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# Moderated Mediation of Attention-Deficit/ Hyperactivity Disorder (ADHD) Symptoms and Peer Relations

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MODERATED MEDIATION OF ATTENTION-DEFICIT/HYPERACTIVITY  
DISORDER (ADHD) SYMPTOMS AND PEER RELATIONS

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Thesis

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A thesis submitted in partial fulfillment of the requirements for the degree of  
Master of Science in the College of Arts and Sciences at the University of Kentucky

By

Christine Anne Lee

Lexington, Kentucky

Directors: Dr. Richard Milich, Professor of Psychology

Lexington, Kentucky

2015

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## ABSTRACT OF THESIS

### MODERATED MEDIATION OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD) SYMPTOMS AND PEER RELATIONS

Children with attention-deficit/hyperactivity disorder (ADHD) experience frequent and persisting peer rejection, yet current social skills training is ineffective. The current study focused on emotion dysregulation as a possible mediator between ADHD symptoms and poor peer outcomes with oppositional defiant disorder (ODD) symptoms as a moderator. Participants included 145 elementary-age children ranging from 8-10 years old. Parents and teachers rated children's ADHD and ODD symptoms as well as their social skills. Parents also rated children on their emotion regulation abilities. Children then participated in a three-hour playgroup with unfamiliar peers in six structured and unstructured tasks. Research assistants provided global ratings of emotion regulation and peer rejection during each of the six tasks. At the end of the playgroup, children and staff completed sociometric questions about each child. Using multiple raters and methods, observed emotion regulation was found to mediate between increased symptoms of ADHD and worse peer relations as rated by the playgroup staff members. There were limited findings of significant moderation by ODD. Emotion dysregulation may be a valuable target for intervention in order to improve peer relations for children with ADHD.

KEYWORDS: ADHD; emotion dysregulation; peer relations; social skills; ODD

- Christine Anne Lee

- June 19, 2015

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## **Chapter 1: Introduction**

Children with attention-deficit/hyperactivity disorder (ADHD) struggle in a variety of domains due to their difficulties with hyperactivity, impulsivity, and inattention. One of their most reliable deficits has been in social relationships, as demonstrated by the consistent and relatively rapid onset of peer rejection (Hoza, 2007). However, the mediators underlying these social deficits are less understood. This lack of understanding of mediators may explain why traditional treatment, such as social skills training, seems to have a negligible effect on building and sustaining positive peer relations (Antshel & Remer, 2003). Gresham's (1988) model of peer relations suggests that self-control deficits, such as emotion dysregulation, could account for the poor peer status of children with ADHD. However, there has been little research studying emotion dysregulation as a mediator for peer rejection. Therefore, the primary purpose of this study is to examine the relation between ADHD and peer problems as well as investigate the role of emotion dysregulation in accounting for this relation.

### **ADHD and Peer Rejection**

Children with ADHD struggle with peer relationships from an early age. In children as young as preschool-age, peer-rated hyperactivity correlated with peer rejection in preschool children (Milich, Landau, Kilby, & Whitten, 1982). Such dislike occurs quickly; within five minutes, children with ADHD are seen as less desirable companions than those without ADHD (Diener & Milich, 1997). Unfortunately, peer rejection can predict cycles of impairment. For example, peer rejection relates to poor social skills, which then predicts future peer rejection (Murray-Close et al., 2010).

Furthermore, peer rejection is predictive of a variety of negative outcomes, including delinquency, anxiety, and global impairment (Mrug et al., 2012). For children with ADHD, the correlates of peer rejection start early and predict further maladaptive behavior.

There are a large number of correlates linking ADHD and poor peer relations. One such correlate is the overall immaturity of children with ADHD compared to their peers. A factor analysis of social functioning using the Child Behavior Checklist found that Social Immaturity (clumsy, clings, acts young) was one of two main factors (Rich, Loo, Yang, Dang, & Smalley, 2009). In particular, Social Immaturity was associated with a greater number of hyperactive symptoms. Similarly, Hinshaw and Melnick (1995) found that aggression related to poor peer status, with aggression being one of the most common reasons reported by elementary-age boys for rejecting peers. Unsurprisingly, those same boys rated aggressive kids with ADHD as having the lowest peer status. In another study, those with ADHD and a learning disability were seen as less popular and more rejected by peers than those with ADHD alone (Flicek, 1992). Thus, there appears to be many pathways connecting ADHD and poor peer relations.

From Gresham's (1988) model of social functioning, children with ADHD could be seen as lacking social skills knowledge and/or having deficient social performance abilities. In other words, children with ADHD may not know how to behave appropriately and/or how to use their social knowledge when placed in a social situation. However, there are mixed results for these hypotheses. Specifically, children with ADHD-Combined (ADHD-C) will engage in behaviors detrimental to peer relations, such as being disruptive and interrupting peers. However, they will still initiate prosocial

behavior with other children and maintain an equal or greater amount of social interaction compared to children without ADHD (Wheeler & Carlson, 1994). Thus, children with ADHD-C do not completely lack social knowledge. Rather, during these initiated interactions, children with ADHD-C may display their maladaptive social skills, such as cutting in line or stealing toys, which may represent more of a performance deficit.

### **Emotion Dysregulation**

Surprisingly missing from this line of work is a comprehensive study of emotion dysregulation as a potential contributor for poor peer relations. This is especially shocking given the recent theoretical work by Martel (2009) and Barkley (2009), among others, relating emotion dysregulation and ADHD. Cole, Michel, and Teti (1994) define emotion regulation as “the ability to respond to the ongoing demands of experience with the range of emotions in a manner that is socially tolerable and sufficiently flexible” (p. 76). Conversely, emotion dysregulation would be any positive or negative response to internal or external stimuli that disregards cultural display rules (Cole et al., 1994; Eisenberg & Spinrad, 2004; Rosen, Milich, & Harris, 2012). This could be an inappropriate intensity of emotion or an inability to inhibit emotional outbursts. These displays of behavior are seen as extreme and inappropriate in the context of the situation in which they are displayed. However, there are still disagreements about the exact definition of emotion dysregulation and how this construct should be measured.

Emotion dysregulation may also be called emotional lability, emotional impulsiveness, or even a part of temperament. Emotional lability is defined more as a quick shift in emotional state (Cole et al., 1994). Similarly, this trait could be called “Reactive Comparison,” which emphasizes the proper modulation of emotions (Martel &

Nigg, 2006). For these types of definitions, investigators may use methods to incite emotional outbursts such as giving the participant a disappointing gift or asking the participant to solve a puzzle with missing pieces (Maedgen & Carlson, 2000; Walcott & Landau 2004). By intentionally putting participants in frustrating situations, those who do struggle with emotion dysregulation are presumed to have more inappropriate behavioral outbursts. Others see emotion dysregulation as more of a temperamental trait, as documented in a strong stability coefficient ( $r = 0.71$ ) over two years (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Keenan, 2000; Martel, 2009).

In contrast to the above definitions, Barkley (2009) argues that emotional impulsiveness/deficient emotional self-regulation is a core feature of ADHD. Barkley theorizes that children with emotional impulsiveness (EI) will react negatively to external stimuli more often and more intensely than their peers. Deficient emotional self-regulation (DESR) is defined as the inability to inhibit emotionally inappropriate responses, self-soothe, refocus attention, or organize one's actions towards a goal (Gottman & Katz, 1989). Whereas Barkley refers to both EI and DESR as separate traits, he believes that EI is subsumed under DESR. Barkley has several different reasons for why he feels that DESR is a key component of ADHD. First, emotion regulation has historically been included in definitions of ADHD from as early as Still's 1902 Goulstonian Lecture and continuing until present day (Barkley, 2009). Though DESR is not a central part of the *Diagnostic and Statistical Manual of Mental Disorders 5's* definition of ADHD, characteristics of DESR, such as low frustration tolerance and mood lability, are included as associated features of ADHD (American Psychiatric Association, 2013). Neurologically, DESR would fit Barkley's theory of executive function deficits

associated with ADHD, chiefly behavioral inhibition and self-regulation. Moreover, parts of the brain, such as the frontolimbic pathway and anterior cingulate cortex, which are postulated to be associated with ADHD, could also explain DESR (Barkley, 2009).

Historically and neurologically, DESR appears to fit logically in the definition of ADHD.

Furthermore, problems with DESR are already reported for those with ADHD.

