2017

The Moderating Role of RSA Baseline, Reactivity, and Recovery in the Link between Parental Socialization of Emotion Regulation and Children's Internalizing Symptoms

Wesley Sanders
University of Vermont

THE MODERATING ROLE OF RSA BASELINE, REACTIVITY, AND RECOVERY IN THE LINK BETWEEN PARENTAL SOCIALIZATION OF EMOTION REGULATION AND CHILDREN'S INTERNALIZING SYMPTOMS

A Dissertation Presented

by

Wesley M. Sanders

to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
Specializing in Clinical and Developmental Psychology

October, 2017

Defense Date: May 12, 2016
Dissertation Examination Committee:

Jamie Abaied, Ph.D., Advisor
Lawrence Shelton, Ph.D., Chairperson
Rex Forehand, Ph.D.
Alice Schermerhorn, Ph.D.
Matthew Price, Ph.D.
Cynthia J. Forehand, Ph.D., Dean of the Graduate College

ABSTRACT

In this study I examined the moderating effect of three profiles of respiratory sinus arrhythmia (RSA at baseline, in response to a stressor, and in recovery from a stressor) on the relationship between parental emotion socialization during an emotion-related discussion and parental report of child internalizing symptoms 6 months later. Parents were observed during an emotion discussion task and coded for their use of emotion encouragement and general positive involvement. A total of 65 families with children between the ages of eight and ten years old completed this task while RSA scores were obtained from children during baseline, task, and recovery phases. Regression analyses were conducted to test for main effects of parental emotion socialization and RSA, as well as two-way emotion socialization x RSA interactions, in the development of internalizing symptoms 6 months following the initial interview. Interactions were further examined for the degree they statistically conformed to either a diathesis-stress or biological sensitivity to context framework (BSC). Hypotheses were partially supported: main effects were found for RSA baseline and recovery, whereas RSA reactivity moderated the association between parental emotion encouragement and child internalizing symptoms, such that parents of children exhibiting RSA withdrawal reported greater internalizing symptoms in the context of low emotion encouragement and lesser internalizing symptoms in the context of high emotion encouragement. This study highlights the importance of considering child psychophysiology, particularly reactivity to stress, in the study of the effects of parental emotion socialization on the development of psychopathology during childhood.

ACKNOWLEDGMENTS

I'd like to thank my undergraduate mentors, Dr. Linda Zyzniewski, Dr. Natalie Shook, Dr. Leticia Flores, and Dr. Timothy Hulsey. Without your guidance, encouragement, and enthusiasm, I would never have discovered my path in psychology. To my advisor at William & Mary, Dr. Janice Zeman, I am forever grateful for your mentorship that helped shape me from an undergraduate student to an aspiring academic. It is because of you that I will never write "while" when I mean to say "whereas." To Dr. Rex Forehand, your guidance and mentorship has been truly inspiring. I will always count myself fortunate to have had the opportunity to work with you. I would also like to thank my advisor, Dr. Jamie Abaied, for her patience and insight during my time at UVM. You have shown me how to be a better researcher, and your passion for research is infectious. Your expertise in development has been instrumental in shaping my understanding of psychology, and I thank you for such a unique opportunity.

I would like to thank my committee: Dr. Jamie Abaied, Dr. Alice Schermerhorn, Dr. Matthew Price, Dr. Rex Forehand, and committee chair Dr. Lawrence Shelton. Your feedback, guidance, and insight has contributed considerably to the quality of my work. I would like to thank Caitlin Wagner, for her feedback and much needed emotional support as we both embarked on the dissertation process together. I am appreciative of the work of the Family Development Lab, particularly Jamie Herold, for helping me code our observational data.

Most of all, I'd like to thank my wife, Kim Sanders. Without your support, love, and encouragement, I know for certain I would not be where I am today. Thank you for taking this leap with me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

As children enter middle childhood, the burden of regulating their emotions begins to pass from parent to child. No longer limited to crying when experiencing negative affect, language and cognitive development allow children to learn a variety of different ways to express emotions with their family and peers. At the same time, psychophysiological developments allow the child to modulate and respond to emotional demands (Calkins, 1994; Gottman & Katz, 2002). It is with these advances that children's ability to appropriately regulate emotion becomes a key developmental milestone as they grow older and develop increasingly complex social interaction skills (e.g., increased vocabulary and meta-cognitive abilities). During this learning period, parents play a critical role, modeling directly and indirectly the appropriate responses to different emotionally arousing stimuli (Barrett & Campos, 1987). Positive emotion socialization efforts by parents, in the form of warmth and validation of the child's emotions, have been linked to adaptive social-emotional functioning in childhood (Eisenberg, Fabes, & Murphy, 1996; Gottman, Katz, & Hooven, 1996). Positive emotion socialization by parents may affect children differently, however, as characteristics of the child may impact sensitivity to these socialization efforts as well. In particular, the relationship between parental emotion socialization practices and adaptive outcomes in childhood may be influenced by the child's regulatory psychophysiology. The goal of this project is to examine the moderating role of the child's physiological regulation in the link between parental emotion socialization and children's internalizing symptoms.

Emotion Regulation in Childhood

Due to both the critical implications of emotion regulation for adaptive functioning in development and the difficulty in objectively defining the term, researchers continue to debate the definition of specific emotion regulation processes (Campos, Frankel, & Camras, 2004). For the purposes of this study, emotion regulation is defined as, "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, p. 27-28). Thompson's definition is broadly conceived; regulation of emotion can involve suppression or enhancement of the emotional expression and experience depending on the situation. This view also acknowledges that emotion regulation can come from both internal sources, such as psychophysiological responses to stress, and external sources, such as efforts by parents to influence their child's behavior (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Given the potential impact of parenting in the development and maintenance of the child's emotion regulation, the present study focuses on this source of influence as it relates to the child's development of maladaptive emotion regulation in the form of internalizing symptoms.

Emotion Regulation and Internalizing Disorders

By effectively monitoring and modifying emotions to achieve desired outcomes, adaptive emotion regulation provides an optimal way for children to manage their affective arousal. What outcomes result, however, from *dysregulated* emotions? Children who are unable to effectively manage their emotions often show poor social

functioning (Coie, Dodge, & Kupersmidt, 1990) and difficulties with a broad range of psychopathology, including anxiety (Suveg & Zeman, 2004; Southam-Gerow & Kendall, 2000), depressive symptoms (Feng et al., 2009; Sanders, Zeman, Poon, & Miller, 2015) and externalizing behavior (Zeman, Shipman, & Suveg, 2002). Of particular interest in the proposed study is the link between emotion dysregulation and internalizing symptoms, which includes symptoms of both mood (e.g., depression) and anxiety disorders. I chose to examine internalizing symptoms for three reasons. First, dysregulated emotions represent a core feature of depressive and anxious symptoms. Second, compared to other types of problems, internalizing disorders have the highest prevalence rates for children in the U.S. (Merikangas, He, Brody, Fisher, Bourdon, & Koretz, 2010), a trend that increases as children enter adolescence. Third, mood and anxiety disorders in childhood are not only risk factors for continued symptom development in adolescence and early adulthood, but are also predictive of one another across time (Copeland, Shanahan, Costello, & Angold, 2009). Therefore, it is important that we better understand these difficulties in childhood both to reduce risk for childhood disorders and to prevent the development of further mental health difficulties in adulthood.

Parental Emotion Socialization

With regards to emotional development, parents influence how children learn to express, understand, and regulate emotions (Barrett & Campos, 1987; Denham, 1998; Halberstadt, 1991; Malatesta & Haviland, 1982). There are a variety of theoretical models of parent emotion socialization. Halberstadt's (1991) three-part model separates

methods of parental influence into modeling, coaching, and contingency; parents socialize emotions by how they show emotion (modeling), how they teach emotion (coaching), and by how they respond to emotion (contingency). Saarni (1993) elaborated on these methods, arguing that children learn about emotion from their parents through imitation (modeling), direct instruction (coaching), and by receiving contingencies, as well as through the communication of verbal and non-verbal expectancies (i.e., learning about the meanings of emotions or contexts through the words and non-verbal cues used by caregivers), identification with others, and social referencing. Each of these methods can influence how the child learns to express, understand, and regulate his or her emotions (Denham, Bassett, & Wyatt, 2007; Saarni, 1985, 1987). Further, in summarizing the parental emotion socialization literature, Eisenberg, Cumberland, and Spinrad (1998) argued that all of these socialization methods can be implemented through parent-child discussions of emotions, which is the focus of the proposed research.

Emotion discussions. Parental discussions of emotions with their children represent unique opportunities for parents to implement each of the aforementioned socialization methods. Parents may provide direct suggestions to their child, model their own emotional responses in the conversation, and provide contingencies through responses to their child's emotionality, thus maximizing the impact of the parent's emotion socialization practices (Eisenberg et al., 1998). Given the potential value of these interactions, researchers have examined how parenting behaviors during emotion-eliciting discussions may play a role in their child's psychosocial outcomes (Dunsmore, Booker, & Ollendick, 2013; Suveg, Sood, Barmish, Tiwari, Hudson, & Kendall, 2008).

Gottman and colleagues (1996) proposed that parental emotion discussion styles fall under the general construct of meta-emotion philosophy, defined as "… an organized set of feelings and thoughts about one's own emotions and one's children's emotions" (p. 1). This philosophy is pervasive in all emotion-related interactions between the parent and child; the parents' response to their child in part reflects the parents' belief about the expression and purpose of emotions. Gottman and colleagues (1996) separate parental meta-emotion philosophies into two broad groups: *emotion-coaching* (EC) and *emotion-dismissing* (ED). Parents who utilize an emotion-coaching approach are highly aware of both their own and their child's emotions, view negative emotions as an opportunity for learning and teaching, validate and talk about their child's negative emotions, and help their child modify these emotions in an adaptive manner. Parents utilizing an emotion-dismissing approach generally view negative emotions as harmful and seek to eradicate them as quickly as possible. Dismissive parents might make attempts to directly alleviate the stimuli that lead to the negative emotion, distract the child from the emotion, punish the child for exhibiting the emotion, or ignore the negative emotion altogether. Past research has found that parents utilizing an emotion-coaching approach tend to have children with more adaptive emotion regulation strategies (Dunsmore et al., 2013; Gottman et al., 1996; Ramsden & Hubbard, 2002). A number of studies have also found direct links between emotion coaching and reduced adjustment problems in childhood (Dunsmore et al., 2013; Gottman et al., 1996; Katz & Hunter, 2007), suggesting that emotion socialization may also directly impact the child's psychosocial adjustment.

Utilizing a meta-emotion framework, the present study incorporates both general and specific parental emotion socialization strategies. Parents were asked to discuss with their child a time the child felt sad with other children his or her own age. In order to measure parental socialization behaviors, parents were coded for their use of emotion encouragement (i.e., emotion coaching) as well as their general positive involvement toward their child while discussing the event. By controlling for general positive involvement (i.e., parental warmth, supportiveness, and engagement), the present study assessed whether a meta-emotion framework contributes to the development of internalizing symptoms in childhood beyond these general features of positive parenting. Consistent with previous research, I expected a main effect for parental emotion encouragement, such that greater emotion encouragement would predict fewer internalizing symptoms after controlling for parents' general positive involvement.

Psychophysiology of Emotion Regulation

Although it is clear that parents play a large role in their child's development of adaptive emotion regulation, less is known regarding the degree to which psychophysiological responses in the child may affect this process. Efforts to operationalize emotion regulation over the past 20 years point to the critical role of psychophysiology as an indicator of adaptive and maladaptive responses to stress (Beauchaine, 2001; Beauchaine, 2015; Fox, 1994; Gottman, & Katz, 2002). More recently, researchers have begun to examine various biological contributions of the child, utilizing methods including autonomic arousal, fMRI, EEG, and event-related potentials (ERP), in order to better understand the development of adaptive emotion regulation in

childhood (see Hastings, Kahle, & Han, 2014 for a review). Of interest in the present study is the role of the vagus nerve, which has been implicated in a multitude of studies as an important mechanism by which the body physiologically copes with negative emotions (Hessler & Katz, 2007; Porges, 1995; Porges, 2007). According to the polyvagal theory (Porges, 1995), innervation of the vagus nerve, or *vagal tone*, serves to promote homeostasis by increasing parasympathetic nervous system activity, effectively slowing heart rate. Thus, through activation or withdrawal of the vagus nerve, heart rate can be dampened or accelerated. Vagal activation can be measured via *respiratory sinus arrhythmia* (RSA). RSA reflects the increase and decrease in heart rate after adjusting for the rhythmic influence of respiration and is linked to the amplitude of heart rate oscillations between inhaling and exhaling. RSA reactivity represents the discrepancy between RSA measured during stress conditions and the baseline (resting) RSA measurement (Butler, Wilhelm, & Gross 2006; Calkins, Graziano, & Keane, 2007). RSA reactivity is particularly useful for determining the rate of vagal withdrawal in response to a stimulus. That is, a decrease in vagal tone (withdrawal) allows for an increase in heart rate and subsequently more resources to devote to self-regulation (Porges, 1985; Wilson & Gottman, 1996). In this way, vagal withdrawal is frequently utilized as a measure of adaptive emotion regulation (Zeman et al., 2006).

