The Pennsylvania State University

The Graduate School

Human Development and Family Studies

LIVING IN ADVERSITY: HOW PARENTING, STRESSFUL LIFE EVENTS, AND PHYSIOLOGY AFFECT CHILD SOCIAL COMPETENCE

A Thesis in

Human Development and Family Studies

by

Kristine L. Bova

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

August 2015

The thesis of Kristine Bova was reviewed and approved* by the following:

Lisa Gatzke-Kopp
Associate Professor of Human Development and Family Studies
Thesis Advisor

Gregory Fosco
Assistant Professor of Human Development and Family Studies; Karl R. and Diane Wendle Fink Early Career Professor for the Study of Families

Eva Lefkowitz
Professor of Human Development and Family Studies
Professor-in-Charge, Graduate Program

*Signatures are on file in the Graduate School

ABSTRACT

Low family socioeconomic status is a robust risk factor for adverse child outcomes, yet the mechanisms by which poverty affects child psychopathology must be better understood in order to identify proximal processes that are more practical for intervention and prevention programs to target as risk-modifiers. This study examined indicators of risk across levels of analysis in children residing in a high-risk neighborhood (high rates of poverty and crime), in order to identify factors that exacerbate or attenuate risk. In a sample of 110 kindergarten children, stressful life events, parenting, and physiological regulation were analyzed, promoting a jointly contextual, psychosocial, and biological approach to assessing risk processes. As expected, results indicated that both greater family exposure to life stress harsh discipline were associated with lower social competence in children. In addition, lower resting RSA moderated the association between life stress and social competence; among children with the greatest stress exposure, those with lower resting RSA had lower social competence than those with higher RSA. The moderating effect of RSA on stress exposure was independent of parenting, highlighting individual differences in vulnerability to contexts of macro-risk factors like stressful life events, but not in contexts of micro-risk factors like the parent-child relationship. The main effect of parenting and lack of interaction with physiology suggests parenting is especially salient in this at-risk context. By focusing exclusively on a high-risk sample, these findings have direct implications for prevention programming in the most at-risk contexts.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Introduction

Many external factors contribute to the overall development of children, including micro factors such as the day-to-day parent-child relationship, as well as broader, macro factors within which experiences occur (e.g. poverty). These factors have the potential to be a source of chronic stress to the developing child, and adversity of this nature (i.e. poverty, parenting and family stress) has been associated with various components of child emotion regulation difficulties including internalizing behaviors, externalizing behaviors, and social interactions (see Blair & Raver, 2012; Evans & Kim, 2013; Propper, 2012). Not all children are equally affected by adversity, however, indicating an important component of individual differences in susceptibility.

The parasympathetic nervous system (PNS) has been explored as one mechanism underlying individual differences in behavioral outcomes due to its role in supporting adaptive functioning of the body's internal state and of emotions during experiences of stress. Research supports two theoretical frameworks for explaining the role of the PNS in children's emotional/behavioral dysregulation. The first suggests that individual differences are a function of possession of a certain physiological trait representing an underlying diathesis (i.e. some children are more vulnerable) (Sameroff, 1983; Zuckerman, 1999). Possession of this vulnerability trait increases the probability of the individual developing psychopathology. This association is most commonly examined in the presence of an adverse environmental factor (El-Sheikh, Hinnant, & Erath, 2011), but research also suggests that vulnerabilities can exist regardless of the environment (Beauchaine, 2001; Fabes, Eisenberg, Karbon, Troyer, & Switzer, 1994). The second theoretical framework maintains that individual differences in physiological markers of susceptibility to the environment underlie vulnerability for psychopathology, but places a greater emphasis on the importance of context in determining how the underlying

susceptibility will manifest (Belsky & Pluess, 2009; Boyce & Ellis, 2005; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2011). In other words, no specific physiological trait is inherently negative; rather the relationship between physiology and child outcomes will vary depending on the quality of the developmental context. In some environments, a physiological trait might be related to greater negative outcomes, while in other environments that same trait is related to greater positive outcomes. Research has begun to examine PNS function from both theoretical perspectives (Ellis, Essex, & Boyce, 2005; El-Sheikh & Hinnant, 2011) with no conclusive evidence favoring one model over the other in all circumstances. This is due, in part, to the necessity of testing these theories across multiple samples that allow an examination of how PNS function affects outcomes within different levels of adversity. Many studies associating PNS function with psychological outcomes have been conducted in moderate to high SES samples (Calkins, Graziano, & Keane, 2007; Eisenberg et al., 2012; Obradović, Bush, Stamperdahl, Adler, & Boyce, 2010; Shannon, Beauchaine, Brenner, Neuhaus, & Gatzke-Kopp, 2007; Whitson & El-Sheikh, 2003) or have not attended to the level of contextual adversity in their sample (El-Sheikh, 2001; Gottman & Katz, 2002; Moore, 2010). What remains unclear regarding the role of the PNS in developing emotion regulation is how specific environmental factors (e.g. parental harshness, chronic life stress) interact with PNS physiology to contribute to psychopathological emotions and behaviors for children living in a highly adverse environment. Further, while many studies relate PNS physiology and environmental risk factors to specific child psychopathologies (deficits in child behavioral and emotional functioning), fewer investigate PNS physiology as it relates to the development of positive social behaviors and general social competencies. Additionally, several studies examining the main effect of resting PNS physiology in predicting psychopathology have reported null results (Bubier, Drabick, & Breiner, 2009; Calkins et al., 2007; Fortunato, Gatzke-Kopp, & Ram, 2013; Keller & El-Sheikh, 2009), supporting the hypotheses that either PNS function is a broad marker of psychopathology

(Beauchaine, 2001) or that specific manifestations of psychopathology (e.g. externalizing or internalizing) are not apparent until later in development (Beauchaine, Gatzke-Kopp, & Mead, 2007). Therefore, a more general marker of child competence might be useful in detecting PNS effects. Thus, although a wide breadth of literature covering several child outcomes will be reviewed, the current study will explore the specific relationship between individual PNS physiology, specific environmental risk factors, and child social competence within an environment where all children are exposed to a high degree of adversity.

Living in an Environment of Adversity: The Context of Poverty

Commonly examined sources of adversity in a child's life are parenting practices and stressful family-related life events (Conradt, Measelle, & Ablow, 2013; Lavee, McCubbin, & Olson, 1987; Obradović et al., 2010; Webster-Stratton, 1990). Before examining these specific stressors, however, it is necessary to understand the general effects of living in an environment of low economic resources, as is the case for the majority of children and families participating in this study. Family SES is a robust risk factor for child dysregulation because it is correlated with a multitude of social and physical stressors, all of which place children at risk for reduced social and emotional competency and health (see Blair & Raver, 2012; Evans & Kim, 2013; Propper, 2012). Poverty has been shown to affect child physical health, cognitive ability, school achievement, and emotional and behavioral health (Duncan & Brooks-Gunn, 2000). In children, this results more specifically in problems with gratification delay, attention control, inhibitory control, aggression, anxiety, and social withdrawal (see Blair & Raver, 2012; Blair, 2010; Brooks-Gunn & Duncan, 1997). As children develop into adolescents, these problems manifest as risky sexual behavior, ineffective stress coping methods, drug use, and high rates of high school dropout (Duncan & Brooks-Gunn, 2000; Escarce, 2003; Wolff, Wadsworth, & Santiago, 2010).

Because poverty contains so many risk factors, we know very little about which ones are the most meaningful targets of intervention. Therefore, two specific risk factors will be examined: parenting and stressful life events.

The Effects of Stressful Life Events and Parenting on Child Functioning

Stressful life events (SLE) are events in the life of a family that have the potential to disrupt normal family functioning and trigger or exacerbate stress and its consequences (Webster-Stratton, 1990). These events typically include job loss, death in the family, incarceration, housing instability, etc. Not only do SLE disrupt family functioning by contributing to increased parental feelings of stress, which might get passed on to the child in the form of harsher discipline or reduced attention (Lavee et al., 1987; Webster-Stratton, 1990), but SLE also have the potential to disrupt housing stability, food availability, and availability of educational resources that are dependent upon multiple family members. These disruptions, in turn, affect child well-being (Conger et al., 2015; Lavee et al., 1987). SLE have been associated concurrently with child externalizing, even after controlling for economic stress and parenting style (Jackson & Warren, 2000; Puff & Renk, 2014), as well as with an increase in child dysfunction over time (Berden, Althaus, & Verhulst, 1990; Mathijssen, Koot, & Verhulst, 1999).

Another strong contributor to child development is parenting. Negative parenting practices, including low responsiveness, ineffective or harsh discipline, and hostility, have been associated with a range of unhealthy child behaviors such as aggression, depression, anxiety, and poor self-regulation (Blair, 2010; Garcia & Alampay, 2012; Nix et al., 1999; Snyder, Cramer, Afrank, & Patterson, 2005). Several examples also exist in the literature that show the power of parenting to either buffer a child from risk, or increase the negative effects of risk. For instance, a study conducted by Propper et al. (2008) showed that at 3 to 6 months of age, infants possessing a

risk allele for developing impulse control disorders and aggression later in life did not respond with normative RSA suppression when their mothers disengaged during the Still Face Paradigm; however, by the time the infants were 12 months old, those whose mothers were rated higher in sensitivity showed RSA suppression levels similar to infants who did not possess this genetic risk. Another example showing the potentially potent effect parents can have on child outcomes comes from Patterson, Garmo, & Knutson (2000), who were interested in the transition from the hyperactive behaviors characterizing ADHD to the antisocial behaviors characterizing conduct disorder. Their results showed that parent discipline entirely mediated the progression from hyperactivity to antisocial behavior. These studies show both the general effects of harsh parenting on children, as well as the potential of parenting practices to enhance the risk of poor outcomes, or protect children from developing more serious psychopathologies.