Parents and teachers rated those with ADHD as having more negative emotions compared to peers (Barkley, 2006). DESR also correlates highly with hyperactivity, impulsivity, and inattention (Barkley, 2009; Mahone et al., 2002). In addition, the persistence of ADHD symptoms from childhood into adolescence accounts for higher levels of verbal aggression and anger (Harty, Miller, Newcorn, & Halperin, 2009).

Overall, children and adults with ADHD are more likely to report symptoms of emotion dysregulation, experience more relationship conflicts, and express greater negative affect (Barkley, 2009). The abovementioned symptoms are just some of the results linking DESR and ADHD, specifically those with ADHD-C. Barkley (2009) points out that the overlap goes beyond comorbidity since DESR does not form a separate disorder apart from ADHD. Rather, Barkley argues that DESR should be seen as a core component of ADHD and be given the same consideration as hyperactivity-impulsivity and inattention.

There is some evidence that emotion dysregulation may play a role in peer problems. Rosen et al. (2012) found that emotion dysregulation was related to current peer victimization in preteen children and also predicted victimization six months later. The authors hypothesized that victims' emotional outbursts served as motivation for aggressors, reinforcing peer victimization. Emotion regulation was also a mediator



between experiencing violent victimization in one's community and future peer rejection (Kelly, Schwartz, Gorman, & Nakamoto, 2008). In turn, peer rejection then predicted future violent victimization in one's community. Yet, little research has been devoted to examining emotion dysregulation as accounting for the relation between ADHD and peer rejection.

### **ADHD and Emotion Dysregulation**

In prior research studies, children with ADHD struggled with emotion dysregulation more than their comparison peers. During a purposely stressful puzzle task, elementary school age boys with ADHD had a harder time regulating their emotions and masking their frustrated feelings compared to comparison boys (Walcott & Landau, 2004). Similarly, preschool children who reacted in an overly expressive manner after listening to mood-inducing stories displayed more externalizing problems than children who responded more appropriately (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). These overly expressive children also had more mother-reported symptoms of ADHD and oppositional defiant disorder (ODD). Thus, consistent with Barkley's theory, emotion dysregulation and ADHD appear to be interrelated.

### **ADHD, Emotion Dysregulation, and Peer Rejection**

Emotion dysregulation is also a significant predictor of peer rejection among children with ADHD (Maedgen & Carlson, 2000). Preteen children with ADHD-C, ADHD-Inattentive (ADHD-I), and a comparison group were compared on social skills knowledge, social skills performance, and emotion dysregulation using teacher report, parent report, self-report, and behavior observations. In order to test social skills performance and knowledge, experimenters asked what each child would do in a social

situation and then what each child thought was the correct action to do in that same social situation. Emotion dysregulation was tested by giving the child a disappointing gift and coding the child's subsequent facial reaction. Parent and teacher ratings indicated that those with ADHD-C were more disliked than those with ADHD-I, possibly due to higher ratings of aggressive behavior. Those with ADHD-I were seen as more socially passive and seemed to lack social knowledge. Overall, a regression analysis found that observed emotion regulation and parent rated social performance significantly predicted parent reported social status. Self-reported social knowledge was also trending towards significance as a predictor. Based on this line of work, the focus of the current study is on the relation between emotion dysregulation and ADHD as well as the interplay among emotion dysregulation, ADHD, and peer problems.

### **ODD as a Moderator**

Aggression is an overlooked, but possibly very influential, part of accounting for the relationship between emotion dysregulation and ADHD. In fact, Martel (2009) pointed out the need for more studies to control for the influence of aggression on emotion dysregulation. It has long been known that hyperactive and aggressive children were more rejected and less popular than their hyperactive peers (Milich & Landau, 1989). More specifically, Maedgen and Carlson (2000) found that those with ADHD-C were more aggressive and more disliked compared to those with ADHD-I and comparison boys. Melnick and Hinshaw (2000) found that those who were highly aggressive and had ADHD were more emotionally dysregulated and less liked. These children also had a less constructive pattern of emotional coping (i.e., venting strongly, negative responses) and were more noncompliant. Finally, Erhardt and Hinshaw (1994)

found that aggression and noncompliance predicted negative peer nominations in elementary-age boys, accounting for almost half of the variance for peer rejection. Aggression and noncompliance are key features of ODD. Therefore, the last goal of this study was to investigate ODD as a possible moderator for the proposed mediational model.

### **Purpose**

The goal of this study was to examine the role of emotion dysregulation as a mediator between symptoms of ADHD and peer rejection. The first goal was to replicate previous findings showing that children with ADHD display more emotion dysregulation and have more peer problems than comparison peers. Then, we tested the hypothesis that emotion dysregulation mediated the relation between ADHD and peer problems. Lastly, we examined if ODD moderated this mediation model (see Figure 1.1 for complete model).

