

Facilitating Emotion Regulation Strategies for Anger and Anxiety Related Emotions  
in Young Children with High Functioning Autism Spectrum Disorders (HFASD)

by

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A thesis submitted to the faculty of  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for a degree of

MASTER OF SCIENCE

in

Psychology

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May 4<sup>th</sup>, 2009

Blacksburg, Virginia

Keywords: Emotion Regulation, Anger and Anxiety, Children, Autism Spectrum Disorders

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(ABSTRACT)

Previous research showed that children with Autism Spectrum Disorders (ASD) tend to experience high levels of anxiety and anger. Some of the deficits that children with ASD experience are due their difficulty expressing and understanding their own and others' emotions. Thus, the purpose of this pilot study was to assess the feasibility and efficacy of an intervention to teach young children with high functioning autism (HFASD) to recognize their emotions and use emotion regulation strategies to self-soothe. We implemented a group therapy that emphasized children's understanding and knowledge of emotions and coping strategies related to anger and anxiety. Eleven 5-7 year-old children were randomly assigned to either an experimental or delayed-treatment control group. The Emotion Regulation Checklist, Behavior Monitoring Sheet, What Makes My Child Angry/Anxious Questionnaires, and anger- and anxiety-related emotions vignettes were used to measure children's emotion regulation abilities. Finally, maternal confidence of their own and their child's ability to regulate their emotions were measured by the Self-Confidence Rating Scale. Children in the experimental group demonstrated more knowledge of emotion regulation strategies, had fewer negative emotional responses, and showed lower frequency and intensity ratings of anger and anxiety related episodes after treatment. All mothers reported higher levels of confidence in their own and their child's ability to deal with anger and anxiety related emotions after treatment. These findings suggest that

teaching young children with HFASD about emotion regulation strategies to manage anger and anxiety emotional states may increase their knowledge about emotion regulation strategies, and improve their emotion regulation abilities. Training mothers about emotion regulation strategies may increase maternal confidence in their own and their child's ability to deal with emotions related to anger and anxiety. Limitations and implications of this study will be discussed.

### Acknowledgements

I would like to thank many people who were part of this process. First, I would like to thank Angela Scarpa for her assistance, support and encouragement throughout this project. I would also like to thank Martha Ann Bell for her enthusiasm and support, Julie Dunsmore for her advice and guidance, and Thomas Ollendick for his assistance and contribution to this project. It was truly an honor to have them as my committee members. I would also like to thank my family and friends for always being there for me and many people who contributed to the completion of this project. I want to acknowledge my grandmother, Anastasia Sorto de Reyes, for her love and inspiration. At last but not least, the children and their families that kindly participated in this research project.

TABLE OF CONTENTS

Abstract.....ii

Acknowledgements.....iv

Table of Contents.....v

List of Tables .....vi

List of Figures.....viii

Introduction ..... 1

Purpose and Hypotheses.....6

Methods.....7

Results.....18

Discussion.....26

Limitations and Conclusions.....37

References.....41

Tables.....48

Figures.....60

## List of Tables

<u>Table 1</u> Time Points of Data Collection by Group.....	48
<u>Table 2</u> Descriptive Statistics for Screening/Diagnostic Measures and Outcome Variables at Time 1 Intake.....	49
<u>Table 3</u> Mean Differences between Groups on the Screening/Diagnostic and Outcome Variables at Time 1 Intake .....	50
<u>Table 4</u> Mean Differences between Outcome Variables at Pre-Treatment in the Delayed-Treatment Control Group.....	51
<u>Table 5</u> Differences between the Pre-, Post-Treatment and Two-Month Follow-up Outcome Variables in the Experimental Group.....	52
<u>Table 6</u> Mean Differences between the Pre-Two and Post-Treatment Outcome Variables in the Delayed-Treatment Control Group.....	53
<u>Table 7</u> Mean Differences between the Experimental and the Delayed-Treatment Control Groups at Time 2.....	54
<u>Table 8</u> Mean Differences Before and After Treatment for both Groups.....	55
<u>Table 9</u> Correlations of Change Scores between Maternal Confidence in Dealing with Child's Anger and Anxiety Related Emotions and the Behavioral Monitoring Sheet after Treatment.	56

Table 10 Mean differences before and after treatment for responders and non-responders  
Treatment.....57

Table 11 Mean differences between responders and non-responders on the Emotion  
Regulation Checklist.....58

Table 12 Mean differences between responders and non-responders on the Behavioral  
Monitoring Sheet.....59

List of Figures

Figure 1. Average number of episodes per hour for the experimental and the delayed-treatment groups.....60

Figure 2. Average level of intensity per episode for the experimental and the delayed-treatment groups.....61

Figure 3. Average duration in minutes per episode for the experimental and the delayed-treatment groups.....62



## Facilitating Emotion Regulation Strategies for Anger and Anxiety Related Emotions in Young Children with High Functioning Autism Spectrum Disorders (HFASD)

Autism Spectrum Disorders (ASD) were first described by Kanner, an Australian psychiatrist, as “early infantile autism” in 1943 as a disorder characterized by deficits in social interactions, communication and ritualistic behaviors (Gillham, Carter, Volkmar, & Sparrow, 2000). Kanner also described autism as the inability to engage in reciprocal affective interactions with others (Begeer, Koot, Rieffe, Terwogt, & Stegge, 2008).

In 1944, Asperger, an Australian pediatrician, described “autism psychopathy” as a contact or personality disorder with social impairment, and odd stereotypes or rituals. Asperger described his patients as withdraw, eccentric, and often gifted (Frith & Hill, 2003). Currently, ASD include Autistic Disorder (or autism), Asperger Syndrome (Asperger’s Disorder), Pervasive Developmental Disorder- Not Otherwise Specified, Rett’s Disorder, and Childhood Disintegrative Disorder (DSM-IV-TR, 2000). Autistic Disorder is defined as a lifelong pervasive developmental disorder that appears during the first three years of life and interferes with the way children communicate and relate to others (Bogdashina, 2006). Asperger Syndrome is characterized by deficits associated with social and emotional difficulties (Frith, 1991) without developmental delays before the age of three. A recent study, conducted by the Centers for Disease Control and Prevention, reported that 1 in 150 eight year-old children may be currently diagnosed with ASD (CDC, 2008). Autism is considered the second most serious developmental disorder after mental retardation. Ganz (2006) reported that an estimated economic cost of autism is \$35 billion per year in the United States.

The hallmarks of these disorders involve deficits in initiating and maintaining social interactions and relationships with age-appropriate peers. One possible reason for this is that

these children have deficits in understanding their own and others' emotions or have *mindblindness* as described by Baron-Cohen (1995). That is, these deficits might relate to difficulties with Theory of Mind, which is defined as the ability to understand others' behaviors and how those behaviors relate to their mental states (e.g., goals, emotions and beliefs) and intentions (Tager-Flusberg, 2007). These deficits would in turn affect the way children understand, interpret, and deal with their emotions and the emotions of others. More specifically, children with ASD are described as having difficulty identifying and conceptualizing thoughts and feelings of others and themselves (Sofronoff, Attwood, Hinton, & Levin, 2007). In fact, Sofronoff et al. claimed that emotions and social interactions seem to be an unknown territory for people with Asperger Syndrome.

A significant amount of literature exists that addresses children's understanding of emotions and emotional development in typically developing children (Dunsmore & Karn, 2001; Eisenberg & Moore, 1997; Gottman & Katz, 1989; Rydell, Berlin, & Bohlin, 2003). This area of research is also carried out in children with developmental delays (Jahromi, Gulsrud, & Kasari, 2007; Wilson, 1999), and to a limited extent, in children with ASD (Bauminger, 2002; Downs & Smith, 2004; Konstantareas & Stewart, 2006; Shalom, Mostofky, Hazlett, Goldberg, Landa, Faran, McLeod, & Hoehn-Saric, 2006). For instance, Konstantareas and Stewart (2006) found that children with ASD show greater variability in their ability to regulate their emotions and tend to use fewer emotion regulation strategies than typically developing peers. Children with ASD also appear to have difficulties expressing their emotions when compared to their same-age peers (Shalom et al., 2006). Finally, Down and Smith (2004) found that children with ASD show more deficits in emotion recognition

than typically developing peers and children with comorbid disorders, such as Attention-Deficit/Hyperactivity Disorder and Oppositional Defiant Disorder.

Emotion regulation has been defined as the “Process of initiating, maintaining, modulating, or changing the occurrence, intensity, or duration of internal feeling states and emotion-related physiological processes, often in the service of accomplishing one's goals” (Eisenberg & Spinrad, 2004, p. 338).

Emotions related to anger and anxiety have also been investigated in children with ASD (Chalfant, Rapee, & Carroll, 2007; Russell & Sofronoff, 2005; Sofronoff, Attwood, & Hinton, 2005; Sofronoff et al., 2007). According to Sofronoff et al. (2005), children with Asperger Syndrome have higher levels of mood disorders (16.9%), general anxiety (13.6%), and separation anxiety (8.5%) than typically developing children. Similarly, Russell and Sofronoff (2005) found that parents of children with ASD report higher levels of anxiety in their children than parents of children with only a diagnosis of anxiety and typically developing children. Other studies have found that children with ASD have comorbid diagnoses of anxiety disorders ranging from 47 to 84.1 % (Chalfant et al., 2007). Additionally, Tonge, Brereton, Gray, and Einfeld (1999) found that children with Asperger Syndrome tend to exhibit higher levels of psychopathology than children with HFA. Sofronoff et al. (2005) also reported that children with ASD tend to be more aggressive and more demanding of parents. Kasary and Sigman (1997) found that parents of children with ASD described their children as more emotionally and temperamentally difficult than typically developing children. These children also tend to have poorer relations with peers and teachers.

Although few empirically-tested interventions have been developed to improve children's management of their emotions in this population, cognitive behavioral therapy has

been used to address some of these difficulties in children with ASD (Atwood, 2004). One program that has been tested focused on teaching methods to regulate emotions associated with anxiety and anger in 10-14 year-old children with ASD (Sofronoff et al., 2005; Sofronoff et al., 2007). This cognitive behavioral intervention found that children's anger and anxiety related emotions decreased after treatment. Additionally, Chalfant et al. (2007) also found that a family based, cognitive behavioral therapy significantly reduced symptoms associated with anxiety in 8-13 year-old children with ASD. They also found that 73% of the children, who initially met criteria for anxiety, did not meet criteria at post-treatment. Bauminger (2002) also created an intervention in order to facilitate social and emotional understanding in 8 to 17 year-old children with high functioning autism. Bauminger found that the use of cognitive behavioral therapy in highly functioning children with autism significantly improved positive interactions, emotional understanding, and social problem-solving abilities. One shortcoming of the previous research on interventions addressing anger and anxiety related emotions is that it only focused on older children (i.e., children in late childhood and early adolescence). Previous research shows that early intervention appears to be a predictor for a favorable prognosis in the quality of life of children with ASD (Bryson, Rogers, & Fombonne, 2003).