It is clear that both stressful life events and parenting contribute to a child's development, but less is understood about their unique contributions within a highly adverse environment. Research has shown that the frequency of major life stressors is two to four times greater for low SES families than for middle-class families, and that mothers reporting greater life stress also reported more controlling and punitive parenting practices (Webster-Stratton, 1990). Because these risk factors for poor child outcomes co-occur with one another, it is difficult to determine which factors are most influential in a child's life, and consequentially which are potential targets for intervention. Some studies do suggest, however, that proximal factors like parenting can buffer against even the effects of macro factors such as poverty and life stress. For instance, one study showed that parental involvement moderated the effect of socioeconomic disadvantage on child externalizing behavior (Flouri, Midouhas, Joshi, & Tzavidis, 2014), while another study showed that parental responsivity and involvement partially mediated the relationship between family SES and child inhibitory control (Sarsour et al., 2011). Similarly, when the effects of parenting and stressful life events on dysregulation were analyzed, researchers found that

adolescent girls living with warm and supportive mothers experienced fewer depressive symptoms than those whose mothers were less warm and supportive (Ge, Lorenz, Conger, Elder, & et al., 1994). Another study showed that children who were low in closeness with their mothers showed more depressive symptoms than those who were higher in closeness with their mothers (Ge, Natsuaki, Neiderhiser, & Reiss, 2009). Thus, even though the effects of risk factors within an environment of adversity are difficult to isolate, there is some evidence that parenting and parent-child relationships might be especially salient.

Social Competence

Because the outcome of interest in the current analysis is social competence, it is useful to understand how social competence is defined, why it is important, and how the identified risk factors (i.e. stressful life events and parenting) specifically contribute to the development of social competence in children.

Definition and Importance

In a review of several papers with individual definitions of social competence, Rose-Krasnor (1997) explained social competence generally as effectiveness in interaction; however, multiple factors and processes contribute to being effective in any given interaction, including context, motivations, goals, and skills. Each social interaction is unique and what is effective in one interaction may not be effective in another (Rose-Krasnor, 1997). Social competence has traditionally been measured through evaluating a child's social skills (e.g. communication, empathy, affect regulation, social problem solving), status among peers, quality of relationships, and the ability to successfully achieve social goals (Rose-Krasnor, 1997). More recently, social

competence has been described as the ability of an individual to thrive in his or her environment (Stump, Ratliff, Wu, & Hawley, 2009). By this definition, a socially competent individual is one who is successful in securing his or her own needs in order to thrive. Self-determination theory offers three core needs of individuals, all of which are identified as the basic goals of human development: autonomy, competency, and relatedness (Rose-Krasnor, 1997; Stump et al., 2009). Developing social competence is thus crucial if an individual is going to achieve both autonomy and relations with others. More specifically, social competence is important because children who are socially competent have a reduced risk for psychopathology both in adolescence and adulthood, are less likely to abuse substances or engage in risky sexual behaviors, and are able to develop and retain social support through positive relationships with others (Repetti, Taylor, & Seeman, 2002).

How Parenting Affects Social Competence

As reviewed previously, it is well known that parenting contributes to general child functioning. There are specific pathways, however, through which parents can potentially influence their child's social competence. First, the attachment relationship children have with their parents serves as the context in which a child first explores social relationships. A secure attachment with a caregiver serves as a foundation in which children can safely meet the core needs of autonomy, competency, and relatedness in a social interaction (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1988; Stump et al., 2009). Next, parents directly influence the development of their child's social competence through the modeling of behaviors. Parents' emotional reactions to situations, as well as their interactions with others, are observed by their children such that children then apply their learned schemas in their own social situations (Morris, Silk, Steinberg, Myers, & Robinson, 2007; Repetti et al., 2002). Another path through

which parents influence child social competence is via their emotion-related parenting practices; emotion-regulation plays a large role in the ability of children to be responsive, sensitive, and adept at solving conflict with peers (Repetti et al., 2002). Parents can vary in their degree of awareness of their children's emotions, their labeling of emotions, and their validation of emotions, all of which contribute to a child's emotional and social intelligence (Morris et al., 2007). Finally, the emotional climate that parents set in the home contributes to the opportunities children have to practice their social skills. If parents practice warmth and support in the home, as well as positive conflict-solving skills with other adults and with their children, children will likely develop their own positive problem-solving skills and be more successful in maintaining positive relationships with peers (Morris et al., 2007). This theory is supported by evidence showing that children whose parents were less responsive, warm, and sensitive were more aggressive and critical during interactions with others, and were actually less likely to initiate social interactions (Morris et al., 2007; Repetti et al., 2002).

Although theory posits specific mechanisms by which parents influence the social competence of their children, this association has been shown to be qualified by both ethnicity and social economic status. Lareau (2003) showed that middle-class parents were more consistently engaged in active cultivation of their children's cognitive and social skills, while working-class and poor parents let their children develop these skills in a hands-off manner. Further, Raver, Gershoff, & Aber (2007) found that while more positive parenting (i.e. greater warmth, more stimulating cognitive engagement, and less physical punishment) predicted greater child social competence, positive parenting practices were adversely influenced by increased economic hardship. Concerning ethnicity, Barbarin & Jean-Baptiste (2013) found that African American parents used less elaboration in their dialogue (elaboration was defined by repeating and affirming a child's success during problem solving, as well as indirectly leading the child to success when he or she was struggling with the given problem); greater elaboration in dialogue

was then associated with greater teacher-rated child social competence. Further, this study showed that European Americans had higher social competence in general than African Americans or Latino Americans (Barbarin & Jean-Baptiste, 2013). Thus, the influence of parenting on social competence is especially salient in a context of poverty and in a sample that is largely African American. It is absolutely necessary to expand upon our understanding of the influence of parenting on child social competence within a context of adversity.

How Stressful Life Events Affect Social Competence

The experience of stressful events early in life disrupts the development of biological systems that contribute to a child's executive functioning, emotion perception, and emotion regulation, all of which are crucial facets of social competence. The development of executive functions coincides with the growth of the prefrontal cortex which occurs between birth and two years, seven to nine years, during adolescence, and into young adulthood (see Pechtel & Pizzagalli, 2012). The prefrontal cortex has a high density of receptors that are stress-susceptible (i.e. glucocorticoid receptors), such that when an individual experiences stress early and often, the prefrontal cortex can be altered and consequently impair executive functioning (e.g. reduced inhibitory control and sustained attention, less cognitive flexibility) (Pechtel & Pizzagalli, 2012).

In addition to executive functioning, life stress alters the connectivity from the amygdala to brain regions associated with emotion perception. Research has shown that individuals with a history of early life stress show a bias toward negative valence emotions such as fear and anger and have difficulty disengaging from threat-related cues (Blair, 2010; Pechtel & Pizzagalli, 2012). This disruption in the perception of emotion might put children at risk for poor conflict management skills, as well as a reduced ability to cope with negative social interactions.

Finally, emotion regulation skills are affected by disruptions to the development of the amygdala during experiences of chronic or early stress. The amygdala plays a role in responding to emotional and social stimuli, and disruptions to its development could possibly contribute to a hypersensitivity to emotional arousal, making regulation during social interactions difficult (Pechtel & Pizzagalli, 2012). Thus, research suggests that stressful events in children's lives disrupt the development of key brain regions that are responsible for skill sets needed to develop social competence.

Parasympathetic Nervous System: Role in Social Competence

One way to gain greater insight into how each environmental risk factor within an adverse environment affects individual child emotion regulation and behavior is to utilize physiological methods, especially those involved in the parasympathetic nervous system because of its role in emotion regulation, as previously mentioned. Most of the research on environmental influences and PNS functioning has been conducted with white, middle-class families, in relatively low-risk contexts; these families do not face the same breadth of risk factors as lower-SES minority families often do. Therefore, it is important to differentiate the effects of the most salient risk factors, including stressful life events and parenting, within low-income families living in high adversity to determine which could potentially act as buffers against child dysregulation, and therefore which could be targeted for intervention. Using measures of the PNS, it is possible to understand how individual parasympathetic stress response interacts with each environmental risk factor uniquely, revealing the potential influence of each risk factor on the developing child.

The parasympathetic nervous system is important in the development of social competence specifically through its involvement in regulating emotion by contributing to an

individual's physiological capacity to respond to a stressful event (Gentzler, Santucci, Kovacs, & Fox, 2009; Hastings et al., 2008). Within the PNS, the vagus nerve allows bidirectional communication between brain structures and visceral organs, including the heart. Most often (i.e. when the individual is not in the midst of a challenging situation), the vagus nerve acts as a "brake" on the heart, slowing heart rate by increasing time between heart beats (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996). The greater the influence of the vagus nerve, the stronger the "brake" effect. When the vagus nerve exerts less influence on the heart, it is in effect "releasing the brake," thereby reducing time between heart beats and allowing heart rate to increase. This increase and decrease (release and application of the "brake") occurs naturally with the breathing cycle, and resting heart rate fluctuates with inspiration and expiration; the amount of fluctuation in heart rate is a phenomenon referred to as respiratory sinus arrhythmia (RSA).

The vagus' control of the heart is important not only when an individual is at rest, but also during a stress response. Because the PNS can increase arousal by "releasing the brake," RSA is often measured during a challenge stimulus as an index of an individual's stress response. PNS-stress-induced arousal is optimal because it is less costly to the body than the mechanisms of an alternative stress-response system, the sympathetic nervous system (SNS). When the SNS is activated, it converts many of the body's resources to energy to allow for physical action. An SNS response also takes longer to "turn off" than a PNS response, thereby continually using bodily resources for a longer period of time (Diamond, Fagundes, & Cribbet, 2012; Porges, 1995). RSA is an ideal measure of emotion regulation capability because the amount of fluctuation in heart rate caused by the PNS conveys an individual's capacity for physiological arousal in response to attention-requiring events without the costly activation of alternative systems.

