly more obsessive-compulsive symptoms and physical injury fears for their children than parents of clinically anxious children; however, no differences were reported between the two groups on overall anxiety scores, suggesting a similar level of overall anxiety but different presentation of anxiety symptoms. Furthermore, Evans, Canavera, Kleinpete, Maccubbin, and Taga (2005) examined anxieties and behavior problems of children with ASD to other mentally aged and chronologically age-matched children. Results of this study suggested that children with ASD reported having more situation phobias and medical fears than comparison groups. Phobias and anxieties were also more closely correlated to behavioral problems for the children with ASD than comparison groups, suggesting a distinct profile of fear and anxiety that is related to behavioral problems for children with ASD. Therefore, results of this study suggested a different profile for the development of anxiety in children with ASD. Overall, results from different studies suggest that children with ASD report anxious symptoms in a
different context or pattern than comparison groups and clinically anxious children, which may account for the inadequate fit of the original model based on the anxiety literature; however, further research needs to be done replicating the findings here before such a model can be discarded. Also, it should be noted that the proposed model, in its entirety, has never been tested in a non-ASD population; obviously it would be important to do so in order to examine similarities and differences in the way anxiety develops in ASD youth and non-ASD youth.

Alternative Path Model

Results from the current study suggest an inadequate fit of the proposed model, developed using the anxiety literature, to explain the development of anxiety symptoms in children with ASD. While some pathways of the proposed model were significant, fit indices suggested that the current variables do not adequately explain the phenomenon of anxiety within this population. Recent studies published after the proposal of the current model offer additional hypotheses with varied theoretical underpinnings to help explain the development of anxiety in children with ASD. Bellini (2006) proposed and tested a model to explain the development of social anxiety in adolescents with ASD. Bellini’s model focuses on temperament and neurobiological functioning with an emphasis on how these characteristics interact with social functioning to create the potential for social anxiety symptoms within the ASD population. It is suggested that individuals with ASD often have a temperament that is characterized by a high degree of physiological arousal. This heightened level of arousal makes it more likely that the individual will be overwhelmed in interactions with others, which causes them to avoid future social interactions and withdraw. Social withdrawal then decreases the frequency of interactions
with others which results in a decreased opportunity to build and practice social skills. The decrease in social opportunity results in social skills deficits which also increases the chance of negative peer interactions and social failure. The pathway is completed by an increase in physiological hyperarousal which makes it more likely that the individual will be adversely conditioned by negative social interactions, therefore leading to an increase in social anxiety. Bellini suggests that the problem may be further worsened by the development of social anxiety symptoms, which leads to further social withdrawal and begins the cycle again.

Bellini’s model was partially tested using multiple regression to determine the contribution of social skills deficits and physiological hyperarousal in the development of social anxiety in adolescents with ASD. Participants consisted of 41 adolescents with ASD and their families. Participants were asked to complete a number of self-report measures including the SSRS (Gresham & Elliott, 1990), the Social Anxiety Scale for Adolescents (SAS-A; La Greca, 1999), and the Multidimensional Anxiety Scale for Children (MASC; Marsh, 1999). Results of the study suggested that the combination of social skills and physiological arousal was a significant predictor of social anxiety and accounted for 34% of the variance of social anxiety. Findings by Bellini are consistent with those of other researchers who suggest a link between temperament, physiological arousal, social functioning, and anxiety in children with ASD (Biederman, Rosenbaum, Chaloff, & Kagan, 1995; Rubin & Burgess, 2001). However, this study only tested part of Bellini’s proposed model, suggesting that additional research needs to be done to determine the influence of the other variables in the model and fit indices of the proposed model. Future research would also be beneficial to determine the influence of these
variables on the development of other types of anxiety in addition to social anxiety. While this study represents an early step in the investigation of social anxiety in youth with ASD, it offers additional factors besides parenting behaviors and parental anxiety that may significantly contribute to the development of anxiety in the ASD population.