An additional area of research that has received limited attention is parental involvement in the treatment process and the role of parental confidence of their own and children's abilities to regulate their emotions. Havighurst, Harley, and Prior (2004) created a parent-based training program with children exhibiting behavioral problems (non-ASD children). The main goal of this program was to teach parents of 4-5 year-olds to encourage expression of emotions, to positively respond to expression of emotions, and to coach their children in managing their emotions (e.g., sadness, disappointment, jealousy). Havighurst et

al. found after teaching parents how to improve children's emotional competence, parents frequently allowed their children to express their emotions, increased parental emotional coaching in dealing with children's emotional episodes and reduced children's problematic behaviors. In regard to children's emotional competence, this program also improved children's ability to manage their expression of negative emotions. However, this program did not include the probands or teach parents about emotion regulation strategies to help children manage their emotions when facing emotionally demanding events.

Sofronoff et al. (2005) and Sofronoff et al. (2007) found that parental confidence in managing their children's anger and anxiety episodes increased when parents were involved in the treatment process. Moreover, Schreibman and Koegel (2005) stated that parental involvement in the treatment process for children with ASD might be an important element to children's outcome. As a result, Schreibman et al. trained parents to become co-therapists for the children's treatment and found that parental involvement appears to help with generalization of skills across different environments and makes parents feel more self-sufficient. This is in contrast to interventions that only focus on children, which have the drawback that they might not help in influencing parents' behaviors (Hupp & Reitman, 2000). For children to have long-term gains, Hupp et al. concluded that it is important to train their parents to assist in implementing protocols and to become therapists. When parents become interventionists, they can enhance children's language abilities and social engagement, as well as decrease problem behaviors. Emphasis on parents' education has emerged from research that suggests a greater intervention success when parents are involved as part of the treatment process. Therefore, providing psychoeducation for parents is crucial because they are considered the primary intervention providers for their children (Schreibman et al., 2005).

### Present Study

For the present study, the group cognitive behavioral intervention used by Sofronoff et al. (2005) and Sofronoff et al. (2007) to teach strategies for dealing with feelings related to anxiety and anger was adapted to be developmentally appropriate for children with ASD who are between 5 and 7 years of age. More specifically, this intervention focused on skill-building through affective education, stress management, and the understanding self and others' expressions of emotions. During the group therapy proposed under this study, children were taught how to recognize emotions in themselves and others and how to express them. Moreover, a primary objective of the group was to teach skills that the children can use when experiencing these distressing emotions. In particular, the proposed therapy facilitated self-soothing by teaching relaxation, physical, social, and cognitive tools.

In addition to the child-group session, a simultaneous psychoeducational parent group was included in which parents met with another therapist and were able to watch their children's sessions. During this session, therapist presented the content of each session and parents learned about children's anger and anxiety related emotions and emotion regulation strategies taught during their child's session and discussed whether or not these strategies were generalized across settings.

### *Purpose and Hypotheses*

The purpose of this study was to investigate and address the following questions:

- (1) Does teaching about emotions and emotion regulation to young children with HFASD improve their knowledge and ability to regulate emotions?
- (2) Does training mothers on children's emotion regulation increase maternal confidence in their own and their child's ability to manage the child's emotions related to anger and anxiety?

(3) Is change in maternal confidence of their own and their child's abilities to regulate the child's emotional states correlated with the child's emotion regulation ability?

It was hypothesized that children with HFASD can learn cognitive and behavioral strategies and utilize them to identify, express and regulate their emotions. An additional hypothesis was that maternal involvement in the treatment process also has a positive effect on both maternal confidence of her own ability and her child's ability to regulate anger and anxiety related emotions. Whether maternal perception on self-confidence in managing their child's emotions was related to children's emotion regulation was also examined. Thus, it was predicted that change in maternal confidence was correlated with change in their child's emotion regulation abilities after the intervention. This latter hypothesis was investigated at post-treatment via parent's reports on their self-confidence and the number of child's anger/anxiety episodes.

## Methods

### *Participants*

Participants included 11 European American families with children (two girls, nine boys) with a mean age of 5.58 years at intake ( $SD = .73$ ; range 4.5-7 years). This sample had a mean household income of \$89,600 (Median = \$85,000;  $SD = 46,352$ ; range = \$14,400 to \$175,000). However, the number of children included in the analyses did not always add to 11 because two children in the delayed-treatment control group did not have data for the intake time point and due to missing data. Families were recruited through word-of-mouth and advertisements sent to the Virginia Tech Autism Clinic listserv, Fauquier Hospital and the New River Valley Autism Action Group. In order to participate in this study, children were had to have an ASD diagnosis (or meet the ASD criteria on the ADOS, see Measures below). They also had to be 5-7 years-old, in kindergarten or first grade, verbal, and able to

understand and follow verbal instructions. Treatment was conducted at two sites, the Virginia Tech Autism Clinic and Fauquier Hospital. One child in the delayed-treatment control group did not complete the intervention due to a family emergency, but he is included in intent-to-treat analyses. When participants were invited to be part of this study, all parents were invited, but only mothers ultimately participated in this intervention.

### *Design*

This study had two groups, an experimental group (receiving intervention) and a delayed-treatment control group (waited and received the intervention immediately after the experimental group) at each site. After determining eligibility, children were randomly assigned to either the experimental (5 children) or delayed-treatment control group (6 children). The two sites ran groups simultaneously, and each group had 2-3 children. All children received the same intervention.

### *Measures*

#### *Screening and Diagnostic Measures*

The *Autism Diagnostic Observation Schedule* (ADOS; Lord, Rutter, DiLavore, & Risi, 1999; Lord, Risi, Lambrecht, Cook, Leventhal, DiLavore, Pickles, & Rutter, 2000) was administered to all the children to evaluate current social and communicative competence in order to confirm an ASD diagnosis. For this assessment, various activities are presented and social presses are made to elicit children's social and communication behaviors. This measure also provides scores that distinguish between Autism, ASD and non-spectrum categories. Modules 2 and 3 of the ADOS were administered. Module 2 of the ADOS is a semi-structured play-based observation used for children who spontaneously use two-word phrases with communicative intent. Two children were administered Module 2; one in the delayed-



treatment control group and one in the experimental group. The remainder received Module 3, which is also a play based observation, but it requires that a child be able to produce communicative utterances of at least three-word phrases and complex clauses. For both modules, scores on the Social and Communication domains are added to obtain a total score with a cutoff of 7 for ASD and 12 for autism. All children met criteria on this measure, 4 for ASD and 7 for Autistic Disorder.

Additionally, the *Social Responsiveness Scale* (SRS; Constantino, Davis, Todd, Schindler, Gross, Brophy, Metzger, Shoushtari, Splinter, & Reich, 2003; Constantino & Gruber, 2005), a 65 item- parent report scale, was used to examine children's social difficulties that are related to ASD. This scale assesses children's social impairments, awareness of others and social information, ability to engage in reciprocal social communication, social anxiety/avoidance, and other autistic features. The SRS also provides a T-score that suggests the degree of deficits in reciprocal social interaction that interfere in everyday life social situations. This scale has a T-score range of <59 (*normal range*), 60-75 (*mild to moderate range*) and >76 (*severe range*). Thus, high scores on the SRS are associated with clinical diagnosis of Autistic Disorder, Asperger's Disorder and Pervasive Developmental Disorder-NOS. A T-score of 60 or higher has a specificity of 0.96 with clinician diagnosis (Constantino, LaVesser, Zhang, Abbacchi, Gray, & Todd, 2007). For the current sample, the internal consistency for the SRS was Cronbach's alpha = .81 (range .27 to 2.36). Three children's scores were associated with ASD and seven with Autistic Disorder.

During a follow-up wave of assessments (before treatment for the delayed-treatment control group and after treatment for the experimental group), mothers also completed the *Social Communication Questionnaire* (SCQ; Rutter, Bailey, & Lord, 2003; Eaves, Wingert, &

Ho, 2006) and the *Asperger Syndrome Diagnostic Scale* (ASDS; Smith-Myles, Bock, & Simpson, 2001). The SRS, SCQ, and ASDS were administered in order to help characterize our sample in terms of ASD symptomatology.

The Social Communication Questionnaire (SCQ) is a parent questionnaire consisting of 40 yes/no questions that assesses symptom severity of ASD (Rutter, et al., 2006). This measure is a screening tool designed to evaluate communication skills and social functioning in children suspecting of having ASD (Berument, Rutter, Lord, Pickles, & Bailey, 1999). Parents provide information about their children's current (in last three months) and past (between 4 and 5 years of age) development in the social and communication domains. The SCQ showed a sensitivity 0.88 and specificity 0.72 in discriminating between ASD and non-ASD cases and a sensitivity 0.90 and specificity 0.86 between autism and non-autism cases (Chandler, Charman, Baird, Simonoff, Loucas, Meldrum, Scott, & Pickles, 2007). The recommended cut-off for Autism is 15 with a sensitivity value .47 and a specificity value of .89 (Wiggins, Bakeman, & Adamson, 2007). One child in the experimental group and two in the delayed-treatment group did not meet criteria for ASD on this measure.

The Asperger Syndrome Diagnostic Scale (ASDS) is a parent questionnaire designed to assess the likelihood of a child or adolescent of having Asperger Syndrome (Myles et al., 2001). This scale provides the Asperger Syndrome Quotient score of children's performance in comparison to children with Asperger Syndrome between 5 to 18 years of age. This Quotient score ranges from less than 69 = *Very Unlikely*, 70-79 = *Unlikely*, 80-89 = *Possible*, 90-110 = *Likely*, and 110 or higher = *Very Likely*. The ASDS has a reliability of .83, but the subscales are less reliable when considered individually. Children in this sample were qualified as *possible to very likely* of having Asperger Syndrome.

### *Outcome Measures*

*Children's emotion regulation* was defined as children's report of the quality and quantity of emotion regulation strategies when dealing with anger and anxiety related emotions, as well as maternal report on emotion regulation, level of anxiety/anger and anxiety/anger episodes.

#### *(1) Children's emotional regulation knowledge and skills (Child Report)*

Two vignettes (*Ben and the Bullies* and *James and the Reading Group*) were developed as a measure of knowledge of emotion regulation skills, specifically in terms of knowledge of strategies that can be used to cope with anger or anxiety related emotions. In the *Ben and the Bullies* vignette, a scenario related to anger emotional state, children were asked to generate a list of strategies that could help *Ben* deal with the bullies at his school in a way that he would not get in trouble:

Ben is in Mrs. Smith's class. Ben has many friends in his class and he often plays with them during recess. There are three boys in his grade who always bother him during recess. They like to find people to tease and get people in trouble. They are not Ben's friends. Sometimes they can be really mean and they hit Ben and call him names. Ben gets mad when they bother him and he hits them back.

It is recess now, and Ben is playing with his friends. He brought his favorite toy from his house, a transformer. The three boys, who always bother him, came over and grabbed his transformer toy. They would not give him back his favorite toy. If he hits them he won't be able to play at recess. What could Ben do so that he stays calm and does not get mad with them?

Similarly, in *James and the Reading Group* vignette, a scenario related to anxiety emotional state, children were asked to generate strategies that could help *James* deal with his anxiety about reading in front of his class.

James' teacher is Mrs. Smith. She is a nice teacher. He really likes being in her class. She keeps the kids quiet and doesn't allow the kids to make fun of each other. James has trouble reading out loud and she helps him when he messes up or doesn't know a word.

On Tuesday, James has reading group and he has to read in front of the whole group. He is scared that he won't do well and the other children will make fun of him. When Tuesday comes, James goes to school and finds that his teacher, Mrs. Smith, is sick and will not be in class that day but he is still going to have to read in front of his group. James gets very nervous because he thinks the other kids will make noise and Mrs. Smith is not there to help. James is worried that he might mess up and the kids will make fun of him. What can James do so that he doesn't feel so scared?