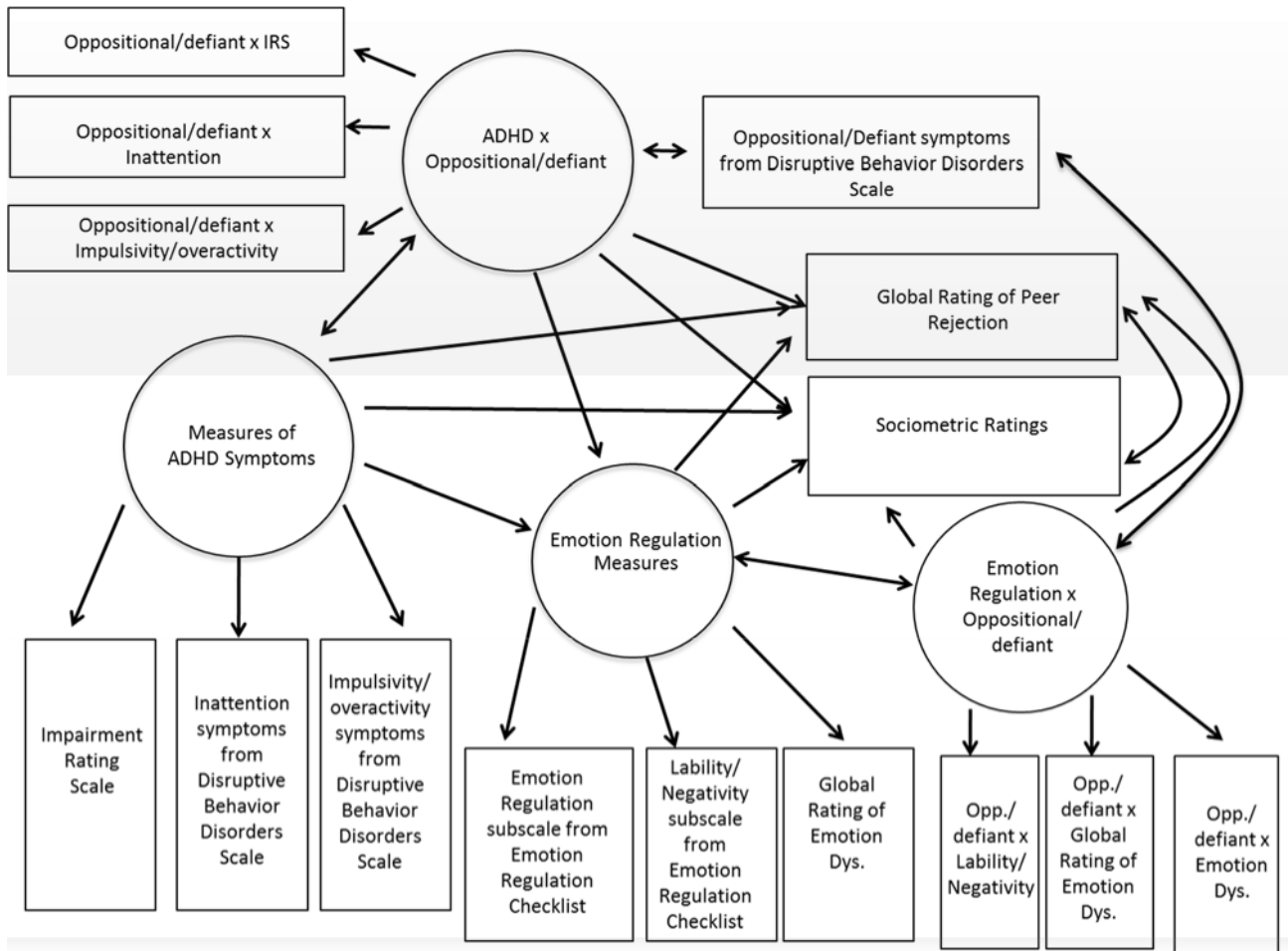


Figure 1.1. Planned Analyses

## Chapter 2: Methods

### Participants

Participants included 145 boys and girls between 8 and 10 years of age ( $M=9.23$  years,  $SD=0.84$ ) at the time of the initial appointment. Based on a comprehensive evaluation during the initial appointment, which included a semi-structured interview and rating scales, two children (1.4%) met criteria for ADHD-predominantly hyperactive/impulsive presentation, 18 children (12%) met criteria for ADHD-predominantly inattentive presentation, and 47 children (32%) met criteria for ADHD-combined presentation. However, participants with a subthreshold number of ADHD symptoms were still included in the analysis, therefore allowing for a continuous range of ADHD symptoms among participants (see Table 2.1). Participants were recruited from schools, pediatric offices, parent support groups, and advertisements. Participants needed to score above an 80 on the Wechsler Abbreviated Scale of Intelligence (WASI), be fluent in English, and be free from any other medical or psychiatric diagnoses that could account for social or academic impairment (e.g., mental retardation, autism, severe hearing impairment). Children with ODD were not excluded from the study. In fact, based on parent endorsement of symptoms on the Disruptive Behavior Disorders Rating Scale, 7 children met criteria for ODD (5%). ODD symptoms were also viewed continuously, allowing for a range of symptoms. Those diagnosed with ADHD who were being treated with stimulant medication did not take their stimulant medication during testing sessions.

## Measures

### **Diagnostic Measures.**

#### ***Disruptive Behavior Disorders Rating Scale (DBD).***

Parents and teachers completed the DBD in order to determine the number and severity of each child's ADHD and/or ODD symptoms. The DBD consists of 48 questions asking about symptoms of inattention (e.g., "is often distracted by extraneous stimuli", "often does not seem to listen when spoken to directly"), hyperactivity/impulsivity (e.g., "often talks excessively, "often fidgets with hands or feet or squirms in seat"), and defiance (e.g., "often argues with adults", "often blames others for his or her mistakes of misbehavior"). Teachers completed a shorter, 28 question version of the DBD. Questions were rated used a 4-point Likert scale ranging from 0 (*Not at All*) - 3 (*Very Much*). The number and severity of symptoms endorsed, based on the DSM-IV criteria for ADHD-predominantly hyperactive-impulsive type ( $\alpha=0.94$ ), ADHD-predominantly inattentive type ( $\alpha=0.92-0.94$ ), and oppositional defiant disorder ( $\alpha=0.89-0.94$ ), were used. Previous studies found that the DBD has high internal consistency ( $\alpha=0.95-0.96$ ) as well as strong negative and positive predictive validity (Pelham, Gnagy, Greenslade, & Milich, 1992).

#### ***Impairment Rating Scale (IRS).***

Parents and teachers completed this 7-question scale in order to determine how much each child's symptoms impacted different domains of daily life. Domains included interpersonal relations with family and peers, academic progress, self-esteem, and overall severity. Parents and teachers rated each area of impairment on a scale of 1 (*No Problem*) – 7 (*Extreme Problem*). Scores of 3 or higher were indicative of significant impairment.

Past studies showed moderate to high test-retest reliability ( $\alpha=0.60-0.89$ ) for parents and teachers over a six-month period as well as convergent validity with similar measures (Fabiano et al., 2006). Current internal consistency for this measure was high across parents and teachers ( $\alpha=0.91-0.92$ ).

### **Emotion Dysregulation Measures**

#### ***Emotion Regulation Checklist (ERC).***

Parents completed this 24-item scale using a 4-point Likert scale ranging from 1 (*Never*) – 4 (*Always*) to describe the frequency of their child’s emotional behavior (e.g., “has wild mood swings”, “displays energy or emotion that others find intrusive or disruptive”). Previous studies have found convergent validity with similar measures such as behavior observations (Shields & Cicchetti, 1997). The current study found adequate internal consistency for the two factors of lability/negativity ( $\alpha=0.90$ ) and emotion regulation ( $\alpha=0.77$ ).

#### ***Behavior Observations.***

Participants were observed during a three-hour playgroup. Research assistants independently coded each child’s overall emotion dysregulation and peer rejection during each of the six different tasks during the playgroup. Ratings ranged from 1 (*low*) – 5 (*high*). Emotion dysregulation was defined as a “situationally inappropriate and disproportionate emotional response in tone of voice, manner, content, and/or expression.” Peer rejection was defined as being “excluded from activities with peers and a recipient of negative words/actions.” Each task was double-coded and displayed sufficient inter-rater reliability (ICC=0.81-0.86).

## **Social Outcome Measures.**

### ***Social Skills Improvement System (SSIS).***

The Social Skills scale from the SSIS is a 46-question measure for parents and teachers that was used to ascertain the child's peer status. The frequency of the child's prosocial behavior was rated on a scale ranging from 1 (*Never*) – 4 (*Always*). Subscales are named Communication, Cooperation, Assertion, Responsibility, Empathy, Engagement, and Self-Control. The SSIS previously displayed good test-retest reliability for teachers, parents, and students,  $r = 0.81-84$ , with strong internal consistency in the current study ( $\alpha=0.95-0.97$ ). Furthermore it has been found to have convergent validity with other social competence scales (Gresham, Elliot, Cook, Vance, & Kettler, 2010). The Social Skills subscale was scored in the negative direction, with higher scores indicating less effective social skills.

### ***Sociometric Ratings.***

At the conclusion of the play group, each participant viewed pictures of the other children and rated each child on a scale of 1 (*not at all*) – 4 (*very much*) in response to six questions asking about compliance, likeability, and cooperation (questions listed in Table 2.2). An average of the children's ratings was taken for each question. These questions demonstrated adequate internal consistency ( $\alpha=0.84$ ). Two staff members also rated each child on the same questions with the average taken between the two ratings ( $\alpha=0.93$ ). Lastly, the child rated himself on the four of the same questions ("How hard did you make it for your group to finish tasks" and "How much did you 'bug' others" were removed). Internal consistency was lower for self-ratings ( $\alpha=0.67$ ). Asher and Dodge (1986) had found that using such a rating scale had convergent validity with peer



nominations, Pearson's  $r = 0.80$ . Sociometric ratings were scored in the negative direction with higher scores indicating more rejection.

## **Procedure**

Parents completed the DBD, IRS, ERC, and SSIS during an initial assessment. Teachers filled out the DBD, IRS, and SSIS online. When completing surveys, parents and teachers were instructed to describe the child when he is unmedicated. Children who were still eligible to participate after the initial assessment were invited to a three-hour playgroup. Measures and raters are outlined in Table 2.3.

### **Playgroup Session.**

Each three- hour playgroup consisted of 5-10 children ( $M = 7$  children) of the same gender who participated in six tasks. Approximately half of the children in the group were diagnosed with ADHD and half of the children were not. Those without a diagnosis of ADHD may still have had a subthreshold number of ADHD symptoms. Twenty playgroups were coded (14 boys groups, 6 girls groups).

At the beginning of the playgroup, each child was given a different colored shirt and a nametag in order to more easily differentiate the children during coding. Supervising staff did not give any feedback during the playgroup unless there was severe physical aggression or distress. Each task was twenty minutes long, regardless if the task was completed or not. The tasks ranged from unstructured (e.g., free play) to structured (e.g., solving a puzzle). The tasks were heavily dependent on teamwork and social interaction. At the end of the playgroup, children and staff members completed sociometric ratings.

During the first task, children paired up and got to know one another through casual conversation. Then, each child introduced his partner to the rest of the group. Since the children were unfamiliar with one another, this task was an opportunity for the children to learn about their peers on a personal basis. It required children to be prosocial with their partner in order to prepare for their introductions. It also helped the children, staff, and coders learn each child's name and voice. This was a semi-structured activity with a specific goal; however, there were no specific directions, so children could achieve this goal using whichever conversation topics they chose.

In the next task, children unanimously decided on a group name and decorated a team banner. This task required children to work together and resolve conflict in order to agree on a name. Further cooperation and communication was needed in order to collaborate on the decoration of the banner. This task was also semi-structured since there was a clear goal but no specific directions for how they must reach the goal.

There were two periods of free play where children played with a variety of toys in the room (e.g., basketball hoop, Lincoln Logs, coloring pages). One free play period occurred halfway through the playgroup, after the banner task, and the other free play period was at the end of the playgroup. Children had the freedom to decide who to play with and what toys to use. Children could also decide what rules, if any, applied to their interactions. There was opportunity for both prosocial and isolating behaviors. Since children were selecting their own playmates, it was easier to observe which kids were popular and which kids were rejected. These tasks were unstructured with no specific goals or instructions.

