

**INVESTIGATING LONGITUDINAL PATHWAYS TO DYSREGULATION:
THE ROLE OF ANOMALOUS PARENTING BEHAVIOR**

by

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A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Psychology

Summer 2018

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THE ROLE OF ANOMALOUS PARENTING BEHAVIOR**

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ACKNOWLEDGMENTS

I would like to acknowledge my husband, Ryne Yarger, for his support before and throughout graduate school. I would like to thank my parents, Maxine and Edward Close, for instilling in me the values of higher education and empathy for others. I would also like to thank my advisor, Mary Dozier, for taking me into her lab and providing me with opportunities to refine my research interests and expertise. Further, I would like to thank the many faculty members that were instrumental in my success in graduate school including Roger Kobak and Jean-Philippe Laurenceau. Finally, I would like to thank my cohort-mates and lab-mates that helped provide levity during graduate school.

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ABSTRACT

The current study investigated longitudinal associations between unresolved parental attachment status, anomalous parenting behavior, parent-child attachment quality, and child dysregulation as part of an ongoing randomized controlled trial investigating the efficacy of Attachment and Biobehavioral Catch-up (ABC; Dozier, Bick, & Bernard, 2011). Specifically, the current study examined whether parental attachment status assessed pre-intervention and anomalous parenting behavior and parent-child attachment quality measured post-intervention predicted dysregulation when children were 3- and 4-years-old. A total of 109 parent-child dyads were included in the current study. Parents randomized to receive ABC demonstrated lower levels of parental withdrawal after completion of the intervention than parents randomized to receive the control condition. Changes in parental withdrawal mediated the association between intervention group and child disorganized attachment. Affective communication errors and disorientation predicted child dysregulation when children were 4 years old. Findings point to the continued efficacy of ABC in improving parenting quality, as well as to the dysregulating role affective communication errors have on children's development.

Chapter 1

INTRODUCTION

Anomalous caregiving behaviors, such as disorientation or extreme withdrawal, affect children's development. Anomalous caregiving behaviors increase the likelihood of children becoming dysregulated physiologically (Bernard, Butzin-Dozier, Rittenhouse, & Dozier, 2010; Bruce, Fisher, Pears, & Levine, 2009; Gunnar & Vazquez, 2001) and of developing disorganized attachments with their parents (Abrams, Rifkin, & Hesse, 2006; Madigan, Moran, & Pederson, 2006). Persistent dysregulation during early childhood without intervention places children at risk for later delinquency, conduct disorder, and antisocial personality disorder (Brennan, Hall, Bor, Najman, & Williams, 2003; Campbell, 2002). Thus, it is important to understand the impact that anomalous caregiving behavior has on children's regulatory abilities beyond infancy. Further, assessing whether interventions that were developed to improve parenting quality are successful in altering these maladaptive pathways is a necessary step. Attachment and Biobehavioral Catch-up (ABC; Dozier et al., 2011) is an evidence-based intervention that has been shown to improve parenting quality (i.e., increasing parental sensitivity, decreasing parental intrusiveness). However, research to date has not explored whether ABC is successful in decreasing more detrimental forms of parenting behavior such as disorientation and withdrawal. Moreover, research is mixed with regards to which forms of anomalous caregiving behaviors are most detrimental to children's development (e.g., Lyons-Ruth et al., 2013; Main & Hesse, 1990). Therefore, the current study aimed to: 1) assess whether ABC was

effective at decreasing anomalous parenting behavior when compared to a control condition, 2) determine whether changes in anomalous parenting behavior due to ABC lead to decreased rates of disorganized attachment in children when compared to a control condition, 3) assess how anomalous parenting behavior confers risk of dysregulation during early childhood, and 4) investigate the associations among parent (i.e., parental attachment state of mind, anomalous parenting behavior) and child (i.e., attachment quality) predictors of child dysregulation.

Emotional and Behavioral Self-Regulation and Parent-child Attachment Quality

The development of self-regulation, or one's ability to control emotional, behavioral, and cognitive responses in order to achieve one's goals (Blair, Berry, & Friedman, 2012) within the first five years of life, influences children's school readiness and academic performance (Blair & Raver, 2015). Poor self-regulation during early childhood poses a risk for peer victimization (Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999) and externalizing problems in middle childhood, and delinquency and substance use during adolescence (Eiden et al., 2016). Therefore, identifying antecedents of emotional and behavioral dysregulation are important in order to develop and refine interventions aimed at promoting regulatory abilities in young children.

The parent-child relationship serves as a key contributor to children's developing emotional and behavioral regulatory abilities (e.g., Bowlby, 1988; Cohn & Tronick, 1989). Through reciprocal dyadic interactions between parents and infants, children are able to develop effective regulatory capacities (Kopp, 1989; Tronick & Gianino, 1986). By being available to children during times of distress and being sensitive to their needs, parents serve as co-regulators and help children develop their

own independent regulatory capabilities (Field, 1994). Attachment quality in infancy represents the expectations that infants have regarding their parents' responsiveness and availability, and is differentiated by the strategy or lack of strategy children utilize with a parent in stressful situations (Ainsworth et al., 1978). Children with organized attachments (i.e., secure, insecure-avoidant, or insecure-resistant) exhibit consistent strategies with their parents during times of stress. Securely attached children use their parent as a source of comfort during stressful situations and are easily soothed. Insecure attachments are marked by behaviors of ignoring parents during distress (i.e., avoidant) or by an inability to be soothed by the parent (i.e., resistant). In some cases, children exhibit a lack of or lapse of use of a strategy in response to distress, which is known as a disorganized attachment (Main & Solomon, 1990).

Organized attachments, especially secure attachments, have long been considered to protect against several maladaptive outcomes, including the development of behavior problems (Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010). Disorganized attachments are identified consistently as a risk factor for later behavior dysregulation above and beyond risk of insecure attachments (Carlson, 1998; Fearon et al., 2010; Lyons-Ruth, Alpern, & Repacholi, 1993; Lyons-Ruth & Jacobvitz, 2008; Milan, Zona, & Snow, 2013). A recent meta-analysis revealed a small effect size ($r = .17$) with regards to children with an organized attachment demonstrating better behavioral regulation, as evidenced by more effortful control, than children with a disorganized attachment (Pallini et al., 2018).

Caregiving Quality as a Risk Factor for Dysregulation

The quality of caregiving a child receives during the first two years of life influences both the development of attachment (Ainsworth et al., 1978) and later social and emotional outcomes (De Wolff & van Ijzendoorn, 1997). Sensitive parenting has been identified as important for the development of normative regulatory abilities (Denham et al., 2012; Kopp, 1989) and attachment security (De Wolff & van Ijzendoorn, 1997; Verhage et al., 2016), whereas insensitive parenting places children at risk for problems with regulatory abilities (Calkins & Johnson, 1998; Halligan et al., 2013). Insensitive parenting is operationalized in many ways within the field of developmental psychopathology and can include withdrawal, hostility, and intrusiveness (Lyons-Ruth et al., 2013). However, parental frightening behavior may be even more detrimental to infants' regulatory abilities than other forms of insensitive caregiving (e.g., Abrams et al., 2006). Main and Hesse (1990) identified several forms of parental behavior that may be frightening to an infant. These consist of blatantly frightening behaviors (e.g., growling at the child), dissociating behavior (e.g., entering into a trance), exhibiting fear of the infant (e.g., backing away from the infant), role-reversing behavior, sexualized behavior toward the infant, and timid/deferential behavior toward the infant (Hesse & Main, 2006). These behaviors are believed to be detrimental to children's regulatory abilities because the parent becomes both a source of comfort and fear to the child, creating a "fright without solution" in the child (Hesse & Main, 1999, p. 484). Macfie, Brumariu, and Lyons-Ruth (2015) also highlighted the detrimental impact parental role/boundary confusion has on children's regulatory abilities and pointed to a need to continue to assess associations between role/boundary confusion and children's development of disorganized attachment and regulatory abilities.