Two raters independently scored these vignettes and consensus was reached with any rating disagreements. A total score for *quantity* was obtained by adding ratings, with 0 = No strategy/inappropriate strategy/irrelevant strategy (e.g., I will grab the toy from them), and 1 = One strategy provided (i.e., general or specific). After coding whether children had reported a strategy, the quality of those strategies was coded. Thus, an overall score for the *quality* of strategies was obtained by adding ratings, with a rating of 1 (*Acceptable*) for a specific strategy (e.g., "I will tell the teacher"), a rating of 2 (*Good/Fairly*) for a main goal of a group of tactics (e.g., "I will ask for help") or two specific strategies, and a rating of 3 (*Very Good*) for three or more main goal or specific strategies (e.g., "I will use my tools, I will take a deep breath, I will relax."). Two combined scores were calculated by adding the quantity of anger and anxiety related strategies and the quality of those strategies across vignettes. The mean for the quantity of strategies was .70 ( $SD = .82$ , range = 0 to 2) and for quality was .80 ( $SD = 1.03$ , range = 0 to 3) at intake.

## (2) Children's emotion regulation (Parent report)

Children's emotion regulation abilities were measured via parent report using (a) the *Emotion Regulation Checklist*, (b) the *Behavior Monitoring Sheet*, and (c) the *What Makes My Child Angry/Anxious Questionnaires*.

(a) The *Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1997; Shields & Cicchetti, 2001) asks caregivers to provide information about a variety of emotional states that

children might display on a general basis, such as outbursts, anxiety, sadness, anger, and hostility. Caregivers rate, in a likert-scale, whether or not these emotional states occur in their children where 1 = *Never*, 2 = *Sometimes*, 3 = *Often*, and 4 = *Always*. This ERC is composed of the Emotion Regulation and the Negativity/Lability subscales. The Emotion Regulation subscale contains 8 items that measures the child's ability to regulate emotional reactivity in different situations (e.g., "Displays appropriate negative affect in response to hostile, aggressive or intrusive play," "Is a cheerful child."). The Negativity/Lability subscale contains 15 items that indicates the child's propensity to become distressed (e.g., "Exhibits wide mood swings," "Is easily frustrated."). A total score for each subscale is obtained by adding items that indicate increased regulation or negativity and reverse scoring items that indicate decreased regulation or negativity, such that high scores on the Regulation subscale reflect more regulation and high scores on the Negativity/Lability indicates more distress/less regulation. Shields and Cicchetti (1997) established validity of this measure using correlations with observers' ratings of children's regulatory abilities and the proportion of expressed positive and negative affect. For the current study, the internal consistency for the Emotion Regulation subscale was Cronbach's alpha = .10 (range = 2.20 to 8.70) and for the Negativity/Lability was Cronbach's alpha = .70 (range = 1.50 to 3.50) at intake.

(b) The *Behavior Monitoring Sheet* (BMS) is a data sheet that was designed to obtain information about the frequency, duration and intensity of reactions to stressful events related to anger and anxiety related emotions. Mothers were asked to observe their child for seven consecutive days and tally the number of outbursts the child displays. For each outburst, *frequency* of episodes per hour and *duration* in minutes and *intensity* per episode from 1 (*not intense*) to 10 (*extremely intense*) were also recorded.

(c) *What Makes My Child Angry/Anxious-Parent Questionnaires* contain 26 statements about anger and 31 statements about anxiety, respectively. These questionnaires ask caregivers whether their child would experience anger (e.g., My child gets angry “when people call my child names”), or anxiety (e.g., My child gets anxious “about what other kids think of him/her”) in those situations. The number of statements endorsed was added to obtain a total score for anger and anxiety. Caregivers were also asked to rate the *frequency* of the anger and anxiety related items on a likert-scale from 1 = *Hardly Ever*, 2 = *Sometimes*, 3 = *Often*, and 4 = *Very Often*, as well as the *intensity* of the anger/anxiety during those situations using a likert-scale of 1 to 10 where 1 = *Just a Little Angry/Anxious*, 5 = *Moderately Angry/Anxious*, and 10 = *Very Angry/Anxious*. Average scores for the frequency and intensity were calculated by adding the ratings and dividing them by the total number of items endorsed in both anger and anxiety questionnaires.

### (3) *Self-Confidence Rating Scale (Parent report)*

*Maternal confidence* was defined as maternal rating of self-confidence; similarly, *children’s confidence* was defined as maternal confidence in their children’s ability to manage anger and anxiety related emotions as measured by the *Self-Confidence Rating Scale*. This scale was created to assess parental self-confidence and parental confidence in their children’s abilities by asking two questions in which mothers rated the extent to which they felt their children were able to handle their emotions related to anger or anxiety. This scale assessed maternal confidence (“On a scale from 1 to 10, please rate how confident you feel in managing your child’s anger/anxiety?”), and maternal confidence in her child’s abilities (“On a scale from 1 to 10, please rate how confident you perceive your child is able to manage his/her own anger/anxiety.”).

A *Therapist Fidelity to Treatment checklist* was created to assess therapists' adherence to treatment for the child group sessions. All sessions, in both experimental groups and the delayed-treatment control group at Fauquier Hospital, were coded independently by two coders, who were familiar with the protocol and the purpose of this intervention. For the experimental groups at Virginia Tech and Fauquier Hospital, the inter-rater reliability was found to be  $Kappa = .51$  ( $p = .11$ ), 95% CI (.02, 1.04), and  $Kappa = .85$  ( $p = .07$ ), 95% CI (.72, .98), respectively; and for the delayed-treatment control group was  $Kappa = .73$  ( $p = .06$ ), CI (.56, .90). In regards to the sessions' criteria, fourteen components in each session were rated as completed or not completed. The average number of components completed in the experimental groups was 13.65 (Virginia Tech) and 13.68 (Fauquier Hospital), and in the delayed-treatment control group was 13.75. The degree of competence for each component was also rated from 1 (*not well*) to 5 (*very well*). The experimental groups had a mean degree of competence of 4.78 (Virginia Tech) and 4.80 (Fauquier Hospital), and the delayed-treatment control group had a mean of 4.80.

### *Procedures*

During the intake session, mothers and children met with the experimenters and were informed about the study's main objectives and procedures. Mothers signed the study consent form, which was approved by the Virginia Tech Institutional Review Board. During this session, children were administered the Autism Diagnostic Observation Schedule (ADOS; diagnostic assessment), as well as pre-treatment children- outcome measures while mothers completed screening and outcome measures.

Children were randomly assigned to either the experimental or delayed-treatment control group. The experimental group began the intervention immediately after the intake session. The delayed-treatment control group completed outcome measures two times before

their own intervention started (at intake/pre-one and immediately before the intervention/pre-two). At the end of the 9 sessions, mothers and children in both groups were asked again to complete post-treatment outcome measures immediately after treatment (see Table 1). Post-treatment outcome measures were also collected two months after the intervention ended, but one mother in the experimental group did not return the outcome measures and only one mother in the delayed-treatment control group returned them. Thus, the treatment group completed the outcome measures at pre (Time 1, intake), post-intervention (Time 2), and two-month follow-up (Time 3), whereas the delayed-treatment control group completed those measures at pre-one (Time 1, intake), pre-two (Time 2, approximately two months after intake), and post-intervention (Time 3).

### *Intervention*

**Child Group Sessions:** Children attended one-hour group meetings for 9 consecutive weeks. Three trained graduate students from the Clinical Program in the Psychology Department at Virginia Tech and two trained staff members from Fauquier Hospital served as therapists. All therapists were trained and supervised by a licensed clinical psychologist. The intervention's treatment manual was followed and sessions were reviewed for treatment adherence. Sessions were structured in such a way as to have a *Welcome Time, Singing, Story Time, Activity/Lesson Time, Snack, and Goodbyes*, all revolving around a particular topic for that session. The topics for the 9 sessions were:

- Session 1: *Understanding Positive Emotions of Happiness.*
- Session 2: *Understanding Positive Emotions of Relaxation and Negative Emotions of Anger and Anxiety.*
- Session 3: *Introduction of the Emotional Toolbox: Teaching Physical and Relaxation Tools.*
- Session 4: *Emotional Toolbox Continued: Teaching Social Tools.*
- Session 5: *Emotional Toolbox Continued: Teaching Thinking Tools.*
- Session 6: *Emotional Toolbox Continued: Teaching Special Interest Tools.*
- Session 7: *Emotional Toolbox Continued: Identifying Appropriate and Inappropriate Tools.*
- Session 8: *Review Session: Create a production (similar to a commercial) to highlight Tools to Remember.*



Session 9: *Wrap-up: Farewell.*

Parent Group Meetings: Nine-psychoeducational-parent group sessions occurred simultaneously with the children's sessions. Mothers met with another therapist to review and discuss session material and discuss/troubleshoot how strategies were being implemented at home or outside of the clinic setting. They also were able to watch the children's sessions on a monitor to observe how lessons were being taught. Mothers were provided a handout outlining the session for every meeting and were given homework assignments to practice skills with their child during the week.

## Analyses

### *Descriptive Statistics and Intercorrelations*

First, descriptive statistics were calculated for all the screening and diagnostic measures and outcome measures. Intercorrelations among all the major variables at intake were also examined to help characterize the data.

### *Pre-treatment Differences*

Second, both screening and diagnostic measures and pre-treatment outcome measures at Time 1 were compared in the experimental and delayed-treatment control groups using an independent *t*-test to investigate if there were any initial group differences. Also, paired *t*-tests were conducted to examine changes at pre-one and pre-two treatment in the delayed-treatment control group in order to assess changes in the time period from intake until the start of their intervention.

### *One Tail t-Test: Comparing Means on Outcome Measures*

Third, one-tailed paired *t*-tests were computed to examine mean differences between pre- and post-treatment and two-month follow-up outcome measures in the experimental group and pre-two and post-treatment in the delayed-treatment control group. Additionally,

one-tailed independent *t*-tests were used to examine mean differences in the outcome measures between the experimental group after treatment and the delayed-treatment control group before their own treatment (i.e., at Time 2). A pair *t*-test was used to examine differences before and after treatment in the whole sample. Also, children's emotion regulation was visually inspected to examine children's mean score differences at pre- and post-treatment.

### *Correlational Analysis*

Pearson correlations were computed to investigate associations between the change of scores of maternal confidence in their abilities to deal with their children emotions related to anger and anxiety and the change of scores of children's anger and anxiety related episodes in term of frequency, duration and intensity.

### *Additional Analysis: Responders vs. Non-Responders*

Independent *t*-tests were conducted in order to investigate differences between responders' and non-responders' scores on the ERC and the BMS. Thus, responders and non-responders were compared on symptom severity, as well as child's and family characteristics.

## Results

### *Descriptive Statistics and Initial Differences*

Descriptive statistics are presented in Table 2 for all the screening and diagnostic measures and outcome variables at intake. Independent *t*-tests on the screening and diagnostic measures did not show significant group differences in symptomatology in the SCQ, SRS, ASDS, or the ADOS (see Table 3). Additionally, neither group showed significant initial differences on the ERC or the What Makes my Child Angry/Anxious Questionnaires. However, initial differences were found between groups, such that the delayed-treatment

control group had lower scores in the frequency of episodes on the BMS, the quantity and quality of scores on the vignettes, and maternal confidence of their own and child's ability to deal with anger related emotions as measured by the Self-Confidence Rating Scale.