Resting RSA

When an individual is at rest, RSA is an index of the PNS's capacity to regulate arousal levels, or the ability to increase or decrease arousal as needed to meet rapidly changing external cues (Porges, 2007). When an individual has lower resting RSA, the vagus is exerting less control over the heart, such that when the "brake" needs to be released during a stressful situation, the individual theoretically has less capacity to increase arousal levels via the PNS to regulate as needed. On the other hand, if an individual has higher resting RSA, the vagus is exerting greater influence on the heart; therefore theoretically, the individual has greater capacity to respond adaptively by increasing arousal during stressful or attention-requiring tasks (see Beauchaine, 2001; Berntson, Quigley, & Lozano, 2007; Porges, 2007).

RSA Reactivity

RSA reactivity is another index used to measure the role of the PNS in emotion regulation. It is measured by an individual's change in RSA level from a resting state to an engaged state, usually during a laboratory task. An increase in RSA during stress or challenge is known as augmentation, while a decrease is known as suppression or withdrawal. Suppression of RSA in response to an external stressor is believed to reflect an ability to respond to and cope with the environment (see Beauchaine, 2001) because the vagus has released its inhibitory effect, allowing the individual to leave a state of rest, increase heart rate, and devote energy to attending to the challenge stimulus (Porges, 2007). Recently, however, research has been emerging that shows that RSA suppression is not always optimal, as once was believed, and it has become evident that the task used to measure RSA reactivity matters. Suppression is more common and beneficial in instances of cognitive engagement, problem solving, or stress (El-sheikh, Harger, & Whitson, 2001; Graziano, Keane, & Calkins, 2007; Hinnant & El-Sheikh, 2013; Suess, Porges, & Plude, 1994), but greater suppression (i.e. increased arousal) to certain emotion content may be associated with specific psychopathological symptoms (Fortunato et al., 2013). As such, suppression is not always the ideal response, because some situations call for calming and the

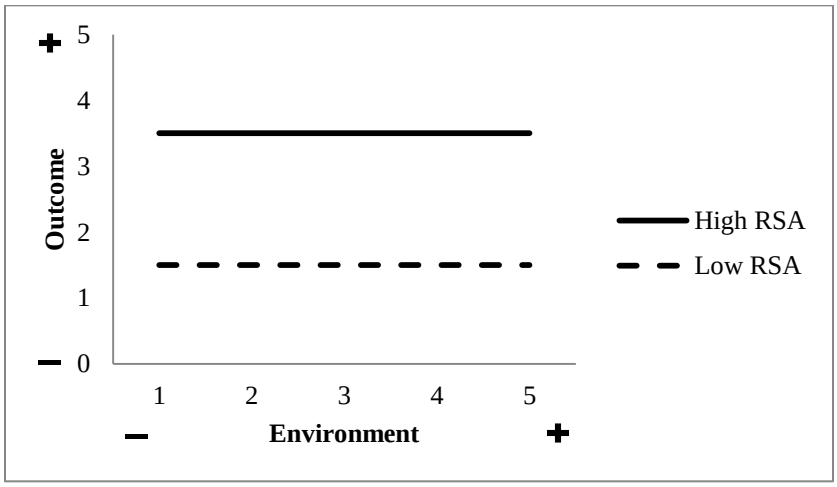
regulation of arousal, in service of optimal engagement; this has been shown to be especially true in social situations where the individual must to remain calm and focused on the social partner (Porges, 2007; Skowron et al., 2011).

Measures of RSA as Indicators of Vulnerability to Psychopathology

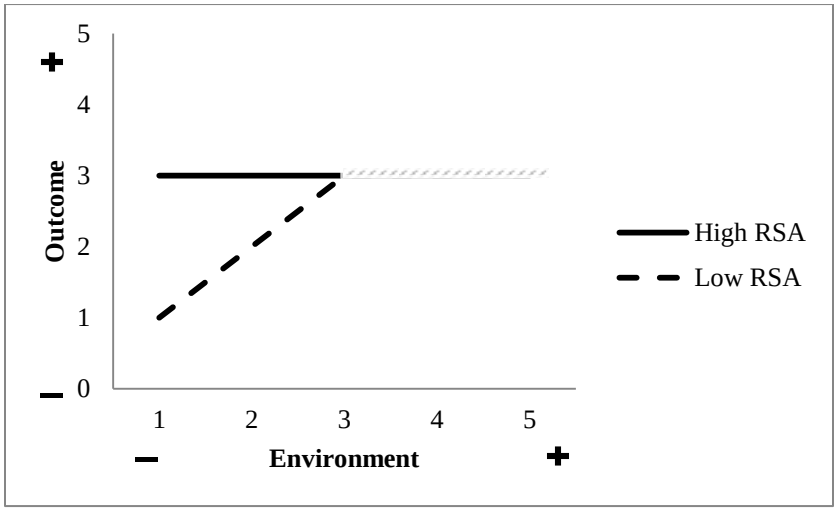
Resting RSA

Resting RSA has long been conceived as a trait-like index of individual capacity to engage with the environment without sacrificing control over physiological arousal. Thus, lower resting RSA has been described as a vulnerability factor indicating that an individual has less capacity to increase arousal levels during stressful conditions. Studies have consistently reported associations between lower resting RSA and a wide range of clinical symptoms both concurrently and prospectively, supporting lower resting RSA as a vulnerability factor (see Beauchaine, 2001; Beauchaine, Gatzke-Kopp, & Mead, 2007). These symptoms include aggression, depression, impaired attention, reduced empathy and greater irritation when responding to others in distress, as well as an increase in symptom severity over time (El-sheikh et al., 2001; El-Sheikh & Hinnant, 2011; Fabes et al., 1994; Pine et al., 1996; Suess et al., 1994). This line of evidence is portrayed theoretically by Figure 1(a).

a.



b.



c.

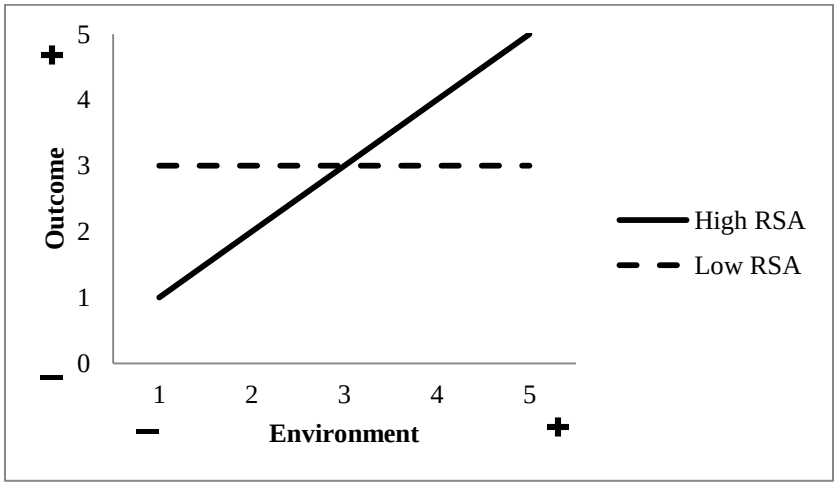


Figure 1. Theoretical models explaining RSA as (a) a general vulnerability factor to poor outcomes in all contexts, (b) a vulnerability factor to poor outcomes only in the presence of an adverse factor, and (c) a sensitivity factor across multiple environments.

RSA Suppression

Similarly, lower levels of RSA suppression have been related to greater externalizing and internalizing behaviors in older children (El-sheikh et al., 2001), lower social skills and peer-rated social preference in young children (Graziano et al., 2007) as well as greater negative affect in infancy (Moore, 2010). The tasks used to measure RSA reactivity in these studies included emotional stress; problem-solving, effortful control, and attention persistence; and the stressful Still Face Paradigm task, respectively. As mentioned previously, there are conditions under which a reduction in RSA during a task is not advantageous; namely, during social interactions. Further literature where this is the case will not be reviewed because in this study RSA reactivity will be measured during an external emotion stimulus and not during an interpersonal social interaction. Relevant here, however, is research that has shown differential associations between RSA reactivity and psychopathological outcomes depending on the specific emotion that is conveyed during the task (Fortunato et al., 2013). Previous research has established associations between exaggerated RSA suppression to the fear and sadness clips and internalizing, as well between blunted RSA suppression to the happy clip and externalizing (Fortunato et al., 2013). What remains unknown is whether associations between RSA reactivity and a positive outcome measure such as social competence, will be emotion-specific. In sum, though attention should be given to the laboratory task chosen to measure RSA, both lower RSA suppression and lower resting RSA have generally been conceived of as contributing to a range of maladaptive emotions and behaviors.

Measures of RSA as Indicators of Vulnerability: Enhancement by Negative Environment

As indicated, research supports that both lower resting RSA and lower RSA suppression are associated with increased rates of emotion dysregulation, but this association is especially apparent among children exposed to negative environmental factors.

Resting RSA

For instance, among children whose parents demonstrated greater conflict behavior during a laboratory task, those with lower resting RSA had higher levels of negative affect and behavioral regulation difficulties (Katz & Gottman, 1997). In later studies, marital conflict reported by both parents and the child predicted greater externalizing and internalizing, as well as lower self-worth, among children with lower resting RSA (El-sheikh et al., 2001; Whitson & El-Sheikh, 2003), further strengthening the robustness of previous findings. In addition to marital conflict, parent/child conflict similarly showed an association with internalizing that was specific to children with lower resting RSA (Whitson & El-Sheikh, 2003). This line of evidence is portrayed in Figure 1(b).

RSA Reactivity

When considering RSA reactivity, similar patterns emerge. Among boys with less RSA suppression from baseline to a challenge task that involved listening to a verbal argument, greater marital conflict was associated with higher externalizing symptoms and an increase in

delinquency behaviors (El-Sheikh et al., 2011; El-Sheikh, 2005). Greater marital conflict was also related to heightened internalizing behavior among boys and girls who exhibited lower RSA suppression (Whitson & El-Sheikh, 2003). Thus, adverse environmental factors appear to be particularly risky for children with lower resting RSA and lower RSA suppression. Alternatively, higher resting RSA and greater suppression may be viewed as protective factors by which resilience can be maintained in the face of adversity.

