ATTACHMENT-RELATED DIFFERENCES IN SELF-REGULATION ACROSS CHILDHOOD

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Infant attachment organization and security has been associated with externalizing behaviors and poor self-regulatory ability in early childhood (Erickson, Sroufe, & Egeland, 1985; Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman 2010). Infant attachment security and organization has also been associated with behavioral difficulties in middle childhood (Fearon et al., 2010). There has also been support for the continuity of disruptive behaviors and behavioral regulation from early to middle childhood (Bennett et al., 1999; Kjeldsen et al., 2016; Moreland & Dumas, 2008). These associations are also significant for children who have experienced early adversity (Erickson et al., 1985; Shaw & Vondra, 1995; Shaw, Owens, Vondra, Keenan, & Winslow, 1996; Sroufe, 1983). The current study examined whether infant attachment security and organization was associated with measures of self-regulation in both early and middle childhood. The final analyses revealed if the measure of self-regulation in early childhood predicted the use of specific regulatory behaviors in middle childhood. Analyses revealed a significant correlation between infant attachment security and the use of active self-regulation in middle childhood (t = -2.09, p < .05), and significant associations between the measure of early childhood self-regulation and the use of active self-regulation (r = -.36, p < .05), active distraction (r = .36, p < .05), and limit testing behaviors in middle childhood (r = .27, p < .05; r = .30, p < .05).

Chapter 1

LITERATURE REVIEW

Children who are at risk for maltreatment (emotional, physical, and sexual abuse and neglect) are at increased likelihood for experiencing emotional and behavior problems throughout childhood (Godinet, Li, & Berg, 2014; Graziano, Keane, & Calkins, 2010). These problems may begin with the caregiver-child relationship, wherein infants are more likely to form maladaptive attachments than children who did not experience early adversity (van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Many studies have found concurrent evidence for associations between attachment classifications and emotional and behavioral problems (Cassidy, 1994; Groh, Roisman, van Ijzendoorn, Bakermans-Kranenburg, & Fearon, 2012), but there is less consistent evidence for the longitudinal associations of infant attachment and behaviors in early or middle childhood.

Infant Attachment

Infant attachment has often been studied as a predictor of behavior from early childhood through adulthood. Parent-infant attachment was first defined by John Bowlby, who described this phenomenon as an offspring's expectations of his or her caregiver's warmth and availability. This attachment figure is a supportive base from which the infant can explore the world around him or her, and is also a safe haven for the infant to return to in times of stress (Bowlby 1969). As infants interact with their caregiver and their environment, they begin to form mental representations of what

they can expect from their caregiver regarding her role as a supportive base and safe haven (Bowlby 1969). Mary Ainsworth and Silvia Bell (1970) furthered Bowlby's groundbreaking theory by providing evidence for the existence of different qualities of attachment that arise from the expectations that the infant has formed about their caregiver, and identified three attachment classifications: secure, insecure-avoidant, and insecure- resistant. Securely attached infants are able to go to their caregivers when distressed, receive comfort, and be soothed by that comfort, so that the negative emotions are alleviated. Infants with an insecure-avoidant attachment do not generally go to their caregiver when distressed, and appear indifferent. Infants with an insecure-resistant attachment become visibly distressed when separated from their caregivers, and are not calmed down by the caregiver's return, appearing angry and inconsolable (Ainsworth & Bell, 1970). Other researchers continued to refine Bowlby's theory, such as Main and Solomon (1990) who identified a fourth attachment classification: disorganized. Disorganized attachments are characterized by contradictory behaviors when under stress, such as moving towards the caregiver when distressed, freezing or stilling, or other confusing behaviors (Main & Solomon, 1990). An organized attachment, even when insecure, still indicates some sort of pattern of behavior that the child may use to cope; disorganized attachments are not characterized by a distinct pattern of behavior.

Considering these four attachment classifications, attachment may be studied by comparing the four categories, secure versus insecure attachment classifications, or organized versus disorganized attachment classifications. Through these perspectives of the study of attachment, researchers have identified many behaviors and variables that are associated with attachment, both longitudinally and concurrently. An early

area of interest was that of self-regulation. Though there have been many definitions of this construct over the years, one of the most widely accepted is similar to Thompson's (1994) definition of emotion regulation: the internal and external processes involved in assessing and manipulating one's emotional affect and states to achieve one's goals. When talking about self-regulation, we can broaden this definition to encompass the related but somewhat distinct domains of emotion and behavior. These areas overlap considerably in early years, when children are more likely to use overt behaviors to express their emotional states than when they are older. There are behavioral displays of emotion and also emotional control of behavior. Infants, being unable to rely on themselves and their own cognitive abilities to cope with negative emotional experiences and adaptively control their behavior, must go to an external source of regulation: the primary caregiver. Infants who have secure attachments to their caregivers theoretically develop adaptive self-regulatory capabilities (Calkins & Leerkes, 2011). Because they are able to be soothed by their caregivers, and they expect to be soothed by their caregivers, these infants are not exposed to chronic negative emotions and are able to learn appropriate strategies to regulate their emotional states and achieve their goals over the course of development.

Children with deficits in self-regulation struggle in a variety of domains, which may persist and grow into more serious concerns. These problems may include both cognitive and behavioral issues that affect functioning in areas such as personal and family life or school readiness (Cassidy, 1994; Graziano et al., 2010; Eisenberg, Valiente, & Eggum, 2010; Hofer, Busch, & Kärtner, 2010). Left unaddressed, children with self-regulation problems are at higher risk for becoming adolescents who engage in high-risk behaviors and who show internalizing and externalizing symptomology,

which may further develop into more severe psychopathology (Buckner, Mezzacappa, & Beardslee, 2009; Utendale & Hastings, 2010). At the extreme, those who cannot control their emotions adaptively and by extension their behavior may become involved with the criminal justice system or sentenced to juvenile detention centers, potentially the beginning of an endless cycle. Given the social burden represented by those with deficits in self-regulation, it is important to identify precursor variables so that appropriate intervention may be implemented with those who are at high-risk.