Mean differences at pre-one and pre-two-treatment in the delayed-treatment control group were also examined with paired *t*-tests (see Table 4). On the Negativity/Lability subscale of the ERC, children scored significantly higher at pre-one than at pre-two treatment. Also, on the BMS, the average duration per episode was significantly higher at pre-one than at pre-two treatment. In the Ben and the Bullies *and* James and Reading Group vignettes, children obtained lower combined scores on quantity of strategies at pre-one than at pre-two treatment. Similarly, children obtained higher combined scores on quality of strategies at pre-two than at pre-one treatment. Thus, in the delayed-treatment control group, the children's negative responses to demanding events and duration of emotional outbursts decreased, and their quantity and quality of reported strategies to the vignettes also increased before they entered treatment. All treatment effects will need to be considered in light of these initial differences.

*Paired t-tests: Comparing the Experimental and Delayed-treatment Control Group before and after the Intervention*

Results of the paired *t*-tests are presented in Tables 5 and 6 for the experimental and delayed-treatment control groups, respectively. On the ERC, paired *t*-tests indicated that children in the experimental group scored significantly higher on the Emotion Regulation subscale at post- than at pre-treatment. Children in the experimental group also tended to have lower scores on the Negativity/Lability subscale at post- than at pre-treatment. Thus, children's emotion regulation significantly improved and negativity responses to emotionally

demanding situations tended to decline after they completed treatment. Additionally, scores on the Negativity/Lability subscale differed significantly, such that the children scored lower at follow-up than at pre-treatment, but scores on the Emotion Regulation subscale did not differ from pre-treatment to two-month follow-up. That is, children in the experimental condition continued to display fewer negative responses to emotionally demanding situations two months after treatment. In the delayed-treatment control group, paired *t*-tests indicated no significant between pre-two and post-treatment for the Emotion Regulation or the Negativity/Lability subscales of the ERC.

On the BMS results of the paired *t*-tests for the experimental group indicated that mothers reported significantly lower average number of episodes per hour at post- than at pre-treatment. Thus, on average children exhibited fewer episodes per hour after treatment. However, no differences were found between pre- and post-treatment for the average intensity or duration of episodes. Overall, mothers also reported lower average number of episodes per hour at two-month follow-up than at pre-treatment. They also reported lower average intensity per episode at two-month follow-up than at pre-treatment, but no differences were found on the average duration per episode. Similarly, the BMS was examined in the delayed-treatment control group before and after their treatment, but no significant differences were found.

In the What Makes my Child Angry Questionnaire, paired *t*-tests indicated that in the experimental group, mothers did not report differences on the average intensity rating per item between pre-treatment and two-month follow-up, but they reported a trend toward a lower average intensity rating per item at two-month follow-up than at pre-treatment. That is, children showed a tendency to exhibit less intense anger on the items rated two months after they completed the intervention. Mean differences were also investigated at pre-two and post-

treatment in the delayed-treatment control group. Mothers also reported a trend toward lower average intensity rating per item at post- than at pre-two treatment. No other significant differences were found on this questionnaire.

Mean differences in the What Makes my Child Anxious Questionnaire were examined at pre- and post-treatment and two-month follow-up in the experimental group. Mothers did not report significant differences on the total number of items endorsed or the average frequency per item, but they reported a trend toward a lower average intensity rating at two-month follow-up than at pre-treatment. No other differences were observed on this questionnaire. Similarly, mean differences were examined at pre-two and post-treatment in the delayed-treatment control group. Mothers did not report significant differences on the total number of items endorsed or the average frequency per item in this group, but they reported a trend toward a lower average number of items endorsed at post- than at pre-two treatment.

Ben and the Bullies (anger scenario) and James and the Reading Group (anxiety scenario) vignettes were also examined. Mean differences for the quantity and quality combined scores were examined in the experimental group between pre- and post-treatment and two-month follow-up. Children in this group obtained higher combined scores on the quantity of strategies at post- than at pre-treatment. Similarly, they obtained higher combined scores on the quality of strategies at post- than at pre-treatment. Thus, children showed an increased knowledge of strategies and an improvement in the quality of those strategies after they completed the intervention. Although children did not show significant differences on the combined scores for the quality or quantity between pre-treatment and two-month follow-up, they reported a trend toward a higher combined scores on the quality of strategies at two-month follow-up than at pre-treatment. In the delayed-treatment control group, the quantity

and quality combined scores were also examined at pre-two and post-treatment. On average, children reported a trend toward a higher quality combined score at post- than at pre-two treatment. No other significant differences were observed in this group.

The Self-Confidence Rating Scale was used to investigate maternal confidence in their ability to manage child's anger and anxiety related emotions at pre- and post-treatment and two-month follow-up in the experimental group. Mothers reported higher levels of self-confidence in managing their child's anger related emotions at post- than at pre-treatment; and at two-month follow-up than at pre-treatment. Moreover, mothers reported higher levels of confidence in their ability to manage their child's anxiety related emotions at post- than at pre-treatment; and at two-month follow-up than at pre-treatment. Thus, mothers reported higher confidence in their ability to manage their child's emotional states related to anger and anxiety after they and their child completed the intervention. In the delayed-treatment control group, mothers also reported significantly higher levels of confidence in their ability to deal with their child's anger and anxiety related emotions at post- than at pre-two treatment.

Mean differences for maternal confidence of their child's ability were also examined in both groups. In the experimental group, maternal confidence of their child's ability to deal with anger related emotions was significantly higher at post- than at pre-post treatment. On average, mothers also reported higher levels of confidence in their child's ability to deal with anxiety related emotion at post- than at pre-treatment; and at two-month follow-up than at pre-treatment. Nonetheless, on average, mothers did not report significantly higher levels of confidence on their child's ability to deal with anger related emotions at two-month follow-up than at pre-treatment, but they tended to report a pattern consistent with our predictions. Additionally, mothers in the delayed-treatment control group reported higher levels of

confidence in their child's ability to deal with anxiety related emotions at post- than at pre-two treatment. Although mothers did not report significant differences between their child's ability to manage their anger at post- and pre-two treatment, they again tended to report a pattern consistent with our hypothesis.

*Independent t-tests: Comparing the Experimental and Delayed-treatment Group at Time 2*

The experimental and the delayed-treatment control groups were compared at Time 2 (i.e., after treatment of the experimental group, but before the control group received any treatment) using one-tailed significance tests. These results of the independent *t*-tests are presented in Table 7.

Group differences emerged either significantly or as trends for the BMS, anger and anxiety related vignettes, and maternal level of confidence. No other significant findings or trends were noted. More specifically, regarding the combined scores of the quantity and quality of strategies across the Ben and the Bullies (anger scenario) and James and the Reading Group (anxiety scenario) vignettes, children in the experimental group showed a higher combined score on the quantity of strategies than the delayed-treatment control group. Similarly, children in the experimental group showed a higher combined score on the quality of strategies than the delayed-treatment control group. Thus, after treatment, the experimental group demonstrated more knowledge of emotion regulation strategies and better quality of those strategies than the delayed-treatment control group.

On the BMS, mothers reported a significantly a higher average intensity rating per episode in the experimental group than the delayed-treatment control group, which was opposite from predicted and therefore could not be interpreted in one-tailed *t*-test. Despite

this, a trend emerged showing a shorter average duration in minutes per episode in the experimental group than the delayed-treatment control group.

Moreover, mothers in the experimental group reported higher levels of confidence in their ability to manage their child's anger and anxiety related emotions than the delayed-treatment control group. Similarly, mothers in this group reported higher levels of confidence in their child's ability to deal with anger and anxiety emotional states than in the delayed-treatment control group.

*Paired t-tests: Comparing the Whole Sample before and after the Intervention*

Both the experimental and delayed-treatment control groups were combined and outcome measures were compared before and after treatment using one-tailed paired *t*-test. These results are presented in Table 8.

No significant differences were found before and after treatment on the Emotion Regulation subscale of the ERC, but children tended to score higher after treatment on this subscale. However, significant differences emerged on the Negativity/Lability subscale, such that children scored lower after treatment, indicating higher levels of emotion regulation abilities. Similarly, on the BMS, children scored significantly lower in the frequency of episodes per hour and tended to score lower in the duration in minutes per episode after treatment. Additionally, children also tended to obtain fewer total number of items and lower intensity per episode on the What Makes my Child Anxious questionnaire, but no differences were found on the What Makes my Child Angry questionnaire. Children also scored significantly higher on the quantity and quality of combined scores of the anger and anxiety vignettes after treatment. Regarding, the Self-Confidence Scale, mothers reported higher



levels of confidence in their own and their children's abilities to deal with anger and anxiety related emotions after treatment.

#### *Individual Differences*

Children's individual mean scores obtained from the BMS were also examined visually in both groups. Figures 1, 2 and 3 for the experimental group and figures 4, 5 and 6 for the delayed-treatment control group show children's mean scores for the average number of episodes per hour, and the average level of intensity and duration in minutes per episode. While some children appeared to improve, others did not seem to change, and yet others appeared to experience higher average number of episodes per hour, and higher average levels of intensity and duration per episodes after treatment.

#### *Correlational Analysis: Maternal Confidence and Children's Emotion Regulation*

The correlations between the difference score for maternal confidence and the difference score for frequency, intensity, and duration of episodes as measured by the BMS were investigated before and after treatment (see Table 9). Contrary to our predictions, change score for maternal confidence in their ability to deal with their child's anger related emotions tended to be positively correlated with the change score for the average frequency of episode per hour. Although no significant correlations were observed, the change score for maternal confidence in their ability to manage their children's anxiety emotional states tended to show a negative correlation with the change score for the average intensity and duration per episode after treatment.

#### *Additional Analysis: Responders vs. Non-Responders*

Paired  $t$ -tests were used to examine differences before and after treatment in responders and non-responders (see Table 10). Children whose scores increased on the

Emotion Regulation subscale and children whose scores decreased on the Negativity/Lability subscale were considered to be responders of the treatment. On table 11, analyses from independent *t*-tests showed that responders on the Emotion Regulation subscale did not differentiate significantly from non-responders on the ADOS' total scores; however, responders scored significantly higher on the SRS and ASDS (indicating higher symptom severity). Regarding family characteristics, on average, responders had lower family income and mothers with lower levels of education and than non-responders. Moreover, on the Negativity/Lability subscale, responders' chronological age was significantly lower than non-responders. No other differences were observed on this scale. In regards to the intensity per episode on the BMS (see Table 12), responders scored significantly lower on the SCQ, and, on the duration per episode, they tended to score significantly higher on the SRS than non-responders. Additionally, on the frequency per episode, responders had a lower family income than non-responders. No other differences were found on the BMS.

### Discussion

While it has been emphasized that children with ASD receive early intervention, few studies have investigated the efficacy of interventions targeting emotions and emotion regulation in children with HFASD. The principal objective in this study was to investigate the effectiveness of a cognitive behavioral intervention teaching about emotional states and emotion regulation strategies to young children with HFASD. Thus, we examined the effectiveness of a child group and parent training intervention designed to teach about anger and anxiety related emotions and strategies to deal with those emotional states. This study investigated the following hypotheses: (1) Teaching about emotions and emotion regulation to young children with HFASD improves their knowledge and ability to regulate emotions; (2)

Training mothers on children's emotion regulation increases maternal confidence in their own and their child's ability to manage the child's emotions related to anger and anxiety; (3)

Change in maternal confidence of their own and their child's abilities to regulate the child's emotional states is correlated with the child's emotion regulation ability.