Although much research has incorporated RSA at baseline and RSA reactivity in response to stressors, relatively few studies have incorporated RSA recovery after a stressful response. This is particularly surprising as many definitions of emotion regulation, including Thompson's, describe recovery from an emotional response as an

essential component of emotion regulation (Cole, Martin, & Dennis, 2004; Eisenberg & Spinrad, 2004; Thompson, 1994). A lack of research in this area may stem from disagreement in the literature on how to measure this construct (Linden, Earle, Gerin, & Christinfield, 1997). Researchers have described RSA recovery as an average score post-stressor (Mauss, Wilhelm, & Gross, 2003; Papousek, Nauschnegg, Paechter, Lackner, Goswami, & Schulter, 2010), a difference score between averages during a stressor and post-stressor (Crowley et al., 2011), differences between peak stress and lowest post-stress scores (Gordon et al., 2011), and through growth curve modeling (Radstaak, Geurts, Brosschot, Cillessen, & Kompier, 2011). In the present study I measured RSA recovery through difference scores between task and recovery periods, as outlined by Kamarck (1992) and utilized in previous studies (Alkozei, Creswell, Cooper, & Allen, 2015; Crowley et al, 2011; Mezzacappa, Kelsey, Katkin, & Sloan, 2001). Further, utilizing a difference score in this manner allows for a mathematically and conceptually symmetrical operationalization of both RSA reactivity and RSA recovery. Keeping in line with my description of RSA reactivity, increases in RSA post-task are referred to as *RSA augmentation* whereas decreases post-task are referred to as *RSA withdrawal*.

Baseline RSA. According to the polyvagal theory, higher resting RSA serves to promote growth and restoration and is considered adaptive during periods where the child is not exposed to stress (Porges, 1995; Porges, Doussard-Roosevelt, & Maiti 1994). In contrast, low baseline RSA represents a vulnerability to stress (Porges, et al., 1994; 2007). Indeed, past research suggests that low baseline RSA in childhood is associated with greater anxiety (El-Sheikh, Harger, & Whitson, 2001; Fox & Field, 1989; Coll,

Kagan, & Reznick, 1984) and internalizing symptoms (El-Sheikh et al., 2001), whereas high baseline RSA is associated with greater self-soothing (Fox, 1989) in infants, as well as greater adaptive coping (Fabes & Eisenberg, 1997) and self-regulatory behaviors (Gottman & Katz, 1989; Linnemeyer & Porges, 1986) in children. Given these findings, in the present study it was expected that low baseline RSA would be associated with greater internalizing symptoms, whereas an inverse relationship was expected for high baseline RSA.

RSA reactivity. Changes in RSA in response to stress represents a useful metric of a child's regulatory capacity. The polyvagal theory suggests that adaptive changes in RSA allow for the child to allocate maximal resources to manage a stressor (Porges, 2007). Thus, a reduction of PNS activity in response to stress, or a *withdrawal* of RSA, allows for SNS activity to provide the body with resources to respond to a stressful situation, whereas increases of RSA in response to stress, or *RSA augmentation*, suggest an increase of PNS activity that deprives the child of physiological resources to manage their distress. The literature regarding how this might be related to internalizing symptoms, however, is mixed. Although some studies have found that RSA withdrawal is associated with fewer internalizing symptoms (Calkins & Dedmon, 2000; El-Shiekh & Whitson, 2006) and RSA augmentation is associated with greater internalizing symptoms in childhood (El-Sheikh & Whitson, 2006; Hastings, Nuselovici, Utendale, Coutya, McShane, & Sullivan, 2008), others suggest an association between RSA withdrawal and *more* internalizing behavior (Boyce, Quas, Alkon, Smider, Essex, & Kupfer, 2001; Calkins et al., 2007) or no association (Alkozei et al., 2015). In a recent meta-analysis,

Graziano and Derefinko (2013) found a small effect for RSA withdrawal such that greater RSA withdrawal was associated with reduced internalizing symptoms. The authors suggest that the inconsistency among measures, analyses, and populations may contribute to the mixed findings in the literature. The present study seeks to further clarify these discrepancies by examining the interactive contributions of RSA reactivity and parental emotion socialization to internalizing symptoms in childhood.

RSA recovery. Although much work has been done examining RSA baseline and reactivity in childhood, relatively few studies have examined how children's RSA recovery from stress may play a role in the child's behavioral outcomes. Further, the limited research available on this topic varies widely in operationalized definitions of RSA recovery. Drawing from polyvagal theory, effective recovery reflects an efficient return to baseline and homeostasis of the body (Porges, 1995; 2007). Thus, an increase of PNS activity (RSA augmentation) after a stressor reflects adaptive recovery from stress, whereas a decrease in PNS activity (RSA withdrawal) after a stressor suggests difficulties reestablishing homeostasis and may serve as a vulnerability for dysregulated emotional responses. To date, researchers have not utilized augmentation/withdrawal terminology in the context of recovery. Utilizing other operationalized definitions of RSA recovery, however, findings suggest that lower RSA during a recovery period from stress is associated with dysregulated emotion (Santucci, Silk, Shaw, Gentzler, Fox, & Kovacs, 2008) and that slower RSA recovery is associated with greater anxiety in childhood (Alkozei et al., 2015). Interestingly, Alkozei and colleagues (2015) did not find effects for RSA reactivity to stress, suggesting that recovery may play a unique role in the

development of anxious symptoms during childhood. Further, findings from McLaughlin, Alves, and Sheridan (2013) suggest that faster vagal recovery (i.e., a swifter return to baseline following a stressor) may be associated with fewer internalizing symptoms for adolescents. In the adult literature, a research has shown that slower RSA recovery is associated with major depressive disorder (Gordon et al., 2011). The limited nature of the current literature on RSA recovery highlights both the importance for further research in this area and the need for caution when forming hypotheses regarding this construct. Given what information is available, however, it was expected that RSA augmentation during the recovery phase would be associated with fewer internalizing symptoms, whereas the opposite was expected for RSA withdrawal during recovery.

Interactions between Child Psychophysiology and Parental Socialization

Although the development of internalizing symptoms reflects both individual (psychophysiological) and environmental (socialization) influences, there is still much work to be done in order to understand the concurrent effects of these two systems in childhood. Two theoretical models of developmental vulnerability and resilience, dual-risk (DR) and biological sensitivity to context (BSC), provide competing frameworks for the understanding of person x environment interactions and may help to clarify the relationship between child psychophysiology and parental emotion socialization. A multitude of studies lend support to both DR and BSC frameworks (Driscoll, Lopez, & Kistner, 2009; El-Sheikh et al., 2001; Hastings et al., 2008; Obradavic, Bush, Stamperdahl, Adler, & Boyce, 2010; Sanders et al., 2015), such that a case may be made for both models. However, most researchers to date have utilized subjective means when

interpreting their findings in the context of these models. Utilizing statistical analyses suggested by Roisman, Newman, Fraley, Haltigan, Groh, and Haydon (2012), in the present study I directly compared the findings in light of these two frameworks and determined the degree to which the data adhered to either a DR or BSC model. Conceptual interactions for each of these models are shown in Figure 1.

Figure 1. *Conceptual Biological Sensitivity to Context and Dual-Risk Models of Risk and Resilience.*

Biological Sensitivity to Context. *Biological sensitivity to context* (BSC), also referred to as *differential susceptibility* (these terms are conceptually synonymous), refers to a vulnerability model in which child characteristics are considered plasticity agents rather than categorized as risk or resilience factors (Belsky, 1997; Boyce & Ellis, 2005). That is, characteristics of the child may increase his or her sensitivity to positive and negative environmental influences, and these characteristics can represent *both* risk and resilience factors. For example, El-Shiekh et al. (2001) found that low RSA children displayed less anxiety than high RSA children in the context of low marital conflict, but greater anxiety in the context of high marital conflict. Similarly, Hastings and colleagues

(2008) found that children with low vagal withdrawal displayed fewer internalizing symptoms than high vagal withdrawal children in the context of high supportive parenting, but greater internalizing symptoms in the context of low supportive parenting.

Importantly, BSC theory posits that to examine contributions of child characteristics and environmental influences independently in the study of developmental psychopathology is insufficient. Rather, the incorporation of interactions is necessary to elucidate effects that would typically be "washed out" in statistical analyses due to opposite effects across contexts (Boyce & Ellis, 2005). For example, Obradavic and colleagues (2010) utilized multiple measures of psychophysiological activity and child outcomes, finding that high RSA and cortisol reactivity were associated with a greater risk for maladaptive outcomes in childhood in the context of high family adversity, whereas these children displayed more adaptive outcomes in the form of academic achievement, school competence, and prosocial behaviors in the context of low family adversity. In examining parenting behaviors, Hastings and colleagues (2008) found that the influence of RSA only became relevant when children were exposed to certain parenting styles, highlighting the importance of considering both individual and environmental factors together.

According to the BSC framework, two profiles of RSA would be expected in the present study: one that is unresponsive to the effects of parental emotion socialization, and another that is highly sensitive to these parenting practices (see Figure 2). Profiles of low baseline RSA and RSA withdrawal in the context of reactivity and recovery facilitate maximal sympathetic arousal, allowing the child to devote additional resources toward

both positive and negative parental emotion socialization, and are thus hypothesized to reflect a sensitive profile of psychophysiology. The BSC framework suggests that these three sensitive profiles of psychophysiology would moderate the link between parental emotion socialization and child internalizing symptoms such that these children would experience the lowest internalizing symptoms in the context of high emotion encouragement from their parents, as well as the highest internalizing symptoms in the context of low emotion encouragement, when compared to children with a nonresponsive profile of RSA psychophysiology. In contrast, profiles of psychophysiology that engage parasympathetic resources during baseline and reactivity, including high baseline RSA and RSA augmentation in the context of both reactivity and recovery, reduce sympathetic resources and limit the child's ability to respond to his or her environment, suggesting an unresponsive profile of psychophysiology. From a BSC perspective, these unresponsive profiles of psychophysiology would be expected to remain similar regardless of parental emotion socialization efforts.

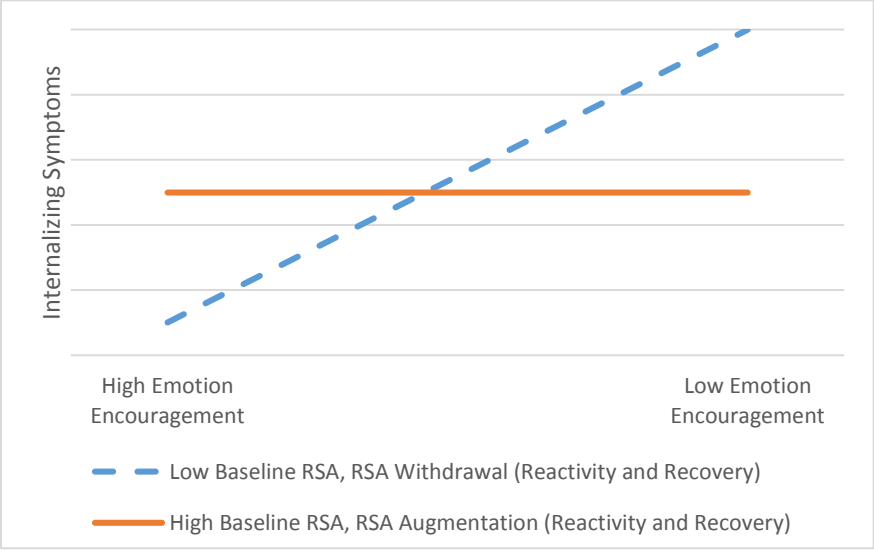

Figure 2. *Hypothesized Biological Sensitivity to Context Interactions.*

Diathesis-Stress. In contrast to the BSC theory of child vulnerability/resilience, a *diathesis-stress* or *dual-risk* (DR) model suggests that certain child characteristics represent diatheses or vulnerabilities and place children at risk for the development of maladaptive outcomes only in the context of certain environmental factors (see Zuckerman, 1999, for a review). Thus, a combination of underlying risk factors and negative environmental influences are required for these children to experience a maladaptive outcome. In contrast to the crossover interaction defined in BSC models, effects within DR models are predominantly found at one level of the environmental factor, typically a high or low level of exposure. In this way, the child's psychophysiological characteristics may represent a vulnerability factor and exacerbate his or her adjustment problems only in negative contexts (e.g., maladaptive emotion socialization).

Some research on RSA supports the DR model. For example, El-Sheikh and Whitson (2006) found greater internalizing symptoms for children in families with high marital conflict versus low marital conflict, but only for those children with low RSA withdrawal. Leary and Katz (2004) found that, in the context of high marital conflict, children who exhibited higher RSA augmentation in response to stress were more likely to engage in conflicts with peers, whereas this effect was not found for children who exhibited greater RSA withdrawal. In a study of baseline RSA, Shannon, Beauchaine, Brenner, Neuhaus, and Gatzke-Kopp (2007) found that for children with high baseline RSA, parent depression was associated with child depressive symptoms. This association

was not found for children with low baseline RSA, suggesting that low baseline RSA may be a protective factor in the context of parental depression (Shannon et al., 2007).

According to the DR framework, one might expect in the present study that maladaptive profiles of psychophysiology would place the child at risk for the development of internalizing symptoms in the context of less supportive environments (see Figure 3). Thus, profiles of maladaptive psychophysiology, including low baseline RSA, RSA augmentation in the context of reactivity, and RSA withdrawal in the context of recovery, would be expected to moderate the link between parental emotion socialization and child internalizing symptoms such that children with these psychophysiological profiles would experience greater internalizing symptoms in the context of low parental emotion encouragement efforts than children who do not possess these physiological profiles. In contrast, profiles of adaptive psychophysiology, including high baseline RSA, RSA withdrawal in the context of reactivity, and RSA augmentation in the context of recovery, would be expected to reflect greater resilience to the effects of low parental emotion encouragement.