Attachment and Early Childhood Behavior Regulation

It has been theorized that attachment may be related to problem behaviors through the development of poor self-regulatory strategies and abilities (Cassidy, 1994). "Problem behaviors" may refer to both internalizing behaviors (such as depressive or anxious symptomology) and externalizing behaviors (disruptive or antisocial tendencies), although attachment has been more strongly related to the latter than the former (Groh et al., 2012). One of the earliest studies on longitudinal associations of infant attachment security by Erickson, Sroufe, and Egeland (1985) found that insecure attachment classifications were associated with externalizing problems as rated by teachers when children were about 4 years old. There has also been support for the predictive ability of attachment disorganization for externalizing behaviors, especially in boys (Fearon et al., 2010; Burgess, Marshall, Rubin, & Fox, 2003), and more general behavior problems (Pauli-Pott, Haverkock, Pott, & Beckmann, 2007). Similar findings have been replicated in samples of high-risk infants and children at younger ages looking at concurrent associations of attachment classification and behavior problems (Erickson et al., 1985; Shaw & Vondra, 1995; Shaw et al., 1996; Sroufe, 1983). Other studies have also found converse results, such

that attachment security or organization may predict positive behaviors and coping strategies (McElwain, Holland, Engle, Wong, & Emery, 2014).

The extensive literature on childhood behavior and attachment has supported the association between attachment and behavioral in early childhood in a variety of ways: by looking at attachment organization and security, and by looking at subsequent and concurrent associations. Child behavior problems are often examined using parent report, such as the Child Behavior Checklist (CBCL) (Achenbaum, 1991; Greenbaum & Dedrick, 1998). However, parent report measures are vulnerable to bias, and may result in the parent over or under-reporting the behaviors (Phillips & Lonigan, 2010). The present study sought to improve upon this methodology by using independently-coded observations.

Attachment and Middle Childhood Behavior Regulation

Studies of attachment disorganization and security have also considered longitudinal outcomes that are present during middle childhood. Although attachment security stability across childhood is not necessarily robust or guaranteed (Beijersbergen, Juffer, Bakermans-Kranenburg, & van Ijzendoorn, 2012; Vondra, Hommerding & Shaw, 1999), some studies have shown that attachment may have a predictive or even deterministic role in middle childhood behavioral problems. Early research by Lyons-Ruth (1997) showed that infant attachment in conjunction with slow mental development has been linked to externalizing problems in late childhood. Fearon et al. (2010) conducted a meta-analysis in which both insecure and disorganized attachment predicted behavior in middle childhood. This meta-analysis included studies with children who were up to 12 years old, but did not show a significant effect of child age on effect sizes. Alternate evidence has shown that a

secure attachment with either mother or father at 15 months was a protective factor against behavior problems in middle childhood, with convergent evidence showing that children who were insecurely attached to both parents were at the highest risk for behavior problems at 8 years old (Kochanska & Kim, 2012). Kochanska and Kim (2012) reported in a separate study that infant attachment security acts as a potential moderator of different social-developmental trajectories, which include rule-breaking conduct in relation to power assertions by the parent and various maladaptive behaviors exhibited by the child, meaning that children with a certain attachment classification are more likely to exhibit specific social-developmental trajectories than children with a different attachment classification. However, they reported few long-term main effects of attachment security.

There appears to be more evidence for a relationship between attachment and behavior problems when these variables are assessed concurrently than when these variables are assessed longitudinally. Given the findings that attachment may be unstable across childhood, it is not surprising that researchers have found more consistent evidence for associations between these domains within one developmental period than between attachment and behavior across multiple developmental stages. Insecure attachments in children at six years of age were found to be associated with mother, teacher, and child-reported externalizing problems at eight years of age (Moss et al., 2006). A similar and more recent finding by O'Connor, Scott, McCormick, and Weinberg (2014) also found an association between attachment security and both internalizing and externalizing symptomology in middle childhood, but highlighted the importance of teacher-child attachment relationships in addition to mother-child attachments. As children develop, their social worlds expand within the school

environments, and their relationships outside of the family become more significant influences on their behaviors.

Trajectory of Childhood Behavior Regulation

Children are at their most disruptive or physically aggressive when they are around two or three years old (Tremblay, 2000). After this, most children's behavior de-escalates into what may be considered a normative range of behavior. The literature has been inconsistent in providing evidence for the continuity of conduct problems across childhood and adolescence (Moreland & Dumas, 2008; Bennett et al., 1999). This may be due to many different factors, such as the samples used, time period, or cultural area, so more recent studies have sought to further define these inconsistencies. There has been evidence for both trait-based aggressive behavior (Frick & Morris, 2004) and the role that external, environmental factors play in the development of disruptive tendencies (Bornovalova et al., 2014). Moffitt (1993) provided support for the existence of multiple trajectories in the development of conduct problems, with a distinction between onset in childhood and onset in adolescence, which may explain the difference between trait-based aggressive behavior and environmentally-reinforced aggression. Additionally, each of these trajectories may be characterized either as life-course-persistent or limited, such that the behavioral problems will fade as the child or adolescent develops (Moffitt, 1993; Sentse, Kretschmer, Haan, & Prinzie, 2016).