### *Knowledge of Emotions and Emotion Regulation Abilities*

It was predicted that teaching young children with HFASD about emotional states and strategies to regulate anger and anxiety related emotions would increase their knowledge of emotions and their ability to regulate their own emotions. This hypothesis was partially supported. In the anger and anxiety vignettes, children in the experimental group showed an improvement in the quantity and quality of combined scores after treatment. These results support previous findings that children with ASD can improve their knowledge of emotions when training is provided (Bauminger, 2002). Although children in this group did not maintain those gains at the two-month follow-up, they did show a trend toward higher quality combined scores at two-month follow-up. Similarly, children in the delayed-treatment control group did not show significant differences after treatment, but they tended to show an improvement in the quality combined scores after they completed treatment. Moreover, when compared to children in the delayed-treatment control group, children in the experimental group demonstrated higher combined scores in the quantity and quality of strategies at time 2. Additionally, when both groups were combined, children demonstrated more knowledge and better quality of emotion regulation strategies after treatment.

These results are similar to those obtained by Sofronoff et al. (2005) and Sofronoff et al. (2007). They found that children's knowledge of effective strategies was significantly different between the experimental and delayed-treatment control groups after treatment in

anger and anxiety related emotions. However, our findings should be interpreted with caution because groups tended to be different in the combined quantity and quality of strategies at intake. That is, children in the experimental group tended to have higher quantity and quality scores than the delayed-treatment control group. It is possible that the groups differed after treatment because of those initial differences, but considering that the experimental group also showed improvement after treatment, this does not seem likely.

Support for changes in emotion regulation was shown from findings indicating that the experimental group had significantly higher ability to regulate their emotions after treatment on the Emotion Regulation subscale of the ERC, but these gains were not maintained at two-month follow-up. Also, children in this group showed a tendency toward lower levels of negative responses after treatment as measured by the Negativity/Lability subscale and continued to show significant differences at the two-month follow-up. It is possible that skills related to Emotion Regulation are more difficult to maintain and would require a more specific maintenance procedure than provided in the current treatment. It is also possible that mothers paid more attention to children's ability to inhibit negative responses and ignored the subtleties of responding positively to emotionally demanding events. Nonetheless, children in the delayed-treatment control group did not show any significant differences in either the Emotion Regulation or Negativity/Lability subscales after they completed treatment, and so responses using this measure were somewhat inconsistent. This inconsistency was also noted in findings that children in the experimental group after treatment did not significantly differ from the delayed treatment control group on either ERC subscale. Konstantareas and Stewart (2006) examined temperament in children with ASD, and they suggested that questions in Surgency/Extraversion and Negative Affectivity dimensions of the Child Behavior

Questionnaire might “interact in complex and as yet unspecified ways with ASD symptoms.” Thus, it is possible that the inconsistencies observed on the ERC are due to distinctive deficits associated with emotional and social reciprocity in children with ASD. For example, a question on the ERC asks parents to indicate whether their child “responds positively to neutral or friendly overtures by peers,” and this question might not tap into the child’s emotion regulation abilities if the child generally does not respond to other children’s social overtures. Nonetheless, when both groups were combined, children showed significantly lower levels of negative responses to emotionally demanding events and tended to increase emotion regulation abilities after treatment.

It should be noted that children in the delayed-treatment control group showed significant improvement on the Negativity/Lability subscale *before* initiating the intervention. Thus, it could be that, overall, children tended to improve in their ability to inhibit negative responses to demanding events regardless of whether they received the intervention. However, children in the delayed-treatment control group did not show any improvements on the Emotion Regulation subscale before receiving treatment, but the experimental group still showed improvement in this domain. It is also possible that mothers in the delayed-treatment control group might have become more aware of the children’s emotions and might have tried to coach them and thus, they became better at inhibiting negative responses. Additionally, Konstantareas and Stewart (2006) reported that children with ASD showed higher levels of variability in their ability to regulate their emotions and because we had a small sample this variability might not have been captured in this study. Previous studies (e.g., Sofronoff, 2005), on emotion regulation abilities, have not reported improvements in the delayed-treatment control group while children waited for the intervention; thus, it is possible that because of our

small sample, children in the group were more likely to improve due to unknown initial differences.

On the BMS, children in the experimental group showed significant differences after treatment in the frequency of anger and anxiety episodes. Thus, children showed a lower number of episodes per hour after they completed treatment. However, children in this group did not show significant declines in the duration or intensity of episodes. Similarly, children in the delayed-treatment control group did not show any significant differences in the BMS scores after treatment. These findings indicated that only the experimental group showed some improvement in frequency of meltdowns. It was also expected that children in the experimental group would experience a lower frequency of episodes and shorter duration, and intensity per episode after treatment when compared to the delayed-treatment control group. The results indicated that children in the experimental group only tended to experience shorter duration of episodes; however, after combining both groups, children showed significantly lower number of episodes per hour and tended to experience shorter duration of episodes after treatment.

Some of these results are different from those reported by Sofronoff et al. (2007). They found that parental report on the number of episodes was significantly different between the experimental group and delayed-treatment control group. Nonetheless, children in Sofronoff's et al. study were considerably older than this sample (ages ranging from 10 to 14 years old) and younger children might be less likely to control or make changes in their environment when facing emotionally demanding events. However, our findings should be interpreted with caution because children significantly differed at intake in the frequency of episodes. That is, parents in the experimental group reported higher average number of

episodes than parents in the delayed-treatment control group. Also, this study did not examine level of stress that the family might have experienced while receiving this intervention. It might be that children showed little improvement because they experienced more stressful events during their participation in this study. In spite of this, it is important to note that duration of emotional outbursts tended to be lower in the experimental group relative to the delayed-treatment control group after treatment, despite the similar levels of frequency, and, on average, children improved in the number of episodes per hour after treatment.

In the What Makes my Child Angry/Anxious questionnaires, mothers reported information regarding the quantity, intensity and frequency of anger/anxiety related situations that might make a child angry/anxious. It was predicted that mothers in the experimental and delayed-treatment control group would report lower total number of items endorsed, and lower overall intensity and frequency per episode after treatment. The experimental group did not show significant differences immediately after treatment, but they did tend to show a lower average intensity rating in both anger and anxiety related emotions at two-month follow-up. Similarly, children in the delayed-treatment control group tended to show a lower average intensity rating per item endorsed on the What Makes my Child Angry Questionnaire and a lower total number of items endorsed on the What Makes my Child Anxious Questionnaire. Except for the anxiety rating in the delayed-treatment control group, it appeared that children's intensity tended to improve after treatment for anger and anxiety related emotions in both groups (albeit only at two-month follow-up for the experimental group). Thus, although frequency per episode did not change, the children tended to improve after treatment in their ability to soothe and calm themselves when experiencing anger and anxiety related emotions. It was expected that children in the experimental group would also

report lower total number of items endorsed, and lower overall intensity rating and frequency per episode after treatment when compared to the delayed-treatment control group; however, no significant differences were found between groups. Differently, when groups were combined, children tended to show lower number of situations in which they became anxious and lower intensity of those anxiety provoking experiences after treatment. The inconsistency in findings for this measure may reflect that fact that we created the measure for use in this study. As such, the scales were not psychometrically tested or normed in any way, and perhaps they did not accurately and reliably capture children's emotional states related to anger or anxiety.

In sum, this intervention appeared to improve children's knowledge regarding emotion regulation strategies dealing with anger and anxiety emotional states. Children also showed some immediate improvement in their abilities to soothe themselves when experiencing emotions related to anger and anxiety after they completed this intervention, with some limited improvement at two-month follow-up.

### *Maternal Confidence*

It was expected that maternal confidence of their own and their child's ability to manage their child's emotional states would be higher at post-treatment for both groups. This hypothesis was supported. Mothers reported higher levels of confidence in their own ability to deal with children's anger and anxiety related emotions in the experimental group, as well as the delayed-treatment control group after treatment. Mothers also reported higher levels of confidence in their child's ability to deal with anxiety related emotions, but they only tended to report higher levels of confidence in their child's ability to deal with anger related emotions in both groups. Additionally, mothers' level of confidence in their own abilities was



significantly higher after treatment when both groups were combined. These findings supported previous research that suggests that parental involvement in the treatment process gives rise to positive self-parental views (Schreibman et al., 2005; Sofronoff et al., 2006). Additionally, some of those gains were maintained at two-month follow-up in the experimental group. In particular, mothers reported higher levels of confidence in their ability to help their child with anxiety related emotions, but they only tended to report higher levels of confidence in their child's ability to deal with anger at two-month follow-up.

Moreover, it was predicted that maternal confidence of their own and their child's ability to manage their child's emotional states would be higher in the experimental group when compared to the delayed-treatment control group. This hypothesis was also supported. Mothers in the experimental group reported higher levels of confidence in their own and their child's ability to deal with anger and anxiety related emotions than mothers in the delayed-treatment control group. However, our findings should be interpreted with caution because mothers in the experimental group tended to report higher levels of confidence in their own and their child's ability to deal with anger at intake. It is possible that mothers' level of confidence was different between groups because of these initial tendencies. Nonetheless, mothers' level of confidence in their children's abilities was significantly higher after treatment when both groups were combined. These results indicated that, on average, mothers in the both groups showed improvement in their level of confidence after treatment. This suggests that initial differences can not be the sole explanation for the findings.

#### *Maternal Confidence and Children's Emotion Regulation*

Finally, the association between maternal perception of their own ability to deal with their child's emotional states related to anger and anxiety and their child's emotion regulation

abilities was examined. It was anticipated that maternal confidence in their ability would be negatively correlated with the frequency, intensity and duration of anger and anxiety episodes observed by mothers on the BMS after treatment. This hypothesis was not supported.

However, mothers tended to report a negative correlation between maternal confidence in their ability to deal with children's anxiety related emotions and their children's intensity and duration in minutes per episodes. It appeared that mothers' confidence may be influencing children's emotion regulation abilities. However, because of the non-significant result and the correlational nature of this analysis, causality cannot be established. It is possible that mothers who perceived some improvement in their child's ability felt more confidence in their own ability or because they first felt more confidence, they actively coached and guided their child to use the emotion regulation strategies taught during this intervention. However, again, these correlations should be interpreted with extreme caution because our sample size was small.

Contrary to our predictions, mothers also tended to show a positive correlation between their level of confidence in dealing with anger and their children frequency of episodes per hour.

These findings are not consistent with the notion that training parents to become more responsive and active in addressing children's needs is associated with the children's social and emotional well being (Mahoney & Perales, 2003). However, due to small sample size, we might not have had enough power to detect significant correlations among these variables, one subject's score could also have driven the direction of the correlation, and the sample might have very little variability to detect differences.