In sum, the literature presented thus far reflects the well-supported view that lower RSA and lower RSA suppression are vulnerability factors; however, it is important to consider the context in which individuals are reacting and regulating, as evidence has shown that vulnerability is especially robust in the presence of a negative environmental factor.

RSA as an Indicator of Sensitivity, Not Vulnerability

Although lower RSA has been proposed to reflect vulnerability for a broad spectrum of dysregulated emotions and behaviors, evidence is accumulating that suggests lower resting RSA and lower RSA suppression are not always inherently negative traits to possess. In particular, several studies have reported associations between *higher* resting RSA/RSA suppression and negative outcomes, when measured in high adversity contexts. In a study of kindergarten children, Obradović et al. (2010) found that in high adversity (defined as 1 SD above the mean on a combined adversity measure of financial stress, parenting overload, marital conflict, negative/anger expressiveness, maternal depression, and harsh/restrictive parenting), children who showed greater RSA suppression had lower levels of school engagement and less improvement in academic competence, whereas children with lower RSA suppression appeared to be protected from these adverse outcomes. The expected association between lower RSA suppression and lower levels of school engagement and academic competence, however, was

found in the low adversity context. Similarly, Eisenberg et al., 2012 found the expected association between lower resting RSA and higher aggression only among young children in a context of low adversity/high environmental quality (1 SD above mean on combined environmental quality measure of parental education, family income, and mother/father Marital Adjustment Test score); this association was not found in contexts of high adversity/low environmental quality.

In addition to studies examining broad, multifaceted adverse contexts, studies examining adversity within the parent/child context have reported similar patterns. For instance, among boys whose mothers had high levels of internalizing psychopathology, internalizing symptoms were greatest among those with higher resting RSA. However, when mothers were low in internalizing psychopathology, internalizing symptoms were highest among boys with lower resting RSA (Wetter & El-Sheikh, 2012). Studies in infants suggest that this effect is present very early in children's lives. Infants in a negative context, characterized by disorganized attachment patterns with their mothers, were more likely to show social and emotional problems (e.g. over-reactivity, anxiety, eating and sleeping problems) if they were relatively high in resting RSA compared to their lower RSA counterparts. Lower RSA was associated with more problem behaviors only among those infants in a more positive context, characterized by secure attachment relationships (Conradt et al., 2013). In sum, within negative parent/child contexts, higher resting RSA is related to greater negative outcomes and fewer positive behaviors, while in positive contexts, those with lower resting RSA fare worse.

Support from studies both of a broader, macro environmental context and a narrower, micro parent/child context show evidence that in some contexts, higher resting RSA and RSA suppression result in greater negative outcomes. Based on these patterns of findings, resting RSA and RSA suppression to challenge may actually be reflecting a more basic measure of sensitivity to the environment, instead of a capacity and ability to regulate response during stress. Sensitivity

indicates the degree to which an individual is engaged with the environment, thus creating a conduit by which the environment influences socioemotional development (Boyce & Ellis, 2005). Thus, since RSA suppression is indicative of attention and response to a stimulus, the greater the RSA response, the more the individual will "take in" from the experience. In this model, physiological markers are believed to reflect a sort of exposure setting (i.e. on a camera) on the effect of the environment on development. For instance, in environments of high adversity, higher resting RSA and RSA suppression might indicate greater attention to the characteristics of that environment (e.g. family stress, parental harshness, parental conflict, low economic resources), which would result in a greater allocation of resources to a demanding environment to enhance survival, even though adapting to the high-risk context may result in maladaptive behaviors outside of that context (Boyce & Ellis, 2005; Ellis et al., 2005). In environments of support where positive resources are abundant (e.g. family social support, learning materials in the home, financial resources, parental warmth and sensitivity, parent mental health), higher RSA and RSA suppression would allow the individual to attend to and benefit from the surrounding positive resources, resulting in positive behavior outcomes such as academic competence, school engagement, and fewer externalizing problems (Ellis et al., 2005; Obradović et al., 2010). Because lower resting RSA and RSA reactivity may indicate less attentional engagement with the environment (i.e. "tuning out"), this trait may enable children to fare better than high RSA children in adverse environments, but worse in supportive environments (Ellis et al., 2011). This theoretical framework is depicted in Figure 1(c). The distinction between viewing RSA as an indicator of sensitivity versus an indicator of vulnerability is therefore the lack of assumption that lower RSA has a predefined qualitative value, i.e. "vulnerability", whereas the implications of "sensitivity" are determined by the quality of the environment to which the child is sensitive and could therefore be associated with a range of positive or negative outcomes.

Reconciling RSA Measures as Vulnerability and Sensitivity Factors

The studies reviewed thus far provide evidence that that both lower *and* higher RSA are related to negative child outcomes. Lower RSA is associated with poor child outcomes in the presence of negative environmental factors, such as marital conflict (El-Sheikh et al., 2011), as is higher RSA in contexts such as high maternal internalizing (Wetter & El-Sheikh, 2012). These results highlight the fact that there are various contributing factors that make up a negative or adverse environment, and not all factors result in poor outcomes for every child. They also suggest that there is an optimal range of RSA reactivity, with too much or too little resulting in negative outcomes. This idea is supported by Kogan, Oveis, Carr, & Gruber (2014), who found that a quadratic model fit their data better than a linear model when examining the relationship between RSA reactivity and prosocial behavior. Thus, the capacity to engage with the environment appears to be a risk factor for negative child behaviors in the presence of certain environmental characteristics, but acts as a buffering factor in the presence of others. Therefore, it is important to understand the conditions in which a child with lower resting RSA or RSA suppression is at risk for poor outcomes compared to conditions where a child with higher resting RSA or greater RSA suppression is at risk. Because the literature thus far has touched upon macro-environmental factors such as stressful life conditions, as well as micro factors such as the interpersonal dynamics within the family (i.e. the parent/child relationship), the current study will investigate each of these domains. Specifically, stressful life events, as well as harsh parenting, will be assessed within a context of economic hardship and adversity.

Current Study

The current study will investigate the unique and combined influences of stressful life events, harsh discipline, and RSA physiology on child social competence.

Specific Hypotheses

First, based on the wide breadth of literature, lower resting RSA and less RSA suppression were expected to be associated with reduced social competence. Second, stressful life events and parenting were also predicted to have main effects on child social competence such that greater stressful life events and harsh discipline would relate to lower social competence. However, resting RSA and RSA reactivity were hypothesized to moderate the associations between experiential factors (stressful life events, parenting) and child's social competence.

If lower resting RSA and lower RSA reactivity reflect vulnerability for poor social outcomes, stressful life events were hypothesized to be more strongly associated with poor social competence among children with lower RSA. Following the interpretation of RSA as an index of capacity to regulate arousal effectively, higher resting RSA and greater RSA reactivity were expected to buffer the association between stress exposure and social competence.

Similar relationships were hypothesized regarding the moderating effect of RSA on the relationship between parenting and child social competence. Again, interpreting RSA as an index of arousal regulation, greater harsh discipline was expected to be independently more strongly associated with poor social competence among children with lower RSA. Higher resting RSA and greater RSA reactivity were again expected to buffer these associations between parenting and social competence.

Method

Data and Sample

The data for the current study were drawn from a longitudinal clinical trial of a multicomponent intervention for children with aggressive behavior. The trial occurred in 10 elementary schools within an urban school district in Central Pennsylvania. At the beginning of the school year in 2008 (Cohort 1) and 2009 (Cohort 2), all kindergarten teachers completed a brief aggressive behavior rating scale for each child in her class. Children were rank-ordered on aggressive behavior, and families of children in the upper quartile of aggressive behavior were contacted for recruitment. From those contacted, 207 children were enrolled in the study, 100 of whom were randomly assigned to the intervention condition. An additional 132 comparison children were selected from the quartile of children ranked lowest in aggressive behavior; however, because these participants did not undergo all study procedures, only the 207 children in the aggression-risk group are examined in this study. However, due to missing data, the final sample size for the current analyses is 110 (see section below on missing data for further explanation). Parents provided informed consent for all data collection, and children provided verbal agreement for all procedures and participation. Full data collection involved teacher surveys, parent surveys collected during home visits, child behavior and academic assessments conducted at school and at home, and child physiological assessments conducted at school in a mobile lab. All study procedures were approved by the Pennsylvania State University Internal Review Board.

All assessments for the current analyses were conducted during the children's kindergarten year. The mean age of participants at the time teachers reported child survey data was 6.05 years (*SD* = .41, with a range from 5.39 to 7.33 years). 64 % of the children in this

sample were male. Consistent with the racial demographics of the region, 71% of the participants were African-American, 21% were Hispanic, and 8% were Caucasian. Demographic data from the school district from which children were drawn are consistent with high adversity; 74% of the families fell below the poverty line and 62% of parents had a high school education or less. Only 2% of parents reported having a college degree. Additionally, 40% of mothers self-reported depression symptoms in the clinical range.

Visit Protocol for Physiological Data Collection

Physiological data were collected in a mobile lab set up in a recreational vehicle (RV) designed to look like a space ship (consistent with the theme of the overall intervention). The RV was driven to each elementary school to conduct site visits. Of the physiological data collected, only RSA is examined in the current study. Once inside the mobile lab and after all physiological electrodes were applied, children were told that they were going to "travel through space" and should sit very still while watching a 2-minute video of a moving starfield in order to record resting RSA. Children then played a go/no-go computer game that lasted approximately 12 minutes; however, data from this task will not be assessed in this paper. After the go/no-go task, children were given a break and a small snack or juice. They then "travelled through space" again, in order to collect another baseline prior to the final task. The final task was an emotion induction task where children were asked to sit quietly while they watched a series of video clips depicting different emotional situations (described below). After this task, a final 2-min baseline was collected. More details regarding protocol and all assessments can be found in (Gatzke-Kopp, Greenberg, Fortunato, & Coccia, 2012).