When considering recent and historic evidence together, it would appear that there are both environmental and biological moderating variables that affect whether or not disruptive behaviors persist across childhood. There are also differences in persistence between clinical and community samples of children (Faris, Nicholson,

Borkowski, & Whitman, 2011), and boys' disruptive behaviors tend to persist more so than girls' (van Domburgh, Leober, Bezemer, Stallings, & Stouthamer-Loeber, 2009; Broidy et al., 2003). Especially when children exhibit high stability of non-normative behavioral trends they are at risk for psychopathology in addition to both internalizing and externalizing problems (Kjeldsen et al., 2016). Regardless of the various paths that behavioral development may take, there have been many studies that do not control for either onset or persistence in the past decade that have found associations between various child behaviors and outcomes from childhood to adolescence and into young adulthood. Additionally, when considering a sample of children who have experienced early adversity and who therefore exhibit a higher risk for regulatory problems (Thompson & Calkins, 1996), it would appear that children may exhibit more stable trajectories of behavior problems across childhood than children who did not experience early adversity.

The Present Study

Because of the mixed literature on the association between attachment and internalizing symptomology, the present study focused primarily on the association between attachment and externalizing symptomology and use of regulatory strategies. This study aimed to expand the literature on longitudinal associations of attachment in the domain of self-regulation, as well as provide additional evidence for behavioral continuity across childhood. It also sought to improve the methodologies employed in previous studies by using observational assessments of self-regulatory behaviors across childhood. The specific self-regulatory behaviors exhibited in middle childhood that were chosen for analyses were based on their relevance and similarities to the constructs captured in the behavioral measure in early childhood. Three main

hypotheses were tested: (1) both secure and organized attachment classifications would be associated with lower behavioral difficulties in early childhood, (2) secure and organized classifications would be associated with lower regulatory difficulties in middle childhood, and (3) behavioral difficulties in early childhood would be positively associated with regulatory difficulties in middle childhood.

Chapter 2

METHODS

Participants

This study was conducted within a larger research project with a foster care diversion program. Caregivers and their children were recruited for the study through referrals by agencies in partnership with Child Protective Services and the city's Child Welfare agency. The total sample included 179 children. For 141 children, data were available for the Strange Situation; for 161 children, data were available for the Disruptive Behavior Diagnostic Observation Schedule (DB-DOS); for 65 children, data were available for the Disappointing Gift. This sample is significantly smaller because participants are still being contacted to complete their participation. Not all participants completed all three tasks used in the analyses because it was not always possible to get in contact with participants and some had terminated their involvement in the study. For demographic information of participants in each of the three measures, see Table 1. The samples and demographics for each measure vary slightly because not all caregiver-child dyads were able to complete the three measures involved in the study, although all were recruited for the foster care diversion program. Demographic information was collected when participants were infants, shortly before they completed the first measure.

Table 1 Demographic variables for the subsamples of participants that completed each measure.

Column1	STR Sample	DBD Sample	DIS Sample
n	141	161	65
	n (%)	*n* (%)	*n* (%)
Child Gender			
Female	64 (45.4)	71 (44.1)	31 (47.7)
Male	77 (54.6)	79 (49.1)	34 (52.3)
Child Ethnicity			
African American	88 (62.4)	98 (60.9)	39 (60.0)
Caucasian	26 (18.4)	28 (17.4)	13 (20.0)
Biracial	27 (19.1)	24 (14.9)	13 (20.0)
Child Ethnicity, Hispanic			
Non-Hispanic	111 (78.7)	119 (73.9)	52 (80.0)
Hispanic	30 (21.3)	31 (19.3)	13 (20.0)
Caregiver Gender			
Female	136 (96.5)	145 (90.1)	63 (96.9)
Male	5 (3.5)	5 (3.1)	2 (3.1)
Caregiver Ethnicity			
African American	90 (63.8)	101 (62.7)	40 (61.5)
Caucasian	42 (29.4)	40 (24.8)	21 (32.3)
Biracial	8 (5.7)	9 (5.6)	4 (6.2)
Caregiver Ethnicity, Hispanic			
Non-Hispanic	114 (80.9)	123 (76.4)	54 (83.1)
Hispanic	27 (19.1)	27 (16.8)	11 (16.9)
Caregiver Education			
Some High School	86 (61.0)	83 (51.6)	40 (61.5)
Completed High School	38 (27.0)	45 (28.0)	20 (30.8)
Some College	6 (4.3)	8 (5.0)	4 (6.2)
Completed College	1 (0.7)	1 (0.6)	0
More Than College	1 (0.7)	1 (0.6)	1 (1.5)
Not Reported	9 (6.4)	12 (7.5)	0
Caregiver Income (per year)			
Less than $10,000	83 (58.9)	85 (52.8)	37 (56.9)
$10,000-$19,999	21 (14.9)	20 (12.4)	12 (18.5)
$20,000-$29,999	12 (8.5)	13 (8.1)	6 (9.2)
$30,000-$39,999	5 (3.5)	8 (5.0)	3 (4.6)

$40,000-$59,999	2 (1.4)	2 (1.2)	1 (1.5)
Not Reported	18 (12.8)	22 (13.7)	6 (9.2)
Welfare			
Received	95 (67.4)	94 (58.4)	50 (76.9)
Not Received	30 (21.3)	37 (23.0)	12 (18.5)
Not Reported	16 (11.3)	19 (11.8)	3 (4.6)

Procedure

This study occurred within the context of a larger longitudinal study conducted by Mary Dozier and colleagues at the University of Delaware that looked at efficacy of the Attachment and Biobehavioral Catch-up Intervention, an intervention designed to enhance caregiver sensitivity (see Bernard, Dozier, Bick, Lewis-Morrarty, Lindhiem, & Carlson, 2012). The procedures relevant to the tasks used in these analyses are described below.

The Strange Situation Procedure

Infants and their primary caregiver were assessed using the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978) in a laboratory setting and coded by master coders. The Strange Situation has been validated for use with children between 12 and 24 months, though researchers extended the age range and assessed infants between 11 and 36 months old. The addition of children who were assessed outside of the validated age range did not significantly affect the results.