Alternatively, other factors in addition to those discussed above may lead to the high rates of anxiety symptoms within this population. Farrugia and Hudson (2006) reported that adolescents with ASD endorsed a similar rate of anxiety symptoms to a clinically anxious population yet reported significantly higher levels of behavioral problems, negative thoughts, and life interference compared to clinically anxious and non-clinical populations. These results suggest that cognitive factors, individual behavioral problems (i.e., not parenting behaviors), and interference with daily functioning may be important factors in the development of anxiety within the ASD population. While Farrugia and Hudson did not offer a model for the development of anxiety, their study suggests many variables that should be further examined to determine their influence on the development of anxiety for children with ASD.

*Limitations*

There appear to be some limitations to the present study which are presumed to have influenced the results and therefore, should be considered before implications of the study can be examined. First, path analysis is not able to determine causal direction of relationships but can explain whether or not a model is plausible in the sample studied. While the overall fit indices were not adequate for the proposed model, certain aspects of the model were supported; however, the directionality of the relationships could be reversed without any effect on the model fit. In order for causal relationships to be truly
studied for the development of anxiety within the ASD population, longitudinal data or experimental manipulation would be necessary.

Another possible limitation of the study may be the heavy reliance on self-report measures completed by children with ASD. Some participants, especially the younger children, may have struggled completing the measures independently, which may have resulted in problems with reliability and internal consistency. This is evidenced by some of the lower alpha scores reported for particular measures. Specifically, the internal consistency of the ASQ, the NSLOC for children 1st through 6th grade, and the overprotection scale of the PBI were lower than expected. Some items on the PBI and NSLOC were poorly worded and may have been difficult for younger children to understand due to their beginning reading abilities. This suggests that those questionnaires may not have been the most accurate in measuring the proposed variables for the current population.

Additionally, cognitive functioning of participants was not obtained in the current study, which may further call into question the validity of the self-report measures. However, pilot data using five participants were collected to determine the ease or difficulties of children completing the measures. The measures were determined to be within the cognitive and development realm of the pilot participants, so data collection continued. Further, a graduate student in clinical psychology was present while most of the measures were being completed by the children in order to assist individuals with reading difficulties or to answer participants’ questions thereby attempting to reduce the potential for errors. Nevertheless, it still may be beneficial for future research studies to evaluate the cognitive functioning of participants prior to participation.
In addition, the relatively small sample size used in this study may have limited the power necessary to reveal relationships among the variables. Some of the path coefficients that approached significance may have reached a statistically significant level if additional participants were included to increase the power.

Further, as noted above, the model tested in the current study has not been examined within a typically developing population, clinically anxious population, or other control group of children. Therefore, while the current model is based on the empirical evidence within the anxiety literature, this specific model has not been proven to adequately explain the development of anxiety for other populations. It may be beneficial for future research to further examine this model and similar models to determine the accuracy of the overall model within varied populations.

Finally, the varied demographic characteristics presented in this sample may have presented some confounding variables that were not statistically adjusted for given the small sample size. Participants varied in the number and type of additional clinical diagnoses, previous treatment, and medications. Furthermore, ASD diagnoses were not confirmed with a specific autism diagnosis questionnaire and diagnoses ranged from high-functioning autism to Asperger’s disorder and pervasive developmental disorder, not otherwise specified. Positive confirmation of a diagnosis relied on the participant’s parents to endorse a specific ASD diagnosis or identification from the child’s school, which specialized in educating children with ASD. Overall, the group was not as homogenous as would be ideal for research studies.
*Implications for Clinical Practice*

While results of the present study suggest that parenting factors may not be helpful in predicting the development of anxiety symptoms, it may be that parental involvement is significant in maintaining anxiety symptoms that have already developed. Therefore, it may be beneficial for parenting factors to continue being addressed in treatment. A study by Sofronoff, Attwood, and Hinton (2005) examined the effectiveness of CBT interventions for anxiety within an ASD population. Seventy-one children diagnosed with ASD with an anxiety profile similar to a sample of clinically diagnosed anxious children were recruited to participate in a 6-week intervention. Results of this study suggested that participants with child and parental participation in treatment (as opposed to wait-list and child only groups) had better long-term outcomes. This study offers some empirical support that CBT with parental involvement can be effective in children with ASD and anxiety features, regardless of the origin of the anxiety symptoms within the child. Therefore, in terms of clinical implications, it may be less important to understand the factors that lead to the development of anxiety in the ASD population and more important to understand the current behaviors and cognitions that are allowing the anxiety symptoms to continue and to address those maladaptive behaviors in treatment. While it may be important to theoretically understand the development of anxiety for children with ASD, it is likely not vital to understand this complex development in order to effectively treat the anxiety symptoms.