Emotion Induction Task

During the 12-min emotion induction task, children viewed a series of video clips from the *Lion King* that conveyed four distinct emotions: fear, sadness, happiness, and anger. Previous research has used the scene in *The Lion King* where Simba's father dies to induce sadness (von Leupoldt et al., 2007), and to maintain consistency within the task for the current study, all four emotional clips were taken from the *Lion King*. The four clips were: the hyenas chasing Simba (fear), Simba's father dying (sadness), characters singing a joyful song (happiness), Simba fighting Scar (anger). Each emotion clip lasted 2-3 min and was followed by a 30-s neutral video clip to restore baseline emotional functioning. Previous work with these data has shown task validity by confirming the highest physiological arousal during the anger clip, followed by the fear clip. Arousal levels during the sad and happy clips did not differ from each other, but were lower than levels during the anger and fear clips (Gatzke-Kopp, Jetha, & Segalowitz, 2014). These results suggest that arousal levels are appropriately responsive to each emotion category. The strong physiological response evidenced during the fear clip compared to other emotional clips and its association with previously identified child outcomes makes fear a relevant context in which to study an RSA response.

Measures

Control Variables

Sex. Sex was coded dichotomously, where male = 0 and female = 1.

Ethnicity. Ethnicity was coded dichotomously, where non-African American = 0 and African American = 1.

Age. Age was measured at the time that teachers completed surveys regarding child behavior and was mean-centered.

Respiratory Sinus Arrhythmia (RSA)

An electrocardiogram (ECG) was recorded and cardiac measures were collected continuously with a sampling frequency of 500 Hz using Biolab 2.4 acquisition software (Mindware, Westerville, OH). The ECG was recorded from three prejelled electrodes placed over the participant's distal right collar bone, lower left rib, and lower right rib. Four spot electrodes were also used to collect impedance cardiography and to estimate respiration frequency. RSA was extracted from the cardiac data using Mindware's HRV (v. 3.0-3.0.15) software. Trained RAs inspected cardiac waves and corrected any misidentified R peaks. Data were processed in 30-s epochs and decomposed using a fast Fourier transform (FFT) to extract power in the frequency band associated with RSA (.12-1.04 Hz).

Resting RSA. For the current study, resting RSA was calculated as the average RSA during the 2-min fixation video clip (stars in space) preceding the initial go/no-go task. Although three individual baseline RSA measures were taken throughout the protocol, the first baseline was selected as the measure of individual differences in RSA at rest due to clear significant differences in baselines across time, $F(2, 92) = 5.09$, $p = .008$. As seen in Table 1, children showed a wide range of RSA levels at rest.

Table 1. Descriptive statistics for predictor and outcomes measures

Measures	***n***	**M**	**SD**	**Observed Range**	**Possible Range**
Resting RSA	110	6.67	1.10	3.08-9.04	n/a
RSA Reactivity	110	0.20	0.61	-1.41-2.24	n/a
Harsh Discipline (parent-report)	110	2.87	1.39	0.0-5.6	0-6

Harsh Discipline (observer-report)	110	2.45	0.81	1.0-4.0	1-5
Stressful Life Events	110	4.10	2.33	0-10	0-13
Social Competence	110	3.22	0.78	1.54-5.62	1-6

RSA Reactivity. For the present analyses, RSA reactivity was calculated as the change from the average RSA during the four neutral video clips to the RSA level during the fear video clip (i.e. baseline – fear). The specific baseline measure used in this calculation (i.e. average RSA during neutral video clips) was chosen to correct for any drift in resting state due to time since the start of the protocol or the influence of the preceding task. Further, it allows for a reactivity measure that is a true measure of the effect of the fear emotion on RSA since the children are attending to the neutral clips. Finally, using this baseline in the reactivity calculation allows for the measures of resting RSA and RSA reactivity used in analyses to be independent of one another. A positive RSA reactivity score indicates RSA suppression during the task, and a negative RSA reactivity score indicates RSA augmentation. As seen in Table 1, the mean RSA reactivity score shows that the average child suppressed RSA during the fear clip, but some children did show augmentation.

Parenting

Parent-report of harsh discipline was measured via a 10-item Discipline Questionnaire (CPPRG, 1999). Parents reported how often they engage in specific discipline strategies on a 7-point Likert scale ranging from 0 (Never) to 6 (Almost every day). Five of the 10 items made up the harsh discipline scale with an alpha of .80 (e.g. raising your voice or yelling, hit or tried to hit child). Parents in this sample reported the full range of harsh behaviors (Table 1).

A research-assistant also rated parents on their use of physical and punitive punishment, as observed during a home visit. Researchers rated these behaviors on a 5-point Likert scale (1 = non-restrictive, mostly positive; 5= severe, strict, often physical).

The scores for parent- and observer-report were standardized and combined to form one measure of harsh discipline. Parent-reported and observer-reported harsh discipline were substantially correlated with one another, $r(110) = .48$, $p < .01$.

Stressful Life Events

Stressful Life Events (SLE) was measured by a 13-item parent survey (CPPRG, 1999). Parents indicated whether each event occurred within the past year (e.g. your family moved, someone in your family lost a job, you were arrested). The score is a cumulative score of experienced events ($\alpha = .63$), and the wide range of events experienced shows that the families in this sample may have experienced adversity to varying degrees, but all experienced adversity nonetheless (Table 1).

Child Social Competence

Social competence was measured using the teacher-reported Social Competence Scale ($\alpha = .75$) (CPPRG, 1999). The scale consists of seven prosocial items (e.g. shares, is helpful, resolves problems with peers on his or her own) and six emotion regulation items (e.g. copes well with disappointment or frustration, controls temper, calms down when upset). Teachers rated each item on a scale from 1 (Almost Never) to 6 (Almost Always) describing how often each child engages in the specific behavior (Table 1).

Data Analysis

First, zero-order correlations were conducted. Next, regression analyses were conducted using the linear regression command in SPSS version 22.0 to examine the main and moderating effects of the physiological, environmental, and family variables on child social competence. The effects of resting RSA and RSA reactivity were examined in separate regression models. Thus, the first analysis examined the effects of harsh discipline, stressful life events, resting RSA, and their interactions on child social competence. The second regression analysis examined the same measures with one exception; RSA reactivity was included in place of resting RSA. For both models, control measures were entered first, followed by main effect measures, followed by interaction terms.

Missing data. Of the 207 children eligible for analyses in the current study, 179 teachers completed the social competence measure. Of these 179 children, 170 had complete data on the parent-reported life stress and parent- and observer-reported harsh discipline items. Of these 170, 136 had complete RSA reactivity data, and of those, 110 had complete resting RSA data. Thus, the sample size used in the current study was 110. The Little's MCAR test for these data revealed that the data were missing completely at random, $\chi^2 = 36.47$ (df = 35, $p = .40$).

Results

Variable Intercorrelations

Correlations among study variables are presented in Table 2. Of the control variables, only sex was correlated with the social competence, indicating that girls show higher social competence than boys. The mean social competence for males was 3.07, while for girls it was

3.49, $F(1,108) = 8.11$, $p < .01$. Sex and age were not correlated with any of the predictors. Parents of African American children reported more stressful life events than parents of non-African American children; the mean reported life stress for African Americans was 4.51, while for non-African Americans it was 3.10, $F(1,108) = 8.90$, $p < .01$. Stressful life events and harsh parenting were both negatively correlated with social competence, such that greater exposure to both stressful events and harsh discipline relate to lower social competence. Within the predictor variables, harsh discipline was positively correlated with resting RSA, indicating that children with higher resting RSA experienced higher levels of harsh discipline.

Table 2. Correlations of study variables

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Sex	--						
2. Ethnicity	-.06	--					
3. Age	-.08	-.11	--				
4. Harsh Discipline	-.11	.15	-.02	--			
5. Stressful Life Events	-.05	.28**	.02	.10	--		
6. Resting RSA	.09	.13	.00	.22*	.10	--	
7. RSA Reactivity	-.02	.03	-.02	.04	.00	-.11	--
8. Social Competence	.26**	-.12	.16	-.19*	-.22*	.03	.02

Note: Sex, 0 = male, 1 = female. Ethnicity, 0 = non-African American, 1 = African American. RSA, respiratory sinus arrhythmia.
*$p < .05$, **$p < .01$.

Regression Analyses

Resting RSA, Parenting, and Stressful Life Events Model.

The first research question asked under what conditions higher resting RSA results in higher child social competence. Age was not included in the final model because it was not

substantially associated with the outcome or any of the predictor variables and would thus not confound any potential effects. Of the remaining control variables, sex significantly predicted social competence (Table 3).

The R^2 for the full resting RSA model was .17, and the adjusted R^2 was .12. This model was overall significant, $F(7,102) = 3.05$, $p < .01$, even though there was not a significant change in R^2 from the control model to the full model (Table 3). After controlling for sex and race, there was a trend-level effect of harsh discipline on child social competence ($\beta = -.14$, $p < .10$), as well as a significant effect of stressful life events ($\beta = -.06$, $p < .05$). As expected, greater harsh discipline and more stressful life events predicted lower levels of child social competence. Though there was no significant main effect of resting RSA, there was a significant two-way interaction between resting RSA and stressful life events ($\beta = .05$, $p < .05$). This interaction was plotted at ± 1 *SD* of stressful life events (Figure 2), and simple slopes were tested to evaluate whether they were significantly different from zero (Aiken & West, 1991; Preacher, Curran, & Bauer, 2006). These analyses revealed that children living in conditions of higher stressful life events have significantly worse social competence than those living in the context of fewer stressful life events only if they have lower resting RSA ($\beta = -.12$, $p < .01$). However, among children with higher resting RSA, there was no association between social competence and stressful life events ($\beta = -.003$, $p = .99$). Children with higher resting RSA had comparable levels of social competence to those with lower resting RSA with low stress exposure.

Table 3. Parameter estimates for predicting social competence when using resting RSA.