In this procedure, infants are guided through a series of separations and reunions with their primary caregivers, partially in the presence of a stranger. It begins with the caregiver and infant alone in a room with age-appropriate toys for the infant to explore. After a few moments, a stranger enters the room and briefly converses with the caregiver before approaching the infant. The caregiver leaves the room inconspicuously while the stranger stays with the infant. After a few minutes, the caregiver re-enters the room and greets the infant as he or she normally would, comforting the infant if necessary. The stranger leaves, and then after a few minutes

the caregiver leaves again so that the infant is alone in the room. After a short while, the stranger re-enters the room and engages the infant, providing consolation if necessary. Then the caregiver re-enters the room, greets the infant a second time, and the task is complete.

The Disruptive Behavior Diagnostic Observational Schedule (DB-DOS)

Children returned for this laboratory assessment when they were around 36 months and again at 48 months to complete the DB-DOS. This is a clinically valid assessment for disruptive behaviors, and has been approved for use with children between the ages of three and five years (Wakschlag et al., 2008a; Wakschlag et al., 2008b). The entire assessment lasts about 70 minutes, and is broken up into three context: parent (i.e., the parent is alone with the child in the room), examiner present, and examiner busy (i.e., the examiner is alone with the child in the room). The parent context lasts about twenty minutes, and begins after the examiner explains the overall procedure to the caregiver and brings the child in. The caregiver is explicitly told in the instructions that the child is not allowed to touch any of the toys that are sitting on a shelf relatively close to the child's chair. For the first two minutes the caregiver and child color as they normally would until the examiner knocks on a two-way window to signal the caregiver to move the dyad into the next task. The next three minutes are spent cleaning up the crayons, again as they normally would. The caregiver is instructed to have the child put the crayons back in the crayon box, and then putting all of the materials away. In the event that the dyad is finished before three minutes is up, the parent is instructed to wait patiently for the knock. If the dyad does not finish in time, they are told to set everything aside and move on. The next five minutes are spent working on four puzzles that have been mixed together, and then the child is

instructed by the parent to look at a book that is beyond the child's comprehension level while the caregiver fills out a questionnaire. The caregiver is instructed not to spontaneously engage the child during this five minutes, except to keep the child from touching the toys. After this task is complete, the child and caregiver are allowed to play with the toys for five minutes before the examiner comes in to set up for the next two contexts.

In the second context, the examiner present condition (in which the parent is no longer in the room), the examiner gives the child three simple sorting activities sequentially for a total of five minutes: moving a stack of VHS tapes from a table to a shelf, sorting plastic silverware into different cups, and lastly sorting a tub of small beads into groups based on color. The child is not required to complete all three tasks, but he or she is expected to work for five minutes. Next, the examiner shows the child a bubble blowing toy, before giving the child his or her own to play with. However, instead of giving the child soap, the child is given water; the bubble blower will not work. The child remains with the "broken" bubble toy for five minutes, before the examiner agrees that the toy isn't working and lets the child play with the examiner's. After the second try with the examiner's bubble toy, the examiner must inform the child that he or she has one turn left. Then they clean up, and the examiner must place a paper towel unobtrusively in front of the child so that the child has the opportunity to take the initiative to help clean up. Lastly, the examiner and the child move to the floor to work on a marble maze toy. The examiner is allowed to spontaneously engage the child in this task, such as asking the child which piece should go next, and making general comments. After the child has had a turn or two putting marbles down the toy, the examiner asks, "Can I have a turn?" which gives the child an opportunity to

demonstrate flexibility. After five minutes of playing with the marble track toy, the examiner abruptly announces that it is time to clean up and instructs the child to put the marbles back in their bag. After all the pieces are put away, they transition to the examiner busy context.

In the last stage, the examiner brings a shelf of attractive toys (different from those in the parent context) to the table where the child is sitting, and "tests" each toy. The examiner then instructs the child not to touch any of the toys, giving the child two pieces of paper and three crayons to color with while the examiner "does [her] work in the corner," facing away from the child (hence “examiner busy”). If the child obviously has touched a toy on the shelf, the examiner reminds the child not to touch the toys. After two minutes, the examiner returns to the table and asks the child if he or she has touched the toys on the shelf twice, giving the child the opportunity to truthfully acknowledge or deny misbehavior. Then, the examiner has the child pick out a prize, and tells the child that in order to win the prize, he or she must complete a puzzle. The examiner holds on to the child's prize and returns to work in the corner, while the child attempts to solve the puzzle for five minutes. The puzzle is very simple, but has a piece missing so that it is impossible to complete. After time is up, the examiner must obviously place the prize back in the box. They both clean up the puzzle, and then the examiner shows the child a remote controlled car toy. She instructs the child not to touch the car toy or any of the toys on the shelf, then leaves the room for two minutes. Upon returning, the examiner once again asks the child twice if he or she has touched any of the prohibited toys. The examiner then lets the child pick out a prize for completing all of the activities, and allows the child to play with any of the toys for a few minutes.

The assessment is given with specific instructions for the examiner to keep the child engaged with the tasks at hand, and to provide minimal support so that the child has the opportunity to display his or her full range of emotion and regulatory ability. In the event that the child becomes to upset to continue, the examiner will either end the task, context, or assessment, depending on how dysregulated the child is.

The Disappointing Gift (DIS)

When children reached eight years old, they came back to the lab again for a series of activities, including the Disappointing Gift task (DIS). This activity takes about twenty minutes to complete, and is similar to the DB-DOS in that it allows the child to display his or her full range of regulatory ability. For this activity, children are first shown ten different prizes by a research assistant and rank each one individually according to their personal preference. Then the child does a drawing activity, in which an examiner appropriately criticizes their attempts to draw a "perfect green circle". Next, the child works on two questionnaires, and when the time is up the examiner informs the child that she will return with the child's prize. The examiner leaves the room, and after thirty seconds the examiner returns with the child's last-ranked prize. They sit together for thirty seconds as the examiner appears busy, looking at some paperwork, before leaving. After another thirty seconds, the research assistant enters to ask the child how he or she felt when the last-ranked prize was given, and after brings the child's caregiver to sit in the room alone with the child for two minutes. When she reenters, the research assistant insists that there must have been a mistake and goes to get the prize tray so that the child can trade in the prize that he or she received for a different one. Once the child has chosen the prize that he or she wanted, the examiner returns to apologize and repair.