*Implications for Future Research*

Future research should focus on better understanding the factors that contribute to high rates of anxiety within the ASD population. While numerous factors have previously
been discussed, it would be helpful for future research to develop and test alternative models to examine the contribution of these factors in the development of anxiety. For example, research extending Bellini’s work (2006) that examines the pathways between temperament, social withdrawal, and social skills would greatly enhance the current understanding of the developmental pathways for anxiety in children with ASD. Bellini’s model only examines social anxiety in individuals with ASD, and research to extend his model to other types of anxiety symptoms (e.g., generalized anxiety, specific fears, and obsessive-compulsive characteristics) would be an important area of future research. In addition, research to date has only examined part of Bellini’s model and more thorough studies would be helpful to examine all aspects of the model.

However, before good models of anxiety symptoms can be developed, the characteristics of anxiety need to be more closely examined for children with ASD to determine if they truly meet criteria for an anxiety disorder, or if the anxiety is a function of their primary diagnosis. Few studies have focused on the actual rates of anxiety within this population, but a study by Kim et al. (2000) found that 13.6% of children with ASD met criteria for generalized anxiety disorder and 8.5% reported separation anxiety. Additional epidemiological studies are necessary to determine the rates of comorbid anxiety disorders and behavioral disorders in addition to the rates of anxiety symptoms that are present but do not meet criteria for an anxiety disorder.

Additionally, longitudinal studies would be helpful to better understand the developmental pathways of anxiety within the ASD population. This design would offer additional insight in determining the directionality of pathways as opposed to the correlational findings that result from studies designed using cross-sectional data.
Longitudinal research would be valuable in examining the relationship among numerous variables, examining how anxiety changes across time, and exploring the role of early temperament in the development of anxiety symptoms for children with ASD as they develop into adulthood.

Furthermore, it may be beneficial for future studies to examine the effectiveness of cognitive-behavioral therapy based programs developed specifically for anxious children with ASD. Limited studies have shown some promising results in the reduction of anxiety within this population, but further programs need to be developed and supported empirically to address the factors that may be contributing to increased anxiety in children with ASD.

**Conclusions**

The findings of this study suggest that children with ASD demonstrate more symptoms of anxiety when they have more external locus of control and when they perceive ambiguous situations as more threatening. Findings also suggest that when children perceive their parents as more controlling, the child is likely to report a higher external locus of control. Overall fit indices of the proposed model suggested an inadequate fit between the data and the model, suggesting that childhood anxiety symptoms within the ASD population may develop in a different manner than clinically anxious children. This suggests that when anxious symptoms are observed or reported by children with ASD, it may be due to additional factors other than parenting behaviors, parental anxiety, and the child’s social skills. Additional research would be beneficial to clarify the factors that contribute to the development of anxiety symptoms within this population and to offer and test alternative models. Future clinical practice and research
should also focus on the behavioral and cognitive deficits that exist within children with ASD to develop interventions specific to the needs of this population.
References


Table 1

Correlation Matrix, Means, and Standard Deviations of Variables in the Path Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Parental Anxiety</td>
<td>--</td>
<td>-.29$^\dagger$</td>
<td>.07</td>
<td>-.14</td>
<td>.12</td>
<td>.17</td>
<td>.18</td>
<td>.02</td>
</tr>
<tr>
<td>2. Child’s Social Skills (reported in standardized units)</td>
<td>--</td>
<td>-.18</td>
<td>.25$^\dagger$</td>
<td>-.14</td>
<td>-.07</td>
<td>-.13</td>
<td>-.11</td>
<td></td>
</tr>
<tr>
<td>3. Parental Acceptance</td>
<td>--</td>
<td>-.18</td>
<td>.12</td>
<td>.16</td>
<td>.16</td>
<td>.37$^\dagger$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Parental Control</td>
<td>--</td>
<td>-.36$^\dagger$</td>
<td>-.45$^*$</td>
<td>-.28$^\dagger$</td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Parental Modeling of anxious behaviors</td>
<td>--</td>
<td>.20</td>
<td>.15</td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Perception of Control (reported in z-score)</td>
<td>--</td>
<td>.48$^*$</td>
<td>.41$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perception of Threat</td>
<td>--</td>
<td>.39$^\dagger$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Child Anxiety</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 42.9 72.7 10.7 24.4 25.7 -.02 4.7 13.2