Since Main and Hesse's (1990) initial hypotheses regarding parental frightening behavior and later dysregulation in infancy, Lyons-Ruth, Bronfman, and Parsons (1999) extended the forms of anomalous caregiving that were theorized to affect child outcomes negatively, including attachment quality with their parent by developing the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE) coding system. Specifically, affective communication errors (e.g., failure to respond to infant distress) and withdrawal (e.g., using physical or verbal means to distance self from the child) were added, in addition to the disoriented and dissociated behaviors, intrusive and directly frightening behaviors, and role confusion behaviors (e.g., escalating distress of an infant, deferring to the infant for comfort, engaging in sexualized behavior) that can be frightening to a child. Evidence is pointing to the dysregulating effect parental withdrawal can have on children's development. Indeed, Lyons-Ruth et al. (2013) found moderate effect sizes ($r = .30 - .49$) for the association between maternal withdrawal during infancy and later risk of psychopathology during adolescence ($N = 43$), above and beyond other forms of anomalous parenting (e.g., frightening behavior) behaviors. Furthermore, experiments using the still-face paradigm demonstrated the robust effects maternal withdrawal can have on children's regulatory abilities, such that infants become dysregulated in response to parents' lack of facial expressions or responses to their children (Mesman, van Ijzendoorn, & Bakermans-Kranenburg, 2009).

Although frightening and withdrawn parenting have uniquely predicted children's dysregulation, global assessments of anomalous maternal behavior have also demonstrated associations with behavior problems during middle childhood. For example, Easterbrooks, Bureau, and Lyons-Ruth (2012) found that the overall level of

atypical maternal behavior, which accounts for all aspects of anomalous caregiving behavior, during infancy predicted teacher-report of behavior problems on the Child Behavior Checklist (CBCL-TRF; Achenbach, 1991) when children were seven years old. Thus, questions remain as to which anomalous parental behaviors are most detrimental to children's developing regulatory capacities.

Adult Attachment, Caregiving Quality, and Children's Dysregulation

Parental frightening behavior is theorized to have origins in parents' unresolved experiences of loss or abuse (Main & Hesse, 1990). In order to assess parents' unresolved experiences of loss or abuse, the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) is used. The AAI is a semi-structured interview that asks questions about parents' childhood experiences with attachment figures, in addition to any experiences of loss or abuse during their lifetime, and is later coded for overall state of mind with regard to attachment. Attachment state of mind is classified as autonomous or non-autonomous (i.e., non-autonomous is further broken down into dismissing or preoccupied). If parents show lapses in their ability to discuss an experience of loss or abuse, the transcript is given a classification of unresolved, in addition to the overall classification. The lapses in discourse that lead to transcripts being classified as unresolved are thought to result from unresolved memories of experiences of loss or abuse (Liotti, 1992). This interference of memories is also thought to predict frightening behavior when parents interact with their children (Main & Hesse, 1990). Indeed, several studies since the inception of this hypothesis have found associations between unresolved states of mind and maternal frightening behavior (Jacobvitz, Leon, & Hazen, 2006; Madigan et al., 2006; Schuengel, Bakermans-Kranenburg, van Ijzendoorn, & Blom, 1999). However, this

association was only seen for parents who were unresolved but who had a secondary non-autonomous classification (Jacobvitz et al., 2006; Schuengel, Bakermans-Kranenburg, van Ijzendoorn, et al., 1999).

Parental unresolved states of mind have predicted infant attachment disorganization irrespective of the presence of anomalous maternal behavior (Goldberg, Benoit, Blokland, & Madigan, 2003). In addition, parental unresolved status was found to predict externalizing symptomatology on the CBCL-TRF when children were 6, 8, 10, and 13 years old (Zajac & Kobak, 2009). Again, this association was observed only among parents that had unresolved status combined with a non-autonomous overall classification (i.e., dismissing or preoccupied). Madigan, Moran, Schuengel, Pederson, and Otten (2007) extended our understanding of the associations between unresolved states of mind with regards to attachment, atypical maternal behavior, and parent-child attachment quality by investigating the associations with later disruptive behavior. Attachment representations of adolescent mothers were assessed when children were 6 months old, atypical maternal behavior and parent-child attachment quality was assessed when children were 12 months, and behavior problems were measured using the CBCL when children were 24 months old. Results supported the mediation model that disorganized attachment leads to behavior problems, but the indirect pathways from unresolved attachment representations to disruptive behavior problems and disrupted maternal behavior to disruptive behavior problems were not significant.

Attachment-based Interventions

Due to the associations between parental unresolved attachment representations, child attachment quality, and later maladaptive outcomes in children,

interventions aimed at improving parenting quality and attachment security have been developed (e.g., Attachment and Biobehavioral Catch-up; Bernard et al., 2012; Video-Feedback Intervention to Promote Positive Parenting; Juffer, Struis, Werner, & Bakermans-Kranenburg, 2017; Child Parent Psychotherapy; Osofsky, Stepka, & King, 2017; Circle of Security; Powell, Cooper, Hoffman, & Marvin, 2014), especially for use among families at-risk for these developmental pathways (e.g., children who have experienced neglect or maltreatment). Most attachment-based interventions have focused on increasing parental sensitivity, rather than focusing on decreasing anomalous parenting behavior (e.g., frightening or intrusive behavior). One intervention that has specifically focused on decreasing anomalous parenting behavior, is the CAPEDP (Compétences parentales et Attachement dans la Petite Enfance: Diminution des risques liés aux troubles de santé mentale et Promotion de la résilience; Parental Skills and Attachment in Early Childhood: reduction of risks linked to mental health problems and promotion of resilience; Tubach et al., 2012) intervention. The CAPEDP intervention is a 44-session home-visiting intervention that begins when parents are approximately 27 weeks pregnant with their first child and follows families through their child's second birthday. Tereno and colleagues (2017) found that a smaller proportion of parents who were randomized to receive CAPEDP were classified as disrupted using the AMBIANCE coding system than parents randomized to receive usual care. Further, a smaller proportion of children whose parents received CAPEDP were classified as having a disorganized attachment than children whose parents received treatment as usual. The association between intervention and disorganized attachment was mediated by changes in disrupted parental communication. These results provided the first known published study

demonstrating that changes in disrupted parental communication are associated with decreases in disorganized attachment.

Attachment and Biobehavioral Catch-up (ABC; Dozier et al., 2011) is an evidence-based intervention that was developed to promote parental sensitivity and attachment security. ABC is a 10-session parenting intervention conducted in families' homes aimed at increasing parental nurturance when children are distressed, increasing parental sensitivity and positive regard when children are not distressed, and decreasing frightening and intrusive parental behavior. Results of randomized controlled trials (RCTs) have demonstrated that ABC is efficacious in improving both parent and child outcomes within several high-risk populations including children who live with their birth parents following involvement with child protective services, children in the foster care system, and children who were adopted internationally. Specifically, parents who were randomized to receive ABC demonstrated higher levels of parental sensitivity (Bick & Dozier, 2013; Yarger, Bernard, Caron, Wallin, & Dozier, under review; Yarger, Hoye, & Dozier, 2016) and positive regard, and lower levels of intrusiveness (Yarger et al., under review) than parents in a control condition. Results of RCTs have also shown that children whose parents received ABC exhibit more normative diurnal cortisol rhythms after completion of the intervention (Bernard, Dozier, Bick, & Gordon, 2015; Bernard, Hostinar, & Dozier, 2015), higher levels of executive functioning (Lewis-Morrarty, Dozier, Bernard, Terracciano, & Moore, 2012; Lind, Raby, Caron, Roben, & Dozier, 2017), and stronger emotion regulation abilities (Lind, Bernard, Ross, & Dozier, 2014) than children of parents in the control condition. Further, children whose parents received ABC demonstrated higher rates of attachment security and organization than children whose parents received the control

condition (Bernard et al., 2012). The current study aims to extend Bernard et al.'s (2012) findings that a lower proportion of children whose parents were randomized to receive ABC were classified as having a disorganized attachment (32%) than children whose parents received the control condition (57%) by investigating whether changes in anomalous parenting behavior led to the intervention effects on attachment organization. Finally, no study to date has investigated whether ABC is successful in decreasing anomalous parenting behavior (e.g., disorientation, withdrawal).

Present Study

It is critical to identify the most detrimental forms of anomalous parental behavior if we are to understand risk factors leading to child dysregulation (Cicchetti & Toth, 2009). Therefore, the goal of the present study was to examine associations between unresolved parental attachment representations, anomalous parenting behavior, child attachment disorganization, and later dysregulation in children within the context of a randomized controlled trial evaluating the efficacy of a parenting intervention aimed at decreasing parental frightening behavior and enhancing attachment security. The current study had four aims. The first aim was to assess whether there were intervention effects on anomalous parenting behaviors. Parents randomized to receive ABC were hypothesized to demonstrate significantly less anomalous parenting behavior than parents randomized to receive the control condition. The second aim was to investigate whether changes in anomalous parenting behavior mediated an association between intervention group and child disorganized attachment. The third aim was to investigate whether anomalous caregiving behaviors during infancy predicted dysregulation when children were 3 and 4 years old. Higher levels of parental disorientation and withdrawal were

hypothesized to be associated with higher levels of child dysregulation. Finally, the fourth aim was to investigate the associations among unresolved parental attachment representations, anomalous parenting behavior, child attachment disorganization, and child dysregulation. Parents classified as unresolved with regard to loss or abuse and a non-autonomous state of mind were hypothesized to display higher levels of disorientation and withdrawal than parents classified as unresolved with regard to loss or abuse with a classification of an autonomous state of mind or no classification of unresolved loss or abuse. Further, parents who engage in higher levels of disorientation and/or withdrawal were hypothesized to be more likely to have children with disorganized attachments. Figure 1 demonstrates the hypothesized path model.