Next, children participated in a problem-solving task where they had to cross the room using four mousepads as their path. They pretended they were crossing a river and could not step off the pads. If the children stepped off the pads, they all had to start over from the beginning. In order to successfully complete the task, children had to think of and implement a plan since the distance was too great for the children to simply walk across the room. Children needed to work together on carrying out a specific strategy with effective communication being key. The task was meant to be intentionally frustrating and stressful, especially if the children did not finish in time. Therefore, children needed to properly regulate their emotions, regardless of outcome. This task was structured since there was a specific goal and specific directions for completion.

Lastly, the children solved a puzzle together. Each child received a bag of pieces that no one else could touch. This rule ensured that all the children would have to work together and communicate in order to complete the task. Prosocial behaviors, such as making suggestions or encouraging the group, were helpful for attaining success. Once again, this task was frustrating since everyone must contribute his own pieces and there was a time limit. Children must regulate their frustration in the face of such distress and communicate effectively with one another. This task was structured since there was both a specific goal and specific directions for how to finish the task. Following this task was the second free play period.

At the conclusion of the group, the children had a snack break and then completed a craft. During this time period, staff members took each child to a different room to complete the self and peer sociometric ratings. Children were told ratings would be anonymous. The craft break was meant to distract the children so they would not discuss

the rating process. Children were picked up by their parents after the craft activity. Two staff members also rated the children at the conclusion of the group.

Global coding of emotion dysregulation and peer rejection, as defined earlier, was completed using video recordings of the playgroups. Each child was coded in each task for both emotion dysregulation and peer rejection. The two free play periods counted as two different tasks. Overall, children had six task ratings for both peer rejection and emotion dysregulation. Coders were trained using two pilot sessions in order to attain reliability and were blind to the diagnostic status of each child. Two independent coders completed each rating with the average between the two coders used as the final value.

Table 2.1

*Demographic information*

	<i>N</i>	<i>M</i>	<i>SD</i>
Gender (male)	145 (67%)		
Age in years		9.23	0.84
Race			
White	64 (44%)		
Black	57 (39%)		
Biracial/Multicultural	18 (12%)		
American Indian	1 (1%)		
Parent Report of symptoms			
on DBD			
Hyperactive/Impulsive		3.01	3.00
Inattention		3.41	3.28
Oppositional/Defiant		1.29	1.92
Teacher Report of symptoms			
on DBD			
Hyperactive/Impulsive		1.12	1.60
Inattention		1.58	1.88
Oppositional/Defiant		0.78	1.44

Table 2.2

*Sociometric Ratings Questions*

Questions	Ratings			
1. How well did ( <i>child's name</i> ) follow the rules?	1 not at all	2 a little	3 pretty much	4 very much
2. How much would you want to play with ( <i>child's name</i> ) again?	1 not at all	2 a little	3 pretty much	4 very much
3. How hard did ( <i>child's name</i> ) make it for your group to finish tasks?	1 not at all	2 a little	3 pretty much	4 very much
4. How much did you like ( <i>child's name</i> )?	1 not at all	2 a little	3 pretty much	4 very much
5. How well did ( <i>child's name</i> ) cooperate with others?	1 not at all	2 a little	3 pretty much	4 very much
6. How much did ( <i>child's name</i> ) "bug" you?	1 not at all	2 a little	3 pretty much	4 very much

Table 2.3

*Measures Used in Study*

	Informants					
	Parent	Teacher	Peers	Observer	Staff Member	Self
<b>Diagnostic Measures</b>						
Disruptive Behavior Disorders Rating Scale	X	X				
Impairment Rating Scale	X	X				
<b>Emotion Regulation Measures</b>						
Emotion Regulation Checklist	X					
Global Rating of Emotion Dysregulation				X		
<b>Social Skills Measures</b>						
Social Skills Improvement System	X	X				
Global Rating of Peer Rejection				X		
Sociometric Ratings			X		X	X

## Chapter Three: Results

### Data Analyses

Models were calculated using the Mplus software package to run analyses using structural equation modeling (Muthén & Muthén, 1998-2012). Moderated mediation was computed using Preacher, Rucker, & Hayes' (2007) syntax. Missing data occurred in 3-8% of the sample though teacher report on the DBD and parent report on the IRS had missing data in 20% of the sample. Over 80% of the teacher responses on the SSIS were missing; therefore, these scores were not included in analyses. Missing data was excluded using casewise deletion. Maximum likelihood estimation with robust standard errors was used to account for non-normality of data and any possible heteroscedascity. Linear transformations of variables were computed in order to maintain appropriate relative variance.

### Construction of latent variables

Before analyses were run, latent variables were created for the constructs of ADHD symptoms, emotion dysregulation, and peer problems. Multiple observed variables were combined into one latent variable to represent each construct. Goodness of fit for each latent variable was evaluated using chi-square fit statistics, root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Good fit was indicated by nonsignificant chi-square statistics, RMSEA equal to or below 0.08, and a CFI above 0.90 (Kline, 2005). All fit indices were considered when determining best overall models with reported models meeting criteria for at least two fit indices.

An overall ADHD factor combining both parent and teacher ratings displayed inadequate fit ( $\chi^2[9]=164.67, p<0.001$ ; RMSEA=0.35, CFI=0.54). Therefore, the best fitting models of



ADHD symptoms resulted in two latent variables, one based on parent report and one based on teacher report. Each variable was comprised of hyperactivity/impulsivity symptoms from the DBD, inattention symptoms from the DBD, and the mean score from the Impairment Rating Scale. Fit indices are not available for just identified models (e.g., latent variables with zero degrees of freedom). In subsequent analyses, separate models were computed depending on if ADHD symptoms were reported by parents or teachers.

The mediator of emotion dysregulation was conceptualized in three different ways: the lability/negativity subscale from the ERC, the emotion regulation subscale of the ERC, and global ratings of emotion dysregulation for each of the six tasks. A latent variable encompassing all of these ratings displayed poor fit ( $\chi^2[20]=101.27, p<0.001$ ; RMSEA=0.17, CFI=0.57). Therefore, each of the three observed variables was considered as a separate mediator. After comparing the various fit statistics, the best fitting latent variable of observed emotion dysregulation was comprised of ratings from Free Play 1, Free Play 2, and River tasks.

Global ratings, peer sociometrics, self sociometrics, and staff sociometrics were four possible social outcomes represented by latent variables. Global ratings of peer rejection from the five tasks, excluding the introduction, comprised one latent variable of observed peer rejection ( $\chi^2[5]=3.651, p>0.60$ ; RMSEA=0, CFI=1). Fit statistics were examined in order to determine which sociometrics questions comprised well-fitting latent variables. These final latent variables of the sociometric questions emphasized likeability and cooperation. Three questions (“How much did you like [child]?” “How well did [child] follow the rules?” and “How much would you want to play with [child] again?”) comprised the peer sociometrics latent variable. Similarly, the self sociometric variable also included three questions (“How much do you think

the other children will want to play with you again?,” “How much do you think the other children liked you?,” and “How well did you cooperate with others?”). Lastly, the staff sociometrics latent variable included the questions, “How hard did this child make it for the group to finish tasks?,” “How annoying was this child to the other children?,” “How well did this child cooperate with others?,” and “How well did this child follow the rules?” ( $\chi^2[2]=4.12$ ,  $p>0.10$ ; RMSEA=0.09, CFI = 0.99). All ratings were coded in the negative direction with higher scores indicating worse peer relations. Again, fit statistics were not available for those with zero degrees of freedom (i.e., composed of three observed variables). These four latent variables, along with the observed variable of parent report on the SSIS, were the five possible outcome variables of this study.

### **Preliminary Analyses**

In order to guide models and better understand the relationships among the variables, preliminary correlations were calculated among predictors, mediators, and outcome variables (see Table 3.1). As expected, parent report of ADHD symptoms was significantly related to the lability/negativity subscale ( $r=0.81$ ,  $p<0.001$ ), the emotion regulation subscale ( $r=-0.39$ ,  $p<0.001$ ), and global ratings of emotion dysregulation ( $r=0.33$ ,  $p<0.001$ ). Similarly, teacher report of ADHD symptoms was significantly related to increased lability/negativity ( $r=0.32$ ,  $p<0.001$ ) and marginally related to decreased emotion regulation ( $r=-0.15$ ,  $p<0.10$ ) and increased global ratings of emotion dysregulation ( $r=0.22$ ,  $p<0.10$ ). Overall, there was clear evidence of significant positive relationships between ADHD symptoms and emotion dysregulation using multiple reporters and methods.