#### *Responders vs. Non-Responders*

Additional analyses on responders and non-responders indicated that, on average, responders showed higher symptom severity than non-responders as measured by the SRS and

the ASDS. However, the SCQ was lower in non-responders. It could be that the SRS and the ASDS are capturing different areas of severity as compared to the SCQ. It might be that children who showed improvement on emotion regulation abilities also improved skills and symptomatology related to the SRS and ASDS, but the SRS and ASDS were administered only once in this study. Thus it is not known whether responders would also have shown improvement on these scales. Moreover, responders' chronological age was significantly lower than non-responders on the Negativity/Lability subscale. It could be that mothers had higher expectations of older children in managing their emotions and thus they reported less emotion regulation abilities. Also, it could be that because this intervention was targeting young children, it might have been less beneficial for older children. In regards to child's and family characteristics, responders' mothers had lower levels of education and reported lower yearly income. Since, higher levels of education might also lead to higher income then it is possible that mothers with higher education levels were already using strategies to help their children regulate their emotions. However, this study did not ask mothers what strategies they were using to help their children with emotion regulation abilities. It is also possible that mothers with lower income and lower level of education do not work outside the home or work fewer hours and spend more time with their children than non-responders' mothers which would give responders' mothers more opportunities to help their children deal with anger and anxiety episodes.

*Pre-treatment improvement in the delayed-treatment control group*

In this study, children were randomly assigned to either the experimental or delayed-treatment control group in order to account for extraneous factors, such as expectancy of change (i.e., placebo effects), time, attention to problems, regression to the mean, pre- and

post- assessments and remission (Kendall, Holmbeck, & Verduin, 2004; Westen, Novotny, & Thompson-Brenner, 2004). However, the delayed-treatment control group showed positive change or spontaneous remission in some of the outcome variables (e.g., the Negativity/Lability subscale of the ERC) before they initiated treatment. To the author's knowledge, wait-list control groups' changes have not been investigated in studies delivering treatment in children with ASD. Nonetheless, other areas of research have investigated this issue and several explanations might account for this improvement. First, Weisz, McCarty and Valeri (2006) argued that findings obtain from single subject designs might be influenced by participants' unique characteristics. Although this study was not a single subject design, it might be that because few participants were assigned to each group, there was still a risk for participants' idiosyncratic characteristics in the small sample to play a role in the observed improvement. Additionally, O'Leary and Borkovec (1978) stated that wait-list groups are useful when they are "highly similar" to the experimental group. However, the fact that children in this study differed significantly at intake (e.g., frequency of episodes per hour) indicates that the delayed-treatment control group was not highly similar to the experimental group. Moreover, Posternak and Miller (2001) found spontaneous remission in a meta-analysis of studies with adults with depressive symptoms that used wait-list groups. That is, approximately 20% of participants showed considerably improvement before treatment. It was hypothesized that "therapeutic benefits of treatment-seeking" and "obtaining a thorough evaluation" might have contributed to the spontaneous improvement and remission in these participants. Because the aforementioned research has not been done with children with ASD, it is not known whether the same explanation apply to this population. Finally, although children in this study were randomly assigned to either group, one is never certain whether the

experimental and delayed-treatment control group have been matched in all relevant factors (Maat, Dekker, Scchoevers, & Jonghe).

### Limitations and Conclusions

Some limitations in this study should be noted. As already discussed, this study's sample size was considerably small and findings cannot be generalized to all children with HFASD. Future studies should include a larger sample size and investigate the nature of these results with more confidence. Also, the therapists who administered the outcome pre- and post-treatment measures were aware of children's experimental condition and it is possible that children's gains are due to experimenter biases. Although this study used multi-methods to collect data, it did not have multi-informant measures. Except for the anger and anxiety related vignettes, this study only collected data via mother's report who also knew their child's experimental condition and the goal of the intervention. Future studies should consider using teachers' and fathers' report. Additionally, many of the outcome measures used for this study were created specifically for this study and they were not normed; therefore, we do not know whether the observed change was due to natural maturation or the effect of the intervention. Thus, future studies should consider using other measures that might capture and assess better children's difficulties. In regards to responders and non-responders, using measures that examine level of symptom severity (e.g., SRS) might also be useful in order to track changes and/or improvement. The scenarios presented in the vignettes included only boys and although gender differences were not explored due to the sample size, it is possible that girls might have responded differently than boys due to gender expectation biases. This intervention was a 9-week program and a more intensive intervention might be needed (e.g., individual sessions with children, more role plays within the treatment itself, as well as a

maintenance program). Other interventionist agents might be needed to help children generalize the new emotion regulation skills and inclusion of other settings might be important (e.g., teacher training) for children to have an opportunity to practice the skills. Also, we did not measure children's expressive or receptive language abilities and this might have affected children's ability to express and understand others emotional states since mental age has been found to be a predictor of how well children regulate themselves (Konstantareas & Stewart, 2006). However, in this study, children's chronological age also appeared to be an important factor for some of their improvement. Although responders' mothers, on average, had lower levels of education and lower family income, children who participated in this study represented a homogenous sample in terms of SES (i.e., high family income) and ethnicity (i.e., Caucasian). Neither parental psychological well being nor family's level of stress was examined at pre- and post-treatment. To test this intervention, it would also be important investigate children's progress or lack thereof while comparing this intervention to another treatment (e.g., a social skills group). In terms of accessibility, this treatment might not be readily accessed by a diverse population because it requires that families allocate resources (e.g., time, transportation to the clinic) in order to participate. Thus, this intervention could also be implemented in schools or others settings and make it more accessible. Finally, multiple *t*-tests were conducted which increased the likelihood of making a type I error.

This study also has some strengths. First, having the delayed-treatment control group helped address natural maturation in children; second, although coders knew the purpose of the study, treatment fidelity was evaluated and therapists who delivered the intervention received were trained on the delivery of the intervention; third, it also included mothers as a part of the treatment process instead of only targeting the probands; this study was a

randomized controlled trial, which is a robust test of treatment efficacy; finally, overall, this study only found significant differences when the effect sizes were considerably large which indicate that intervention's moderate effects were not detected and this intervention was effective at creating large effects sizes.

The current study filled a gap in our knowledge about the effectiveness of Cognitive Behavioral therapy interventions to enhance emotional development in young children with HFASD. Although children with autism have theory of mind difficulties, they can still identify thoughts and emotions when coached and trained (Bauminger, 2002) which are necessary for a cognitive behavioral approach (Chalfant, 2007). Children with ASD have profound deficits related to the expressions, perception, responding and understating of emotions (Begeer, Koot, Rieffe, Terwogt, & Stegge, 2007) that might hinder their ability to successfully regulate their emotions when experiencing stressful events. This intervention ameliorated some of those core deficits related to emotional regulation by increasing children's knowledge of emotion regulation skills and coaching them using those skills during emotionally demanding situations. Halberstadt, Denham and Dunsmore (2001) argued that emotions are active and collaborative processes that emerge because of social interactions and are created during these interactions. Teaching children with HFASD about emotions and how to regulate those emotions might in turn enhance their emotional competence in developing reciprocal social relationships and make their social world less foreign or unknown.

Children with HFASD have until recently been treated with pharmacotherapy for anxiety and anger related difficulties and new empirically based psychosocial interventions are needed (Chalfant et al., 2007). Although a handful of prior studies showed improvement in emotional functioning after cognitive behavioral treatment in older children (i.e., 8-14 years

old), the current findings provide some initial, albeit limited, support for the efficacy of a cognitive behavioral approach to teach emotion regulation skills to younger children with HFASD. Previous research showed that children with ASD are at risk for loneliness and depression after puberty due to their awareness of their social and emotional difficulties (Wing, 1992), are rated higher in anxiety and depression (Butzer & Konstantareas, 2003), and tend to experience high levels of negative mood (Kasary et al., 1997). In the light of this, teaching children to regulate their emotions at an early age could potentially decrease the likelihood that they would develop other psychopathologies and decrease anger outbursts and possibly have a positive effect in other deficits, such as Theory of Mind abilities (Sofronoff et al., 2005). Specialized interventions that address difficulties related to emotions and emotion regulation in early childhood should be further investigated.



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Table 1  
Time Points of Data Collection by Group

	Experimental Group	Delayed-treatment control group
Time 1	Pre-intervention (Intake)	Pre-one intervention (Intake)
Time 2	Immediately after intervention (9 weeks after intervention started)	Pre-two intervention (9 weeks after intake)
Time 3	Two-month follow-up (two months after last session ended)	Immediately after intervention (9 weeks after intervention started)



Table 2  
Descriptive Statistics for Screening/Diagnostic Measures and Outcome Variables at Time 1 Intake

Measures	Mean	SD	Range
<i>Diagnostic and Screening Measures</i>			
Social Responsiveness Scale (T-score)	82.58	7	74-90
Social Communication Questionnaire	18.78	7.31	10-34
Asperger Syndrome Diagnostic Scale (Quotient score)	103.22	12.62	86-122
Autism Diagnostic Observation Schedule (Total score)	13.33	5.38	7-22
<i>Measures Outcome Measures</i>			
Emotion Regulation Checklist			
Emotion Regulation Subscale	23	3.13	17-18
Negativity/Lability Subscale	41	4.81	34-50
Behavioral Monitoring Sheet			
Frequency of episodes per hour	.33	.14	.13-.50
Duration in minutes per episode	7.02	3.21	4-12.37
Intensity per episode	4.65	1.05	3.26-5.92
What Makes my Child Angry Questionnaire			
Total number of items	15.90	5.74	6-26
Intensity per item endorsed	5.94	1.30	3.50-8.60
Frequency per item endorsed	2.70	.40	2-3.21
What Makes my Child Anxious Questionnaire			
Total number of items	15.70	8.08	5-31
Intensity per item endorsed	5.21	1.52	3.26-7.89
Frequency per item endorsed	2.48	.51	1.72-3
Ben and the Bullies <i>and</i> James and the Reading Group Vignettes			
Quantity combined score	.70	.82	.00-2
Quality combined score	.80	1.03	.00-3
Self Confidence Rating Scale			
Maternal self-confidence_ anger	4.56	2.07	1-7
Maternal self-confidence_ anxiety	5.44	1.59	4-8
Confidence in child_ anger	3.33	1.94	1-7
Confidence in child_ anxiety	3.33	1.80	1-6

Table 3  
Mean Differences between Groups on the Screening/Diagnostic and Outcome Variables at Time 1 Intake

	Experimental group <i>Mean (SD)</i>	Delayed-treatment control group <i>Mean (SD)</i>	t-values
<i>Screening and Diagnostic Measures</i>			
Social Communication Questionnaire	21.60 (8.30)	15.25 (4.57)	-.309
Social Responsiveness Scale (T-score)	84 (6.74)	85 (4.55)	1.36
Asperger Syndrome Diagnostic Scale (Quotient score)	106.60 (13.67)	99 (11.52)	.89
Autism Diagnostic Observation Schedule (Total score)	12 (5.10)	14.29 (5.77)	-.71
<i>Outcome Measures</i>			
Emotion Regulation Checklist			
Emotion Regulation Subscale	22.40 (3.29)	23.60 (3.21)	-.58
Negativity/Lability Subscale	41.40 (5.03)	40.60 (5.13)	.25
Behavioral Monitoring Sheet			
Frequency of episodes per hour	.44 (.05)	.21 (.07)	4.29*
Intensity per episode	4.17 (1.12)	5.15 (.87)	-1.20
Duration in minutes per episode	5.53 (1.16)	8.51 (4.22)	-1.18
What Makes my Child Angry Questionnaires			
Total number of items	17.20 (7.60)	14.60 (3.51)	.70
Intensity per item	5.54 (1.24)	6.35 (1.35)	-.99
Frequency per item	2.80 (.42)	2.60 (.42)	.64
What Makes my Child Anxious Questionnaires			
Total number of items	15.20 (10.78)	16.20 (5.50)	-.18
Intensity per item	5.04 (1.39)	5.38 (1.78)	-.34
Frequency per item	2.60 (.32)	2.38 (.69)	.56
Ben and the Bullies <i>and</i> James and the Reading Group Vignettes			
Quantity combined score	1.20 (.84)	.20 (.45)	2.36*
Quality combined score	1.40 (1.14)	.20 (.45)	2.19+
Self-Confidence Rating Scale			
Maternal self-confidence_ anger	5.60 (1.52)	3.25 (2.06)	1.98+
Maternal self-confidence_ anxiety	5.60 (1.82)	5.25 (1.50)	.31
Confidence in child_ anger	4.40 (1.95)	2 (.82)	2.28+
Confidence in child_ anxiety	3.40 (1.14)	3.25 (2.63)	.12

\* $p < .05$ , + $p < .10$ , two-tailed.