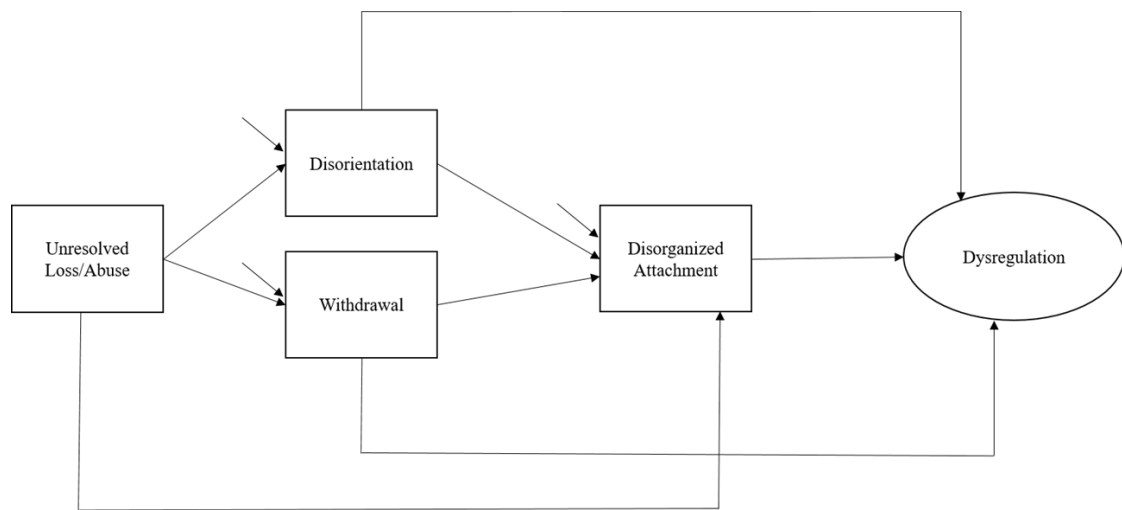


Figure 1 Hypothesized Path Model of Parent and Child Predictors to Child Dysregulation

Chapter 2

METHODS

Participants

The current sample included 109 parent-child dyads from a large mid-Atlantic city that participated in a randomized controlled trial assessing the efficacy of a parenting intervention (Bernard et al., 2012). Families were initially referred to Child Protective Services (CPS) due to substantiated or unsubstantiated reports of maltreatment (e.g., neglect, abuse). All families were enrolled in a city program aimed to keep families intact rather than relocate children into the foster care system. As such, families were referred to study staff to participate in a parenting intervention.

Parents ranged in age from 14.9 years to 47.3 years ($M = 27.3$, $SD = 8.2$) at the initial data collection visit. The majority of parents were female (96.3%) and identified as Black or African American (63.3%). Further, 21.4% of parents identified as Hispanic. Fifty-two percent ($n = 57$) of children were male. Children ranged in age from 11.7 months to 35.3 months ($M = 20.7$, $SD = 6.2$) at the first post-intervention visit. The majority of children were identified as Black or African American (63.3%). Approximately 24% of children were identified as Hispanic. Demographic variables of interest by intervention group are presented in Table 1. There were no significant differences between groups on demographic characteristics.

Table 1 Demographic Characteristics of Parents and their Children by Intervention Group

Variable	ABC (<i>n</i> = 52)	DEF (<i>n</i> = 57)	Test of difference
Parent Age at AAI (years; <i>M</i> & <i>SD</i>)	27.2 (7.3)	27.4 (9.1)	<i>t</i> (99) = .16, <i>p</i> = .87
Parent Gender (% female)	96.2	96.5	χ^2 (1, 109) = .009, <i>p</i> = .93
Parent Race			χ^2 (2, 106) = .79, <i>p</i> = .67
African-American (%)	33 (63.5)	36 (66.7)	
Caucasian (%)	15 (28.8)	16 (29.6)	
Biracial (%)	4 (7.7)	2 (3.7)	
Ethnicity (% Hispanic)	9 (19.6)	12 (23.1)	χ^2 (1, 98) = .18, <i>p</i> = .67
Parent Education			χ^2 (3, 100) = 1.52, <i>p</i> = .68
Some High School	31 (64.6)	31 (59.6)	
High School Diploma	13 (27.1)	17 (32.7)	
Some College	3 (6.3)	4 (7.7)	
More than College	1 (2.1)	0 (0.0)	
Marital Status			χ^2 (1, 101) = .80, <i>p</i> = .37
Single (%)	45 (93.8)	47 (88.7)	
Married (%)	3 (6.3)	6 (11.3)	
Household Income			χ^2 (4, 93) = 7.8, <i>p</i> = .10
< \$10,000 (%)	28 (62.2)	33 (68.8)	
\$10,000 – \$19,999 (%)	5 (11.1)	8 (16.7)	
\$20,000 – \$29,000 (%)	9 (20.0)	3 (6.3)	
\$30,000 – \$39,000 (%)	1 (2.2)	4 (8.3)	
\$40,000 – \$59,000 (%)	2 (4.4)	0 (0.0)	
Child Age at Strange Situation (months; <i>M</i> & <i>SD</i>)	20.6 (6.1)	20.9 (6.4)	<i>t</i> (102) = .23., <i>p</i> = .82
Child Age at Age 3 Visit (years; <i>M</i> & <i>SD</i>)	3.2 (.2)	3.1 (.2)	<i>t</i> (86) = -.1.73, <i>p</i> = .09
Child Age at Age 4 Visit (years; <i>M</i> & <i>SD</i>)	4.2 (.3)	4.2 (.4)	<i>t</i> (95) = .31, <i>p</i> = .76
Child Gender (% male)	28 (53.8)	29 (50.9)	χ^2 (1, 109) = .10, <i>p</i> = .78
Child Race			χ^2 (2, 109) = 4.91, <i>p</i> = .09
African-American (%)	33 (63.5)	36 (63.2)	
Caucasian (%)	6 (11.5)	14 (24.6)	
Biracial (%)	13 (25.0)	7 (12.3)	
Ethnicity (% Hispanic)	11 (21.2)	15 (26.3)	χ^2 (1, 109) = .40, <i>p</i> = .53

Procedures

Pre-intervention and post-intervention assessments

Approval for the completion of this research was obtained from the University of Delaware Institutional Review Board. After participants were referred to study staff, a pre-intervention visit was completed. During this visit, the study was explained, consent was obtained, and demographic information and AAIs were conducted. Next, parents were randomly assigned to receive the experimental intervention (ABC) or a control intervention (Developmental Education for Families; DEF).

Data collection

As mentioned earlier, demographic information and AAIs were collected prior to parents being randomized into ABC or DEF. Next, parents participated in one of the two 10-session interventions. An initial follow-up visit was completed on average 7 months ($SD = 5.87$) after completion of the intervention. During this visit, children and parents participated in the Strange Situation. Families were also contacted to complete follow-up visits when children were 3 and 4 years old. Outcome data for the present study were collected during the pre-intervention home visit, during the initial follow-up visit after completion of the intervention, and at children's 3- and 4-year-old follow-ups.

Interventions

The interventions were matched for duration (i.e., 10-week sessions) and conducted in parents' homes. Further, experienced interventionists adhered to an intervention manual and all sessions were video-recorded for later fidelity checks.

Experimental Intervention

Attachment and Biobehavioral Catch-up (ABC) is a brief parenting intervention aimed at increasing parents' ability to provide nurturance to their children when children are distressed, respond in sensitive, contingent ways when children are not distressed, delight in their children, and behave in non-frightening ways. Sessions 1 and 2 focus on discussing the importance of providing children nurturance even when children are not providing clear cues. Sessions 3 and 4 focus on parents behaving in sensitive and delighted ways by following children's lead. Sessions 5 and 6 help caregivers identify and appropriately respond to children's signals while exploring how some play interactions may be frightening and/or intrusive for children. Sessions 7 and 8 focus on exploring parents' own experiences of being parented and how those experiences may interfere with their ability to meet intervention targets in a supportive context. Finally, sessions 9 and 10 provide additional opportunities for parents to receive additional feedback and coaching on intervention targets, as well as a time to celebrate parents' accomplishments.