Predictor	**Step 1**	**Step 2**	**Step 3**
Sex	.42(.15)**	.37(.15)*	.38(.15)*
Ethnicity	-.17(.16)	-.06(.17)	-.03(.16)

Harsh Discipline		-.14(.09)†	-.16(.09)†
Stressful Life Events		-.06(.03)*	-.06(.03)*
Resting RSA		.05(.07)	.06(.07)
Harsh Discipline X Resting RSA			-.01(.08)
SLE X Resting RSA			.05(.03)*
R-square	.08	.14	.17
Adjusted R-square	.06	.10	.12
Change in R-square	.08*	.06†	.03

Note: Sex, 0 = male, 1 = female. RSA, respiratory sinus arrhythmia. SLE, stressful life events. Standard errors are in parentheses following the unstandardized regression coefficients.
†$p < .10$, * $p < .05$, **$p < .01$.

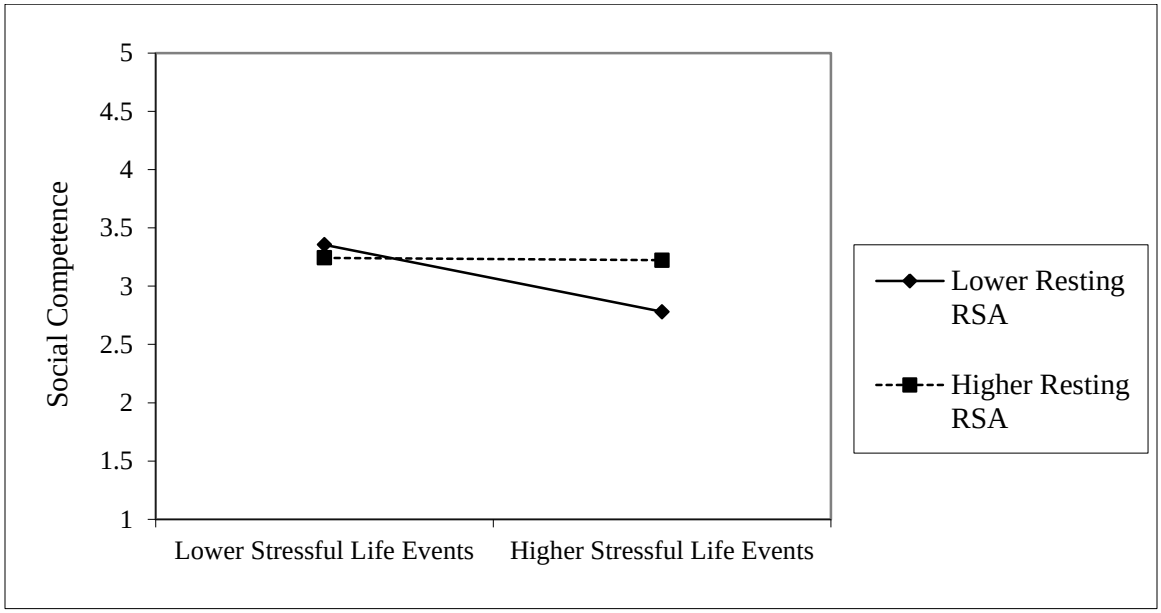


Figure 2. Associations between stressful life events and child social competence among children with higher or lower resting RSA.

RSA Reactivity, Parenting, and Stressful Life Events Model

The second research question investigated under what conditions higher RSA suppression resulted in better child social competence, and under what conditions it resulted in worse social

competence. The R^2 for the full model was .16, and the adjusted R^2 was .10 (Table 4). Again, although there was not a significant increase in R^2 from the control model to the full model, the full model predicted a significant amount of variance in social competence, $F(7,102) = 2.69$, $p < .05$). In this model, after controlling for sex and race, stressful life events was the only significant main effect, where greater stress exposure predicted lower child social competence ($\beta = -.06$, $p < .05$). RSA reactivity to fear did not predict social competence ($\beta = .04$, $p = .76$), nor did any of the interaction terms.

Table 4. Parameter estimates for predicting social competence when using RSA reactivity.

Predictor	**Step 1**	**Step 2**	**Step 3**
Sex	.42(.15)**	.38(.15)*	.37(.15)*
Ethnicity	-.17(.16)	-.05(.16)	-.06(.16)
Harsh Discipline		-.13(.09)	-.14(.09)
Stressful Life Events		-.06(.03)*	-.06(.03)†
RSA-R		.04(.12)	.03(.12)
Harsh Discipline X RSA-R			.21(.13)
SLE X RSA-R			-.02(.05)
R-square	.08	.14	.16
Adjusted R-square	.06	.09	.10

Note: Sex, 0 = male, 1 = female. RSA-R, respiratory sinus arrhythmia reactivity. SLE, stressful life events.
Standard errors are in parentheses following the unstandardized regression coefficients.
†$p < .10$, * $p < .05$, **$p < .01$.

Discussion

The purpose of the current study was to examine whether macro-level (life stress) and micro-level (parental interactions) factors differentially interact with individual child parasympathetic physiological patterns to predict child social competence for children experiencing adversity.

Main Effects

As hypothesized, in both the resting RSA and RSA reactivity models, findings for stressful life events were significant, and findings for harsh discipline trended towards significance in the resting RSA model only. Harsher parental discipline and greater stress exposure were both associated, independently, with lower child social competence, supporting the hypothesis that a macro-environmental factor like stressful life events *and* a micro-environmental factor like parenting would directly affect child social competence. Interestingly, both stressful life events and harsh discipline were similarly correlated with social competence (Table 2), but in the regression model for resting RSA, the significance of harsh discipline became stronger after the interactions were added in the third step (i.e. the regression coefficient approached a *p*-value of .07 compared to a *p*-value of .10 achieved in the main effects step of the regression), while the significance of life stress remained the same in both steps. This suggests that harsh discipline is a salient predictor. Previous studies have found consistent relationships between harsh parenting practices and negative outcome behaviors, such as externalizing (Nix et al., 1999; Snyder et al., 2005), as well as relationships between positive parenting practices and positive outcome behaviors, such as social competence (Lengua, Honorado, & Bush, 2007); the findings of the current study extend this body of literature by showing evidence of a relationship between harsh

parenting practices and the positive behavioral outcome of social competence. Additionally, the finding that stressful life events predict social competence adds to the stressful events literature that thus far has reported significant associations mainly with externalizing behaviors (Jackson & Warren, 2000).

Interaction Effects

The findings of the current study also partially supported hypotheses regarding interactions between parasympathetic physiology and environmental contextual measures. Specifically, the results suggest that higher stressful life events were associated with lower levels of social competence among children with lower resting RSA, but those who had higher resting RSA were buffered from this effect. This finding supports the hypothesis that stressful life events, as a single macro-risk factor would have a larger negative impact on the children with lower resting RSA than on those with higher resting RSA, suggesting two things. First, this suggests that parasympathetic physiology matters in the context a macro-risk factor such as stressful life events. It also suggests that lower resting RSA is a vulnerability factor for reduced social competence in the presence of more stressful life events, while higher resting RSA buffers children from reduced social competence. While this finding fits a general pattern found in a body of literature relating poor child outcomes (e.g. externalizing, internalizing) to negative environmental factors (e.g. marital conflict, parent-child conflict) for children with lower RSA (El-sheikh et al., 2001; Katz & Gottman, 1997), it is in contrast to the results of studies investigating child physiology and behavior outcomes in larger contexts of adversity (e.g. cumulative risk measures) showing that children with lower RSA did not fare any worse than children with higher RSA and in some cases, these children were actually better off than those with higher RSA (Eisenberg et al., 2012; Obradović et al., 2010).

Unsupported Hypotheses

RSA

Several findings were inconsistent with hypotheses. First, resting RSA did not show a significant main effect in predicting social competence. This is likely due to the fact that resting RSA is only related to social competence in a subset of the sample, as indicated by the interaction between resting RSA and stressful life events. This pattern of findings is consistent with a series of studies by Muhtadie, Koslov, Akinola, & Berry Mendes (2014) whose results, when interpreted collectively, suggest that while resting RSA is not a significant predictor of child outcomes on its own, it can serve as an important moderator in the context of certain stressful environmental factors.

Next, RSA reactivity to a fearful video clip did not predict social competence either. This could be due to the possibility that reactivity to a fear-exposure task is not an appropriate context in which to relate social competence to RSA reactivity. To assess the likelihood of this hypothesis, reactivity to the happy film clip was assessed in a follow-up analysis. Happiness serves as a relevant contrast to fear because it is an approach-based emotion, whereas fear is a withdrawal-based emotion (Fortunato et al., 2013). Additionally, previous research has established a relationship between a blunted RSA suppression response to the happy clip and externalizing behavior. However, these results were virtually identical to the results already presented for the fear model of RSA reactivity, and RSA reactivity to happy did not predict social competence ($\beta = .03$, $p = .81$). This raises the possibility that reactivity to a passive emotion task was not suitable, and perhaps reactivity to an active engagement task would be more valid and relate more strongly to social competence.

Interactions

Although stressful life events interacted with resting RSA to predict child social competence, parenting practices did not. Several studies from existing literature found support for lower RSA as a vulnerability factor for poor outcomes in the context of a negative environmental factor related to parenting, but the factor of interest was largely parental conflict (El-sheikh et al., 2001; Katz & Gottman, 1997). Conflict between parents might have a stronger negative effect on social competence than negative discipline because children develop social skills by modeling the relationships they observe in their families (Repetti et al., 2002). Children also develop relationship schemas in their home environments that they then apply to new contexts (e.g. school, playground) (Repetti et al., 2002). If children are observing a high level of arguing or physicality between parents, they are more likely to use these negative conflict-resolution tactics with their peers because they believe this is the appropriate response and have not had practice using positive social competence skills (Repetti et al., 2002). Another possible reason as to why parenting did not interact with RSA is that parenting affects all children, regardless of individual parasympathetic physiology. This would suggest that RSA is more salient in the presence of a macro-risk factor compared to a micro-risk factor because there is more room for a buffering effect; in other words, parenting is such a strong influence on children's social competence that it leaves little room for an individual differences factor.