Measures

Strange Situation

The Strange Situation (Ainsworth et al., 1978) is a laboratory procedure in which a child is separated and reunited with his or her caregiver, with and without the presence of a stranger. This measure has been strongly validated in the literature as a reliable assessment tool for assessing infant attachment. Coders of the strange situation look for specific behaviors exhibited by the child when he or she is distressed (during the caregiver's absence) and in response to the caregiver's return. Ainsworth et al. (1978) outline the behavioral qualifications for three different classifications of organized attachment: secure, avoidant, and resistant. Children with organized attachments have a defined and consistent strategy, good or bad, that they use to soothe themselves or receive comfort when they are distressed. Children with a disorganized attachment classification do not have a set strategy, and exhibit a number of random, contradictory, or unusual behaviors (see Main & Solomon, 1990). A trained and reliable coder coded the Strange Situation videos used for these analyses. Attachment was examined contrasting organized and disorganized attachments, and by contrasting secure and insecure attachments.

Disruptive Behavior Diagnostic Observation Schedule (DB-DOS)

The DB-DOS is a clinically reliable and valid measure used to assess the prevalence of disruptive behaviors in preschool-aged children (see Wakschlag et al., 2008a, and Wakschlag et al., 2008b). The task is set up to see how children cope with stress with various amounts of adult support. The first condition contains a set of activities for the parent to do with their child, and provide evidence for how the child copes with stress in the presence of a familiar adult. The second condition contains

activities for an examiner to do with the child. During this condition, the examiner provides support for the child when necessary and reflects the child's level of excitation. She is not supposed to spontaneously engage the child or elicit emotion from the child. For example, if the child smiles at one of the toys and looks at the examiner, the examiner may smile back, but the examiner should not initiate the sharing of positive affect. The third condition contains activities that the child must complete mostly on his or her own, while the examiner is "doing work in the corner." The examiner is not engaged with the child during this condition and does not provide much support for the child when he or she is distressed; this allows coders to assess how well the child can cope with stressors on his or her own. The examiner is allowed to respond to direct bids by the child, but must ignore all other comments.

Independent coders watch the DB-DOS contexts as they were filmed from behind a two-way mirror, and rate children on three sets of scales: anger modulation, behavioral regulation, and competence. The competence scales were omitted from this study because they pertain to behaviors that are positive and social in nature rather than disruptive. Additionally, not all of the behavioral regulation scales were used. This was a hypothesis-driven choice, made to create consistency between the different measures of self-regulatory ability from early to middle childhood. The scales identified for use in the analyses were intensity of negative affect, predominance of negative affect, elicitation of negative affect, escalation of negative affect, difficulty recovering from negative affect, copes with frustration poorly, defiance, passive noncompliance, predominance of noncompliance, provocative behavior, destructiveness, directed aggression, verbal aggression, and spiteful behavior.

In order to create a robust and global measure of children's self-regulatory abilities during the preschool years, researchers created a single composite score based on the all of the scales using principal component analysis. Please see the results for more details concerning this analysis.

Approximately 20% of the DB-DOS tasks in the two contexts were double-coded. Interclass correlations for the DB-DOS, examiner present context ranged from *ICC* = .66 to .91. Because reliabilities for directed aggression, verbal aggression, and spiteful behaviors were below .6, they were omitted from the creation of composite scores. Interclass correlations for the DB-DOS, examiner busy context ranged from *ICC* = .69 to .84.

The Disappointing Gift (DIS)

When children were eight years old they completed a task called the Disappointing Gift (DIS). For the purposes of these analyses, only the portions of the procedure during which the child was alone and when the examiner was present were used. The Disappointing Gift protocol is similar to other procedures in which a child is given a prize that he or she did not want. By the time children have reached middle childhood, they are at least somewhat familiar with proper social conduct, especially in the case of frustration or disappointment, although the definition of "proper" may vary from culture to culture and it is the responsibility of parents to appropriately acclimate their children to these social constructs (Saarni 1984; Eisenberg, Cumberland, & Spinrad, 1998). Disobeying these unspoken social rules has the potential to harm relationships, and therefore it is advantageous for children to conform. Saarni (1984) originally developed the disappointment paradigm, which has been revised by Cole (1986). The procedure used in the present study is a variation of

that used by Kieras, Tobin, Graziano, and Rothbart (2005). All procedures involve the child ranking a set of toys based on preference, and then at some point receiving their least-preferred toy. The response is captured by a camera, often inside the same room, and then coded by independent observers. Assuming that the children understand how they are expected to react when given an undesirable toy or object, this task allows children to display that knowledge and their ability to self-regulate.

The coding scheme was based on an emotion regulation coding system developed by Dr. Pamela Cole (Cole, 2008) and adapted for this age range by members of the Infant Caregiver Project. Coders used the software program Noldus, which enables coders to track the amount of time children spend exhibiting a specific behavior. These behaviors are: gaze (looking at toy, parent/examiner, or other), toy engagement (touching/not touching), bids/support-seeking, active self-regulation, passive toleration, self-soothing, social monitoring, tension, active distraction, limit-testing behaviors, disruptive behaviors, and child statements (positive, negative or neutral; about the toy or not about the toy). In order to create consistency between measures of self-regulation across childhood, we only considered behaviors hypothesized to be associated with regulatory behaviors, focusing on active self-regulation, passive toleration, bids or support-seeking, self-soothing, social monitoring, tension, active distraction, limit-testing behaviors, and disruptive behaviors. The author and one graduate student, both master coders trained to reliability, coded all videos for these analyses.