Control Intervention

Developmental Education for Families (DEF) was adapted from previous interventions shown to improve children's gross and fine motor skills, cognition, and language abilities (e.g., Ramey, Yeates, & Short, 1984). Components of the initial version of the intervention related to parental sensitivity were removed for this study

in order to distinguish it from ABC. Parent coaches discussed and modeled ways to help children reach developmental milestones during the session. Specific activities completed with each child were adjusted according to the child's developmental level.

Measures

Parental Attachment State of Mind

During the pre-intervention visit, participants completed the Adult Attachment Interview (AAI; Main, Kaplan, & Cassidy, 1985), a semi-structured interview regarding their early memories of their attachment figures. AAIs were audio-recorded, transcribed, and later coded following Main and Goldwyn's (1998) coding system. Parental representations of attachment were coded as autonomous, dismissing, or preoccupied. Parents were also classified as to whether or not the parent was unresolved with regards to experiences of loss or abuse. Five percent ($n = 5$) did not fit criteria for these classifications and were thus labeled "cannot classify" and were categorized with the non-autonomous classifications, as is customary (e.g., Schuengel, Bakermans-Kranenburg, & van Ijzendoorn, 1999). All AAI transcripts were coded by a certified, reliable coder. Data were missing for five families. Fifteen percent ($n = 16$) of transcripts were double coded in the current sample. The two coders agreed on 100% of the classifications of autonomous, dismissing, or preoccupied, and unresolved ($k = 1.00$). Agreement was 94.4% ($k = .92$) for the full sample of AAIs that were double coded ($n = 18$). In addition, the two coders agreed on 100% of the two-way unresolved/resolved classifications ($k = 1.00$) and for the full sample. All first coder data were used for the current analyses. For the current study, parents were re-classified into a dichotomous variable such that parents had an

unresolved attachment representation with a non-autonomous classification (coded as 1), were unresolved with an autonomous classification (coded as 0), or did not have an unresolved attachment representation (coded as 0), as has been suggested based on previous research (e.g., Jacobvitz et al., 2006).

Infant Attachment Quality

At the post-intervention laboratory visit, parents and their children completed the Strange Situation procedure designed to assess children's attachment security. The Strange Situation procedure consists of two separations from and subsequent reunions with the parent. On average, children were 20.7 ($SD = 6.2$) months old. Using criteria identified by Ainsworth et al. (1978), attachment behaviors, such as proximity seeking, contact maintenance, avoidance, and resistance, were coded when the child was reunited with his or her parent.

Children were classified as having a secure, avoidant, resistant, or disorganized attachment. Children received a secondary classification of disorganized attachment if they exhibited a lapse in their strategy in response to distress. Children classified as having a secure attachment seek contact with their parent during reunion episodes and are able to calm down during such reunions. Children classified as having an avoidant attachment do not look to the parent for reassurance or turn away during reunion episodes. Children classified as having a resistant attachment show a mixture of proximity seeking and resistance, combined with an inability to be soothed during reunion episodes. Finally, disorganized attachment is characterized by unusual behaviors upon reunion, such as displays of contradictory behaviors, freezing or stilling, approaching the stranger when upset, expressing fear when the parent returns, and disoriented wandering (Main & Solomon, 1990). These classifications were then

collapsed into a two-way classification that were used in the current paper. Specifically, children were classified as organized (secure, avoidant, resistant) or disorganized (disorganized-secure, disorganized-avoidant, or disorganized-resistant), as has been done in previous research (e.g., van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). In some instances children exhibit extreme behaviors that do not fit into the previously identified categories and are labeled “cannot classify.” In these instances, the cases were included with the cases classified as disorganized, as has been done in previous research (e.g., Lionetti, Pastore, & Barone, 2015).

Two coders, blind to intervention status, classified each participant’s Strange Situation. The primary coder, who had previously attended Strange Situation coding training at the University of Minnesota and passed the reliability test, coded all videos. The second coder, an expert coder of Strange Situations and co-leader of Strange Situation coder training, coded 32% of the videos. The two coders agreed on 89% of the four-way classifications of secure, avoidant, resistant, and disorganized/cannot classify ($k = .75$). In addition, the two coders agreed on 89% of the two-way organized-disorganized/cannot classify classifications ($k = .77$). For the purposes of data analysis, classifications assigned by the second coder were used for double-coded videos.

Atypical Parental Behavior

Anomalous parenting behavior was coded from videos of the Strange Situation procedure using the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE; Bronfman, Madigan, & Lyons-Ruth, 2009–2014). AMBIANCE yields several components of anomalous parental behavior including five separate dimensions of parental behavior, an overall level of disrupted

communication, and a categorical indication of whether or not the parent is disrupted or not disrupted. The five dimensions, coded on 7-point scales, include affective communication errors (e.g., contradictory signaling to the child, failure to respond to infant cue, inappropriate response to infant cue), role/boundary confusion (e.g., prioritizing parent's needs over child's, treating infant as a sexual partner), fearful/disoriented behaviors (e.g., appearing frightened by the child, exhibiting disorientation), intrusiveness/negativity (e.g., physically harming the child, engaging in negative verbal comments toward the infant), and withdrawal (e.g., engaging in silent interactions with the child, directing infant toward toys rather than providing comfort during distress). Parents coded high on each dimension are likely to engage in more frequent and/or intense levels of the behavior, whereas parents coded low on each dimension are likely to engage in the behavior less frequently, as well as engage in less problematic forms of the behavior.

A single coder (HY), blind to intervention status, child attachment security, and maternal attachment representations, coded all Strange Situation videos. This coder was trained by the developers of the current AMBIANCE manual (E. Bronfman, S. Madigan, and K. Lyons-Ruth) and had successfully completed the reliability set of randomly selected videos ($n = 25$) that was used in the current project prior to coding the remaining videos. Thirty videos (27.5%) were double coded by one of the AMBIANCE trainers (i.e., E. Bronfman). The reliabilities were as follows: affective communication errors, $r = .79$; role/boundary confusion, $r = .73$; fearful/disoriented behavior, $r = .68$; intrusive/negative behavior, $r = .85$; withdrawal, $r = .74$; level of disrupted communication, $r = .79$. Disrupted classification agreement was 86.7%, $K =$

.72 ($p < .01$). For the purposes of data analysis, scores coded by E. Bronfman were used for double-coded videos.

Childhood Externalizing Symptomatology

The Disruptive Behavior Diagnostic Observation Schedule (DB-DOS; Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008) measured child behavioral dysregulation when children were 3 and 4 years old (Wakschlag et al., 2005). Eighty-eight (80.7%) of the children in the current sample completed this measure during the 3-year visit. Ninety-six (88%) of the children in the current sample completed this measure during the 4-year visit. Children ranged in age from 2.9 years old to 3.77 years old ($M = 3.2$, $SD = .2$) at the time of the 3 year visit and ranged in age from 3.89 years to 5.76 years ($M = 4.2$, $SD = .4$) at the time of the 4 year visit.

This procedure was designed to expose children to a series of frustrating tasks in order to study their ability to regulate behavior and emotions, and their social-emotional reciprocity. The DB-DOS consists of three different contexts, in which children are given varying levels of support: parent, examiner present, and examiner busy. In the parent condition, the child interacts with the parent, who is instructed to engage in a series of activities with their child. In the Examiner Present context, the child is asked to complete a series of tasks with the help and support of the examiner. During this context the examiner responds to all of the child's cues and participates in the activities with the child. During the Examiner Busy context the examiner retreats to the corner of the room and interacts minimally. The child is required to complete a different series of tasks independently.