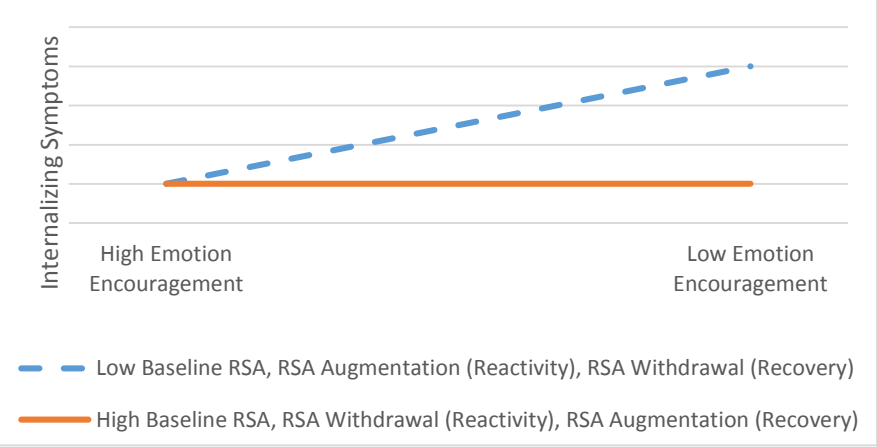

Figure 3. *Hypothesized Dual-Risk Interactions.*

Both BSC and DR models are conceptually plausible and empirically supported. Rather than hypothesizing in terms of one over the other, the primary goal of this study is to evaluate whether a model of RSA and parental emotion socialization interaction better fits with a BSC or DR model of stress vulnerability in childhood. Following recommendations put forth by Roisman et al., (2012), interactions were plotted and examined for the degree to which crossover effects occur. Crossover effects in which RSA profiles predict differences in internalizing symptoms at primarily one side of the interaction reflect a better fit with a dual-risk model, whereas interactions in which differences in RSA profiles are present evenly on both sides of the crossover reflect a better fit with a biological sensitivity to context model. Statistical methods for evaluating these concepts are described in the analytic plan.

Study Strengths

Despite the burgeoning literature on parent emotion socialization, only recently have researchers begun to examine the role of psychophysiology in this process. Results from these studies suggest that parental emotion socialization does not occur in a vacuum; rather, children's psychophysiological profiles likely affect the outcomes of these socialization interactions and may serve as either a vulnerability or strength in the development of internalizing symptoms (Allen, Kuppens, & Sheeber, 2012; Hastings, Sullivan, McShane, Coplan, Utendale, & Vyncke, 2008; Williams & Woodruff-Borden, 2014). Indeed, a recent review of the emotion regulation literature suggests that the inclusion of multiple methods, particularly observational and physiological data, plays a significant role in the impact these studies have on the field (Adrian, et al., 2011). The

current study serves to further elucidate this link while adhering to rigorous standards by including multiple forms of methodology (observational data, psychophysiological recording, and parent self-report) and multiple time points (initial and 6-month follow up data) to better assess the moderating role of psychophysiology in the link between parental emotion socialization and internalizing symptoms for a middle childhood sample. A key strength of the present study is the inclusion of observational data, which is considered the "gold standard" in the study of parenting in childhood (Hawes & Dadds, 2006; O'Connor, Matia, Futh, Tantam, & Scott, 2013) and represents an improvement over previous studies of emotion socialization.

In addition to the aforementioned improvements in methodology, this study included three separate regulatory stages of RSA – baseline, reactivity, and recovery – as moderators of the relationship between parental emotion socialization and child internalizing symptoms. A dearth of studies examining RSA recovery in particular represents a significant gap in the literature; the consideration of both emotion response to and recovery from a stressor is necessary to understand how child regulatory processes interact with parental socialization practices.

Summary of Hypotheses

1. Parental emotion encouragement at time 1 will predict decreased child internalizing symptoms at time 2.
2. Low baseline RSA at time 1 will be associated with greater child internalizing symptoms at time 2.

3. High RSA withdrawal reactivity at time 1 will be associated with fewer child internalizing symptoms at time 2.
4. High RSA augmentation recovery at time 1 will be associated with fewer child internalizing symptoms at time 2.
5. As described earlier, measures of RSA (baseline, reactivity, and recovery) at time 1 are expected to moderate the effects of parental emotion encouragement at time 1, adhering either to a DR or BSC framework, in predicting child internalizing symptoms at time 2.

Methodology

Participants

A total of 65 families with children between the ages of eight and ten years old (36 males, *M* = 9 years old, *SD* = 0.81) were recruited from the local community of a public university in the northeastern United States. Parents in the present study consisted largely of mothers (97%) and were predominately Caucasian (97%). Children were primarily Caucasian (94%), with an additional 1.5% who identified as African-American, 1.5% as Latino, 1.5% as Asian, 1.5% as Pacific Islander, and 1.5% who chose not to disclose their race. Parents' education levels ranged between attending some college (6.4%), earning a college degree (31.8%), attending at least some graduate school (6.3%), and receiving a graduate degree (55.5%). Reported family income ranged from under $15,000 a year to over $90,000 a year with 14.5% making less than $30,000 per year, 6.5% making between $30,000 and $45,000, 16.1% making between $45,000 and $60,000, 6.5% making between $60,000 and $75,000, 12.9% making between $75,000

and $90,000, and 43.5% making at least $90,000 gross combined income. Of participating parents, 7.9% reporting being single, never married; 9.5% reporting being divorced, separated, or widowed; and 82.5% being married (3.2% of participants declined to report). Due to equipment error, psychophysiological data was unavailable for one of the 65 families.

At Wave 2, 51 (78%) of families completed the study. Parents who did and did not participate at Wave 2 did not significantly differ by demographic categories such as relationship to child, marital status, parent gender, gross family income, and education, nor the study variables of child internalizing symptoms, child RSA baseline, reactivity, and recovery. A chi-square analysis revealed that Wave 2 participants differed from Wave 1 participants based on ethnicity ($\chi^2 = 11.88$, $p = .01$), such that a disproportionate sample of non-Caucasian participants did not participate at Wave 2 ($n = 3$).

Measures

Emotion Discussion Task. Both parent and child completed a semi-structured emotion discussion task in which the parent and child were asked to discuss a recent (i.e., within the past six months) time the child felt sad with other peers his or her own age. Parents were asked to leave the room while the research assistant asked the child to think of a time he or she felt sad with another child his or her own age. Example events include bullying, peer rejection, and peer disagreements. Children were asked to rate their sadness during the event on an "emotion thermometer" scale ranging from 0 (*not sad at all*) to 10 (*the saddest you've ever been)* and were guided to choose an event within a range of 5-8 ($M = 6.2$, $SD = 1.3$, range = 7) in order to create sufficient emotional arousal

while not overly distressing the child. Participants were also asked to report whether the other child involved in the emotion-eliciting event was a "Best friend (18.8%)," "Good friend (31.1%)," "OK friend (23.4%)," or "Not your friend (26.6%)." Upon determining the topic of discussion (i.e., the sadness event), parents were asked to return to the room and to discuss the topic with their child as they normally would in the context of a typical day. Parents were instructed to allow the child to describe the topic first, after which parent and child could discuss the topic until they felt they were done. Parents were not given a specific time limit in order to stimulate natural conversation; however, after 10 minutes parents who remained in conversation were encouraged by research assistants to finish their conversation. These conversations were videotaped. This discussion task has successfully been utilized in previous studies to assess for parent-child interactions in the context of emotion discussions (Baker, Fenning, & Crnic, 2011; Dunsmore et al., 2013; Suveg, et al., 2008).

Coding Scheme. In order to assess both global and specific emotion socialization practices, mothers' and fathers' responses to their child during the emotion discussion task were coded by me and one trained undergraduate research assistant, utilizing a coding system based on the Parent-Child Emotion Talk Task (Dunsmore et al., 2013) and the Emotion Discussion Task (Poon, Zeman, Miller, & Sanders, 2015). This coding system (see Appendix A) examined parental socialization of emotion regulation in both a global and specific framework.

Specific Parental Emotion Socialization (Emotion Encouragement; EE). Parents' responses were coded for their encouragement of their child's emotion talk utilizing a 1-4

scale: 1 = no encouragement or response from the parent; 2 = acknowledgment of the child's discussion of facts or *event-related* information (e.g., "You were trying to find your friend."); 3 = acknowledgment of the *emotion,* including nonverbal responses (e.g., mirroring the emotional response or physically comforting the child); and 4 = emotion coaching behavior, including validation and labeling of the child's emotions (e.g., "How did you feel when that happened?"). Each response to the child was individually coded and encouragement scores were averaged across all events for each participant. Consistent with previous research (Dunsmore, et al., 2013; Moilanen, Shaw, & Fitzpatrick, 2010), 25% of videotapes were double-coded; disagreements were resolved through discussion between coders (ICC prior to discussions = .91).

General Parental Emotion Socialization (Positive Involvement; PI). A global score of parental positive involvement was coded for each parent; this global score reflects the general positive quality of the interpersonal interaction between parent and child. Involvement includes behavior such as supportive responses (e.g. smiling, praising), warmth and engagement, and a high degree of participation in the conversation. Based on the frequency of positive behavior utilized during the discussion, a 0-3 scale was used: 0 = no positive interactions; 1 = "low", representing infrequent positive interactions with the child (1-2 times during the discussion); 2 = "moderate," representing several positive interactions (at least 3 times during the discussion); and 3 = "high," representing a predominately positive interaction style (several acts of positive behavior). Intra-class correlations suggest these codes were reliable across raters (ICC prior to discussions = .70).

Respiratory sinus arrhythmia. An electrocardiogram (ECG) was used to assess RSA. ECG was measured using physiological equipment designed by James Long Company (Caroga Lake, NY) including a Pentium computer, custom bioamplifier, and Snapmaster Software. Trained research assistants instructed participants to place one electrode on each side of their rib cage approximately 10-12 centimeters below their armpits. To assess respiration (i.e., chest expansion and contraction), a pneumatic bellows was attached to a pressure transducer and affixed around the participant's waist with a metal bead chain. Respiration was sampled at a rate of 1000 Hz. ECG bandpass filtering was set with half power cutoff frequencies of .1 and 1000 Hz. James Long Company's IBI Analysis automated software was used to process ECG data and identify R waves. Misidentified R waves were visually inspected and manually corrected. Cardiac inter-beat intervals (IBI) were calculated as time in milliseconds between successive R waves. RSA was calculated as the difference in seconds between the minimum IBI during inspiration and the maximum IBI during expiration, consistent with the 'peak-to-valley' method, a procedure for quantifying RSA used in previous studies (e.g., Berntson et al., 1997, Murray-Close, 2011). In order to control for respiration when calculating RSA, both ECG and respiration measurements were used (Grossman, Karemaker, & Wieling, 1991). RSA values calculated with the peak-to-valley method that represented outliers were manually replaced to three standard deviations above or below the mean.

Baseline RSA. RSA baseline (RSA-B) was monitored continuously during an initial six-minute rest period at the beginning of the study. Participants were told to sit quietly and relax while sitting in a chair with their feet on the floor for the duration of the

baseline assessment. Baseline scores were calculated as the mean-level RSA during this six-minute period (M = 0.25, SD = 0.21).

RSA Reactivity. Consistent with previous investigations (e.g., Gentzler, Santucci, Kovacs, & Fox, 2009; Murray-Close, 2011) RSA reactivity (RSA-R; M = 0.01, SD = 0.22) was calculated by subtracting the mean RSA during a three-minute baseline period immediately preceding the discussion task from the mean RSA during the discussion task. Positive values of RSA-R indicate augmentation (n = 25), or increased vagal input during the task, whereas negative values indicate withdrawal (n = 39), or decreased vagal input during the task.

RSA Recovery. Following the discussion task, participants were asked to read and sit quietly with their feet on the floor during a three-minute recovery period. Consistent with previous conceptualizations of recovery (Crowley et al., 2011; Mezzacappa et al., 2001), RSA recovery ("RSA down-regulation," RSA-D; M = -0.02, SD = 0.20) was calculated by subtracting the mean RSA during the discussion task from the mean RSA during the recovery period. Negative difference scores indicate RSA withdrawal (n = 34), whereas positive difference scores indicate RSA augmentation (n = 30).

Internalizing Symptoms. *Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001).* The CBCL is a parent-report measure of competencies and behavior problems in children ages 4-18. The 118 items are measured on a 3-point Likert scale (0 = *never*, 1 = *sometimes*, 2 = *often*). The CBCL has demonstrated moderate internal reliability, with α = .72 - .96, along with excellent test-retest reliability and criterion validity (Achenbach, 1991).