Standard Deviation: 9.6 16.4 6.7 6.0 6.8 1.0 2.5 6.0

*Correlation is significant at the 0.0018 level (Bonferroni correction).
$^\dagger$ Correlation is significant at the 0.05 level
Table 2

Results of Goodness of Fit Indices for Tested Model

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$ (df)</th>
<th>RSMEA (confidence interval)</th>
<th>NFI</th>
<th>CFI</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>38.43* (16)</td>
<td>.152 (.091, .214)</td>
<td>.525</td>
<td>.576</td>
<td>.259</td>
</tr>
</tbody>
</table>

* $p < .05$
Figure 1. Proposed path model from parental anxiety symptomatology and child's social skills to the development of child anxiety symptomatology.
* $p < .05$, ** $p < .001$

Figure 2. Path model with standardized path coefficients from parental anxiety symptomatology and child’s social skills to the development of child anxiety symptomatology.
APPENDIX A

DEMOGRAPHIC INFORMATION

Child’s Name:____________________________________________________

Date of Birth:________________________________  Age:_______________

Gender: _____Male   _____Female

Ethnicity: _____European-American  _____Native American

_____African American  _____Asian American

_____Latin American/Hispanic  _____Other:________________

Parent’s Occupation: Mother ________________________________________

Father_________________________________________

Parent’s Highest Level of Education: Mother____________________________

Father _____________________________

Has your child ever been diagnosed with a psychological disorder?
A) Yes, currently  B) Yes, in the past  C) No
If yes, please give diagnosis and a brief explanation:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Has your child ever been treated for a psychological disorder (received
medication/therapy)?
A) Yes, currently  B) Yes, in the past  C) No
If yes, please provide the names of current medications and/or a brief description of
therapy:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Dear Mental Health Care Professional:

I am a doctoral student in the clinical psychology program at The University of Toledo. I am conducting research for my Doctoral Dissertation pertaining to worry in children diagnosed with high-functioning autism spectrum disorders (including Asperger’s Disorder and High-Functioning Autism). The purpose of this study is to look at different levels of worries, social skills, and parenting behaviors. Parents will be asked to complete a short parent questionnaire that asks for demographic information, a form about their child’s social functioning, and a measure about their own level of worry.

Children will be asked to complete a number of measures about their level of worry, how they view their parents and friends, and social skills.

If any of your clients diagnosed with a high-functioning autism spectrum disorder and between the ages of 8 to 15 would be interested in participating, please have them complete the attached form. I will contact them via telephone or email to give them more information about the study and answer any additional questions. Please feel free to contact me directly with any questions at (419) 530-2740 or sjhildeb@hotmail.com. Additionally, if any potential participants would like to contact me immediately, please have them contact me at the same number. Your help in referring participants for this study is greatly appreciated.

Sincerely,

Sarah Hildebrand, M.A.
Clinical Psychology Graduate Student
The University of Toledo
APPENDIX C

I, __________________________, give permission for Sarah Hildebrand to contact me via telephone or mail regarding potential participation in her dissertation research at The University of Toledo. I realize by signing this form, I am not obligated to participate.

________________________________________
Name

________________________________________
Signature

________________________________________
Address

________________________________________
Telephone (please indicate the best times to call)

________________________________________
E-mail address
APPENDIX D

Date

Dear Parent:

I am a doctoral student in the clinical psychology program at The University of Toledo. I am conducting research for my doctoral dissertation pertaining to worry in children diagnosed with high-functioning autism spectrum disorders (including Asperger’s Disorder and High-Functioning Autism). The purpose of this study is to look at different levels of worries and social skills. If you agree to participate in my study, you will be asked to complete a short parent questionnaire that asks for demographic information, a form about your child’s social skills, and a form about your own level of worry. Your children will be asked to complete a number of measures about their level of worry, how they view their parents and friends, and social skills.