Each context of the DB-DOS was coded separately to assess the child's behavior on 24 different items, using a 0-3 scale to score each item. These items were summed to obtain three composites within each context (i.e., Examiner Present, Examiner Busy, and Parent): problems in Anger Modulation, which provides an assessment of the child's ability to control his or her anger and frustration and is further noted as problems in Emotion Regulation, problems in Behavioral Regulation, which assesses the child's compliance, aggression, and oppositionality, and Competence, which measures the child's positive affect and positive social interactions. Only the scores focusing on emotion regulation and behavioral regulation were used in the current project. The DB-DOS has been shown to be a reliable and valid assessment of problems with emotion and behavior regulation (Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008). Two coders coded 21% ($n = 26$) of videos for the 3-year-old follow-ups in the examiner contexts and reliabilities were as follows: examiner present emotion regulation, $r = .92$; examiner present behavioral regulation, $r = .86$; examiner busy emotion regulation, $r = .85$; examiner busy behavioral regulation, $r = .89$. Two coders coded 5% ($n = 6$) of videos for the 3-year-old follow-ups in the parent context and the reliabilities were as follows: parent emotion regulation, $r = .90$; parent behavioral regulation, $r = .50$. Two coders coded 22% ($n = 31$) of videos for the 4-year-old follow-ups in the examiner contexts and reliabilities were as follows: examiner present emotion regulation, $r = .77$; examiner present behavioral regulation, $r = .87$; examiner busy emotion regulation, $r = .92$; examiner busy behavioral regulation, $r = .98$. Two coders coded 6% ($n = 8$) of videos for the 4-year-old follow-ups in the parent context and the

reliabilities were as follows: parent emotion regulation, $r = .57$; parent behavioral regulation, $r = .61$.

Data Analyses

Descriptive statistics, bivariate correlations, chi-square tests, and one-way analyses of variance (ANOVA) were completed using Statistical Package for the Social Sciences (SPSS version 24.0). The remaining analyses were conducted using MPlus version 8 (Muthén & Muthén, 2017). Full information maximum likelihood estimation was used to account for missing data in MPlus. First, separate higher order confirmatory factor analyses (CFA) were used to test the factor structure of the DB-DOS when children were 3 and 4 years old. Previously determined cut-offs of acceptable model fit statistics (CFI, RMSEA, etc.) were used to evaluate the validity of the measurement models. Next, a structural equation model with a dichotomous outcome (i.e., attachment disorganization) and continuous mediator (i.e., withdrawal) was estimated based on guidelines described by Muthén and Asparouhov (2015) and Muthén, Muthén, and Asparouhov (2016). This method allowed for the assessment of whether mediation occurred through the use of counterfactuals. Specifically, the total effect of the intervention was broken down into the pure natural direct effect (PNDE; the effect of the intervention on the outcome that is not explained by the mediator) and the total natural indirect effect (TNIE; the effect of the intervention on the outcome that is explained by the mediator). The mediation model was fit using probit regression for the binary outcome and bootstrapping in order to obtain confidence intervals (CI). If the CI does not include one, then this can be interpreted as statistically significant. Finally, structural equation models and path models were used to examine hypothesized associations between parent variables (i.e., unresolved

attachment representation, anomalous parenting behaviors) and child outcomes (i.e., child attachment disorganization, child dysregulation).

Chapter 3

RESULTS

Preliminary Analyses

Bivariate correlations and associations between variables

Child age at the initial post-intervention visit was significantly negatively correlated with parental disorientation ($r = -.25, p = .01$). An independent samples t-test revealed significant differences between behavioral dysregulation during the examiner present context in females versus males when children were 3 years old, such that boys exhibited more behavior dysregulation ($M = 5.09, SD = 3.71$) than girls ($M = 3.21, SD = 3.67$). An independent samples t-test also revealed significant differences between emotion regulation during the examiner busy context in boys versus girls when children were 3 years old, such that boys exhibited more emotion dysregulation ($M = 6.37, SD = 5.57$) than girls ($M = 3.70, SD = 4.49$). When children were 4 years old, an independent samples t-test indicated that there was a significant difference between levels behavioral dysregulation during the examiner busy context in females versus males, such that boys exhibited more behavioral dysregulation ($M = 3.67, SD = 4.29$) than girls ($M = 1.96, SD = 2.54$). Table 2 provides descriptive statistics and correlations between independent and dependent variables.

Table 2 Means, Standard Deviations, and Bivariate Correlations of Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Intervention	--																			
2. Affective communication errors	-.11	--																		
3. Role/boundary confusion	-.02	.38**	--																	
4. Disorientation	.07	.42**	.32**	--																
5. Intrusive/negativity	.05	.59**	.52**	.34**	--															
6. Withdrawal	-.22*	.56**	-.03	.25**	.20*	--														
7. Unresolved parental attachment	.02	-.11	.02	-.03	-.04	-.24*	--													
8. Child disorganized attachment	-.13	.35**	.22*	.27**	.27**	.35**	-.07	--												
9. ER parent 3-year	-.04	.37**	.17	.33**	.16	.07	-.05	.06	--											
10. ER examiner busy 3-year	-.00	.12	.06	.06	.04	.08	.21	-.02	.28*	--										
11. ER examiner present 3-year	.05	.05	.00	-.03	.06	-.10	.13	-.20	.23*	.60**	--									
12. BR parent at 3-year	-.09	.33**	.18	.23*	.20	-.01	.02	.12	.66**	.26*	.23*	--								
13. BR examiner busy 3-year	-.03	.12	.12	.05	.11	-.06	.21	-.01	.31**	.62**	.50**	.32**	--							
14. BR examiner present 3-year	.08	.07	.11	.04	.13	-.10	.02	-.07	.22*	.45**	.50**	.18	.47**	--						
15. ER parent 4-year	-.06	.20	.13	.07	.21*	.12	-.12	.11	.35**	.27*	.10	.33**	.39**	.16	--					
16. ER examiner busy 4-year	-.15	.05	.01	-.12	.02	-.07	.04	.14	.25*	.39**	.23*	.23*	.27*	.04	.36**	--				

Table 2 Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
17. ER examiner present 4-year	-.06	.08	-.05	-.19	.05	-.07	.00	-.00	.19	.39**	.36**	.21	.31**	.18	.39**	.71**	--			
18. BR parent at 4-year visit	.00	.15	.16	.00	.12	-.01	.09	.09	.39**	.28*	.17	.42*	.38**	.24*	.58**	.18	.26*	--		
19. BR examiner busy 4-year	-.03	.19	.01	-.14	.07	-.03	.17	.03	.26*	.36**	.26*	.18	.48**	.18	.34**	.60**	.56**	.27*	--	
20. BR examiner present 4-year	-.05	.15	.11	-.10	.10	-.03	.10	.04	.29**	.38**	.40**	.22	.55**	.43**	.37**	.37**	.37**	.44*	.65**	--
Mean	--	3.94	2.51	2.82	3.37	4.13	--	--	6.09	4.99	2.41	4.18	3.86	4.13	4.76	3.70	2.16	3.56	2.86	3.13
Standard Deviation	--	1.83	1.57	1.58	2.01	1.60	--	--	5.14	5.18	4.00	3.00	3.85	3.78	5.00	4.74	3.39	3.51	3.66	3.31

Parental disruption and child disorganization

Children whose parents were categorized as disrupted were more likely to be categorized as having a disorganized attachment than children whose parents were categorized as not disrupted ($\chi^2 = 12.44$, $df = 1$, $p < .01$). Specifically, 76.8% ($n = 33$) of children had a disorganized attachment when their parent was disrupted, whereas only 23.3% ($n = 10$) of children had a disorganized attachment when their parent was not disrupted.

Specification of the second-order DB-DOS factor model

The models were specified based on the original factor structure reported in Wakschlag, Hill, et al.'s (2008) study of DB-DOS validity, as shown in Figure 2.