Procedure

Study procedures were approved by the Internal Review Board (IRB) at the University of Vermont. Parents provided consent and children provided assent before completing a 2.5-hour laboratory assessment that included a series of tasks and questionnaires administered by trained undergraduate and graduate research assistants. After washing their hands and recording their height and weight, child participants were guided by a research assistant and the child's parent to attach physiological sensors in order to monitor RSA during a series of laboratory tasks and baseline assessments. Upon attachment and calibration of the physiological equipment, a graduate research assistant begin video recording the assessment. After an initial six-minute baseline measurement, the child completed two tasks unrelated to the study, followed by the emotion discussion with the parent. A three-minute baseline period was administered prior to the discussion task, and a three-minute recovery period was administered following the discussion task. Throughout this first phase of the study, parents remained in the room with their child except for during the determination of the emotion-eliciting event prior to the discussion task. Following this first phase of the study, both parent and child completed a series of questionnaires. A research assistant read aloud the questions to the child and ensured comprehension before recording the child's answers. Parents were compensated $40.00 for participation in the study and children received a toy or book of their choice offered by the research assistant.

Six months after participating in the study, parents were contacted and invited to complete a second wave of the initial questionnaires. Parent packets were mailed along

with return postage such that the parent could mail the packet upon completion. Children completed a second wave of questionnaires either in person or over the phone with a trained undergraduate or graduate research assistant. Parents were compensated $15.00 for completing the packet of questionnaires and children received a $15.00 gift card to a local store for participating. Families that completed both waves of the study were also given a $15.00 gift card to a local ice cream shop for their continued participation.

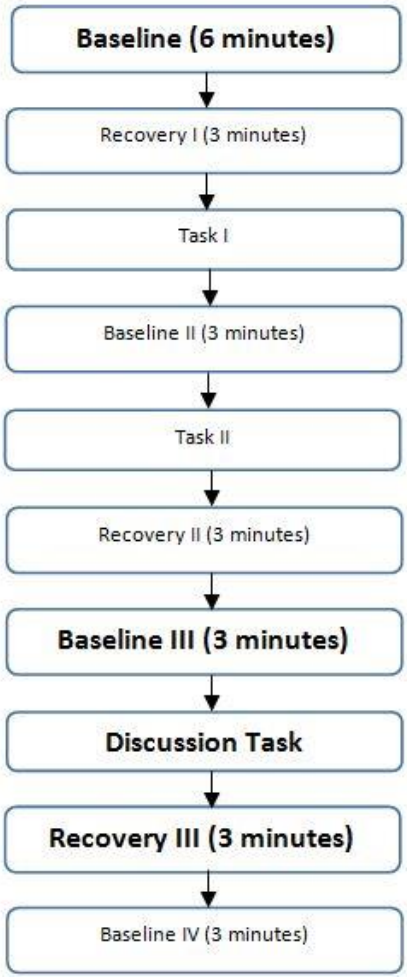

Figure 4. *Flow diagram of study procedure.* Included study variables are indicated in bold.

Data Analytic Plan

The analyses were conducted in two phases. In the first phase, correlational analyses were used to determine associations between the target variables and demographic characteristics of the participating families, including age and sex of both parent and child, socioeconomic status (parent education and income), marital status of the parent, ethnicity of the parent, and relationship of the parent to their child. Demographic variables significantly associated with parental emotion socialization, child psychophysiology, or child internalizing symptoms were retained as covariates in the regression analyses in order to control for potential confounds. Internalizing symptoms at time 1 and positive involvement were retained as covariates across all analyses, and RSA-B was retained as an additional covariate in the model of RSA-D to control for potential influences of baseline RSA on subsequent RSA recovery.

The second phase utilized Mplus 6.1 software (Muthen & Muthen, 2010) to conduct three multiple linear regression analyses to examine the longitudinal relationships between parental emotion socialization practices, child psychophysiology, and child internalizing symptoms at wave 2 (six months) separately for RSA baseline, RSA-R, and RSA-D (Table 3). Emotion encouragement was allowed to covary with positive involvement, and for the model of RSA-D, RSA-B and RSA-D were allowed to covary. After including all covariates and predictor variables, two-way interactions between emotion encouragement and each respective RSA profile was added. To interpret significant interactions, significant models were plotted at low (-1 *SD*) and high (+1 *SD*) values of the moderators. Using procedures discussed by Aiken and West (1991)

and Dawson and Richter (2006), significance testing was conducted to determine if the simple slopes differed from zero.

A sensitivity power analysis was performed (GPower 3.1 software) to estimate the minimal detectible effect (MDE) for these two-way interactions based on the current sample size (N = 65) and sufficient power (0.8). MDE in the proposed study was 0.18 for interaction effects between psychophysiology and emotion socialization, suggesting that the current sample is sufficiently powered to detect medium-to-large effects for the proposed interactions. To account for missing data, maximum likelihood estimation with robust standard errors (MLR) was used. The following fit statistics were employed to evaluate model fit: Chi-square (χ^2: p > .05 excellent), Comparative Fit Index (CFI; > .90 acceptable, > .95 excellent), Root Mean Square Error of Approximation (RMSEA; < .08 acceptable, < .05 excellent) and the Standardized Root Mean Square Residual (SRMR; < .08 acceptable, < .05 excellent) (Hu & Bentler, 1999).

In order to test whether findings reflect a BSC or DS framework, significant interactions were assessed via procedures recommended by Roisman et al. (2012). Interactions were graphed at 2 standard deviations above and below the mean of parental emotion socialization practices values and a proportion of the interaction (PoI) score was utilized to indicate the degree to which the interaction lay on either side of the crossover effect. A PoI closer to 0 or 1.0 reflects an interaction on primarily one side of the crossover point, thus providing evidence for a DS interaction, whereas a PoI closer to 0.5 suggests that the interaction lies somewhat equally on either side of the crossover point, providing evidence for a BSC interaction. In addition, significant interactions were

probed for the proportion affected (PA) by high versus low values of baseline, reactivity, and recovery scores for RSA. Scores closer to 0 on the PA index indicate evidence for DS, whereas scores closer to 0.50 provide evidence for BSC. The significance of these interactions, including their PoI and PA index scores, were calculated using a template developed by R. Chris Fraley, which can be found at www.yourpersonality.net.

Results

Tables 1 and 2 display descriptive statistics and intercorrelations among the study variables. Correlational analyses revealed a significant positive association between emotion encouragement and positive involvement. Positive involvement was significantly positively associated with internalizing symptoms at time 2, whereas emotion encouragement was significantly negatively associated with baseline RSA. Among RSA variables, baseline RSA was positively associated with RSA-R and marginally negatively associated with RSA-D, whereas RSA-R was significantly negatively associated with RSA-D. Contrary to hypotheses, none of the RSA profiles were significantly associated with internalizing symptoms at time 1 or 2.

Among demographic variables, positive involvement was positively associated with the total observed comments from parents, internalizing at time 1, and child sex, such that girls were more likely to receive positive involvement from their parents. Among profiles of RSA, RSA-D was marginally positively associated with parent and child sex, such that children were more likely to display RSA augmentation with mothers compared to fathers, and daughters were more likely than sons to display RSA augmentation when physiologically recovering from the emotion discussion. Among

correlations between demographic variables and the outcome measure, child age, total observed parents comments, and time 1 internalizing symptoms were significantly associated with time 2 internalizing symptoms, whereas parent income was negatively associated with time 2 internalizing symptoms. These four variables (child age, total parent comments, time 1 internalizing symptoms, and parent income) were thus retained as covariates in subsequent analyses. Additional chi-square analyses indicated that study variables did not vary significantly as a function of parent relationship to child or parent ethnicity (Table 3).

Regression Analyses

RSA Baseline. Regression analyses predicting internalizing symptoms at time 2 (Table 4) did not support initial hypotheses and the proposed model demonstrated poor fit [χ^2 (12, N = 61) = 22.52, p = .03, RMSEA = .12, 95% CI .03 - .20, CFI = .65, SRMR = .07]. Significant positive main effects emerged for time 1 internalizing symptoms, child age, and RSA-B. Emotion encouragement was significantly associated with positive involvement, such that parents who engaged in emotion encouragement with their child were more likely to display positive involvement during the discussion task. No significant two-way interaction was found predicting time 2 internalizing symptoms.

RSA Reactivity. Regression analyses predicting internalizing symptoms at time 2 demonstrated excellent fit [χ^2 (12, N = 61) = 7.64, p = .81, RMSEA = .00, 95% CI .00 - .08, CFI = 1.00, SRMR = .05]. Significant positive main effects emerged for time 1 internalizing symptoms and child age, whereas parental income was negatively associated with time 2 internalizing symptoms and child age was marginally positively

associated with time 2 internalizing symptoms. A significant two-way interaction was found between RSA-R and emotion encouragement (Figure 1). Emotion encouragement predicted greater internalizing symptoms in the context of high RSA-R (RSA augmentation) and lesser internalizing symptoms in the context of low RSA-R (RSA withdrawal). Calculation of simple slopes revealed a significant slope for RSA withdrawal, such that, compared to children with RSA augmentation, internalizing symptoms at time 2 were highest in the context of low emotion encouragement and lowest in the context of high emotion encouragement. A marginally significant simple slope was found for children with high RSA-R, revealing an inverse relationship compared to children with RSA withdrawal such that RSA augmenting children had fewer internalizing symptoms when exposed to low emotion encouragement, and greater internalizing symptoms when exposed to high emotion encouragement. PoI and PA index scores were utilized to determine model fit with a BSC versus DS framework (Figure 2). Findings revealed a PoI score of 0.71 and a PA score of 0.53, indicating a crossover effect congruent with a BSC framework.

RSA Recovery. Regression analyses predicting internalizing symptoms at time 2 partially supported hypotheses, and the proposed model demonstrated excellent fit [χ^2 (12, N = 61) = 13.57, p = .85, RMSEA = .00, 95% CI .00 - .06, CFI = 1.00, SRMR = .07]. Significant positive main effects emerged for time 1 internalizing symptoms and child age, whereas positive involvement was marginally positively associated with internalizing symptoms at time 2. Consistent with hypotheses, RSA-D was marginally negatively associated with time 2 internalizing symptoms, such that children displaying

RSA withdrawal (negative RSA values) during recovery displayed higher internalizing symptoms over time. In addition, no significant two-way interaction was found predicting time 2 internalizing symptoms.

Discussion

In this study I examined the moderating effect of three RSA profiles (baseline, reactivity, and recovery) on the relationship between parental emotion encouragement during an emotion-related discussion and parental report of child internalizing symptoms 6 months later. My hypotheses were partially supported. Hypothesis 1 was not supported: after controlling for covariates, emotion encouragement did not significantly predict internalizing symptoms at time 2, nor was emotion encouragement significantly correlated with internalizing symptoms. Hypothesis 2 also was not supported: RSA baseline was positively rather than negatively associated with internalizing symptoms at time 2. This finding held after inclusion of covariates in the regression model as well. Hypothesis 3 was not supported: RSA-R did not predict internalizing symptoms at time 2. Hypothesis 4 was supported, as RSA-D augmentation marginally predicted lower internalizing symptoms at time 2. Finally, Hypothesis 5 was partially supported: a two-way interaction predicting internalizing symptoms was found only for RSA-R, and additional analyses suggest this interaction may best be understood in the context of a BSC framework rather than a diathesis stress framework.

RSA Baseline

Contrary to hypotheses, higher RSA at baseline was associated with greater internalizing symptoms at time 2. Higher baseline RSA was also associated with

maladaptive forms of RSA-R (RSA augmentation) and RSA-D (RSA withdrawal), as well as lower emotion encouragement from parents. At rest, elevated RSA is thought to provide sufficient parasympathetic influence to maintain homeostasis and is thus widely considered an adaptive physiological state (Hastings, Kahle, & Han, 2014; Porges, 1995; Porges, et al., 1994). However, recent studies have provided mixed evidence, with some researchers finding no link between baseline RSA and internalizing symptoms (Bosch, et al., 2009) and others finding that high baseline RSA is associated with heightened internalizing symptoms (Byrne et al., 2010). One possible explanation for these mixed findings may be the nature of the populations studied, as the majority of evidence for a link between low baseline RSA and low internalizing symptoms emerged among clinical populations. In contrast, in a longitudinal study of 10-11-year-old children, Bosch and colleagues (2009) found that higher baseline RSA was associated with higher subsequent depressive symptoms within a normative sample. Thus, it may be that the findings in the present study reflect a relatively adaptive profile of baseline RSA in a normative population. These and other studies highlight the variability in populations with which RSA and internalizing symptoms have been examined. Given these contrasting findings, future research comparing psychophysiological profiles among normative and clinical populations will help to elucidate the nature of adaptive psychophysiology during middle childhood.

An additional consideration in understanding the link between resting RSA and the development of child internalizing symptoms is the challenge of parent report. Internalizing difficulties, by the nature of their symptoms (i.e., experienced primarily

from within the child), are difficult to gauge from parent report, particularly from a normative sample (Hourigan, Goodman, & Southam-Gerow, 2011). It may be that, for children exhibiting high baseline RSA, discussions of negative emotionality with parents and self-report of negative emotions may occur more frequently, as these children are better physiologically equipped to confront and share these emotions with others when they occur. Therefore, parents of children with high baseline RSA may be more aware of internalizing symptoms from their child because of these more frequent conversations. Indeed, researchers have found that adults exhibiting high baseline RSA are also more likely to express emotionality, both negative (Butler, et al., 2006) and positive (Beauchaine, 2001). Future research may benefit from utilizing multiple informants to measure internalizing symptoms in order to delineate potential biases of parent report. Overall, the present study suggests that, within a normative middle childhood population, high baseline RSA may be an indicator of risk for later internalizing symptoms.