Study Limitations

Several limitations of this study should be addressed. First, although not a goal of this study, measuring RSA reactivity in the context of a live social interaction would add a new dimension to the existing understanding of the physiological regulatory component of social

competence; this is especially important since physiological regulation during social interaction is not typically studied in a high-adversity context. Next, this study was a cross-sectional in design and as such, parents were asked only to report on stressful life events that their family experienced within the past year. These experiences, along with harsh discipline, if reported earlier in the child's life, would provide a more comprehensive understanding of the development of social competence.

Summary

Developing social competence in an environment where the adversity-related risk factors are already competing for the limited resources a child possesses presents an obvious challenge. However, with a better understanding of the specific factors that hold the potential to hurt or benefit the development of child social competence skills, we can better inform skill-building programs for children living in a context of adversity. Because RSA measures the capacity for the regulation of arousal during stress, the results of this study contribute to a better understanding of the regulatory component of social competence. Specifically, more stressful life events related to deficits in social competence for children with lower RSA, suggesting that in an adverse context, lower RSA can act as a vulnerability factor whereby reduced capacity for regulating arousal contributes to poor child social competence. There were no findings in the current study suggesting that children with *higher* RSA fare worse than children with lower RSA; thus, the current study provides no evidence for RSA as a sensitivity factor. This does not mean, however, that we can rule out higher RSA as a sensitivity factor in an environment of high adversity, because the hypothesis was not explicitly tested in two different environments. To be a true test of sensitivity, the study should be conducted in both a resource-rich environment and a resource-poor environment. However, this study provides a foundation for further research into the specific

processes involved in the development of social competence for children facing adversity in their day-to-day lives, and future investigations would benefit by using such a multi-faceted approach to understanding individual differences in the development of child emotion regulation and social competence.

References

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

Ainsworth, M. S., Blehar, M. C., Waters, E., & Wall, S. (1978). Patterns of attachment: A psychological study of the strange situation. Oxford, England: Lawrence Erlbaum.

Barbarin, O., & Jean-Baptiste, E. (2013). The relation of dialogic, control, and racial socialization practices to early academic and social competence: Effects of gender, ethnicity, and family socioeconomic status. *American Journal of Orthopsychiatry*, *83*(2,3), 207–217. doi:10.1111/ajop.12025

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*(2), 183–214. doi:10.1017/S0954579401002012

Beauchaine, T. P., Gatzke-Kopp, L., & Mead, H. K. (2007). Polyvagal Theory and developmental psychopathology: emotion dysregulation and conduct problems from preschool to adolescence. *Biological Psychology*, *74*(2), 174–84. doi:10.1016/j.biopsycho.2005.08.008

Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological Bulletin*, *135*(6), 885–908. doi:10.1037/a0017376

Berden, G. F., Althaus, M., & Verhulst, F. C. (1990). Major life events and changes in the behavioural functioning of children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *31*(6), 949–959.

Blair, C. (2010). Stress and the development of self-regulation in context. *Child Development Perspectives*, *4*(3), 181–188.

Blair, C., & Raver, C. C. (2012). Child development in the context of adversity: experiential canalization of brain and behavior. *The American Psychologist*, *67*(4), 309–18. doi:10.1037/a0027493

Bowlby, J. (1988). A secure base: Parent-child attachment and healthy human development. New York: Basic Books.

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*(2), 271–301. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/16761546

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children / Center for the Future of Children, the David and Lucile Packard Foundation*, *7*(2), 55–71. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/22583341

Bubier, J. L., Drabick, D. a G., & Breiner, T. (2009). Autonomic functioning moderates the relations between contextual factors and externalizing behaviors among inner-city children. *Journal of Family Psychology : JFP : Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *23*(4), 500–10. doi:10.1037/a0015555

Calkins, S. D., Graziano, P. A., & Keane, S. P. (2007). Cardiac vagal regulation differentiates among children at risk for behavior problems, *74*(2), 144–153. doi:10.1016/j.biopsycho.2006.09.005.Cardiac

Conger, R. D., Ge, X., Elder, G. H., Lorenz, F. O., Ronald, L., Lorenz, O., & Simons, R. L. (2015). Economic stress, coercive family process , and developmental problems of adolescents. *Child Development*, *65*(2), 541–561.

Conradt, E., Measelle, J., & Ablow, J. C. (2013). Poverty, problem behavior, and promise: differential susceptibility among infants reared in poverty. *Psychological Science*, *24*(3), 235–242. doi:10.1177/0956797612457381

CPPRG. (1999). Initial impact of the Fast Track prevention trial for conduct problems: I. The high-risk sample. *Journal of Consulting and Clinical Psychology*, *67*(5), 648–657. doi:10.1037/0022-006X.67.5.648

Diamond, L. M., Fagundes, C. P., & Cribbet, M. R. (2012). Individual differences in adolescents' sympathetic and parasympathetic functioning moderate associations between family environment and psychosocial adjustment. *Developmental Psychology*, *48*(4), 918–931. doi:10.1037/a0026901

Duncan, G. J., & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development*, *71*(1), 188–196. doi:10.1111/1467-8624.00133

Eisenberg, N., Sulik, M. J., Spinrad, T. L., Edwards, A., Eggum, N. D., Liew, J., … Smith, C. L. (2012). Differential susceptibility and the early development of aggression: Interactive effects of respiratory sinus arrhythmia and environmental quality. *Developmental Psychology*, *48*(3), 755–768. doi:10.1037/a0026518.Differential

Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: an evolutionary--neurodevelopmental theory. *Development and Psychopathology*, *23*(1), 7–28. doi:10.1017/S0954579410000611

Ellis, B. J., Essex, M. J., & Boyce, W. T. (2005). Biological sensitivity to context: II. Empirical explorations of an evolutionary-developmental theory. *Development and Psychopathology*, *17*, 303–328. doi:10.1017/S0954579405050157

El-Sheikh, M. (2001). Parental drinking problems and children's adjustment: Vagal regulation and emotional reactivity as pathways and moderators of risk. *Journal of Abnormal Psychology*, *110*(4), 499–515. doi:10.1037//0021-843X.110.4.499

El-Sheikh, M. (2005). Stability of respiratory sinus arrhythmia in children and young adolescents: a longitudinal examination. *Developmental Psychobiology*, *46*(1), 66–74. doi:10.1002/dev.20036

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.

El-Sheikh, M., & Hinnant, J. B. (2011). Marital conflict, respiratory sinus arrhythmia, and allostatic load: interrelations and associations with the development of children's externalizing behavior. *Development and Psychopathology*, *23*(3), 815–29. doi:10.1017/S0954579411000320

El-Sheikh, M., Hinnant, J. B., & Erath, S. (2011). Developmental trajectories of delinquency symptoms in childhood: the role of marital conflict and autonomic nervous system activity. *Journal of Abnormal Psychology*, *120*(1), 16–32. doi:10.1037/a0020626

Escarce, J. J. (2003). Socioeconomic status and the fates of adolescents. *Health Services Research*, *38*(5), 1229–1234.

Evans, G. W., & Kim, P. (2013). Childhood poverty, chronic stress, self-regulation, and coping. *Child Development Perspectives*, *7*(1), 43–48. doi:10.1111/cdep.12013

Fabes, R. A., Eisenberg, N., Karbon, M., Troyer, D., & Switzer, G. (1994). The relations of children's emotion regulation to their vicarious emotional responses and comforting behaviors. *Child Development*, *65*(6), 1678. doi:10.2307/1131287

Flouri, E., Midouhas, E., Joshi, H., & Tzavidis, N. (2014). Emotional and behavioural resilience to multiple risk exposure in early life: the role of parenting. *European Child & Adolescent Psychiatry*. doi:10.1007/s00787-014-0619-7

Fortunato, C. K., Gatzke-Kopp, L. M., & Ram, N. (2013). Associations between respiratory sinus arrhythmia reactivity and internalizing and externalizing symptoms are emotion specific. *Cognitive, Affective & Behavioral Neuroscience*, *13*(2), 238–51. doi:10.3758/s13415-012-0136-4

Garcia, A. S., & Alampay, L. P. (2012). Parental efficacy, experience of stressful life events, and child externalizing behavior as predictors of Filipino mothers' and fathers' parental hostility and aggression. *Philippino Journal of Psychology*, *45*(1), 1–24.

Gatzke-Kopp, L. M., Greenberg, M. T., Fortunato, C. K., & Coccia, M. a. (2012). Aggression as an equifinal outcome of distinct neurocognitive and neuroaffective processes. *Development and Psychopathology*, *24*(03), 985–1002. doi:10.1017/S0954579412000491

Gatzke-Kopp, L. M., Jetha, M. K., & Segalowitz, S. J. (2014). The role of resting frontal EEG asymmetry in psychopathology: Afferent or efferent filter? *Developmental Psychobiology*, *56*(1), 73–85. doi:10.1002/dev.21092

Ge, X., Lorenz, F. O., Conger, R. D., Elder, G. H., & Et Al. (1994). Trajectories of stressful life events and depressive symptoms during adolescence. *Developmental Psychology*, *30*(4), 467–483. doi:10.1037/0012-1649.30.4.467

Ge, X., Natsuaki, M. N., Neiderhiser, J. M., & Reiss, D. (2009). The longitudinal effects of stressful life events on adolescent depression are buffered by parent-child closeness. *Development and Psychopathology*, *21*, 621–635. doi:10.1017/S0954579409000339

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*, 156–163. doi:10.1016/j.biopsycho.2009.07.002

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

Graziano, P. A., Keane, S. P., & Calkins, S. D. (2007). Cardiac vagal regulation and early peer status. *Child Development*, *78*(1), 264–278.

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*, 299–306. doi:10.1016/j.biopsycho.2008.07.005

Hinnant, J. B., & El-Sheikh, M. (2013). Codevelopment of externalizing and internalizing symptoms in middle to late childhood: sex, baseline respiratory sinus arrhythmia, and respiratory sinus arrhythmia reactivity as predictors. *Development and Psychopathology*, *25*(2), 419–36. doi:10.1017/S0954579412001150

Jackson, Y., & Warren, J. S. (2000). Appraisal, social support, and life events: predicting outcome behavior in school-age children. *Child Development*, *71*(5), 1441–1457. doi:doi:10.1111/1467-8624.00238

Katz, L., & Gottman, J. (1997). Buffering children from marital conflict and dissolution. *Journal of Clinical Child Psychology*, *26*(2), 157–171.