In terms of social outcomes, neither parent nor teacher report of ADHD was significantly related to peer sociometrics or self sociometrics ( $p>0.15$ ). Therefore, peer sociometrics and self sociometrics were not used as outcomes in the models. Parent and teacher reports were significantly related to global ratings of peer rejection, parent report on the Social Skills subscale of the SSIS, and staff sociometrics ( $r=0.27-0.44$ ,  $p<0.01$ ), so these variables were used as the social outcomes for models.

For the emotion dysregulation variables, lability/negativity and global ratings of emotion dysregulation were significantly related to both parent report on the SSIS and staff sociometrics ( $r=0.16-0.61$ ,  $p<0.05$ ). Emotion regulation was also significantly related to parent report on the SSIS ( $r=-0.52$ ,  $p<0.001$ ). Lastly, global emotion dysregulation was significantly related to global peer rejection ( $r=0.67$ ,  $p<0.001$ ). Since both predictors and mediators showed significant relationships with outcome variables, mediation models were able to be constructed.

Based on the significant relationships found among variables, models focused on lability/negativity, emotion regulation, and global ratings of emotion dysregulation as three possible mediators between parent and teacher report of ADHD symptoms and social outcomes represented by staff sociometrics, global ratings of peer rejection, and parent report on the SSIS. Further, parent and teacher report of ODD symptoms were significantly correlated to many of these variables and were thus added as moderators to model paths.

### **Emotion dysregulation as a mediator between ADHD and social outcomes**

Overall, emotion dysregulation significantly mediated between symptoms of ADHD and social outcomes in several different models. Most notably, one such model held across multiple methods and raters. As shown in Figure 3.1, parent report of ADHD symptoms was significantly

related to higher global ratings of emotion dysregulation in the playgroup ( $\beta=0.34, p<0.001$ ) and poorer ratings on staff sociometrics ( $\beta=0.44, p<0.001$ ). Additionally, higher levels of observed emotion dysregulation were related to poorer ratings on staff sociometrics ( $\beta=0.53, p<0.001$ ). This model displayed good fit ( $\chi^2[32]=45.49, p>0.05$ ; RMSEA=0.05, CFI=0.98) and had significant indirect effects indicating mediation (indirect effects=0.18,  $p<0.01$ , 95% CI:0.05-0.30). When emotion dysregulation was entered into this mediation model, the relationship between ADHD symptoms and staff sociometrics decreased ( $\beta=0.26, p<0.01$ ). Overall, using multiple methods and raters, this model provides strong evidence that emotion dysregulation is a key contributor to poor peer relations for those with ADHD.

Both lability/negativity and emotion regulation subscales significantly mediated between parent report of ADHD symptoms and parent report on the SSIS. Similarly, lability/negativity mediated between teacher report of ADHD and parent report on the SSIS. Increased number of ADHD symptoms was related to more emotion dysregulation, which was then related to lower levels of social skills. In addition, lability/negativity significantly mediated between parent report of ADHD symptoms and staff sociometrics. However, contrary to other models, more lability/negativity was significantly related to better, rather than worse, ratings on staff sociometrics. This relationship was not replicated in any other model. Lastly, global ratings of emotion dysregulation mediated between parent report of increased ADHD symptoms and higher global ratings of peer rejection. Overall, increased levels of ADHD symptoms were related to increased levels of emotion dysregulation, which then were related to worse peer outcomes.

Model results showed that parent ratings and global ratings of emotion dysregulation were able to explain the relation between parent report of ADHD and social outcomes,

represented by parent ratings, observed behavior, and staff members' sociometrics. Models held across multiple methods of assessment and multiple raters, which controlled for possible shared method or rater variance and reduced the need to run multiple models.

### **ODD as a moderator**

Based on significant correlations, parent and teacher report of ODD symptoms were investigated as moderators between ADHD symptoms and emotion regulation as well as emotion regulation and social outcomes. Each possible moderated path was tested separately. In the model examining lability/negativity as a mediator between parent report of ADHD symptoms and staff sociometrics, higher levels of ODD symptoms as reported by teachers moderated the relationship between lability/negativity and staff sociometrics (Figure 3.2). Those with low levels of ODD symptoms and high levels of lability/negativity received better staff sociometrics. Moderation was also evident in the model with parent report of ADHD symptoms, global emotion dysregulation, and global peer rejection. As shown in Figure 3.3, teacher report of ODD symptoms moderated the relationship between global emotion dysregulation and global peer rejection so that more observed emotion dysregulation was significantly related to more observed peer rejection, particularly at higher levels of ODD symptoms. There were not many instances of moderation by ODD symptoms; however, it did appear to exacerbate peer rejection when combined with emotion dysregulation.

### **Exploratory analyses of social behaviors as mediators**

Social behaviors, or social performance, are often emphasized for change during social skills training. Therefore, exploratory analyses examined both positive and negative social behaviors as possible mediators between symptoms of ADHD and social outcomes. Positive

behaviors included global ratings of prosocial behavior and the frequency of positive, sharing behaviors during the playgroup. Negative behaviors were represented by global ratings and frequency of negative behavior, frequency of aggressive behavior, and frequency of disruptive behavior during the playgroup. Social behaviors were latent variables comprised of the ratings made across each of the playgroup tasks. Overall, negative behaviors, but not positive behaviors, served as significant mediators. Higher levels of ADHD symptoms were related to increased negative behaviors, which then were related to poorer peer outcomes, such as higher global ratings of peer rejection or worse staff sociometrics. These models were significant based on both parent and teacher report of ADHD.

Once again, this mediation model displayed good fit ( $\chi^2[51]=60.75, p>0.15$ ; RMSEA=0.04, CFI=0.99) and was significant across three different sources: parent or teacher, observations made by research assistants, and staff members. For example, in Figure 3.4, teacher ratings of ADHD were significantly related to a higher frequency of negative behaviors in the playgroup ( $\beta=0.36, p<0.001$ ) and poorer ratings on staff sociometrics ( $\beta=0.34, p<0.001$ ). A higher frequency of negative behavior was also significantly related to poorer ratings on staff sociometrics ( $\beta=0.50, p<0.001$ ). When the frequency of negative behavior was entered into the model as a mediator, the direct relationship between teacher ratings of ADHD and staff sociometrics was no longer significant ( $\beta=0.15, p>0.10$ ) with significant indirect effects indicating mediation (indirect effects=0.18,  $p<0.01$ , 95% CI:0.08 to 0.28). Therefore, using both multiple methods and raters, there was strong evidence that negative behaviors also accounted for the relation between symptoms of ADHD and peer outcomes.

Similar to the emotion dysregulation models, there was some evidence of moderation based on both parent and teacher report of ODD. However, there was no consistent or meaningful pattern to such moderation. For example, more ODD symptoms and a higher frequency of negative behavior were related to poorer social outcomes in one model but better peer relations in another model. Therefore, these relationships were not interpreted.

Table 3.1

*Correlations Among Variables*

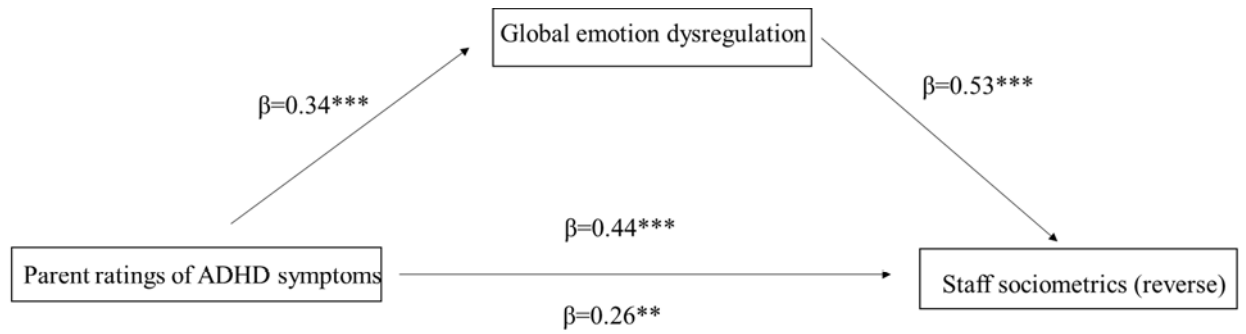
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Parent report of ADHD	1												
2. Teacher Report of ADHD	0.39** *	1											
3. Liability/Negativity	0.81** *	0.32* **	1										
4. Emotion Regulation	- 0.39** *	-0.15†	- 0.58* **	1									
5. Global Emotion Dysregulation	0.33** *	0.22†	0.08	0.03	1								
6. Parent report of Social Skills (reverse)	0.57** *	0.28* **	0.59* **	- 0.52* **	0.16*	1							
7. Global Acceptance	0.14	0.15	0.03	0.10	0.08	-0.05	1						
8. Global Rejection	0.27**	0.33* *	0.04	0.03	0.67* **	0.22*	-0.16†	1					
9. Peer Sociometrics	-0.08	0.03	-0.08	0.05	0.15†	-0.02	-0.10	0.35* **	1				
10. Self Sociometrics	0.06	0.07	0.09	-0.14	0.17	0.17†	-0.05	0.20†	0.53* **	1			
11. Staff sociometrics	0.44** *	0.34* **	0.20*	0.05	0.61* **	0.27* *	-0.02	0.83* **	0.28* *	0.21†	1		