Chapter 3

RESULTS

Data Preparation

Before analyzing associations between attachment and behavior regulation in middle childhood, as mentioned above, a composite score was created for behavior regulation. This was done by first creating composites of the scales at each age and during each context for a total of four. The subscales of the DB-DOS that were used to create the composites were intensity of negative affect, predominance of negative affect, elicitation of negative affect, escalation of negative affect, difficulty recovering from negative affect, poor coping, defiance, passive noncompliance, predominance of noncompliance, provocative behaviors, and destructive behaviors. These were chosen based on whether or not they indicated negative self regulatory behaviors or emotions. Passive noncompliance and predominance of noncompliance loaded onto a second component, and were therefore omitted from the analyses.

After the creation of these four composite scores, both ages and contexts were compared to determine whether or not there was a significant change in self-regulatory ability between 36 and 48 months, and to determine if children showed consistent differences in self-regulatory ability between the two contexts. A one-way repeated measures ANOVA revealed a significant effect of age, $F(1, 105) = 5.28$, $p < .05$, such that children received higher scores on the DB-DOS composite at 36 months than at 48 months. There was also a significant effect of context, $F(1, 105) = 10.40$, $p < .01$, such that children received higher scores in the examiner busy context than in the

examiner present context. There was no significant interaction between age and context, $F(1, 105) = .46$, $p = .5$.

Regardless of this finding, we wanted a robust and global measure of early childhood regulatory ability, so the next step was to create a final, overall composite of the four age and context composites. These findings reflect the literature on behavioral regulation in early childhood. The composite score was not associated with the age of the child, but was associated with child gender ($r = -.26$, $p < .01$).

Infant Attachment and Early Behavior Regulation

We analyzed the relationship between infant attachment organization and the DB-DOS composite, and infant attachment security and the DB-DOS composite. An independent samples t-test revealed no significant association between either attachment organization or security and DB-DOS scores.

Infant Attachment and Middle Childhood Self-Regulation

The Disappointing Gift coding system allows researchers to look at the coded behaviors in a multitude of ways, giving rise to hundreds of possible variables for consideration. I chose to consider only the percentage of time spent exhibiting each of the regulatory behaviors of primary interest, which were active self-regulation, passive toleration, bids or support seeking, self-soothing, social monitoring, tension, active distraction, limit-testing, and disruptive behaviors.

An independent samples t-test was used to compare mean differences between infant attachment organization groups and regulatory behaviors in both the examiner present and examiner absent conditions during middle childhood. This was repeated analyzing infant attachment security groups as well. Analyses revealed no significant

association between attachment organization and any of the measured behaviors. However, there was a significant association between attachment security and active self regulation during the examiner absent condition such that those who were secure as infants were more likely to engage in active self-regulation when the examiner was not in the room (t = -2.09, p < .05) (see Figure 1).

Early Childhood and Middle Childhood Self-Regulation

The following analyses examined whether early childhood regulation in a frustrating task (DB-DOS) predicted middle childhood regulation in a disappointing task (the Disappointing Gift). We first analyzed the associations between the DB-DOS composite and the mean percent of time spent exhibiting each of the regulatory behaviors in middle childhood. We then conducted regression analyses for associations with significant correlations (p < .05) to see if the association remained when controlling for two variables: intervention status and child sex.

Associations between the DB-DOS composite score and the prevalence of regulatory behaviors in middle childhood were examined as Pearson correlations. The DB-DOS composite in early childhood (ages 3 and 4) was significantly associated with active self-regulation in the alone condition (r = -.36, p < .01), active distraction in the alone condition (r = .36, p < .01), and limit-testing behaviors in both the present and alone conditions at age 8 (r = .27, p < .05; r = .30, p < .05).

Regression analyses were conducted as hierarchical linear models, with the control variables (intervention status and child sex) entered in Step 1, and the variable of interest (the DB-DOS composite) entered in Step 2. In all of the analyses, Step 1 analyses did not yield significant effects; effects of interest are presented in Step 2.

For the active self-regulation behavior in the alone condition, as indicated, Step 1 of the model was not significant, R = .11, Adj. R^2 = -.03, $F(2, 53)$ = .34, p = *ns.* With the addition of Step 2, the model was significant and the DB-DOS composite was a significant predictor of the use of active self regulation (see Table 2). Regression analyses examining the effect of the DB-DOS on active self-regulation in the examiner present condition were revealed a non-significant association for the DB-DOS on Step 2 (β = .28, p = *ns*).

For the active distraction behavior in the alone condition, step 1 of the model was not significant, R = .09, Adj. R^2 = -.03, $F(2, 53)$ = .22, p = *ns*. In Step 2, the DB-DOS composite was a significant predictor of the use of active distraction in the alone condition (see Table 3).

For limit-testing behaviors in the alone condition, the overall model was not significant for both Steps 1 and 2. However, the DB-DOS composite was a significant predictor in Step 2 (β = .28, $p < .05$). The model was then examined without the control variables, intervention status and sex, which were not associated with our dependent or independent variables. In the resulting model with only one predictor, the model was significant and the DB-DOS composite was a significant predictor of the use of limit-testing (see Table 4). In the examiner present condition, Step 1 of the model was not significant, R = .17, Adj. R^2 = -.00, $F(2, 54)$ = .82, p = *ns.* In Step 2, the DB-DOS composite was a significant predictor of the use of limit-testing in the examiner present condition (see Table 4).

Figure 1 Attachment security and mean percent of time spent engaging in active self regulation, alone condition.