Keller, P. S., & El-Sheikh, M. (2009). Salivary alpha-amylase as a longitudinal predictor of children's externalizing symptoms: respiratory sinus arrhythmia as a moderator of effects. *Psychoneuroendocrinology*, *34*(5), 633–43. doi:10.1016/j.psyneuen.2008.12.016

Kogan, A., Oveis, C., Carr, E., & Gruber, J. (2014). Vagal activity is quadratically related to prosocial traits, prosocial emotions, and observer perceptions of prosociality. *Journal of Personality and Social Psychology*, *107*(6), 1051–1063. Retrieved from http://psycnet.apa.org/psycinfo/2014-39093-001/

Lareau, A. (2003). Unequal childhoods: Race, class, and family life. Berkeley: University of California Press.

Lavee, Y., McCubbin, H. I., & Olson, D. H. (1987). The effect of stressful life events and transition on family functioning and well-being.pdf. *Journal of Marriage and the Family*, *49*(4), 857–873.

Lengua, L. J., Honorado, E., & Bush, N. R. (2007). Contextual risk and parenting as predictors of effortful control and social competence in preschool children. *Journal of Applied Developmental Psychology*, *28*(1), 40–55. doi:10.1016/j.appdev.2006.10.001

Mathijssen, J. J., Koot, H. M., & Verhulst, F. C. (1999). Predicting change in problem behavior from child and family characteristics and stress in referred children and adolescents. *Development and Psychopathology*, *11*, 305–320. doi:10.1017/S0954579499002072

Moore, G. A. (2010). Parent conflict predicts infants' vagal regulation in social interaction. *Development and Psychopathology*, *22*(1), 23–33. doi:10.1017/S095457940999023X

Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development*, *16*(2), 361–388. doi:10.1111/j.1467-9507.2007.00389.x

Muhtadie, L., Koslov, K., Akinola, M., & Berry Mendes, W. (2014). Vagal flexibility : A physiological predictor of social sensitivity. *Journal of Personality and Social Psychology*.

Nix, R. L., Pinderhughes, E. E., Dodge, K. A., Bates, J. E., Gregory, S., Mcfadyen-ketchum, S. A., & Pettit, G. S. (1999). The relation between mothers' hostile attribution tendencies and children's externalizing behavior problems : The mediating role of mothers' harsh discipline practices. *Child Development*, *70*(4), 896–909.

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 socioemotional behavior and school readiness. *Child Development*, *81*(1), 270–89. doi:10.1111/j.1467-8624.2009.01394.x

Patterson, G. R., Garmo, D. S. D. E., & Knutson, N. (2000). Hyperactive and antisocial behaviors : Comorbid or two points in the same process ? *Development and Psychopathology*, *12*, 91–106.

Pechtel, P., & Pizzagalli, D. (2012). Effects of early life stress on cognitive and affective function: An integrated review of human literature. *Psychopharmacology*, *214*(1), 55–70. doi:10.1007/s00213-010-2009-2.Effects

Pine, D. S., Wasserman, G., Coplan, J., Fried, J., Sloan, R., Myers, M., … Parsons, B. (1996). Serotonergic and Cardiac Correlates of Aggression in Children. *Annals of the New York Academy of Sciences*.

Porges, S. W. (1995). Cardiac vagal tone: A physiological index of stress. *Neuroscience and Biobehavioral Reviews*, *19*(2), 225–233. doi:10.1016/0149-7634(94)00066-A

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., Portales, A. L., & Greenspan, S. I. (1996). Infant regulation of the vagal "brake" predicts child behavior problems: a psychobiological model of social behavior. *Developmental Psychobiology*, *29*(8), 697–712. doi:10.1002/(SICI)1098-2302(199612)29:8<697::AID-DEV5>3.0.CO;2-O

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*(4), 437–448. doi:10.3102/10769986031004437

Propper, C. (2012). The early development of vagal tone: Effects of poverty and elevated contextual risk. In V. Maholmes & R. B. King (Eds.), *Oxford Handbook of Poverty and Child Development* (pp. 103-123). Oxford: Oxford University Press.

Propper, C., Moore, G. a., Mills-Koonce, W. R., Halpern, C. T., Hill-Soderlund, A. L., Calkins, S. D., … Cox, M. (2008). Gene-environment contributions to the development of infant vagal reactivity: The interaction of dopamine and maternal sensitivity. *Child Development*, *79*(5), 1377–1394. doi:10.1111/j.1467-8624.2008.01194.x

Puff, J., & Renk, K. (2014). Relationships among parents' economic stress, parenting, and young children's behavior problems. *Child Psychiatry and Human Development*, 1–16. doi:10.1007/s10578-014-0440-z

Raver, C. C., Gershoff, E. T., & Aber, J. L. (2007). Testing equivalence of mediating models of income, parenting, and school readiness for White, Black, and Hispanic children in a national sample. *Child Development*, *78*(1), 96–115. doi:10.1111/j.1467

Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin*, *128*(2), 330–366. doi:10.1037/0033-2909.128.2.330

Rose-Krasnor, L. (1997). The nature of social competence: A theoretical review. *Social Development*, *6*(1), 111–135. doi:10.1111/j.1467-9507.1997.tb00097.x

Sarsour, K., Sheridan, M., Jutte, D., Nuru-Jeter, A., Hinshaw, S., & Boyce, W. T. (2011). Family socioeconomic status and child executive functions: the roles of language, home environment, and single parenthood. *Journal of the International Neuropsychological Society : JINS*, *17*(1), 120–32. doi:10.1017/S1355617710001335

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*(3), 701–27. doi:10.1017/S0954579407000351

Skowron, E. A., Loken, E., Gatzke-Kopp, L. M., Cipriano-Essel, E. a, Woehrle, P. L., Van Epps, J. J., … Ammerman, R. T. (2011). Mapping cardiac physiology and parenting processes in maltreating mother-child dyads. *Journal of Family Psychology*, *25*(5), 663–74. doi:10.1037/a0024528

Snyder, J., Cramer, A., Afrank, J., & Patterson, G. R. (2005). The contributions of ineffective discipline and parental hostile attributions of child misbehavior to the development of conduct problems at home and school. *Developmental Psychology*, *41*(1), 30–41. doi:10.1037/0012-1649.41.1.30

Stump, K. N., Ratliff, J. M., Wu, Y. P., & Hawley, P. H. (2009). Theories of social competence from the top-down to the bottom-up: A case for considering foundational human needs. In J. L. Matson (Ed.), *Social Behavior and Skills in Children* (pp. 23–37). New York: Springer. doi:10.1007/978-1-4419-0234-4

Suess, P. E., Porges, S. W., & Plude, D. J. (1994). Cardiac vagal tone and sustained attention in school-age children. *Psychophysiology*, *31*, 17–22.

Von Leupoldt, A., Rohde, J., Beregova, A., Thordsen-Sörensen, I., zur Nieden, J., & Dahme, B. (2007). Films for eliciting emotional states in children. *Behavior Research Methods*, *39*(3), 606–609. doi:10.3758/BF03193032

Webster-Stratton, C. (1990). Stress: A potential disruptor of parent perceptions and family interactions. *Journal of Clinical Child Psychology*. doi:10.1207/s15374424jccp1904_2

Wetter, E. K., & El-Sheikh, M. (2012). Trajectories of children's internalizing symptoms: the role of maternal internalizing symptoms, respiratory sinus arrhythmia and child sex. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *53*(2), 168–77. doi:10.1111/j.1469-7610.2011.02470.x

Whitson, S. M., & El-Sheikh, M. (2003). Moderators of family conflict and children's adjustment and health. *Journal of Emotional Abuse*, *3*(1-2), 47–73. doi:10.1300/J135v03n01

Wolff, B. C., Wadsworth, M. E., & Santiago, C. D. (2010). Family poverty, stress, and coping. In R. J. R. Levesque (Ed.), *Enclycopedia of Adolescence* (pp. 941-951). New York, NY: Springer.

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

Appendix A

Full Survey Scales

Table 5. Harsh Discipline Scale

Item	**Range of Response**
Based on everything you have learned from the parent, please rate the parent's use of physical or punitive punishment.	1 (non-restrictive, positive) to 5 (severe, strict, often physical)
Raising your voice or yelling	0 (Never) to 6 (almost every day)
Threatening a spanking	0 (Never) to 6 (almost every day)
Threatening another kind of punishment	0 (Never) to 6 (almost every day)
Giving a swat or spanking	0 (Never) to 6 (almost every day)
Hit or tried to hit child	0 (Never) to 6 (almost every day)
Start here	

Table 6. Life Stress Scale

Item	***M***	***SD***
Your family moved.	.39	.49
Someone in your immediate family had serious medical problems.	.42	.49
Death of a close relative.	.39	.49
Death of a close friend.	.20	.40
A relative or someone close to your family had serious medical problems.	.43	.50
Your income decreased substantially.	.43	.50
You had an alcohol or drug problem.	.02	.14
You were arrested.	.05	.22
Someone in your family was arrested.	.22	.42
Your child lived with someone else for part of the year.	.09	.29
Your family had financial problems.	.48	.50
Someone in your family lost a job.	.40	.49
A family member moved in or out of your house.	.26	.44

Note. Each item is dichotomous, with 0 indicating the event did not occur and 1 indicating the event did occur within the last year.

Table 7. Social Competence Scale

Item	**Range of Response**
Copes well with disappointment or frustration	1 (almost never) to 6 (almost always)
Accepts things not going his or her way	
Feelings are easily hurt	
Whines or complains	
Controls temper when there is a disagreement	
Stops and calms down when frustrated or upset	
Shares with others	
Is helpful to others	
Resolves problems with other children on his or her own	
Listens to other people's point of view	
Cooperates	
Understands other people's feelings	
Expresses needs and feelings appropriately	