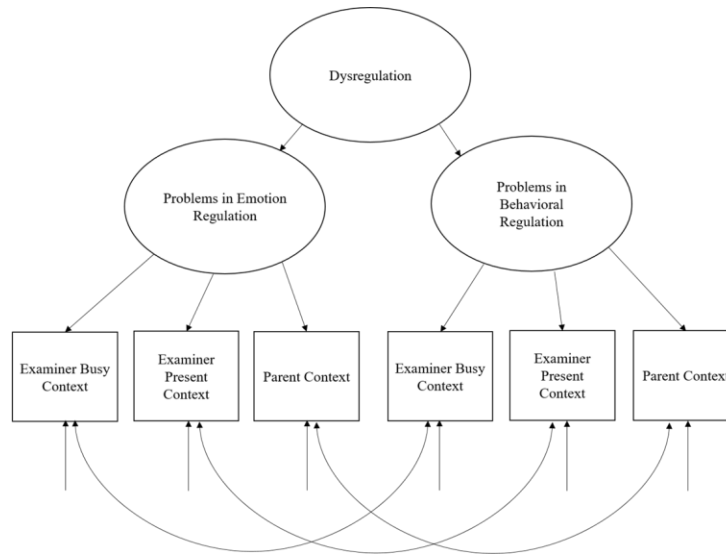


Figure 2 Proposed Second-Order Factor Structure based on Wakschlag, Hill, et al.'s (2008) Model

Specifically, the model was specified with two first-order latent variables (i.e., problems in emotion regulation and problems with behavioral regulation) and one second-order latent variable representing overall dysregulation. Three indicators (i.e., the context-specific composites) were used to specify each first-order latent variable. The model results indicated that there was a problem with the behavior regulation residual variance; therefore, the residual variance for behavior regulation was constrained to zero. Further, the indicators were initially specified to co-vary based on Wakschlag, Hill, et al.'s (2008) model. In the 3-year CFA, a chi-square difference test between the model with the Behavior Regulation indicators (i.e., parent context, examiner present context, and examiner busy context) specified to co-vary with the Emotion Regulation indicators and the model with only the indicator that was statistically significantly correlated (i.e., parent context) revealed no significant difference ($\chi^2 = 2.90, df = 2, p = .23$); therefore the more parsimonious model was used moving forward (i.e., with fewer indicators allowed to co-vary). In the 4-year CFA, a chi-square difference test between the model with the Behavior Regulation indicators (i.e., parent context, examiner present context, and examiner busy context) specified to co-vary with the Emotion Regulation indicators and the model with only indicators that were statistically significantly correlated (i.e., examiner present context, examiner busy context) revealed no significant difference ($\chi^2 = .126, df = 1, p = .72$); therefore the more parsimonious model was used moving forward (i.e., with fewer contexts allowed to co-vary). See Figures 3 and 4 for the final factor structure and estimated factor loadings.

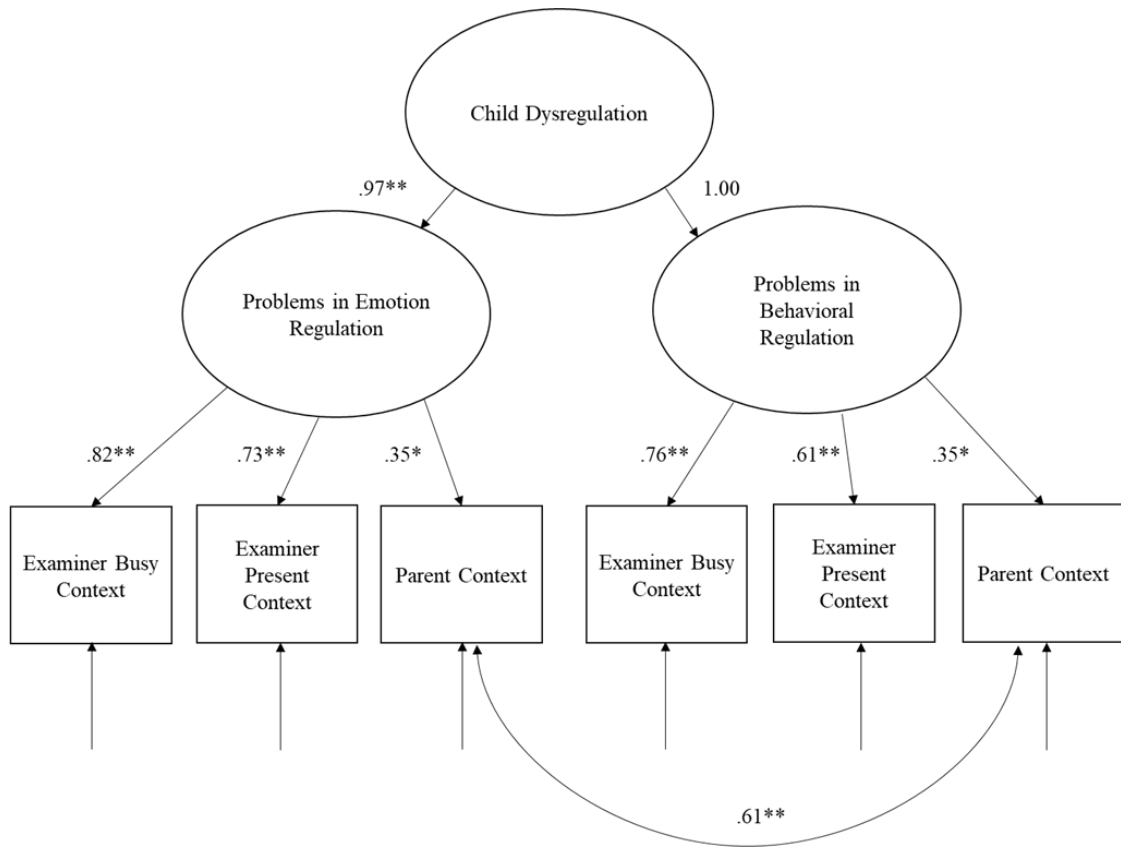


Figure 3 Final Factor Structure with Factor Loadings of the DB-DOS at Age 3

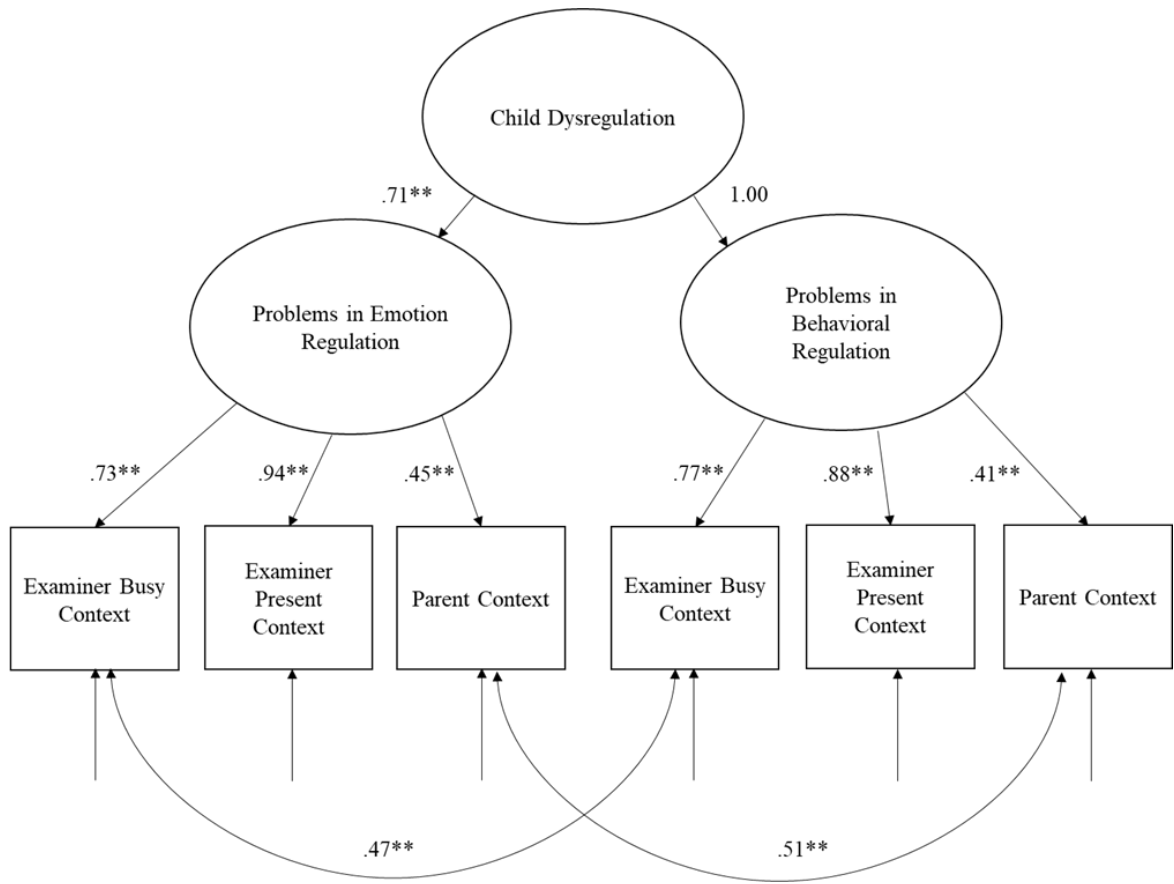


Figure 4 Final Factor Structure with Factor Loadings of the DB-DOS at Age 4

Primary Analyses

Aim 1. Intervention effects

Disrupted parental behavior

At the first follow-up visit after completion of the intervention, 56.0% ($n = 61$) of parents were categorized as disrupted. A chi-square test revealed no significant difference between parents who received ABC versus parents who received DEF ($\chi^2 = 1.44$, $df = 1$, $p = .23$). Approximately 50% ($n = 26$) of parents who received ABC were categorized as disrupted and 61% ($n = 35$) of parents who received DEF were categorized as disrupted.