12. Parent report of ODD	0.77** *	0.16†	0.83**	- 0.48**	0.15†	0.51**	-0.03	0.10	0.02	0.21†	0.24*	1	
13. Teacher report of ODD	0.16†	0.69**	0.29**	-0.17*	0.13	0.30**	0.20*	0.24*	0.09	0.13	0.25**	0.23*	1

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† $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$



$\chi^2(32) = 45.49, p > 0.05$ ; RMSEA = 0.05, CFI = 0.98, indirect effects = 0.18,  $p < 0.01$ , 95% CI: 0.05 to 0.30

*Figure 3.1.* Global emotion dysregulation mediates between parent ratings of ADHD symptoms and staff sociometrics (reverse)

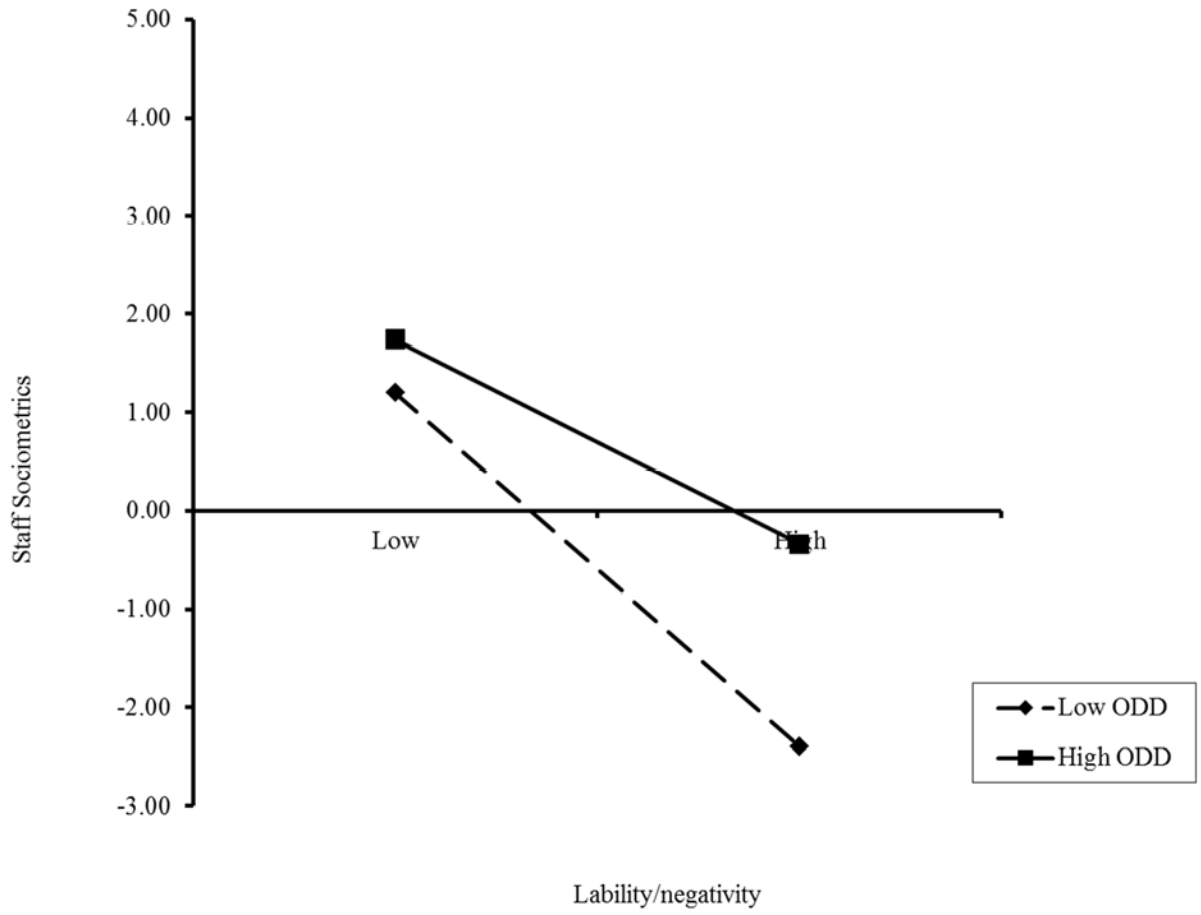


Figure 3.2. Teacher report of ODD symptoms moderates between liability/negativity and staff sociometrics

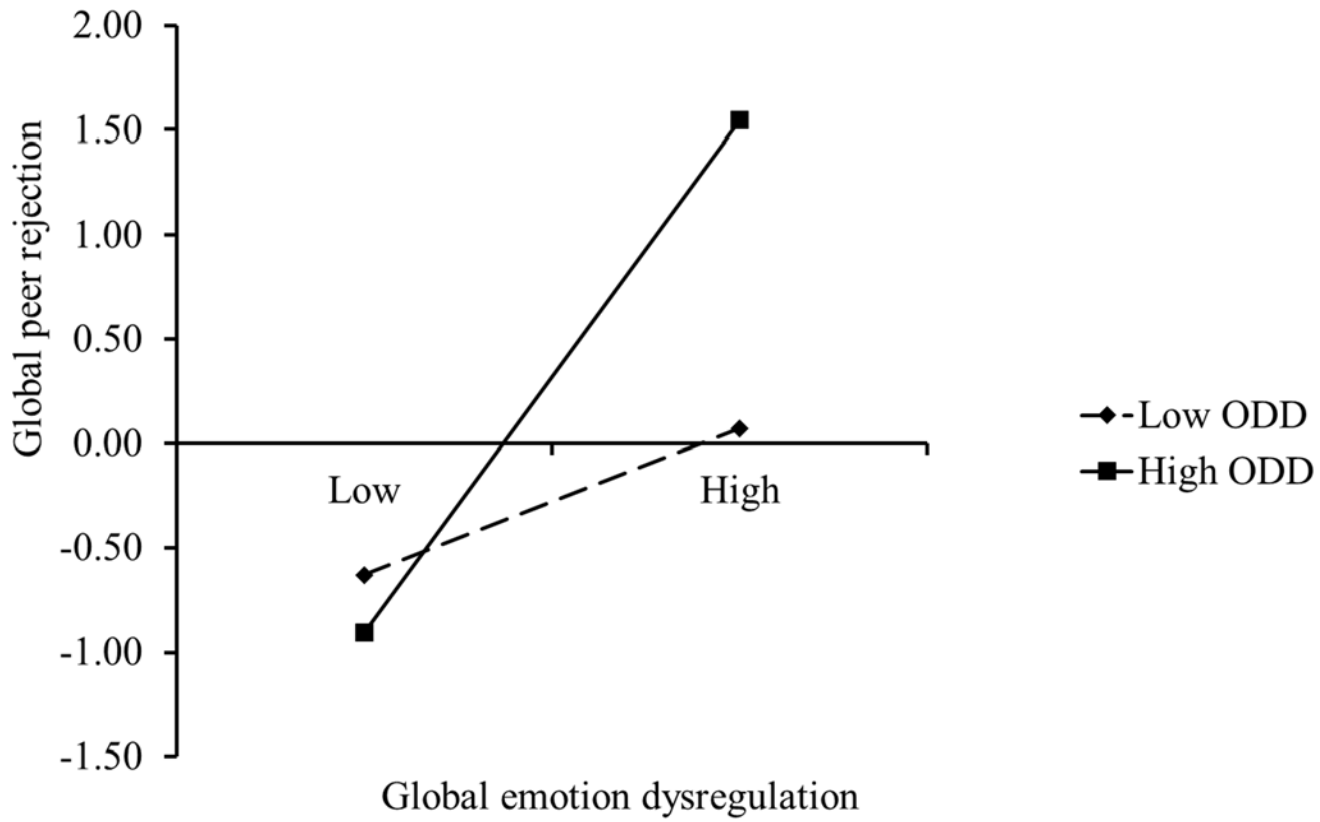
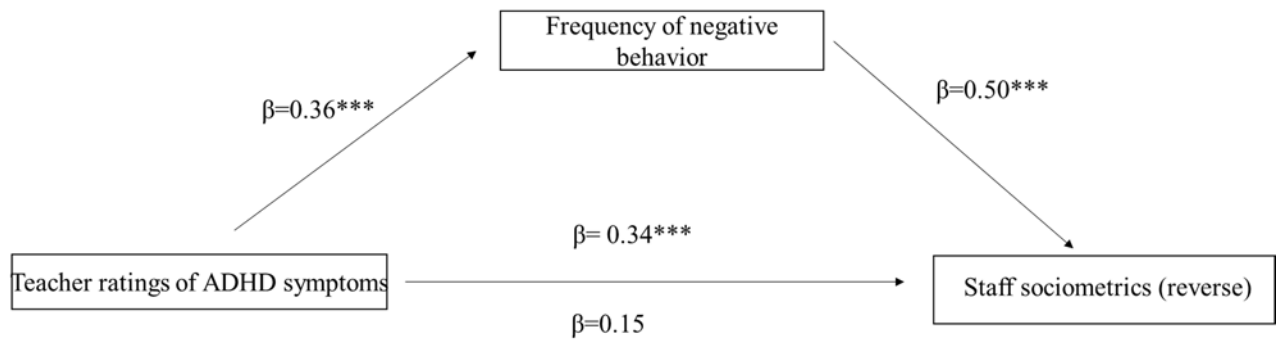