Table 4

Mean Differences between Outcome Variables at Pre-Treatment in the Delayed-Treatment Control Group

	Pre-one <i>Mean (SD)</i>	Pre-two <i>Mean (SD)</i>	t-values
<b>Emotion Regulation Checklist</b>			
Emotion Regulation Subscale	23.60 (3.21)	23.60 (2.41)	.00
Negativity/Lability Subscale	40.60 (5.13)	35.20 (4.60)	2.44*
<b>Behavioral Monitoring Sheet</b>			
Frequency of episodes per hour	.22 (.08)	.17 (.19)	.44
Intensity per episode	5.15 (.87)	3.98 (.88)	1.70
Duration in minutes per episode	8.51 (4.22)	5.28 (2.55)	3.31*
<b>What Makes my Child Angry Questionnaires</b>			
Total number of items	14.60 (3.51)	14.20 (7.05)	.20
Intensity per item	6.95 (1.45)	5.82 (1.69)	1.06
Frequency per item	2.60 (.42)	2.26 (.45)	
<b>What Makes my Child Anxious Questionnaires</b>			
Total number of items	16.20 (5.50)	16.80 (9.93)	-.18
Intensity per item	6.15 (1.89)	6.02 (1.21)	.08
Frequency per item	2.38 (.69)	2.21 (.33)	.43
<b>Ben and the Bullies and James and the Reading Group Vignettes</b>			
Quantity combined score	.20 (.45)	1.40 (.89)	-3.21*
Quality combined score	.20 (.45)	1.60 (1.14)	-2.75*
<b>Self Confidence Rating Scale</b>			
Maternal self-confidence_ anger	3.25 (2.06)	4.50 (1.29)	-.76
Maternal self-confidence_ anxiety	5.25 (1.50)	3.25 (1.70)	1.48
Confidence in child_ anger	2 (.82)	3(.82)	-2.45*
Confidence in child_ anxiety	3.25 (2.63)	1.75 (.96)	1.13

\*  $p < .05$ , two-tailed.

Table 5

Differences between the Pre-, Post-Treatment and Two-Month Follow-up Outcome Variables in the Experimental Group

	Pre-treatment <i>Mean (SD)</i>	Post-treatment <i>Mean (SD)</i>	t-values (pre- and post-treatment )	Effect size ( <i>d</i> )	Two-month follow-up <i>Mean (SD)</i>	t-values (pre-treatment and Two-month follow-up)
Emotion Regulation Checklist						
Emotion Regulation Subscale	22.40 (3.29)	23.20 (2.68)	-2.14**	.73	22.40 (2.30)	.00
Negativity/Lability Subscale	41.40 (5.03)	35.80 (4.71)	1.78+	.66	35.40 (3.43)	3.30**
Behavioral Monitoring Sheet						
Frequency of episodes per hour	.44 (.05)	.17 (.07)	9.52**	.99	.21 (.19)	2.85*
Intensity per episode	4.17 (1.12)	5.99 (1.61)	-1.16	.63	3.10 (1.27)	6.02**
Duration in minutes per episode	5.53 (1.16)	3(2.78)	1.69	.77	3.93 (1.84)	1.15
What Makes my Child Angry Questionnaire						
Total number of items	17.20 (7.60)	15.80 (6.22)	.61	.29	17.60 (5.37)	-.27
Intensity per item	5.54 (1.24)	5.08 (2.03)	.47	.23	4.31 (1.33)	2.00+
Frequency per item	2.80 (.42)	2.13 (.69)	1.21	.57	2.43 (.35)	1.14
What Makes my Child Anxious Questionnaire						
Total number of items	15.20 (10.78)	13.60 (11.19)	.44	.21	16.40 (8.35)	-.53
Intensity per item	5.04 (1.39)	5.18 (2.06)	-.17	.08	4.05 (1.78)	1.84+
Frequency per item	2.60 (.32)	2.66 (.56)	-.20	.11	2.30 (.18)	.74
Ben and the Bullies and James and the Reading Group Vignettes						
Quantity combined score	1.20 (.84)	4 (2.45)	-2.42**	.74	2.40 (2.70)	-1.24
Quality combined score	1.40 (1.14)	3.40 (1.52)	-2.24**	.77	2.40 (1.95)	-1.58+
Self Confidence Rating Scale						
Maternal self-confidence_ anger	6 (1.41)	7.75 (1.26)	-7**	.97	7.80 (1.30)	-4.49**
Maternal self-confidence_ anxiety	5.60 (1.82)	8 (.71)	-3.54**	.87	7.40 (1.14)	-2.45**
Confidence in child_ anger	4.40 (1.95)	6.80 (.84)	-2.23**	.74	6.80 (1.10)	-1.99+
Confidence in child_ anxiety	3.40 (1.14)	6.60 (.89)	-4 **	.89	6.40 (1.34)	-3.59**

\*\* $p < .05$ , \* $p = .05$ , + $p < .10$ , one-tailed.

Table 6

Mean Differences between the Pre-Two and Post-Treatment Outcome Variables in the Delayed-Treatment Control Group

	Pre-two treatment <i>Mean (SD)</i>	Post-treatment <i>Mean (SD)</i>	t-values	Effect size ( <i>d</i> )
<b>Emotion Regulation Checklist</b>				
Emotion Regulation Subscale	23.17 (2.04)	26.33 (8.07)	-1.20	.47
Negativity/Lability Subscale	35.17 (3.92)	32 (4.94)	1.05	.42
<b>Behavioral Monitoring Sheet</b>				
Frequency of episodes per hour	.20 (.13)	.19 (.11)	.81	.42
Intensity per episode	4.98 (1.56)	3.93 (1.32)	1.37	.62
Duration in minutes per episode	8.34 (9.16)	3.56 (2.08)	1.26	.59
<b>What Makes my Child Angry Questionnaire</b>				
Total number of items	14.83 (8.28)	10.33 (3.50)	1.37	.52
Intensity per item	5.88 (1.09)	4.58 (.94)	1.79+	.72
Frequency per item	2.20 (.38)	2.33 (.51)	-.44	.19
<b>What Makes my Child Anxious Questionnaire</b>				
Total number of items	18.17 (7.68)	12.50 (1.76)	1.62+	.59
Intensity per item	6.62 (.57)	5.65 (.89)	1.33	.61
Frequency per item	2.38 (.38)	2.42 (.38)	-.18	.08
<b>Ben and the Bullies and James and the Reading Group Vignettes</b>				
Quantity combined score	1.50 (.84)	2.67 (2.07)	-1.28	.50
Quality combined score	1.67 (1.03)	2.83 (1.83)	-1.47+	.55
<b>Self Confidence Rating Scale</b>				
Maternal self-confidence_ anger	5.33 (1.75)	6.83 (2.14)	-6.71**	.95
Maternal self-confidence_ anxiety	4 (1.79)	6.83 (1.17)	-4.03**	.87
Confidence in child_ anger	3.17 (.75)	4.33 (1.86)	-1.78+	.62
Confidence in child_ anxiety	2.33 (1.21)	4.67 (1.97)	-2.77**	.78

\*\* $p < .05$ , + $p < .10$ , one-tailed.

Table 7

Mean Differences between the Experimental and the Delayed-Treatment Control Groups at Time 2

	Experimental group <i>Mean (SD)</i>	Delayed-treatment control group <i>Mean (SD)</i>	t-values	Effect size ( <i>d</i> )
Emotion Regulation Checklist				
Emotion Regulation Subscale	23.20 (2.68)	23.43 (1.99)	-.17	.05
Negativity/Lability Subscale	35.80 (4.71)	34.57 (3.91)	.49	.15
Behavioral Monitoring Sheet				
Frequency of episodes per hour	.16 (.05)	.17 (.12)	-.14	.05
Intensity per episode	6.79 (1.58)	4.86 (1.25)	2.26**	.60
Duration in minutes per episode	2.57 (2.10)	7.74 (7.18)	-1.54+	.46
What Makes my Child Angry Questionnaire				
Total number of items	15.80 (6.22)	14.57 (7.59)	.30	.09
Intensity per item	5.08 (2.03)	5.51 (1.26)	-.40	.14
Frequency per item	2.13 (.69)	2.25 (.37)	-.39	.13
What Makes my Child Anxious Questionnaire				
Total number of items	13.60 (11.19)	16.43 (8.38)	-.50	.16
Intensity per item	5.18 (2.06)	6.23 (1)	-1.02	.34
Frequency per item	2.66 (.56)	2.39 (.35)	.98	.31
Ben and the Bullies and James and the Reading Group Vignettes				
Quantity combined score	4 (2.45)	1.29 (.95)	2.70**	.65
Quality combined score	3.40 (1.52)	1.43 (1.13)	2.59**	.63
Self Confidence Rating Scale				
Maternal self-confidence_ anger	7.75 (1.26)	5.43 (1.62)	2.46**	.63
Maternal self-confidence_ anxiety	8 (.71)	4.14 (1.68)	4.80**	.84
Confidence in child_ anger	6.80 (.84)	3.43 (.98)	6.24**	.89
Confidence in child_ anxiety	6.60 (.89)	2.71 (1.50)	5.15**	.85

\*\* $p < .05$ , + $p < .10$ , one-tailed.