A significant effect of intervention on parental withdrawal was revealed $F(1, 107) = 5.21$, $p = .02$, such that parents who were randomized to receive ABC demonstrated significantly lower levels of withdrawal ($M = 3.77$, $SD = 1.42$) than parents who were randomized to receive DEF ($M = 4.46$, $SD = 1.69$). No significant effects of intervention were found on affective communication errors, $F(1, 107) = 1.26$, $p = .27$, role/boundary confusion, $F(1, 107) = .04$, $p = .84$, disorientation, $F(1, 107) = .54$, $p = .46$, or intrusive/negativity, $F(1, 107) = .22$, $p = .64$.

Aim 2. Assessing a mediation model of intervention effects

Child disorganization

As noted earlier, Bernard et al. (2012) previously reported data from the same RCT using a larger sample of participants ($n = 120$) than in the current study ($n = 109$). Forty-four percent ($n = 53$) were classified as having a disorganized attachment in the initial study. Further, the proportion of children classified as having a

disorganized attachment in ABC (32%) was significantly smaller than the proportion of children in the DEF condition (57%).

In the current sample, 39.4% of children were classified as having a disorganized attachment at the first follow-up visit after completion of the intervention. A chi-square test revealed no significant difference between children whose parents received ABC versus DEF ($\chi^2 = 1.90$, $df = 1$, $p = .17$). Approximately 32.7% ($n = 17$) of children whose parents received ABC were classified as having a disorganized attachment and 45% ($n = 26$) of children whose parents received DEF were classified as having a disorganized attachment.

Mediation model

Results suggested that the ABC intervention led to lower odds of children showing attachment disorganization [OR = .60 (95% CI: .26 – 1.33)]; however, consistent with results of chi-square tests earlier, the CI covered one and therefore there was no significant total effect (i.e., the effect of intervention on the proportion of children classified with a disorganized attachment). The PNDE, or the effect of the intervention on the outcome that is not explained by the mediator, was also not significant. Results indicate that the TNIE, or the effect of the intervention on the outcome that is explained by the mediator, was significant. Specifically, the TNIE OR was estimated to be .74 (95% CI: .52 - .96). Parents' withdrawal at the post-intervention assessment accounted for approximately 19% of the effect of ABC on the proportion of children classified as having a disorganized attachment, as indicated by the ratio of the indirect to total effect. See Table 3 for bootstrap confidence intervals of total, indirect, and direct effects based on counterfactuals.

Table 3 Bootstrap Confidence Intervals for Intervention Effects on Child Disorganized Attachment

	Estimate	Lower 2.5%	Upper 2.5%	S.E.	<i>p</i>
Effects from intervention group to disorganized attachment					
TNIE	-.068	-.154	-.008	.037	.068
PNDE	-.053	-.238	.137	.095	.577
Total Effect	-.122	-.304	.066	.094	.196
Odds ratios for binary Y					
TNIE	.744	.516	.962	.115	.000
PNDE	.804	.366	1.759	.363	.027
Total Effect	.598	.262	1.325	.274	.029

Note. TNIE = Total natural indirect effect; PNDE = Pure natural direct effect.

Aim 3: Parenting predictors of child dysregulation

Structural equation models accounted for intervention effects on parental withdrawal, child age at first follow-up visit on disorientation, and child gender effects on dysregulation. Due to poor model fit when not allowing parenting variables to co-vary when children were 3-years-old [$\chi^2 = 144.94$, $p < .01$, RMSEA = .117 (90% CI = .093-.141), CFI = .670, TLI = .582, SRMR = .109] and 4-years-old [$\chi^2 = 128.93$, $p < .01$, RMSEA = .107(90% CI = .082-.132), CFI = .783, TLI = .720, SRMR = .108], and multicollinearity among anomalous parenting variables, the model was specified such that parenting variables were allowed to co-vary based on significant bivariate correlations between them. Specifically, role/boundary confusion co-varied with affective communication errors, disorientation, and intrusive/negativity; affective communication errors and disorientation were specified to co-vary with all other parenting variables; and withdrawal was specified to co-vary with affective communication errors, disorientation, and intrusive/negativity.

Predictors of dysregulation at age 3

The model showed adequate fit [$\chi^2 = 87.12, p = .02, RMSEA = .061$ (90% CI = .023-.090), CFI = .906, TLI = .887, SRMR = .080]. No disrupted parenting behaviors were predictive of dysregulation.

Predictors of dysregulation at age 4

The model showed acceptable fit [$\chi^2 = 71.11, p = .20, RMSEA = .038$ (90% CI = .00-.07), CFI = .972, TLI = .965, SRMR = .069]. Controlling for child age at the time of the assessment, a one unit increase in parental disorientation decreases child dysregulation by .32 standard deviation units. Finally, parental affective communication errors ($\beta = .41, p = .02$) predicted higher rates of child dysregulation. See Table 4 for standardized path coefficients of structural equation models when children were 3- and 4-years-old.

Table 4 Path Coefficients of Anomalous Parenting Behavior Predicting Dysregulation by Age

Parenting Variable	Age 3		Age 4	
	β	p	β	p
Affective Communication Errors	.25	.21	.41	.02
Role/boundary Confusion	.02	.90	.01	.95
Disorientation	.01	.93	-.32	.01
Intrusive/Negativity	-.05	.77	-.03	.82
Withdrawal	-.19	.22	-.17	.19

Note. Standardized coefficients are shown.

Aim 4: Path model assessing parent and child risk factors for child dysregulation at age 4

No anomalous parenting behaviors were predictive of dysregulation when children were 3-years-old. Therefore, the path model was specified using the data

capturing child dysregulation when children were 4-years-old. Additionally, of the parenting variables that were initially hypothesized to be associated with later child dysregulation, only parental disorientation was associated with child dysregulation at age 4. Affective communication errors were also predictive of child dysregulation at age 4. As a result, these parenting variables were used in order to assess a) whether the direct effects of anomalous parenting behaviors (i.e., affective communication errors and disorientation) on child dysregulation remained when including previously identified predictors of dysregulation (i.e., parental unresolved attachment representation, child disorganized attachment), b) whether child attachment disorganization mediated the association between atypical parenting behavior and later child dysregulation, c) if affective communication errors and/or disorientation mediated the association between unresolved attachment status and child disorganization, and d) if there was a direct effect from unresolved attachment status to child dysregulation.

The path model accounted for the fact that the participants were randomized to receive an intervention aimed at decreasing atypical parenting behavior and child dysregulation and the previous finding that the larger sample had effects on attachment security. Further, the model accounted for the significant association between child age at first follow-up and disorientation, and child gender and dysregulation. Logistic regression odds ratios (OR) and 95% confidence intervals (CI) were used to interpret associations with predictors of disorganized attachment due to it being a dichotomous dependent variable. If the CI for the odds ratio does not include one, then this can be interpreted as statistically significant.

Direct effects

Affective communication errors continued to predict dysregulation ($\beta = .50, p = .004$). Further, for a one unit increase in affective communication errors, the odds of a child being disorganized increased by .36 (OR 1.36, 95% CI: 1.04 – 1.79). Parents with higher levels of disorientation were less likely to have children with higher levels of dysregulation ($\beta = -.64, p = .001$). For a one unit increase in disoriented behavior, the odds of a child being disorganized increased by .31 (OR 1.31, 95% CI: .96 – 1.77); however, this was not statistically significant as the 95% CI included 1. No significant direct effect of unresolved parental attachment status on child dysregulation ($\beta = .76, p > .05$) or child disorganization (OR: .78, 95% CI: .27 – 2.25) was observed. See Figure 5 for the final path model with coefficients and ORs of direct paths.