If your child is between ages of 8 to 15 and is interested in participating, please complete the attached consent form. Upon completion of the study, children who participated will be entered into a drawing for a $25 gift certificate to the store of their choice. Please feel free to contact me directly with any questions at (419) 530-2740 or sjhildeb@hotmail.com Thank you in advance for your help!

Sincerely,

Sarah Hildebrand, M.A.
Clinical Psychology Graduate Student
The University of Toledo
APPENDIX E

Parent Consent Form

Title of Experiment: Worry in Children with Social Difficulties

Purpose of the Study
The purpose of this study is to look at what different factors affect children’s level of worry.

Procedures
You will be asked to complete a short survey that asks for information such as your child’s age, gender, and ethnicity. You will also be asked to complete a measure on your own level of worry and your child’s social skills. Your child will be asked to complete a number of measures about his/her level of worry, things that may contribute to his/her worry, and interactions with parents and friends.

Discomforts/Risks from Participating in this Study
The risks associated with this study are minimal. There is a possibility that you or your child may experience some discomfort when answering questions; however, you and your child have the option to discontinue participation at any time. Further, a graduate student trained in clinical psychology will be available throughout the study in case you or your child has any questions.

Expected Benefits
Information from this research may be useful in helping to develop better treatments for children who have problems with worry or for children who have problems in social situations. Your child will also be entered into a drawing for a gift certificate to a local bookstore or toy store. One participant will be selected upon completion of the study to receive the prize.

Freedom to Withdraw
You and your child are free to withdraw from participation in this study at any time, without penalty.

Confidentiality of Results
The results of this study will be kept strictly confidential. The information you provide will have you and your child’s name removed and only an identification number will identify you and your child during analysis and write-up of the research.

Use of Research Data
The information from this research may be used for scientific or educational purposes. It may be presented at scientific meetings and/or published and reproduced in professional journals or books, or used for any other purpose that the University of Toledo’s Department of Psychology considers proper in the interest of education, knowledge, or research.
Approval of Research
This research project has been approved by the Human Subjects Research and Review Committee at the University of Toledo, as is required by all research projects conducted at the University of Toledo.

Parents’ Permission
I have read the above description of the study. I have had an opportunity to ask questions and have had them answered. I hereby acknowledge the above and give my voluntary consent for me and my child to participate in this study.

I further understand that if we participate, we may withdraw at any time without penalty. I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below.

Sarah J. Hildebrand, M.A., Investigator  419-530-2740
Laura Seligman, Ph.D., Licensed Clinical Psychologist  419-530-4399

_________________________________ __________________________________
Parent’s Name (Printed)   Child’s Name (Printed)

_________________________________
Parent’s Signature

_________________________________
Date

ID Number (Office use only)
APPENDIX F

Child Assent Form

Title of Experiment: Worry in Children with Social Difficulties

If you agree, you will be asked to complete some papers on your worries, how you see others around you like your parents and friends, and social skills.

Only people working on this project will know what you say and do. We hope that you will try your best to answer all the questions but you can stop any time you want, and we will understand.

If you want to answer the questions, please sign this form to let us know that you understand what the study is about, you know who to ask if you have any questions, and that you understand that you can stop at any time. If you do not want to participate at all, you do not have to.

“I agree to answer the questions.”

__________________________________________________________________________
Name Date

__________________________________________________________________________
Witness Date
APPENDIX G

Dear Parent,

Thank you for agreeing to participate in my research study. Attached is a packet of questionnaires for you and your child to complete. Please follow the specific directions on each measure. There are no right or wrong answers, so please answer all questions honestly. Additionally, it is important that you and your child complete the questionnaires independently, so please do not assist one another in answering questions.

Please return this form with your completed measures to be entered into a drawing for a $25 gift certificate. One child will be selected for the drawing from all participants. If you have any questions, please contact me at 419-530-2740 or sjhildeb@hotmail.com.

Thank you in advance for your participation!

Sincerely,

Sarah Hildebrand, M.A.
Clinical Psychology Graduate Student
The University of Toledo

Child’s name: ____________________________________________________________

Address gift certificate should be sent to: ______________________________________

_______________________________________

Desired gift certificate (please check one): _____ Toys ‘R’ Us

_____ Target

_____ Barnes & Noble

_____ Other (specify:________________)