RSA Reactivity

Unique to RSA-R, emotion encouragement did not predict internalizing symptoms over time, but rather was moderated by psychophysiology, such that children displaying RSA withdrawal and augmentation responded differently to their parent's emotion encouragement. Children exhibiting RSA withdrawal appear to benefit from high emotion encouragement but exhibit greater internalizing symptoms when exposed to low emotion encouragement. The opposite was found for children displaying RSA augmentation; these children fared more negatively when parents provided high emotion encouragement, whereas low encouragement from parents contributed to lower

internalizing symptoms. This crossover effect was partially consistent with hypotheses proposed within a BSC framework: children exhibiting RSA withdrawal were indeed sensitive to emotion encouragement from their parents such that they fared better when receiving greater emotion encouragement but poorly when parents utilized less emotion encouragement. Unexpectedly, children exhibiting RSA augmentation were also sensitive, but fared better when exposed to less emotion encouragement and poorly when exposed to greater emotion encouragement from parents.

Given that neither RSA-B nor RSA-D moderated the effects of emotion encouragement on internalizing symptoms, it may be that RSA reactivity is uniquely equipped as an indicator of sensitivity to the environment during childhood. El-Sheikh and colleagues (2001) have argued that, compared to baseline RSA, RSA changes in response to stress may reflect attempts to engage or disengage with stressors, rather than simply maintain homeostasis. This hypothesis may also extend to RSA recovery which, as with baseline RSA, may serve primarily to reestablish homeostasis when a stressor is no longer present. Indeed, in defining polyvagal theory, Porges (2007) argued that the human nervous system consists of three neural circuits: one that maintains homeostasis and two that encompass defensive strategies (i.e., fight/flight and freeze behaviors). According to Porges, homeostasis is inherently incompatible with these defensive strategies and is thus activated separately. In the absence of a stressor, it may be that RSA-B and RSA-D are primarily driven by this homeostatic neural circuitry, whereas RSA-R reflects the addition of defensive strategies engaged separately to prepare the body for interaction with a stressor. The present findings provide empirical evidence that

RSA reactivity may be a better indicator of sensitivity to influences from the environment (e.g., parenting) than RSA baseline or recovery.

In examining the interaction between RSA-R and emotion encouragement, children exhibiting RSA augmentation were also sensitive to parental emotion encouragement, such that these children fared *worse* under conditions of greater emotion encouragement from parents, but better than RSA withdrawal children when exposed to less emotion encouragement. These results suggest that emotion encouragement from parents may be maladaptive for children displaying RSA augmentation when discussing a negative emotion. Augmentation of RSA in response to stress reflects an increase in parasympathetic activity, allowing for increased social engagement, and is considered adaptive in the absence or removal of a stressor (Porges, 2007). It may be that the event chosen for the emotion discussion task was not sufficiently stressful for children displaying RSA augmentation, and thus they adaptively engaged in PNS activation while discussing the event with parents. Parents engaging in low emotion encouragement were more likely to ask questions related to the event (e.g., "What happened next?"), whereas parents engaging in high emotion encouragement were more likely to ask emotion-focused questions (e.g., "How did that make you feel?"). For children exhibiting RSA augmentation, emotion encouragement from parents may have provided an additional stressor by evoking potentially distressing thoughts/emotions related to the event as opposed to comments focused more on the recollection of the event itself. Parents' attempts to engage in greater emotion-specific language may backfire for children exhibiting RSA augmentation, as these children might lack sufficient

psychophysiological resources to facilitate this process. Hastings and colleagues (2008) have argued similarly that RSA augmentation can be adaptive for children engaging in interpersonal tasks, but that unhelpful parenting practices may negatively influence this relationship. The present findings suggest that in the context of more emotion-specific socialization efforts by parents, children displaying RSA augmentation could be ill-equipped to engage in these discussions and are more likely to develop internalizing symptoms as a result.

As expected, however, children displaying RSA withdrawal fared significantly better when exposed to greater emotion encouragement. For these children, parents' offering of additional opportunities to discuss and validate emotions may be helpful to process their heightened physiological response. In contrast to children displaying RSA augmentation, decreases in PNS activation as a consequence of RSA withdrawal may have provided these children with sufficient physiological resources to effectively engage with the parents' discussion of the emotion-eliciting event. For children displaying RSA withdrawal, the discussion may have provided a helpful opportunity to process and adaptively manage their emotions. However, this heightened physiological arousal may be maladaptive without the tools provided by parental emotion socialization to successfully cope with the heightened emotionality evoked by the event.

Although it was hypothesized that RSA would moderate the association between emotion encouragement and the development of child internalizing symptoms, two competing models were proposed: Diathesis Stress (DS) and Biological Sensitivity to Context (BSC). Indicators of crossover interactions were assessed utilizing

recommendations by Roisman and colleagues (2012); results suggested that the interaction between emotion encouragement and RSA-R were more consistent with a model of biological sensitivity to context than diathesis-stress. That is, children's RSA-R appears to be an indicator of sensitivity to parental emotion socialization such that both high and low reactivity may be adaptive or maladaptive depending upon the degree of emotion coaching behavior utilized by the parent.

In proposing the BSC model, Boyce and Ellis (2005) argued that those with reactive phenotypic biological stress responses may be sensitive to positive and negative environments, whereas those with low reactivity may display a resilient phenotype relatively unaffected by environmental differences. The present findings are not entirely in line with this proposal; both RSA-R withdrawal *and* augmentation were sensitive to the effects of parental emotion socialization. Interestingly, children exhibiting RSA-R at the mean level during the discussion task were relatively unaffected by parents' emotion encouragement. These findings suggest that larger discrepancies between baseline and reactivity RSA, both positive and negative, may be considered highly reactive phenotypic stress responses. In contrast to high and low RSA reactivity, mean RSA reactivity in this sample reflects relatively little change in RSA in response to stress, suggesting that children exhibiting this profile are not experiencing changes in PNS activation during the experience of discussing a sad event with their parent; in addition, they seemed to be unaffected by parents' use of emotion encouragement during the discussion. This interpretation aligns with Boyce and Ellis's (2005) original argument in proposing the BSC model, in which the authors provide a multitude of evidence suggesting that stress

responses should not be considered a unitary biological response (i.e., stress reactivity as equivalent to upregulatory changes in psychophysiological processes), but rather consider both activation and deactivation of stress response systems as potential indicators of sensitivity to environmental influence. Indeed, in addition to previous research indicating RSA-R withdrawal as a reactive phenotypic biological stress response, two studies have found RSA-R augmentation to be an indicator of sensitivity to the environment as well (Abaied, Wagner, & Sanders, 2014; Hastings et al., 2008; Obradović, Bush, & Boyce, 2011). Abaied, Wagner, & Sanders (2014) found that profiles of both RSA-R withdrawal *and* augmentation were sensitive to parental coping suggestions; similarly, in a young childhood sample, Obradović and colleagues (2011) found that RSA-R withdrawal and augmentation both indicated sensitivity to the effects of marital conflict. It is important to note, however, that in both of these studies, the sensitive profiles of RSA-R varied as a function of the tasks utilized (i.e., interpersonal vs. cognitive). This study is the first to observe RSA-R as a moderator of specific emotion socialization parenting practices, controlling for general parental emotion socialization, observed within the same task.

Past research and the present findings paint a complex picture of RSA-R that suggests that psychophysiological profiles may be differentially sensitive dependent upon the nature of the stressor and outcome assessed. My results suggest that, in the context of parental emotion socialization and interpersonal stress responses, RSA may indicate sensitivity to parental emotion socialization at both high and low levels of reactivity. In contrast with previous research conceptualizing RSA-R augmentation exclusively as a vulnerability (i.e., a diathesis-stress model; Porges, 2007), the current findings appear

more in line with a BSC framework, within which high and low reactivity may each represent profiles of sensitivity to environmental influences. As indicated by previous research, however, it will be important for future studies to incorporate multiple stress tasks in order to further elucidate the nature of psychophysiological sensitivity to parental emotion socialization.

RSA Recovery

Although marginally significant, RSA recovery predicted child internalizing symptoms in a manner consistent with hypotheses, such that lower RSA-D (RSA withdrawal) was associated with greater internalizing symptoms. As hypothesized, these results suggest that withdrawal of RSA is maladaptive when recovering from a stressor. That is, although a reduction in PNS arousal is generally adaptive in response to a stressor, adaptive recovery from a stressor requires augmentation of RSA and an increase in parasympathetic resources in order to maintain homeostasis. These findings add to a limited body of research on the effects of RSA recovery in the development of child psychopathology and advance the literature by providing terminology congruent with a large proportion of research on RSA reactivity (Abaied et al., 2014; El-Shiekh & Erath, 2011; Graziano & Derefinko, 2013), thereby allowing for more direct comparisons across these forms of RSA in future research. Findings from this study suggest that RSA withdrawal and augmentation may be reciprocally adaptive depending on whether examined during or after a stressor. This serves to better clarify the role of RSA recovery in the link between child psychophysiology and the development of child psychopathology.

The Role of Parental Emotion Socialization

In proposing the meta-emotion framework, Gottman and colleagues (1996) argued that emotion-specific parental socialization may impact the child's psychosocial development and the subsequent development of psychopathology. Contrary to past research and hypotheses in the present study, emotion encouragement was not associated with internalizing symptoms at time 2, and a main effect for emotion encouragement was not found among all three analyses. However, the relationship between emotion encouragement and child internalizing symptoms was only revealed when considering the moderating role of RSA-R, which suggests that child psychophysiology plays an important role in the relationship between emotion socialization and child internalizing outcomes. Although Gottman and colleagues proposed that characteristics of the child, particularly psychophysiology, likely affect the outcome of parental emotion socialization strategies (1996), researchers have only recently begun to examine interactions that incorporate both parent and child contributions in elucidating the effects of emotion socialization (Hastings, et al., 2014; Hastings et al., 2008; Williams & Woodruff-Borden, 2014). The present findings add to this growing literature and highlight the importance of considering child psychophysiology in understanding the effects of parenting on the development of internalizing symptoms in childhood.

General parental emotion socialization (positive involvement), in addition to emotion-specific socialization strategies (emotion encouragement), appears to play a role in the development of internalizing symptoms in childhood, though contrary to what was expected. Positive involvement was significantly associated with child internalizing

symptoms and was marginally predictive of internalizing symptoms when adjusting for RSA-D. These findings, however, are contrary to research showing that broadly positive parenting characteristics, such as parental warmth, are predictive of *decreases* in youth internalizing symptoms (Ge, Lorenz, Conger, Elder, & Simons, 1994; Hipwell et al., 2008). It may be that these parenting behaviors (e.g., praise, engagement, affection) come across as invalidating for children discussing difficult emotions. For example, in designing the Emotions as a Child Scale (Magai, 1996), a frequently used self-report index of emotion socialization Magai developed an "Override" subscale that includes comments from parents such as "When my child is sad, I tell him/her to cheer up." Although well-meaning, evidence suggests that overriding children's emotions, even with positive comments by others, can be nonsupportive and is associated with the development of behavior problems in children and adolescents (Klimes-Dougan et al., 2014; McCord & Raval, 2016; Sanders, 2011).

In addition, this construct may be mediated by additional environmental influences. Positive involvement was predictive of higher internalizing symptoms at time 2 across all regression analyses before including demographic variables, but was non-significant or marginal after their inclusion. These results suggest that the broad nature of this form of emotion socialization, after accounting for specific emotion socialization practices, may be capturing variability largely attributed to demographic factors in the parent-child relationship. Thus, it may be that although this general form of emotion socialization is useful for capturing a "birds-eye view" of parental interactions with their child, the study of specific emotion socialization strategies provide a unique opportunity

to understand parents' influence on positive psychosocial outcomes for their child dependent upon the child's psychophysiological profile. Indeed, Eisenberg has argued that global characteristics of positive parenting, such as parental warmth, may not be sufficient to capture parenting constructs that meaningfully socialize emotion regulation skills for children (Eisenberg, 1996). Global indices of parenting may reflect a variety of influences, including demographic factors (e.g., parent income, gender) and characteristics of the parent (e.g., depressive symptoms). Given the purposefully broad nature of this construct, these findings highlight the need to delineate potential confounds within global parenting responses in order to identify contributions to the development of internalizing symptoms in childhood.

Implications for Theory and Research

Since Gottman and colleagues' original introduction of parental emotion socialization (1996), much of the parenting literature has examined emotion socialization as a unidirectional, unitary contribution to the development of child psychopathology (Chaplin, Cole, & Zahn-Waxler, 2005; Kehoe, Havighurst, & Hurley, 2014; Zander & Haviland, 1982). Although we have learned much in recent years, the present findings point to the limitations of this approach; a main effect for emotion encouragement was not found across all analyses. Rather, only by including the child's psychophysiological reactivity was the impact of emotion encouragement apparent. A nuanced approach is thus critical to understanding parental emotion socialization, and recent studies suggest the field is moving in this direction. For example, Hastings, Klimes-Dougan, Kendziora, Brand, and Zahn-Waxler (2014) found that for girls exhibiting RSA withdrawal in

response to watching a sad film clip, depressive symptoms were higher in the context of low supportive emotion socialization from parents, whereas girls displaying RSA augmentation were relatively unaffected by parents' emotion socialization. Adding to a burgeoning literature, results in the present study suggest that emotion socialization may best be understood through its interplay with children's psychophysiological responses.