Figure 3.3. Teacher report of ODD symptoms moderates between global emotion dysregulation and global peer rejection



$\chi^2(51)=60.75, p>0.10$ ; RMSEA=0.04, CFI = 0.99, indirect effects=0.18,  $p<0.01$ , 95%CI:0.08 to 0.28

*Figure 3.4.* Frequency of negative behavior mediates between teacher ratings of ADHD symptoms and staff sociometrics (reverse)

## Chapter 4: Discussion

Peer relations are a significant area of weakness for children with ADHD. Though remediation has primarily focused on social skills training, the current study argues for the importance of emotion regulation skills. Similar to previous studies, increased number and severity of ADHD symptoms were significantly related to increased emotion dysregulation (Cole et al., 1996; Walcott & Landau, 2004). These findings provide support for Barkley's (2009) argument that emotion dysregulation is a key feature of ADHD. Moreover, in the current sample, ADHD symptoms were related to both parent-reported emotion dysregulation and behavioral observations of emotion dysregulation, suggesting that emotion dysregulation is consistently related to ADHD symptoms across situations and reporters. These results emphasize the strong link between symptoms of ADHD and emotion dysregulation.

Further, emotion dysregulation significantly mediated between symptoms of ADHD and peer problems. Overall, higher levels of ADHD symptoms were related to more emotion dysregulation, which was then related to higher levels of observed peer rejection. Though one model found that emotion dysregulation was positively related to better social outcomes, this result was not replicated across other models. In this model, there was a high correlation between parent ratings ( $r=0.81$ ) of ADHD symptoms and emotion dysregulation. Such multicollinearity between variables and shared rater variance may have led to this anomalous finding. Previous work studying emotion dysregulation and ADHD had been constrained to rating scales and limited reporters (Bunford, Evans, Becker, & Langberg, 2014), whereas the current work expanded those results to include multiple methods and reporters. Emotion dysregulation was explored

using parent report and behavioral observations with peer problems measured using parent report, behavior coding, and staff ratings. The model remained significant across multiple reporters: parents, teachers, research assistants, and staff members. Such agreement across raters and situations reinforces the idea that emotion dysregulation is a key mediator for peer problems, especially given the difficulty of establishing cross-informant agreement for childhood psychopathology (Achenbach, McConaughy, & Howell, 1987; De Los Reyes & Kazdin, 2005). Based on Gresham's (1988) model of peer relations, this self-control deficit in emotion regulation seems to be an important component of children with ADHD's peer problems.

Exploratory analyses also included observed social behaviors as possible mediators between ADHD symptoms and peer problems. Interestingly, positive behaviors were not significantly related to symptoms of ADHD or peer problems. However, this is not surprising given that children with ADHD make as many, if not more, social overtures as their comparison peers (Wheeler & Carlson, 1994). Rather, negative behaviors, such as disruptive or aggressive behavior, significantly explained the relation between ADHD symptoms and peer problems, with results consistent across both parent and teacher report of ADHD symptoms. This finding has implications for current social skills treatment, which often focuses on teaching more prosocial behavior, such as starting conversation or sharing. Perhaps one of the deficits of social skills training is the emphasis on positive, rather than negative, behaviors. Social skills training may be more efficacious if the focus was more on reducing negative behaviors, including emotion dysregulation.

The proposed moderation of the model by ODD symptoms was limited. In two models, higher levels of both observed emotion dysregulation and teacher reported ODD symptoms were significantly related to more peer rejection. There was also some evidence of moderation in the social behaviors models, but no meaningful pattern emerged. These results may be due to the restricted range of ODD symptoms. Though ODD symptoms were not a rule-out, children were not specifically recruited to have a variety of ODD symptoms. Moreover, it is possible that ODD was not properly conceptualized in the model and may be more relevant as a moderator between ADHD symptoms and peer problems or even as a mediator. Future work should continue to investigate the nature of the relationship between ODD symptoms and emotion dysregulation.

Surprisingly, peer ratings were not a significant social outcome in models of emotion dysregulation and social behaviors. Peer ratings were not significantly related to parent or teacher report of ADHD. Similarly, though less surprising given that children with ADHD have a positive illusory bias (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007), self-report of peer problems was also not a significant outcome. However, cross-informant agreement was found among adults (e.g., parents, research assistants, staff), perhaps indicating differences in what adults and children find relevant for peer relations. It is possible that if children had been with familiar peers or had repeated, longer peer interactions, peer ratings would emerge as more relevant outcomes. Another possible reason for this lack of effect was the placement of a snack break before sociometrics were completed, perhaps positively priming children's ratings. Further, peer ratings were collapsed across children with and without ADHD. Given the poor social awareness of



children with ADHD, it is possible that their ratings may not have been valid. Future work should differentiate ratings based on diagnostic group. However, peer ratings were significantly correlated to other measures collected during the playgroup, such as global ratings or staff ratings, indicating the validity of the sociometric questions. Peer ratings require further study in order to ascertain what characteristics peers believe are important to positive social outcomes.

### **Implications**

These results have important clinical implications for current social skills treatment for children with ADHD. Whereas current social skills treatment focuses on social cognition and positive behaviors, the current study suggests that a more relevant focus may be on emotion regulation and other negative behaviors. Children may benefit more from training on emotion recognition, coping skills, and frustration management. Moreover, preliminary results from an emotion regulation group have found significant decreases in externalizing behavior, emotion dysregulation, and associated impairment by the end of the group (Rosen, Loren, & Epstein, 2010). Additionally, instead of increasing positive behaviors, a more fruitful focus may be on increasing self-control and inhibition in order to reduce negative behaviors, such as aggression or emotional outbursts. Changing the focus of social skills treatment to emotion regulation could lead to more consistent and tangible gains in children's social outcomes.

### **Limitations**

Though the study combined multiple methods and reporters to analyze results, it is not without limitations. There was only one significant model relating emotion dysregulation and social outcomes based on teacher report of ADHD symptoms. These

limited results may be because teachers observe children in a more structured setting in the presence of familiar peers, giving children less opportunity for emotional outbursts. Children may be able to better inhibit their emotions in the presence of familiar peers due to concerns of social rejection. Thus, the relation between teacher report and emotion dysregulation still needs to be further explored. Another limitation was that analyses did not control for possible group dynamics. Within each group, there may have been specific events or behaviors that evoked different peer interactions or reactions. Moreover, differences in groups may have occurred based on gender or size. Future analyses should account for group differences as a covariate. As noted before, peer sociometrics were not a significant social outcome and need to be explored further. Lastly, the design of this study was cross-sectional, rather than longitudinal or experimental, meaning that causal conclusions cannot be made. Future research may utilize confederates within playgroups in order to display a range of emotion dysregulation and examine the impact of such behavior on peer relations. Treatment studies could also focus on targeting emotion dysregulation and investigate how peer status is changed, if at all, post-treatment. However, the results of this study help narrow the focus onto specific social mediators that could be studied longitudinally or experimentally in the future.