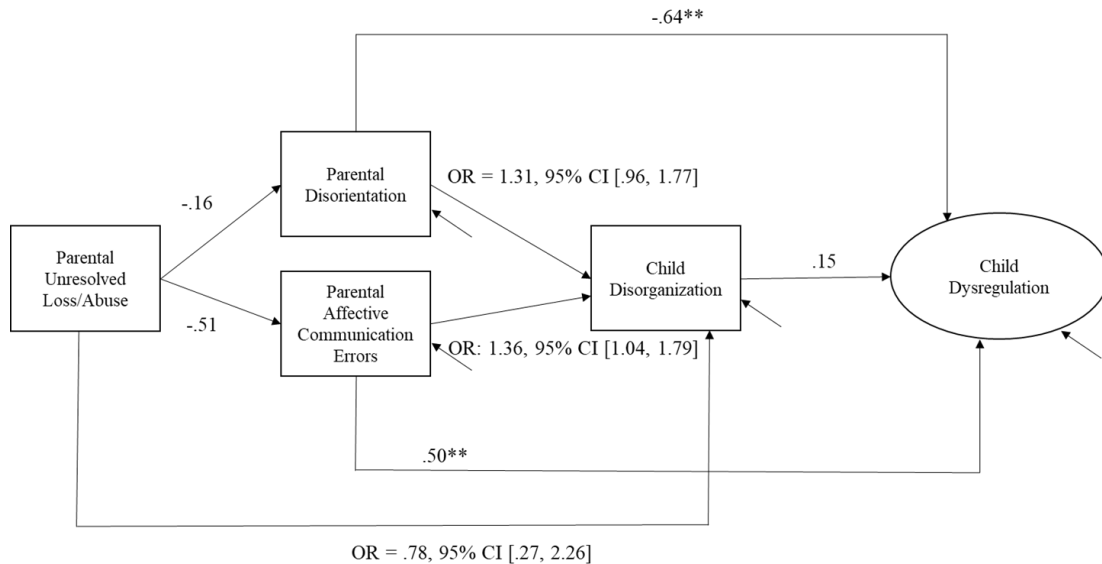


Figure 5 Final Path Model Predicting Child Dysregulation at Age 4

Indirect effects

Due to no significant associations between unresolved parental attachment status and child disorganization, counterfactual effects including the total effect, PNDE, and TNIE were unable to be computed for this model. Further, no significant indirect effects from disorientation to dysregulation through disorganization or affective communication errors to dysregulation through disorganization were found.

Chapter 4

DISCUSSION

Broadly, the current study aimed to extend previous research by examining the unique contribution five types of anomalous parenting behaviors have on children's regulatory abilities. In addition, the current study evaluated the efficacy of the Attachment and Biobehavioral Catch-up intervention at decreasing anomalous parenting behaviors through a randomized controlled trial.

The first aim of the current study was to investigate whether parents who were randomized to receive the ABC intervention displayed less anomalous parenting behaviors after completion of the intervention than parents who were randomized to receive the control condition. Parents who received the ABC intervention demonstrated significantly less withdrawal at the first follow-up visit after completion of the intervention than parents who received DEF. ABC targets decreasing parental withdrawal through the intervention aims of following the child's lead and providing nurturance when children are distressed. Therefore, it is not surprising that parents who were randomized to receive ABC demonstrated lower rates of withdrawal than parents who received the control condition. For example, parents who engage in withdrawing behavior may have no interaction with their child during times of distress, put their child down too soon, or dismiss their child's need for comfort, all of which are antithetical to provision of nurturance when children are distressed or following children's leads.

The second aim was to investigate whether decreases in parental withdrawal mediated the association between intervention status and the proportion of children classified with disorganized attachment. Mediation analyses support the hypothesis that the ABC intervention led to a lower proportion of children classified as having a disorganized attachment by decreasing parental withdrawal.

The third aim was to investigate whether anomalous caregiving behaviors during infancy predicted dysregulation when children were 3 and 4 years old. Of the parenting behaviors, parental withdrawal and disorientation were hypothesized to predict increases in dysregulation. No anomalous parenting behaviors were significantly associated with child dysregulation when children were 3 years old. However, parental disorientation was associated with child dysregulation when children were 4 years old, although the direction of the association was not as hypothesized. Further, parental affective communication errors predicted significant increases in child dysregulation.

The fourth aim was to investigate associations among unresolved parental attachment representations, anomalous parenting behavior, child attachment disorganization, and child dysregulation. Parents with unresolved parental attachment representations were hypothesized to display higher levels of disorientation and withdrawal than parents without unresolved parental attachment representations. No significant associations between parental unresolved attachment representations and anomalous parenting behaviors or child attachment disorganization were found. These findings are not consistent with meta-analytic results of studies investigating these associations, which revealed moderate effect sizes for parental unresolved attachment representations and anomalous parenting behaviors ($r = .26$) and unresolved

attachment representations and child attachment disorganization ($r = .21$; Madigan et al., 2007). One explanation for this null finding may be related to a possible unaccounted for intervention effect on parental attachment representations. Although the ABC intervention has not investigated whether the intervention leads to changes in adult attachment representations, it is possible that through opportunities to reflect on past experiences of being parented, parents' attachment representations are changing, highlighting a need for future research. Further, parental disorientation and withdrawal were not significantly associated with increased odds of a child being classified as having a disorganized attachment. In the current study, children whose parents engaged in more affective communication errors were almost 1.4 times more likely to be classified as having disorganized attachments than children whose parents engage in less affective communication errors. These inconsistent findings with regards to the paths from unresolved parental attachment representation, anomalous parenting behavior, and attachment disorganization, may be explained by individual child vulnerability factors or resiliency characteristics that are not included in the model (e.g., gene-environment interactions) and point to a need to consider the threshold approach when evaluating a child's development of a disorganized attachment (Bernier & Meins, 2008).

Findings from the current study add to the growing body of evidence supporting ABC's efficacy at improving parenting outcomes, and provide evidence for the mediating role decreases in parental withdrawal had on the proportion of children classified with a disorganized attachment. These results suggest that ABC, a brief parenting intervention, is also able to decrease the presence of anomalous parenting behaviors that have been associated with child disorganization, which may be more

feasible to implement with high-risk populations than long-term interventions such as CAPEDP. Further, previous research investigating the contributions of specific anomalous parenting behaviors on later dysregulation have shown support for parental disorientation (e.g., Abrams, Rifkin, & Hesse, 2006) and withdrawal (e.g., Lyons-Ruth et al., 2013). The current study extends this body of research by pointing to affective communication errors as an additional key contributing parenting behavior that leads to children's difficulty regulating emotions and behavior during early childhood.

Strengths, Limitations, and Future Directions

The current study had several strengths including the use of a longitudinal design which allowed for the assessment of mediation and path models across time. Further, the study assessed intervention effects within an RCT framework, providing increased confidence in the finding that the ABC intervention promoted decreases in parental withdrawal. The study also used observational methods of parenting behavior, child attachment quality, and child dysregulation, rather than self-report methods, which allowed for more objective assessments of the behavior being coded.

Although there were several strengths, results of the study should be interpreted within the context of its limitations. As noted previously, the current sample is a smaller sample size than previously reported (i.e., Bernard et al., 2012). The current sample included 76.7% ($n = 92$) of the sample reported in the Bernard et al. (2012) paper. There are several reasons why there were differences between the two samples including difficulties with video quality, removal of siblings from the current sample, and additional families completing the intervention after publication of Bernard et al. (2012). The difference in sample led to differences in attachment disorganization, which leaves questions as to whether the full sample size would

reveal similar results. Additionally, the current sample had low base rates of some of the dimensions of parenting behaviors that were coded (e.g., role/boundary confusion) and therefore that may have limited the ability to identify associations between anomalous parenting behaviors and children's regulatory abilities. Further, although fit statistics of the second-order confirmatory factor analyses of the DB-DOS were acceptable, separating emotional and behavioral dysregulation between children's behavior with parents versus examiners may be more socially valid than the current CFA. Finally, the current study did not include additional risk factors (e.g., cumulative risk index) or protective factors (e.g., parental sensitivity) that have previously been found to predict attachment quality and later regulatory abilities in children and highlights an area for future exploration.

Future studies should continue to assess the unique contributions of each anomalous parenting behavior on children's regulatory functioning. Results of the current study suggest that anomalous parenting behaviors may become predictive of dysregulation later in life. Therefore, it will be useful to investigate the long-term effects anomalous parenting behavior has on children's regulatory abilities later in life.

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Appendix

IRB-APPROVAL LETTER



RESEARCH OFFICE

210 Hullen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: February 24, 2016

TO: Mary Dozier, PhD
FROM: University of Delaware IRB

STUDY TITLE: [143902-22] Specialized Services for Birth Parents

SUBMISSION TYPE: Continuing Review/Progress Report

ACTION: APPROVED

APPROVAL DATE: February 24, 2016

EXPIRATION DATE: February 24, 2017

REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # (9)

Thank you for your submission of Continuing Review/Progress Report materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.