The present study also builds considerably on the limited research incorporating moderating effects of child RSA reactivity on parental emotion socialization by utilizing three forms of data (observation, psychophysiology, and parent-report) in a longitudinal sample. A recent review of the emotion socialization literature found that 61% of research conducted in the past 35 years utilized one method, and the vast majority of publications have been cross-sectional, self/other-report methodologies (Adrian et al., 2011). The rigorous design of the study, combined with the conservative nature of the analyses (i.e., the inclusion of both general and emotion-specific socialization strategies), provides an important contribution to a literature which has frequently utilized limited methodologies.

Psychophysiological differences found in the present study suggest that the two functions of RSA – to maintain homeostasis and to respond adaptively to stressors – each contribute differentially to the development of internalizing symptoms in childhood through baseline, reactivity, and recovery profiles of physiology. The role of RSA reactivity was only understood when considering external influences during the event (i.e., the impact of the parent's emotion socialization), whereas RSA baseline and recovery contributed directly to the development of internalizing problems in children. In

line with Porges' (2007) original conceptualization of RSA, it will be important for future studies to build upon the present findings by examining the unique contributions of both homeostatic and stress-response profiles to the development of psychopathology in childhood. Further, although much of the literature to date has utilized a variety of terminology and methods to define RSA baseline, reactivity, and recovery, the inclusion in the present study of consistent and compatible methodology (difference scores) and terminology (withdrawal, augmentation) across measures of RSA allows for comparisons among these different profiles. Future research may benefit from utilizing this consistent scoring and terminology in order to facilitate comparison of findings across studies and expand our understanding of the contribution for both homeostatic and reactivity profiles of RSA.

In considering the present study's contribution to the broader developmental literature, results suggest that RSA-R is uniquely relevant to parenting, particularly parental emotion socialization. These results are consistent with the principle of multifinality, a central tenant in the study of developmental psychopathology (Cicchetti, 2008). Multifinality suggests that children may experience similar events but experience different adjustment outcomes, particularly regarding the development of psychopathology. Thus, studies of direct effects may miss important moderators or mediators that explain these differential findings. The present findings point to psychophysiology as a rich area of study in determining these differential outcomes, as similar parenting practices appear to impact child psychopathology differently dependent upon child psychophysiology. It is therefore critical that future research incorporate

contributions from both parent *and* child in the study of the development of psychopathology in youth.

Limitations and Future Directions

Several limitations should be noted. First, a relatively homogenous sample, including limited economic and racial diversity, limits the generalizability of the findings. The importance of emotion socialization has been shown in diverse populations, including low-income, African-American (Cunningham, Kliewer, & Garner, 2009), and Asian Indian immigrant families (McCord & Raval, 2016), highlighting the importance of incorporating diverse samples in future studies. In addition, the present study was limited by a small sample of fathers who participated in the discussion task. Fathers have been shown to contribute in unique ways to emotional development in youth (Cassano, Adrian, Veits, & Zeman, 2006; Sanders, et al., 2015), and future research should incorporate data from both mothers and fathers to evaluate potential contributions from both parents.

The design of the present study also limits the role of children's influence. Parental socialization is likely not a "one-way street," and the focus on parents in our observations precluded the role of children within this discussion. Future research may benefit from incorporating observational data from the child as well as the parent in order to determine bi-directional influences of parent and child during emotional discussions. A final limitation is the relatively small sample size. Larger sample sizes in future research will allow for both a more representative sample, and opportunities to detect changes across RSA values before, during, and after a stressor by modeling individual differences

across all psychophysiological profiles. For example, researchers have begun to model linear and quadratic effects of RSA across multiple time periods in order to more accurately understand how RSA changes during a stressor (Cui et al., 2015).

Conclusion

The present study provides evidence, utilizing a rigorous study design, that parental emotion socialization contributes to the development of internalizing symptoms in childhood and is moderated by children's RSA reactivity. Psychophysiological processes contributed to the development of internalizing symptoms in childhood differentially, with RSA at baseline and recovery directly affecting internalizing symptoms, and RSA reactivity contributing through moderation of parental emotion socialization. These findings point to a nuanced and complicated picture of the development of internalizing symptoms in youth. Future research should continue to evaluate internal mechanisms of psychophysiology, particularly RSA, as a differentiating process by which children develop adjustment difficulties.

Table 1

Descriptive Statistics and Intercorrelations among Study Variables

Measure	1	2	3	4	5	6	7
1. EE	--	**.27***	**-.25***	.13	.09	.00	-.05
2. PI		--	-.07	.09	.07	**.11***	**.29***
3. RSA-B			--	**.32***	**-.22^**	-.12	.09
4. RSA-R				--	**-.40****	-.01	.09
5. RSA-D					--	-.06	-.07
6. T1INT						--	**.66****
7. T2INT							--
M	2.35	2.06	0.25	0.01	-0.02	6.78	4.79
SD	0.27	0.74	0.21	0.22	0.20	5.75	4.24

Note. EE = Emotion Encouragement. PI = Positive Involvement.
RSA = Respiratory Sinus Arrhythmia (B = Baseline, R = Reactivity, D = Down-regulation).
T2INT = Internalizing symptoms at time 2.
^ $p < .10$. * $p < .05$. ** $p < .01$.

Table 2

Intercorrelations among Study Variables and Demographic Information

Measure	EE	PI	RSA-B	RSA-R	RSA-D
Parent Age	.20	.04	.00	-.06	.11
Parent Sex	.19	.19	.07	-.12	**.21**^
Parent Education Level	-.12	-.07	-.13	-.11	-.07
Parent Income	.03	.00	-.03	-.15	.21
Child Age	.19	.05	-.13	-.06	.16
Child Sex	.20	**.47****	.03	-.11	**.22**^
Total Comments	-.03	**.15***	.09	.14	.08

Note. EE = Emotion Encouragement. PI = Positive Involvement.
RSA = Respiratory Sinus Arrhythmia (B = Baseline, R = Reactivity, D = Down-regulation).
^ $p < .10$. * $p < .05$. ** $p < .01$.

Table 3

Multiple Regression Predicting Internalizing Symptoms at Time 2 from Parenting and Physiological (Baseline, Reactivity, & Recovery) Mechanisms

	RSA-B			RSA-R			RSA-D		
	Beta	b	S.E.	Beta	b	S.E.	Beta	b	S.E.
Child Age	**.20***	1.02	0.43	**.17^**	0.85	0.44	**.22***	1.09	0.44
Parent Income	-.14	-0.28	0.22	**-.20***	-0.41	0.21	-.13	-0.27	0.23
Time 1 Internalizing	**.57****	0.42	0.10	**.63****	0.46	0.10	**.56****	0.40	0.11
Total Comments	.03	0.01	0.03	.01	0.00	0.03	.07	0.03	0.04
Emotion Encouragement	-.05	-0.87	2.18	-.09	-0.16	2.07	-.09	-1.45	2.42
Positive Involvement	.16	0.88	0.57	.13	0.72	0.52	**.19^**	1.08	0.62
RSA-B	**.26***	4.90	1.98	-	-	-	.10	1.88	2.84
RSA-R	-	-	-	.12	2.25	1.48	-	-	-
RSA-D	-	-	-	-	-	-	**-.14^**	-2.83	1.52
RSAxEE	.16	11.99	10.07	**.30****	33.95	8.80	-.03	-2.55	8.40
R^2		**.56****			**.62****			**.57****	

Note. RSA = Respiratory Sinus Arrhythmia (B = Baseline, R = Reactivity, D = Down-regulation).
^ $p < .10$. * $p < .05$. ** $p < .01$.

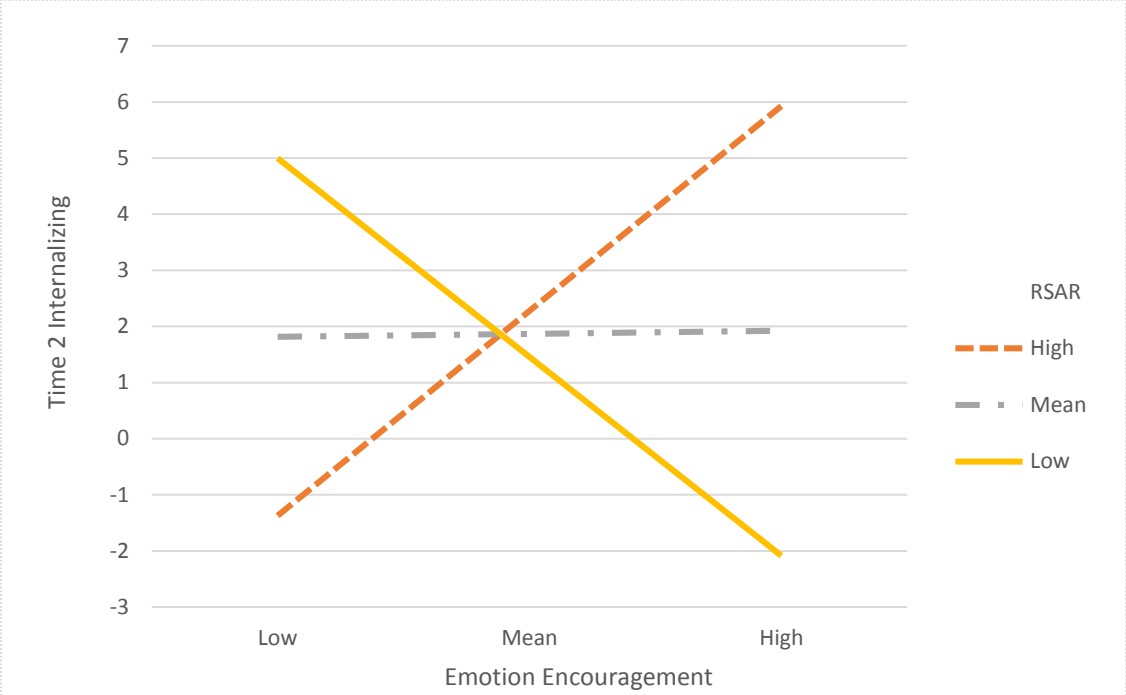

Figure 5. Interaction between emotion encouragement and RSA reactivity at *high* (+1 SD), *mean*, and *low* (-1 SD) levels of emotion encouragement. High RSAR: b = 5.70, CI[-.17, 11.57]. Low RSAR: b = -8.83, CI[-13.91, -3.74].

References

Abaied, J. L., Wagner, C., & Sanders, W. (2014). Parent socialization of coping in emerging adulthood: Moderation by respiratory sinus arrhythmia. *Journal of Applied Developmental Psychology*, *35*(4), 357–369. doi:10.1016/j.appdev.2014.06.002

Achenbach, T. M. (1991). Manual for the child behavior checklist 4-18 and 1991 profile. Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M., & Rescorla, L. A. (2001). Manual for the ASEBA school-age forms and profiles. Burlington: University of Vermont, Department of Psychiatry.

Adrian, M., Zeman, J., & Veits, G. (2011). Methodological implications of the affect revolution: a 35-year review of emotion regulation assessment in children. *Journal of Experimental Child Psychology*, *110*(2), 171–97. doi:10.1016/j.jecp.2011.03.009

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage.

Alkozei, A., Creswell, C., Cooper, P. J., & Allen, J. J. B. (2015). Autonomic arousal in childhood anxiety disorders: Associations with state anxiety and social anxiety disorder. *Journal of Affective Disorders*, *175*, 25–33. doi:10.1016/j.jad.2014.11.056

Allen, N. B., Kuppens, P., & Sheeber, L. B. (2012). Heart rate responses to parental behavior in depressed adolescents. *Biological Psychology*, *90*(1), 80–87. doi:10.1016/j.biopsycho.2012.02.013

Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology*, *112*(4), 545–57. doi:10.1037/0021-843X.112.4.545

Baker, J. K., Fenning, R. M., & Crnic, K. A. (2011). Emotion socialization by mothers and fathers: Coherence among behaviors and associations with parent attitudes and children's social competence. *Social Development*, *20*(2), 412–430. doi:10.1111/j.1467-9507.2010.00585.x

Barrett, K. C., & Campos, J. J. (1987). Perspectives on emotional development II: A functionalist approach to emotions. In J.D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 555–578). New York: Wiley.

Beauchaine, T. (2001). Vagal tone, development, and Gray's motivational theory: Toward an integrated model of autonomic nervous system functioning in psychopathology. *Development and Psychopathology*, *13*(02), 183–214.

Belsky, J. (1997). Variation in susceptibility to environmental influence: An evolutionary argument. *Psychological Inquiry*, *8*(3), 182–186. doi:10.1207/s15327965pli0803_3

Berntson, G. G., Bigger, Thomas, J., Eckberg, D. L., Grossman, P., Kauffman, P. G., Malik, M., … van der Molen, M. W. (1997). Heart rate variability: Origins, methods, and interpretive caveats. *Psychophysiology*, *34*(6), 623–648. doi:10.1111/j.1469-8986.1997.tb02140.x

Bosch, N. M., Riese, H., Ormel, J., Verhulst, F., & Oldehinkel, A. J. (2009). Stressful life events and depressive symptoms in young adolescents: Modulation by respiratory sinus arrhythmia? The TRAILS study. *Biological Psychology*, *81*(1), 40–7. doi:10.1016/j.biopsycho.2009.01.005

Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary–developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, *17*(02). doi:10.1017/S0954579405050145

Boyce, W. T., Quas, J., Alkon, A., Smider, N. A., Essex, M. J., & Kupfer, D. J. (2001). Autonomic reactivity and psychopathology in middle childhood. *The British Journal of Psychiatry*, *179*, 144–50.