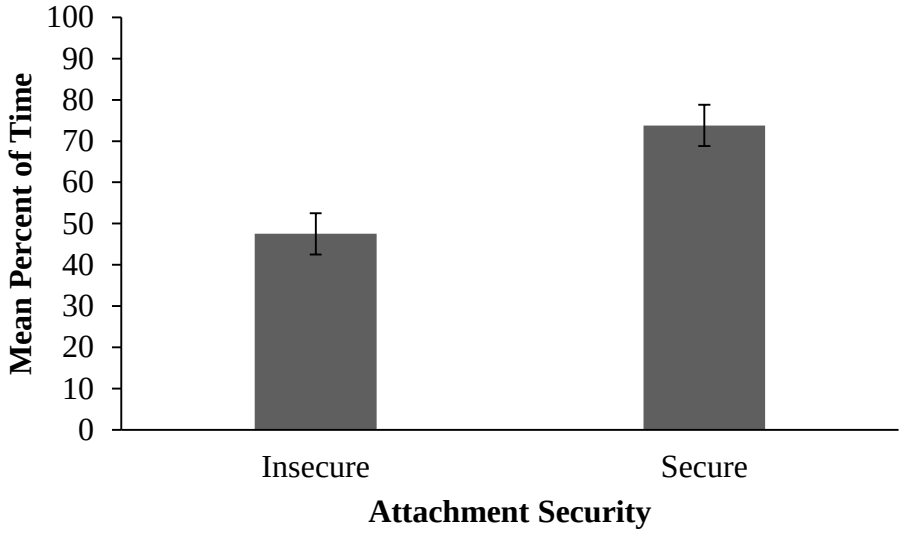

Table 2 Regression coefficients for the DB-DOS composite predicting active self-regulation in the alone condition.

	β	B	F Change	R^2 Change
Step 1				
Intervention Status	-.11	-9.23		
Child Sex	-.01	-.39		
Step 2				
DB-DOS Composite	-.39*	-19.18*	9.10*	.15*
			F	Adj. R^2
Total Model *F* and *Adj.* R^2 for Step 2			3.29*	.11*

Note. β is standardized regression coefficient at entry; B is unstandardized regression coefficient at entry. N = 56.
*$p < .05$

Table 3 Regression coefficients for the DB-DOS composite predicting active distraction in the alone condition.

	β	B	F Change	R^2 Change
Step 1				
Intervention Status	-.04	-2.19		
Child Sex	-.08	-4.26		
Step 2				
DB-DOS Composite	-.39*	12.08*	8.78*	.14*
			F	Adj. R^2
Total Model *F* and *Adj.* R^2 for Step 2			3.10*	.10*

Note. β is standardized regression coefficient at entry; B is unstandardized regression coefficient at entry. N = 56.
*$p < .05$

Table 4 Regression coefficients for the DB-DOS composite predicting limit-testing behaviors in the alone and present conditions.

Alone, With Controls	β	B	F Change	R^2 Change
Step 1				
Intervention Status	.01	.12		
Child Sex	-.00	-.03		
Step 2				
DB-DOS Composite	.28*	3.74*	4.23*	.08*
			F	Adj. R^2
Total Model *F* and *Adj.* R^2 for Step 2			1.41*	.02*

Alone, Without Controls	β	B	F	Adj. R^2
DB-DOS Composite	.27*	3.56*	4.12*	.05*

Present	β	B	F Change	R^2 Change
Step 1				
Intervention Status	.12	.19		
Child Sex	-.13	-.20		
Step 2				
DB-DOS Composite	.36*	.34*	7.60*	.15*
			F	Adj. R^2
Total Model *F* and *Adj.* R^2 for Step 2			3.15*	.10*

Note. β is standardized regression coefficient at entry; B is unstandardized regression coefficient at entry. N = 57.
*$p < .05$

Chapter 4

DISCUSSION

This study found some tentative support for longitudinal associations of attachment security, although not for attachment organization, with regulatory behaviors in middle childhood. Neither infant attachment security nor organization was not related to disruptive behavior tendencies in early childhood, contrary to other studies that have shown a moderate relationship between these constructs (Erickson et al., 1985; Groh et al., 2012; Shaw & Vondra, 1995; Shaw et al., 1996; Sroufe, 1983). This study also found evidence for stability between disruptive behaviors in early childhood and later regulatory behaviors.

Although other research studies have supported attachment organization and security as predictors of early childhood behavior dysregulation, the present study failed to replicate any of these findings. Given the high-risk population that was used, these results are even more surprising because of the research supporting higher incidence of both attachment insecurity (Cyr, Euser, Bakermans-Kranenburg, & van Ijzendoorn, 2010), attachment disorganization (Carlson, Cicchetti, Barnett, & Braunwald, 1989), and poor self-regulation tendencies (Bernard, Butzin-Dozier, Rittenhouse, & Dozier, 2010; Blandon, Calkins, & Keane, 2010) in these populations. However, there are several potential explanations for the lack of significant associations in the first phase of analyses. Attachment, though relatively stable during early childhood, is less stable for those in high-risk situations, such as the sample used in the present study (Vondra, Shaw, Swearingen, Cohen, & Owens, 2001). The lack of

significant findings between infant attachment and early childhood behavioral regulation may be attributed to a change in attachment in early childhood. A study by Vondra et al. (2001) found only moderate stability of attachment assessed in infancy, and that attachment at 24 months old rather than 12 or 18 months old was predictive of caregiver-reported externalizing and internalizing behavior problems at 3.5 years. The sample used in the current study included infants from 11 months to about 36 months, so it is possible that the relatively large age range could have overpowered a significant association between attachment and behavior problems in early childhood.

Attachment security was significantly related to the use of active self regulation in the examiner absent condition in middle childhood. That is, children who displayed a secure attachment as infants were able to better cope with a disappointing event when they were left alone to manage their disappointment. Infants with secure attachment styles are characterized as being able to explore their world but receive adequate comfort and soothing from their primary caregiver when stressed. As they age, this positive relationship supports the development of adaptive internal coping strategies so that the child is capable of soothing him or herself when stressed and no longer has to seek external support to the same degree. When the child is presented with an unexpected and disappointing gift, he or she is better able to cope with his or her emotions and feelings of disappointment. Active self-regulation is a behavior that is indicative of good emotional and behavioral regulation. These results should be interpreted with caution, given that none of the other positive or negative regulatory behaviors were associated with infant attachment organization or security.