## **Conclusion**

Children with ADHD struggle with rapid and consistent peer rejection (Hoza, 2007). The current study used multiple methods and raters to determine if emotion dysregulation serves as a relevant mediator between symptoms of ADHD and peer rejection. It was found that those with more symptoms of ADHD experience higher levels

of emotion dysregulation, which is related to more observed peer rejection. Moreover, observed negative behaviors, such as aggressive or disruptive behavior, also explain the relationship between ADHD symptoms and observed peer rejection. These results have important implications for treatment. Current social skills training emphasizes increasing positive behaviors with negligible improvements found (Antshel & Remer, 2003).

Instead, more relevant targets for treatment may be increasing emotion regulation and inhibiting negative behaviors. Focusing on emotion regulation training during treatment could lead to larger and more sustained benefits for children with ADHD.

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- Rosen, P.J., Milich, R. & Harris, M.J. (2012). Dysregulated negative emotional reactivity as a predictor of chronic peer victimization in childhood. *Aggressive Behavior*, 38, 414-427. doi: 10.1002/ab.2143
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# Christine Anne Lee

## EDUCATION

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June 2012            **B.A. in Psychology**  
Northwestern University; Evanston, IL  
Minor in Chinese Language and Culture  
Cum laude  
Thesis: *Comparison of acculturation and parenting style on behavioral inhibition in European American and Chinese American toddlers.*  
Advisors: Karl S. Rosengren, Ph.D  
              Sarah C. Mangelsdorf, Ph.D.  
GPA: 3.75/4.00  
Study Abroad: Tsinghua University, Beijing, China, Summer 2010

## PROFESSIONAL POSITIONS

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July 2014-present            **Therapy Groups Coordinator**  
Jesse G. Harris Jr. Psychological Services Center

April 2014- Present            **Assessment Trainee**  
Jesse G. Harris Jr. Psychological Services Center  
Supervisors: Michelle M. Martel, Ph.D  
                  David Susman, Ph.D  
                  Greg Smith, Ph.D

January 2014- Present            **Group Therapist**  
Jesse G. Harris Jr. Psychological Services Center  
Supervisors: Mary Beth Diener McGavran, Ph.D  
                  Michelle M. Martel, Ph.D.

August 2013– Present            **Individual Therapist**  
Jesse G. Harris Jr. Psychological Services Center  
Supervisors: Mary Beth Diener McGavran, Ph.D.  
                  Lindsey Jasinski, Ph.D.

July 2013– June 2014            **Assessment Trainee**  
Amend Psychological Services  
Supervisor: Edward R. Amend, Psy.D

## **GRANTS, SCHOLARSHIPS, AND OTHER FUNDING**

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### *University of Kentucky*

- 2013–present      **Research Assistant**, Center for Drug Abuse Research Translation  
2012–2015        **Recipient**, Graduate School Multi-Year Fellowship  
2012–2015        **Recipient**, Daniel R. Reedy Quality Achievement Award

### *Northwestern University*

- 2011                **Recipient**, Undergraduate Research Grant  
2011                **Recipient**, Weinberg College of Arts and Sciences Summer Research Grant  
2008–2012        **Recipient**, Lola and William Duff scholarship  
2008                **Recipient**, National Merit Scholarship

## **HONORS AND AWARDS**

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### *University of Kentucky*

- 2015                **Recipient**, 2<sup>nd</sup> place in Student Poster Competition at Children at Risk Research Conference  
2015                **Recipient**, Society for Prevention Research Minority Travel Award  
2015                **Recipient**, Graduate School Travel Award  
2013, 2014, 2015   **Recipient**, Department of Psychology Travel Award

### *Northwestern University*

- 2012                **Recipient**, Asian American Psychological Association Division of Students Undergraduate Research Award  
2008–2012        **Recipient**, Dean's List

## **PUBLICATIONS**

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- Brown, C.S. & Lee, C.A. (2014). Impressions of immigration: Comparisons between immigrant and non-immigrant children's immigration beliefs. *Analyses of Social Issues and Public Policy*. doi: 10.1111/asap.12067

## **PRESENTATIONS**

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- Lee, C.A., Martel, M.M., Derefinko, K., Milich, R., & Lynam, D. (2015, May). *Longitudinal Analysis of ADHD Symptoms, Impulsivity, and Substance Use in a College Sample*. Poster presented at the Society for Prevention Research, Washington, D.C.
- Lee, C.A., Odom, J., Milich, R., Lorch, E., Evans, S.W., Flory, K., ... & Van Horn, L. (2015, March). *Moderation of ADHD Subtype Symptoms and Peer Rejection by Anxiety*. Poster presented at the Society for Research in Child

Development, Philadelphia, PA.

- Lee, C.A.**, Milich, R., Lorch, E., Evans, S.W., Flory, K., Owens, J.S., & Van Horn, L. (2015, February). *Cross-Informant Reports of Children's Social Competence*. Poster presented at Niagara in Miami Conference on Evidence-Based Approaches for Child and Adolescent Mental Health, Miami, FL.
- Doran, M.M., **Lee, C.A.**, Boyd-Hayden, A., Van Neste, J., Lorch, E.P., Milich, R., . . . & Van Horn, L. (2014, May). *Goal comprehension as a mediator between ADHD symptoms and social functioning*. Poster presented at Midwestern Psychological Association, Chicago, IL.
- Poore, H.E., **Lee, C.A.**, Van Neste, J., Holt, N., Milich, R., Lorch, E., . . . & Van Horn, L. (2014, May). *Emotional understanding as a mediator of ADHD symptoms and social functioning*. Poster presented at Midwestern Psychological Association, Chicago, IL.
- Lee, C.A.**, Milich, R., Lorch, E., Evans, S.W., Flory, K., Owen, J.S., & Van Horn, L. (2013, November). *Cross-situational reliability and validity of observed emotion dysregulation*. Poster presented at the Association for Behavior and Cognitive Therapies: Special Interest Group Exposition, Nashville, TN.
- Walco, D., French, J., Tumuluru, S., Bruton, C., Brailas, N., **Lee, C.**, . . . & Rosengren, K. (2012, June). *Stability of grasping errors over a two-month time period*. Poster presented at the International Conference on Infant Studies, Minneapolis, MN.

## **RESEARCH EXPERIENCE**

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- |                      |  |
|----------------------|--|
| May 2013–present     | <b>Department of Psychology, University of Kentucky</b><br>Graduate Research Assistant (Clinical)<br>Supervisors: Richard Milich, Ph.D., Karen J. Derefinko, Ph.D.   |
| August 2012–present  | <b>Department of Psychology, University of Kentucky</b><br>Graduate Research Assistant (Clinical)<br>Supervisors: Richard Milich, Ph.D.<br>Elizabeth P. Lorch, Ph.D. |
| Jan. 2011–Jun. 2012  | <b>Department of Psychology, Northwestern University</b><br>Undergraduate Research Assistant (Developmental)<br>Advisor: Karl S. Rosengren, Ph.D.                    |
| Jan. 2011– Jun. 2011 | <b>Department of Psychology, Northwestern University</b><br>Undergraduate Research Assistant (Clinical)<br>Advisor: Robin Nusslock, Ph.D.                            |

Jan. 2010 – Dec. 2010      **Department of Psychology, Northwestern University**  
Undergraduate Research Assistant (Clinical)  
Advisor: C. Emily Durbin, Ph.D.

## **TEACHING/MENTORING EXPERIENCE**

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*Teaching Experience:*

2015                      **Department of Psychology, University of Kentucky**  
Guest Lecturer for Undergraduate Abnormal Psychology Course

2015                      **Department of Psychology, University of Kentucky**  
Guest Lecturer for Undergraduate Child Psychopathology Course

2014-2015              **Department of Psychology, University of Kentucky**  
Guest Lecturer for Undergraduate Field/Community Based Learning  
Course

2014                      **Department of Psychology, University of Kentucky**  
Guest Lecturer for Undergraduate Research Methods Course

*Mentoring Experience:*

Holly Poore	(2013 – 2014)
Madeline Doran	(2013 – 2014)
Jaye Odom	(2014 – present)
Angelia Davis	(2015 – present)
Joelene Goh	(2015 – present)
Brienna Meffert	(2015 – present)