Butler, E. A., Wilhelm, F. H., & Gross, J. J. (2006). Respiratory sinus arrhythmia, emotion, and emotion regulation during social interaction. *Psychophysiology*, *43*(6), 612–22. doi:10.1111/j.1469-8986.2006.00467.x

Byrne, M. L., Sheeber, L., Simmons, J. G., Davis, B., Shortt, J. W., Katz, L. F., & Allen, N. B. (2010). Autonomic cardiac control in depressed adolescents. *Depression and Anxiety*, *27*(May), 1050–1056. doi:10.1002/da.20717

Calkins, S. D. (1997). Cardiac vagal tone indices of temperamental reactivity and behavioral regulation in young children. *Developmental Psychobiology*, *31*(1990), 125–135. doi:10.1002/(SICI)1098-2302

Calkins, S. D., & Dedmon, S. E. (2000). Physiological and behavioral regulation in two-year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology*, *28*(2), 103-118.

Calkins, S. D., Graziano, P. A., & Keane, S. P. (2007). Cardiac vagal regulation differentiates among children at risk for behavior problems. *Biological Psychology*, *74*(2), 144–53. doi:10.1016/j.biopsycho.2006.09.005

Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development*, *75*(2), 377–94. doi:10.1111/j.1467-8624.2004.00681.x

Cassano, M., Adrian, M., Veits, G., & Zeman, J. (2006). The inclusion of fathers in the empirical investigation of child psychopathology: An update. *Journal of Clinical*

Child and Adolescent Psychology, *35*(4), 583–589. doi:10.1207/s15374424jccp3504_10

Chaplin, T. M., Cole, P. M., & Zahn-Waxler, C. (2005). Parental socialization of emotion expression: Gender differences and relations to child adjustment. *Emotion*, *5*(1), 80–8. doi:10.1037/1528-3542.5.1.80

Cicchetti, D. (2008). Integrating biological processes into the design and evaluation of preventive interventions. *Development and Psychopathology*, *20*, 737–1022.

Coie, J. D., Dodge, K. A., & Kupersmidt, J. B. (1990). Peer group behavior and social status. In S. R. Asher, & J. D. Coie (Eds.), *Peer rejection in childhood* (pp. 17-59). New York, NY: Cambridge University Press.

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development*, *75*(2), 317–33. doi:10.1111/j.1467-8624.2004.00673.x

Coll, C. G., Kagan, J., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development*, *55*(3), 1005-1019.

Copeland, W. E., Shanahan, L., Costello, E. J., & Angold, A. (2009). Childhood and adolescent psychiatric disorders as predictors of young adult disorders. *Archives of General Psychiatry*, *66*(7), 764-772.

Crowley, O. V, McKinley, P. S., Burg, M. M., Schwartz, J. E., Ryff, C. D., Weinstein, M., … Sloan, R. P. (2011). The interactive effect of change in perceived stress and trait anxiety on vagal recovery from cognitive challenge. *International Journal of Psychophysiology*, *82*(3), 225–32. doi:10.1016/j.ijpsycho.2011.09.002

Cui, L., Morris, A. S., Harrist, A. W., Larzelere, R. E., Criss, M. M., & Houltberg, B. J. (2015). Adolescent RSA responses during an anger discussion task: Relations to emotion regulation and adjustment. *Emotion*, *15*(3), 360–372.

Cunningham, J. N., Kliewer, W., & Garner, P. W. (2009). Emotion socialization, child emotion understanding and regulation, and adjustment in urban African American families: Differential associations across child gender. *Development and Psychopathology*, *21*(1), 261–83. doi:10.1017/S0954579409000157

Dawson, J. F., Richter, A. W., (2006). Probing three-way interactions in moderated multiple regression: development and application of a slope difference test. *Journal of Applied Psychology, 91*, 917–926.

Denham, S. A. (1998). *Emotional development in young children*. New York, NY: Guilford Press.

Denham, S. A., Bassett, H. H., & Wyatt, T. (2007). The socialization of emotional competence. In J. E. Grusec, & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 614-637). New York, NY, US: Guilford Press.

Driscoll, K. A., Lopez, C. M., & Kistner, J. A. (2009). A diathesis-stress test of response styles in children. *Journal of Social and Clinical Psychology*, *28*(8), 1050–1070. doi:10.1521/jscp.2009.28.8.1050

Dunsmore, J. C., Booker, J. A., & Ollendick, T. H. (2013). Parental emotion coaching and child emotion regulation as protective factors for children with oppositional defiant disorder. *Social Development*, *22*(3), 444–466. doi:10.1111/j.1467-9507.2011.00652.x

Eisenberg, N. (1996). Meta-emotion and socialization of emotion in the family — a topic whose time has come: Comment on Gottman et al. (1996). *Journal of Family Psychology*, *10*(3), 269–276.

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*(4), 241–273.

Eisenberg, N., Fabes, R. A., & Murphy, B. C. (1996). Parents' reactions to children's negative emotions: Relations to children's social competence and comforting behavior. *Child Development*, *67*(5), 2227-2247.

Eisenberg, N., & Spinrad, T. L. (2004). Emotion-related regulation: sharpening the definition. *Child Development*, *75*(2), 334–9. doi:10.1111/j.1467-8624.2004.00674.x

El-Sheikh, M., & Erath, S. A. (2011). Family conflict, autonomic nervous system functioning, and child adaptation: State of the science and future directions. *Development and Psychopathology*, *23*(02), 703–721. doi:10.1017/S0954579411000034

El-Sheikh, M., Harger, J., & Whitson, S. M. (2001). Exposure to interparental conflict and children's adjustment and physical health: the moderating role of vagal tone. *Child Development*, *72*(6), 1617–1636. doi:10.1111/1467-8624.00369

El-Sheikh, M., & Whitson, S. A. (2006). Longitudinal relations between marital conflict and child adjustment: vagal regulation as a protective factor. *Journal of Family Psychology*, *20*(1), 30–39. doi:10.1037/0893-3200.20.1.30

Enders, C. K., Baraldi, A. N., & Cham, H. (2014). Estimating interaction effects with incomplete predictor variables. *Psychological Methods*, *19*(1), 39–55. doi:10.1037/a0035314

Fabes, R. A., & Eisenberg, N. (1997). Regulatory control and adults' stress-related responses to daily life events. *Journal of Personality and Social psychology*, *73*(5), 1107.

Feng, X., Keenan, K., Hipwell, A. E., Henneberger, A. K., Rischall, M. S., Butch, J., … Babinski, D. E. (2009). Longitudinal associations between emotion regulation and depression in preadolescent girls: moderation by the caregiving environment. *Developmental Psychology*, *45*(3), 798–808. doi:10.1037/a0014617

Fox, N. A. (1998). Temperament and regulation of emotion in the first years of life. *Pediatrics*, *102*(5), 1230–1235. doi:10.1542/peds.102.5.SE1.1230

Fox, N. A., & Field, T. M. (1989). Individual differences in preschool entry behavior. *Journal of Applied Developmental Psychology*, *10*, 527–540. doi:10.1016/0193-3973(89)90025-7

Ge, X., Lorenz, F. O., Conger, R. D., Elder, G. H., & Simons, R. L. (1994). Trajectories of stressful life events and depressive symptoms during adolescence. *Developmental Psychology*, *30*(4), 467. doi:10.1037/0012-1649.30.4.467

Gentzler, A. L., Santucci, A. K., Kovacs, M., & Fox, N. A. (2009). Respiratory sinus arrhythmia reactivity predicts emotion regulation and depressive symptoms in at-risk and control children. *Biological Psychology*, *82*(2), 156–63. doi:10.1016/j.biopsycho.2009.07.002

Gordon, J. L., Ditto, B., Lavoie, K. L., Pelletier, R., Campbell, T. S., Arsenault, A., & Bacon, S. L. (2011). The effect of major depression on postexercise cardiovascular recovery. *Psychophysiology*, *48*(11), 1605–10. doi:10.1111/j.1469-8986.2011.01232.x

Gottman, J. M., & Katz, L. F. (2002). Children's emotional reactions to stressful parent-child interactions: The link between emotion regulation and vagal tone. *Marriage & Family Review*, *34*(3/4), 265–283.

Gottman, J. M., & Katz, L. F. (1989). Effects of marital discord on young children's peer interaction and health. *Developmental Psychology*, *25*(3), 373.

Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, *10*(3), 243–268. doi:10.1037//0893-3200.10.3.243

Graziano, P., & Derefinko, K. (2013). Cardiac vagal control and children's adaptive functioning: A meta-analysis. *Biological Psychology, 94*(1), 22–37. doi:10.1016/j.biopsycho.2013.04.011

Grossman, P., Karemaker, J., & Wieling, W. (1991). Prediction of tonic parasympathetic cardiac control using respiratory sinus arrhythmia: the need for respiratory control. *Psychophysiology, 28*(2), 201-216.

Halberstadt, A. G. (1991). Toward an ecology of expressiveness: Family socialization in particular and a model in general. In R. S. Feldman, & B. Rimé (Eds.), *Fundamentals of nonverbal behavior* (pp. 106-160). New York, NY: Cambridge University Press.

Hastings, P. D., Kahle, S. S., & Han, G. H.-P. (2014). Developmental affective psychophysiology: Using physiology to inform our understanding of emotional development. In K. H. Lagattuta (Ed.), *Children and Emotion: New Insights into Developmental Affective Sciences* (Vol. 26, pp. 13–28). doi:10.1159/000354347

Hastings, P. D., Klimes-Dougan, B., Kendziora, K. T., Brand, A., & Zahn-Waxler, C. (2014). Regulating sadness and fear from outside and within: Mothers' emotion socialization and adolescents' parasympathetic regulation predict the development of internalizing difficulties. *Development and Psychopathology, 26*, 1369–1384. doi:10.1017/S0954579414001084

Hastings, P. D., Nuselovici, J. N., Utendale, W. T., Coutya, J., McShane, K. E., & Sullivan, C. (2008). Applying the polyvagal theory to children's emotion regulation: Social context, socialization, and adjustment. *Biological Psychology, 79*(3), 299–306. doi:10.1016/j.biopsycho.2008.07.005

Hastings, P. D., Sullivan, C., McShane, K. E., Coplan, R. J., Utendale, W. T., & Vyncke, J. D. (2008). Parental socialization, vagal regulation, and preschoolers' anxious difficulties: Direct mothers and moderated fathers. *Child Development, 79*(1), 45–64. doi:10.1111/j.1467-8624.2007.01110.x

Hawes, D. J., & Dadds, M. R. (2006). Assessing parenting practices through parent-report and direct observation during parent-training. *Journal of Child and Family Studies, 15*(5), 554–567. doi:10.1007/s10826-006-9029-x

Hessler, D. M., & Fainsilber Katz, L. (2007). Children's emotion regulation: Self-report and physiological response to peer provocation. *Developmental Psychology, 43*(1), 27–38. doi:10.1037/0012-1649.43.1.27

Hipwell, A., Keenan, K., Kasza, K., Loeber, R., Stouthamer-Loeber, M., & Bean, T. (2008). Reciprocal influences between girls' conduct problems and depression, and parental

punishment and warmth: A six year prospective analysis. *Journal of Abnormal Child Psychology*, 36(5), 663-677. doi:10.1007/s10802-007-9206-4

Hourigan, S. E., Goodman, K. L., & Southam-Gerow, M. A. (2011). Discrepancies in parents' and children's reports of child emotion regulation. *Journal of Experimental Child Psychology*, *110*(2), 198–212. doi:10.1016/j.jecp.2011.03.002

Kamarck, T. (1992). Recent developments in the study of cardiovascular reactivity: Contributions from psychometric theory and social psychology. *Psychophysiology*, *29*(5), 491–503.

Katz, L. F., & Hunter, E. C. (2007). Maternal meta-emotion philosophy and adolescent depressive symptomatology. *Social Development*, *16*(2), 343–360. doi:10.1111/j.1467-9507.2007.00388.x

Kehoe, C. E., Havighurst, S. S., & Harley, A. E. (2014). Tuning in to teens: Improving parent emotion socialization to reduce youth internalizing difficulties. *Social Development*, *23*(2), 413–431.

Klimes-Dougan, B., Pearson, T. E., Jappe, L., Mathieson, L., Simard, M. R., Hastings, P., & Zahn-Waxler, C. (2014). Adolescent emotion socialization: A longitudinal study of friends' responses to negative emotions. *Social Development*, *23*(2), 395–412. doi:10.1111/sode.12045

Leary, A., & Katz, L. F. (2004). Coparenting, family-level processes, and peer outcomes: the moderating role of vagal tone. *Development and Psychopathology*, *16*, 593–608. doi:10.1017/S0954579404004687

Linden, W., Earle, T. L., Gerin, W., & Christenfeld, N. (1997). Physiological stress reactivity and recovery: Conceptual siblings separated at birth? *Journal of Psychosomatic Research*, *42*(2), 117–135. doi:10.1016/S0022-3999(96)00240-1

Linnemeyer, S. A., & Porges, S. W. (1986). Recognition memory and cardiac vagal tone in 6-month-old infants. *Infant Behavior and Development, 9*(1), 43-56.