Maladaptive behavioral regulation in early childhood was associated with the use of three regulatory behaviors in middle childhood. Those who were more poorly

regulated in early childhood engaged in less active self-regulation in middle childhood when left alone with a disappointing gift than those were were better behaviorally regulated in early childhood. In other words, those who had difficulty with challenging tasks as young children also had more trouble coping under challenging conditions in middle childhood than children who had less difficulty in early childhood. These children were not able to control their affect well enough to focus on the object given to them. Additionally, a positive relationship was found between poor behavior regulation in early childhood and the use of active distraction in a disappointing situation when the child was alone. This may be because children who were not able to control their behaviors and focus in a neutral or positive manner on the upsetting task may have coped by seeking out other less stressful stimuli on which to focus their attentions. While in this very brief task active distraction was considered a negative coping mechanism, it may also be interpreted as a positive regulatory behavior in other tasks (see Cole et al., 2011). For example, when children are expected to wait patiently, active distraction is seen as a positive coping strategy. When children are coping with disappointment, active distraction is not necessarily a positive coping strategy because it indicates that the child is unable to confront their negative emotions. Limit-testing was also associated with poorer behavior regulation when the child was alone and when the child was with a researcher, which suggests that children who are less behaviorally-regulated are more inclined to act out when under stress than other children.

Significant relationships may not have been found between poor behavioral regulation in early childhood and regulatory behaviors during middle childhood when with an examiner because children are more likely to reach out to the examiner for

support or information and do not have to rely as much on themselves to cope with their disappointment. However, it is still interesting that a significant association was found between behavior problems in early childhood and regulatory strategies in middle childhood because the nature of the two tasks are different, even though they are indicative of processes within the same, broad domain. The tasks in early childhood are intended to elicit frustration and anger from the child, whereas the tasks in middle childhood are intended to elicit disappointment. Both tasks are structured so that the child has the opportunity to display his or her range of strategies, but the strategies are for managing different kinds of negative emotions and the coding systems capture different kinds of behaviors.

Study Strengths and Limitations

This study employed several methodological advantages. Most notably, the Infant Strange Situation procedure has been strongly validated in the literature and is considered the best measure of infant attachment available. Child behavior problems were assessed in many of the studies that were reviewed using the Child Behavior Checklist (CBCL), a parent or teacher-report measure. The CBCL may be subject to parent and teacher bias, and may exaggerate the results. In the present study, the observational assessment used (DB-DOS) allowed for a more objective or accurate measure of child behavior problems.

A primary limitation of this study is that these analyses were conducted before all of the data at eight years old had been collected. Participants are still being brought into the laboratory to complete these tasks, so the results may be affected by employing a larger sample size. There were also inherent challenges in coding observational behaviors during both early and middle childhood. However, those

variables that did not meet a certain threshold of inter-rater reliability were omitted from the study.

Attention must also be brought to the nature of the sample used for analyses. This study was conducted in the context of a foster-care diversion program, therefore all children who participated were at high-risk for experiencing some kind of maltreatment. Though the literature has supported a relationship between maltreatment risk and behavior problems (Godinet et al., 2014), these children were not clinically assessed for disruptive behavior or conduct disorders. Some of the scales of the DB-DOS had to be omitted from analyses because of low base-rate incidence, such as verbal aggression and directed aggression. It is more likely that these behaviors, which are strong indicators of behavioral difficulty, would occur more frequently in a clinically-diagnosed sample, and could have improved affect sizes.

This study did not assess many external influences on child behavior that may have mediated the relationship between early child behavior problems and later regulatory behaviors, such as social influences. As children start going to school and spending more time with peers and teachers, their behavior may be reinforced differently than when they are at home with their primary caregiver. Variables such as teacher-reported child behaviors and information about peers would be relevant to consider. Our analyses also did not consider the effect of demographic variables on the associations other than gender, though socioeconomic status and parent characteristics (substance abuse, psychological illness, etc.) may also play a role in determining child behavior.

Future Directions

This study looked at a small portion of the data afforded by the measures that were used. For the regulatory behaviors at 8 years in the Disappointing Gift task, only percentage of time spent on the behaviors was considered, so additional analyses may reveal different results. The microanalytic coding can also produce variables such as latency to a behavior and duration of a behavior. It could also be helpful to expand on the measure of regulatory strategies by considering any statements given by the child or how long the child spent touching or looking at the toy. Furthermore, the coding system also includes the coding of emotions, which has not yet been completed. In order to truly capture emotion regulation, we would want to examine the associations child emotions and regulatory strategies. Alternate methods of analyzing these data may result in different associations with longitudinal data.

This study also only considered child behaviors with an unfamiliar adult, the examiner, and when alone. When looking at associations with attachment, it would be particularly enlightening to study the coping and regulatory behaviors employed when the child is in the presence of their primary caregiver.

Conclusions

This study found evidence for a relationship between infant attachment security and the use of a positive regulatory behavior at 8 years old. For infants at high-risk for maltreatment, attachment security could have long-term implications for stress management and emotion regulation. This would suggest a non-linear relationship between attachment classifications and longitudinal, behavioral outcomes. The present analyses did not reveal an association between infant attachment security or organization and behavioral problems in early childhood. There was also a

significant relationship between behavioral problems in early childhood and the use of several self-regulation strategies in middle childhood at 8 years old. These results provide convergent evidence that behavior dysregulation and self-regulation strategies are related constructs, but are subject to change across childhood.

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Appendix A

CAPITALIZED APPENDIX TITLE

If you only have one appendix, change the styles of the previous two paragraphs to *Appendix - one* and *APPENDIX TITLE - one*, respectively.