Table 8  
Mean Differences Before and After Treatment for both Groups

	Before treatment	After Treatment	<i>t</i> -test
Emotion Regulation Checklist			
Emotion Regulation Subscale	22.82 (2.56)	24.91 (6.17)	-1.45+
Negativity/Lability Subscale	38.00 (5.33)	33.73 (5.00)	2.03**
Behavioral Monitoring Sheet			
Frequency of episodes per hour	.31 (.16)	.18 (.09)	2.28**
Intensity per episode	4.63 (1.35)	4.81 (1.72)	-.19
Duration in minutes per episode	7.13 (6.68)	3.32 (2.20)	1.77+
What Makes my Child Angry Questionnaire			
Total number of items	16.82 (8.85)	13 (7.21)	1.53
Intensity per item	5.74 (1.34)	5.39 (1.58)	.63
Frequency per item	2.46 (.35)	2.52 (.45)	-.28
What Makes my Child Anxious Questionnaire			
Total number of items	15.91 (7.67)	12.82 (5.46)	1.52+
Intensity per item	5.69 (1.12)	4.86 (1.57)	1.38+
Frequency per item	2.44 (.48)	2.24 (.56)	.52
Ben and the Bullies and James and the Reading Group Vignettes			
Quantity combined score	1.36 (.81)	3.27 (2.24)	-2.61**
Quality combined score	1.54 (1.04)	3.09 (1.64)	-2.68**
Self Confidence Rating Scale			
Maternal self-confidence_ anger	5.60 (1.58)	7.20 (1.81)	-9.80**
Maternal self-confidence_ anxiety	4.73 (1.90)	7.36 (1.12)	-5.58**
Confidence in child_ anger	3.73 (1.49)	5.45 (1.92)	-2.86**
Confidence in child_ anxiety	2.82 (1.25)	5.55 (1.81)	-4.75**

\*\* $p < .05$ , \* $p = .05$  + $p < .10$

Table 9  
Correlations of Change Scores between Maternal Confidence in Dealing with  
Child's Anger and Anxiety Related Emotions and the Behavioral Monitoring  
Sheet after Treatment

	Parental confidence	
	Anger	Anxiety
Behavioral Monitoring Sheet		
Frequency of episodes per hour	.53+	.12
Intensity per episode	.14	-.47+
Duration in minutes per episode	.39	-.45+

\*\* $p < .05$ , + $p < .10$



Table 10

Mean differences before and after treatment for responders and non-responders

	Responders <i>Mean (SD)</i>		t-values	Non-Responders <i>Mean (SD)</i>		t-values
	Before	After		Before	After	
Emotion Regulation Checklist						
Emotion Regulation Subscale	22.57 (3.0)	26.42 (7.46)	-1.88**	23.50 (1.00)	23.00 (1.63)	1.00
Negativity/Lability Subscale			3.71**			-5.20**
Behavioral Monitoring Sheet						
Frequency of episodes per hour	.36 (.13)	.16 (.11)	3.71**	.13 (.08)	.14 (.05)	-.50
Intensity per episode	5.59 (.84)	4.04 (1.31)	2.97**	3.57 (.54)	5.44 (1.72)	-2.09+
Duration in minutes per episode	8.17 (6.88)	3.60 (2.62)	2.23**	-	-	-
Ben and the Bullies <i>and</i> James and the Reading Group Vignettes						
Quantity combined score	1.00 (.89)	4.67 (2.07)	-4.82**	1.40 (.89)	1.20 (1.10)	1.00
Quality combined score	.80 (.84)	4.20 (1.30)	-8.50**	1.67 (1.03)	1.50 (1.22)	1.00

\*\* $p < .05$ , + $p < .10$ , one-tailed.

Table 11  
Mean differences between responders and non-responders on the Emotion Regulation Checklist

	Emotion Regulation Checklist					
	Emotion Regulation Subscale			Negativity/Lability subscale		
	Responders	Non-responders	<i>t</i> -value	Responders	Non-responders	<i>t</i> -value
<i>Diagnostic and Screening Measures</i>						
Social Responsiveness Scale (SRS;T-score)	86.43 (6.425)	76.25 (2.872)	2.95**	82.88 (7.95)	82.33 (6.81)	.10
Social Communication Questionnaire (SCQ)	22.00 (7.314)	22.00 (5.679)	1.62+	18.67 (4.13)	19.00 (13.08)	-.06
Asperger Syndrome Diagnostic Scale (ASDS; Quotient score)	109.40 (13.07)	95.50 (7.33)	1.89*	104.00 (11.61)	101.67 (17.16)	.25
Autism Diagnostic Observation Schedule (ADOS; Total score)	12.86 (4.91)	15.50 (6.46)	-.77	14.5 (4.66)	12 (7.81)	.67
<i>Child's and family characteristics</i>						
Child's chronological age	5.50 (.90)	5.8750 (.25)	-.80	5.38 (.63)	6.33 (.58)	-2.30**
Maternal age	36.86 (5.30)	39.25(3.30)	-.81	37.75 (5.34)	37.67 (2.89)	.02
Maternal education	15.00 (2.10)	17.50 (1.00)	-2.19**	16.00 (1.63)	16.00 (3.46)	.00
Family income	68,566.67 (35,236.44)	137,500.00 (53,033.01)	-2.18**	79,400.0000 (2,5919.10)	96,466.67 (80358.28)	-.46

\*\* $p < .05$ , \* $p = .05$ , + $p < .10$ , one-tailed.

Table 12  
Mean differences between responders and non-responders on the Behavioral Monitoring Sheet

	Behavior Monitoring Sheet								
	Frequency of episodes per hour			Intensity per episode			Duration per episode		
	Responders <i>Mean</i>	Non-responders <i>Mean</i>	<i>t</i> -value	Responders <i>Mean</i>	Non-responders <i>Mean</i>	<i>t</i> -value	Responders <i>Mean</i>	Non-responders <i>Mean</i>	<i>t</i> -value
<i>Diagnostic and Screening Measures</i>									
Social Responsiveness Scale (SRS; T-score)	84.80 (7.43)	79.00 (2.83)	1.02	84.25 (6.75)	81.67 (8.02)	.46	84.67	74.00	1.65+
Social Communication Questionnaire (SCQ)	18.80 (4.60)	14.00 (5.66)	1.19	14.50 (4.20)	21.33 (2.89)	-2.40**	16.50	23.00	-1.26
Asperger Syndrome Diagnostic Scale (ASDS; Quotient score)	103.80 (14.57)	98.00 (1.41)	.53	98.25 (11.79)	107.33 (13.05)	-.97	102.00	103.00	-.07
Autism Diagnostic Observation Schedule (ADOS; Total score)	13.60 (5.03)	14.50 (10.61)	-.16	12.75 (6.55)	15.33 (6.11)	-.53	13.83	14.00	-.02
<i>Child's and family characteristics</i>									
Child's chronological age	5.44 (.77)	5.40 (.85)	.06	5.30 (.81)	5.60 (.69)	-.51	a--	a--	a--
Maternal education	15.50 (1.91)	17.00 (1.41)	-.96	16.00 (2.31)	16.00 (.00)	.00	a--	a--	a--
Maternal age	36.20 (4.97)	38.00 (2.83)	-.47	36.00 (5.72)	37.67 (2.08)	-.47	a--	a--	a--
Family income	74,000.00 (25,059.93)	147,500.00 (38,890.87)	-2.65**	115,666.67 (53,257.24)	85,000.00 (49,497.47)	.65	a--	a--	a--

\*\* $p < .05$ , + $p < .10$ , one-tailed.

Note. a: could not be computed; one group only

Figure 1. Average number of episodes per hour for the experimental and the delayed-treatment control groups

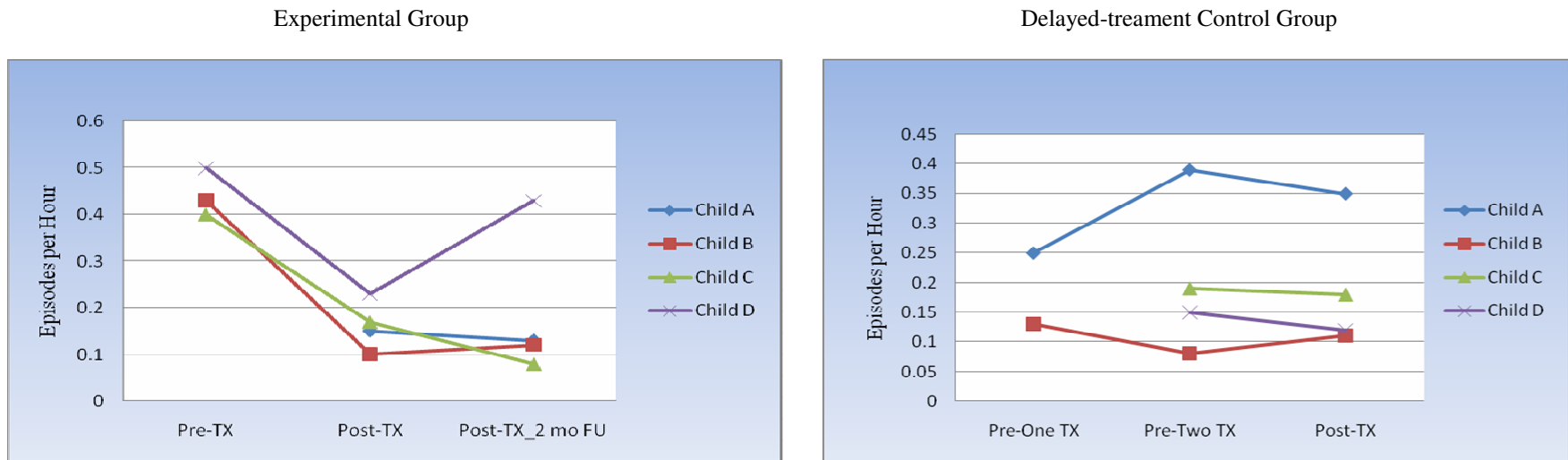


Figure 2. Average level of intensity per episode for the experimental and delayed-treatment control groups

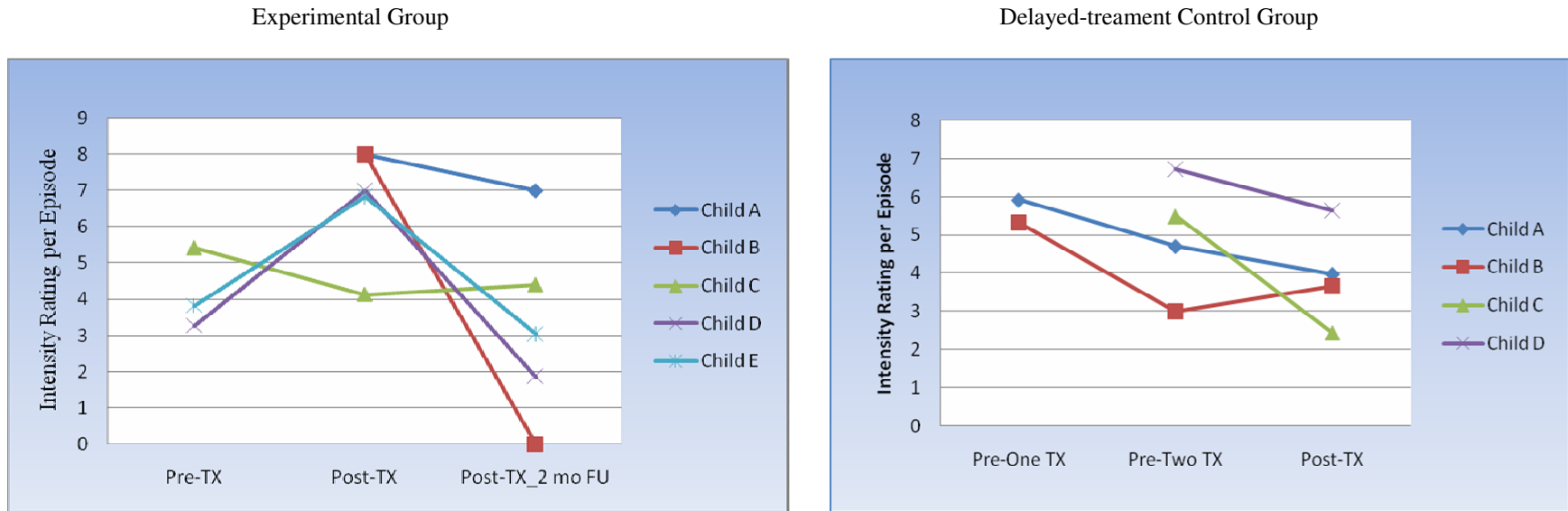


Figure 3. Average duration in minutes per episode for the experimental and the delayed-treatment groups