Magai, C. M. (1996). *Emotions as a child self-rating scale.* Unpublished measure, Long Island University, New York.

Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development, 53*(4), 991-1003. doi:10.2307/1129139

Mauss, I. B., Wilhelm, F. H., & Gross, J. J. (2003). Autonomic recovery and habituation in social anxiety. *Psychophysiology, 40*(4), 648–53.

McCord, B. L., & Raval, V. V. (2016). Asian Indian immigrant and white American maternal emotion socialization and child socio-emotional functioning. *Journal of Child and Family Studies, 25*(2), 464–474. doi:10.1007/s10826-015-0227-2

Merikangas, K. R., He, J. P., Brody, D., Fisher, P. W., Bourdon, K., & Koretz, D. S. (2010). Prevalence and treatment of mental disorders among US children in the 2001–2004 NHANES. *Pediatrics, 125*(1), 75-81.

Mezzacappa, E., Kelsey, R., Katkin, E., & Sloan, R. (2001). Vagal rebound and recovery from psychological stress. *Psychosomatic Medicine, 657*, 650–657.

Moilanen, K. L., Shaw, D. S., & Fitzpatrick, A. (2010). Self-regulation in early adolescence: relations with mother-son relationship quality and maternal regulatory support and antagonism. *Journal of Youth and Adolescence, 39*(11), 1357–67. doi:10.1007/s10964-009-9485-x

Murray-Close, D. (2011). Autonomic reactivity and romantic relational aggression among female emerging adults: moderating roles of social and cognitive risk. *International Journal of Psychophysiology, 80*(1), 28–35. doi:10.1016/j.ijpsycho.2011.01.007

Obradović, J., Bush, N. R., & Boyce, W. T. (2011). The interactive effect of marital conflict and stress reactivity on externalizing and internalizing symptoms: The role of laboratory stressors. *Development and Psychopathology, 23*(1), 101–14. doi:10.1017/S0954579410000672

Obradović, J., Bush, N. R., Stamperdahl, J., Adler, N. E., & Boyce, W. T. (2010). Biological sensitivity to context: The interactive effects of stress reactivity and family adversity on socio-emotional behavior and school readiness. *Child Development, 81*(1), 270–289. doi:10.1111/j.1467-8624.2009.01394.x

O'Connor, T. G., Matias, C., Futh, A., Tantam, G., & Scott, S. (2013). Social learning theory parenting intervention promotes attachment-based caregiving in young children: Randomized clinical trial. *Journal of Clinical Child & Adolescent Psychology, 42*, 358–370. doi:10.1080/15374416.2012.723262

Papousek, I., Nauschnegg, K., Paechter, M., Lackner, H. K., Goswami, N., & Schulter, G. (2010). Trait and state positive affect and cardiovascular recovery from experimental academic stress. *Biological Psychology, 83*(2), 108–15. doi:10.1016/j.biopsycho.2009.11.008

Poon, J., Zeman, J., Sanders, W., & Miller, R. (in progress). "Good enough" maternal and paternal support of children's sadness: Links to psychological and social development.

Porges SW. (1985). Respiratory sinus arrhythmia: An index of vagal tone. In J. F. Orlebeke, G. Mulder, & L. J. P Van Dornen, (Eds.) *Psychophysiology of cardiovascular control: Models, methods, and data* (pp. 437-450). New York: Plenum.

Porges, S. W. (1995). Cardiac vagal tone: a physiological index of stress. *Neuroscience and Biobehavioral Reviews*, *19*(2), 225–33.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology*, *74*(2), 116–43. doi:10.1016/j.biopsycho.2006.06.009

Porges, S. W., Doussard-Roosevelt, J. A., & Maiti, A. K. (1994). Vagal tone and the physiological regulation of emotion. *Monographs of the Society for Research in Child Development*, *59*(2/3), 167–186.

Radstaak, M., Geurts, S. A. E., Brosschot, J. F., Cillessen, A. H. N., & Kompier, M. A. J. (2011). The role of affect and rumination in cardiovascular recovery from stress. *International Journal of Psychophysiology*, *81*(3), 237–44. doi:10.1016/j.ijpsycho.2011.06.017

Ramsden, S. R., & Hubbard, J. A. (2002). Family expressiveness and parental emotion coaching: their role in children's emotion regulation and aggression. *Journal of Abnormal Child Psychology*, *30*(6), 657–667.

Rubin, D. (1996). Multiple imputation after 18+ years. *Journal of the American Statistical Association*, *91*(434), 473–489.

Saarni, C. (1985). Indirect processes in affect socialization. In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 187-209). New York, NY: Springer.

Saarni, C. (1987). Cultural rules of emotional experience: A commentary on Miller and Sperry's study. *Merrill-Palmer Quarterly*, *33*(4), 535-540.

Saarni, C. (1993). Socialization of emotion. In M. Lewis, & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 435-446). New York, NY: Guilford Press.

Sanders, W. M. (2011). *Parental emotion socialization and its associations to internalizing symptoms: The influence of parent gender and emotion understanding* (Unpublished master's thesis). College of William & Mary, Williamsburg, Virginia.

Sanders, W., Zeman, J., Poon, J., & Miller, R. (2015). Child regulation of negative emotions and depressive symptoms: The moderating role of parental emotion socialization. *Journal of Child and Family Studies*, *24*(2), 402–415. doi:10.1007/s10826-013-9850-y

Santucci, A. K., Silk, J. S., Shaw, D. S., Gentzler, A., Fox, N. A., & Kovacs, M. (2008). Vagal tone and temperament as predictors of emotion regulation strategies in young children. *Developmental Psychobiology*, *50*(3), 205–16. doi:10.1002/dev.20283

Shannon, K. E., Beauchaine, T. P., Brenner, S. L., Neuhaus, E., & Gatzke-Kopp, L. (2007). Familial and temperamental predictors of resilience in children at risk for conduct disorder and depression. *Development and Psychopathology*, *19*(03), 701-727.

Southam-Gerow, M. A., & Kendall, P. C. (2000). A preliminary study of the emotion understanding of youths referred for treatment of anxiety disorders. *Journal of Clinical Child Psychology*, *29*(3), 319–327. doi:10.1207/S15374424JCCP2903_3

Suveg, C., Sood, E., Barmish, A., Tiwari, S., Hudson, J. L., & Kendall, P. C. (2008). "I'd rather not talk about it": Emotion parenting in families of children with an anxiety disorder. *Journal of Family Psychology*, *22*(6), 875–84. doi:10.1037/a0012861

Suveg, C., & Zeman, J. (2004). Emotion regulation in children with anxiety disorders. *Journal of Clinical Child and Adolescent Psychology*, *33*(4), 750-759.

Thompson, R. A. (1994). Emotion regulation: a theme in search of definition. *Monographs of the Society for Research in Child Development*, *59*(2-3), 25–52.

Williams, S. R., & Woodruff-Borden, J. (2014). Parent emotion socialization practices and child self-regulation as predictors of child anxiety: The mediating role of cardiac variability. *Child Psychiatry and Human Development*. doi:10.1007/s10578-014-0492-0

Wilson, B. J., & Gottman, J. M. (1996). Attention—the shuttle between emotion and cognition: Risk, resiliency, and physiological bases. In E. M. Hetherington & E. A. Blechman, (Eds.), *Stress, coping, and resilience in children and families* (pp. 189-228). Mahwah, NJ: Erlbaum.

Zander, C., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development*, *53*(4), 991–1003.

Zeman, J., Cassano, M., Perry-Parrish, C., & Stegall, S. (2006). Emotion regulation in children and adolescents. *Journal of Developmental and Behavioral Pediatrics*, *27*(2), 155–68.

Zeman, J., Shipman, K., & Suveg, C. (2002). Anger and sadness regulation: Predictions to internalizing and externalizing symptoms in children. *Journal of Clinical Child and Adolescent Psychology*, *31*(3), 393–398.

Zuckerman, M. (1999). Diathesis-stress models. In M. Zuckerman (Ed.), *Vulnerability to psychopathology: A biosocial model*, (pp. 3-23). Washington, D.C.: American Psychological Association.

Appendix A

Emotion Socialization Coding Manual

- Watch ENTIRE tape and read the transcript first!
- Code for overall Quality of Interaction
- Code for encouragement

TIME

- Time of the question asked

All of the below are related to the *parent's* response: This can be about the person's emotion or the emotion of a 3rd person.

I. ENCOURAGING

- 0 = parent shows no encouragement; for example, does not respond or is discouraging
- 1 = parent acknowledges the facts or discusses the *event*
  - this is more than just saying "okay" and moving on
  - Examples: "yeah, and we were waiting for her to try on jeans," "oh, now I remember that," "what was that game we were playing?"
  - If parent is just responding "yes/no" to a question, not considered acknowledgement
- 2 = parent acknowledges the *emotion* (can be nonverbal)
  - nonverbal: mirroring of emotion; pat on back; shows awareness of the emotion
  - this should be a clear acknowledgement of the *emotion* and not of the event
  - even if the parent joins in the conversation or shows recognition of the event it doesn't mean they have acknowledged the expressed emotion per se
- 3 = coaching (validate or label emotions)
  - talking about causes and consequences
  - parent helps the child to verbally label the emotions in their response
  - parent seeks intimacy or teaching opportunity about the child's emotion
  - parent verbally empathizes with or validates the child's emotion
  - parent helps the child to problem solve
  - Examples: 'How did you feel when that happened?', 'Were you sad?', 'I could tell you were sad because you walked away', 'Can you think of anything that would have made it easier?', 'Yeah, I can see how you feel…'
  - If parent is coaching, i.e. asking questions about emotions, and child responds to questions, consider this as reference to emotion

Notes:

- Higher scores trump lower ones: if you see evidence for both acknowledging of the event AND of the emotion, you should code that as *Encouraging 3.* In other words, when separate pieces of evidence support a lower and higher score, go with the higher score
- When one piece of evidence is in between two scores, go with the lower one. For instance, if you are undecided between a '2' and a '3' for encouraging emotion, go with a '2' – be conservative
- Can have encouragement without any reference to emotion originally being brought up by the child
- Dramatization of event can be seen as mirroring the expressed emotion
- When conversation is off topic, don't code

More Examples:

Encouraging 2:

Child is talking about a situation that made him sad and Mom says: "I can understand why you are sad, but ..."

In this case, Mom clearly acknowledges the child's emotion even though she quickly goes on to talk about the reason she did what she did.

Encouraging 3:

Mom talks about something that made her sad and at some point the child says: "why did it make you sad?" This shows awareness on the part of the child to Mom's feelings. In addition, by asking "why", the child is seeking to further understand the cause of that emotion.

II. GLOBAL INDEX OF PARENTAL INVOLVEMENT

Definition: The degree to which the parent's style of interaction is generally positive or negative. This code also reflects the quality of communication skills. Coding of this item should be based on the coder's overall impression of the interaction.

A. Positive Involvement

0 = None. In general, the parent is not positively involved in the conversation.

1. The parent 's participation in the conversation must be at least one of the following lettered items:
    a. Nonexistent (e.g., simply sits through the conversation)
    b. Minimal (e.g., simply says "yes" or "no" or shakes his/her head or really seems to be struggling to find something to say)
2. Does not show any clear indication of eagerness, supportiveness, reinforcement, praising, or warm/affectionate body contact.
3. Poor communication skills (e.g., the parent is rarely responsive or easy to understand, may not pay attention/seems distracted, or very slow to respond to what the child has said)

You are looking for a lack of positive behaviors.

1 = Low. In general, the parent's positive involvement in the conversation is low.

1. The parent seems distant/removed (e.g., displays flat affect or seems distracted or very uninterested in the conversation)
2. Throughout most of the conversation, the parent occasionally does <u>at least one</u> of the following lettered items:
    a. participates in the conversation
    b. is attentive
    c. is responsive

3. Overall style of interaction is only rarely positive.
    a. Rarely supportive, reinforcing, display warm body contact, be eager, smiling (genuinely), be animated, and/or praise the child.
    b. Smiling/laughter is minimal or most smiling/laughing is due to anxiety and embarrassment (not enjoyment, encouragement, warmth, etc.)
4. Adequate communication skills (e.g., the parent is minimally responsive, listens to what the child has to say, is clear, is easy to understand, etc.) but sometimes becomes distracted from the conversation.

2 = Moderate In general, the parent's <u>positive involvement in the conversation is moderate.</u>

1. Throughout most of the conversation, the parent does <u>at least one</u> of the following lettered items:
    a. participates in the conversation
    b. is attentive
    c. is very responsive
    d. Occasionally positive

2. Overall style of interaction is only fairly positive.
    a. Somewhat supportive, reinforcing, display warm body contact, be eager, smiling (genuinely), be animated, and/or praise the child.

    The parent has moderate communication skills (e.g., the parent listens to what the child has to say, is responsive, is clear, is easy to understand, etc.)

3 = <u>High</u>. In general, the parent displays a genuine interest in what the child has to say and is positive overall.

1. The parent must clearly display at least one of the following items:
    a. Supportive
    b. Reinforcing
    c. Displays clear warm body contact
    d. Eager (e.g., smiles, is animated)
    e. Praises the child
2. Overall, the parent seems to be enjoying the child and/or is actively engaged.
3. The parent has good communication skills (e.g., participates to a high degree, listens to what the child has to say, is responsive, is clear, easy to understand, asks good questions)