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**EMOTION REGULATION, MULTIPLE RISK,
AND EXTERNALIZING BEHAVIOR PROBLEMS**

A Dissertation in

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by

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ABSTRACT

Children's skill at regulating their emotions is an important component of short- and long-term healthy development. Difficulties with emotion regulation are associated with behavior problems across childhood, beginning in the toddler and preschool years, and skillful emotion regulation appears to play a protective role for children at risk for the development of behavioral difficulties. The present study examined the links among multiple risk, emotion regulation, and externalizing behavior problems longitudinally in young children (ages 30 to 48 months). Risk was conceptualized as exposure to stressors, and both additive and cumulative approaches to assessing risk were employed. Exposure to higher levels of risk, as measured by both approaches, predicted externalizing behavior problem symptoms. Skill at emotion regulation inconsistently predicted externalizing symptoms. Finally, contrary to prediction, competent emotion regulation did not act as a buffer, moderating the link between risk exposure and behavior problems. Possible explanations for the unexpected findings regarding young children's emotion regulation are examined, and implications of the findings for the conceptualization and study of risk are discussed.

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Introduction

The concepts of risk and protection are central to understanding children's developmental outcomes (Cicchetti, 2006). Considerable information has been learned about many risk and protective factors and their links, respectively, with psychopathology and healthy adaptation, but we have much yet to learn regarding the mechanisms by which these factors influence developmental pathways and outcomes. Toward the goal of illuminating these mechanisms and informing the development of effective prevention and intervention programs, it is particularly important to identify protective factors, characteristics that buffer a person from the negative effects that can arise as a result of growing up in adverse circumstances (Masten, Best, & Garnezy, 1990). Protective factors include both personal attributes of the individual and characteristics of the environment in which the child is developing. One individual protective factor may be the quality of a child's emotion regulation. That is, skill at regulating emotions may enable a child to modulate negative emotions that accompany stressful life circumstances and serve to protect the child from the development of negative outcomes, such as behavior problems. This hypothesis, that emotion regulation skill moderates the relation between exposure to risk and child behavior problems, is based on the evidence that skill at emotion regulation reduces the chances that a child will be emotionally overwhelmed by stress and unable to cope effectively (Eisenberg et al., 1997; Lengua, 2002). A variety of adverse or stressful circumstances are known to be associated with the development of behavior problems (e.g., Campbell, 1995), and there is a growing body of evidence to indicate that children in these circumstances who cope well have fewer problems than those who are less skilled at regulating negative emotions

(e.g., Davies & Cummings, 1998). The present study builds in two particular ways upon the premise that the quality of a child's emotion regulation serves as a buffer against the development of externalizing behavior disorder symptoms in young children exposed to risk. Specifically, the project examines this buffering effect in preschool-aged children and examines which aspects of emotion regulation buffer a child against cumulative risk.

Emotion regulation

One individual characteristic that is thought to act as a protective factor against the development of maladaptive behavior is emotion regulation. Emotion regulation is the way in which individuals oversee and change or maintain their affective states, by their own means or with the help of others, in order to reach their goals (Thompson, 1994). Emotion regulation does not merely involve the "control" of one's emotions; it requires the ability to adapt to the demands of different contexts and goals and may involve maintaining, attenuating, or increasing one's emotional experience or expression (Cole, Michel, & Teti, 1994). There are many factors that must be taken into account in determining whether an individual is emotionally well-regulated, including the adaptability, flexibility, and effectiveness of one's emotion regulation attempts as well as more global factors such as the immediate context, applicable cultural norms, and developmental goals for the child (Cole & Hall, 2008; Cole, Michel et al., 1994).

Both theory and research suggest that individuals of all ages regulate their emotions; even young infants have been found to engage in a variety of behaviors that appear to help them to modulate emotion in the face of an arousing stimulus (e.g., Shapiro, Fagen, Prigot, Carroll, & Shalan, 1998). However, much of children's successful emotional self-regulation during the first two years of life is dependent upon interactions

with a sensitive and available caregiver (Calkins, 1994; Calkins & Johnson, 1998; Kopp, 1989). As children get older, they generally become better at behaving appropriately and flexibly even in the face of intense or persistent emotion. Specifically, with time, children's emotion does not derail their behavior from being socially acceptable (i.e. appropriate to adults monitoring them and tolerable to other children); in addition, children's behavior remains contextually appropriate (i.e. fitting with the demands of the situation, such as a classroom environment) despite the presence of emotion that might have earlier led to inappropriate actions (Hall & Cole, 2007). Logically, just as children show advances in multiple areas of development – including social, cognitive, and physical growth – as they age, children as a group become more skilled at regulating their own emotions. By the time children enter formal schooling, they are expected to have basic skill at regulating the negative emotions associated with ordinary frustrations and disappointments (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002).

Improvements in children's emotion regulation abilities, including the establishment of individual, stable “patterns” of emotion regulation, are thought to be supported by the advances in cognitive, language, and self-reflective skills and abilities that occur in the third year and beyond (Sroufe, 1996; Stipek, 1995). Both theory and empirical work suggest that this shift occurs during the toddler to preschool years, roughly between the ages of two and four years (Hall & Cole, 2007; Kochanska, Coy, & Murray, 2001; Kochanska, Murray & Harlan, 2000; Kopp, 1982, 1989; Sroufe, 1996). Therefore, the present study examined children's emotion regulation capabilities when they had just turned 3 years old, during this period when many children are capable of self-regulating their frustration but individual variation is great.

There are multiple factors that influence the judgment that an individual's emotion regulation behavior is skillful or competent (Cole & Hall, 2008; Cole, Michel et al., 1994; Halberstadt, Denham, & Dunsmore, 2001; Saarni, 1999). In general, children who exhibit skillful emotion regulation are adaptive, effective, appropriate, and flexible in their regulatory efforts. First, skillful emotion regulation is adaptive in that it involves behaving in ways that promote optimal development at each stage of childhood. This is a complex issue, as adapting to an adverse circumstance may produce regulatory behavior that in the short term helps a child cope by reducing overall levels of distress but in the long term represents a restricted range of regulatory behavior (Cole, Michel et al., 1994). For example, a fear-prone youngster's proclivity to withdraw and seek adult support in the face of uncertainty or novelty protects the child from distress in the immediate sense (i.e. is effective in reducing negative emotion); however, a behavior that is adaptive in an adverse circumstance may also become maladaptive if it comes to interfere with the child's ability to adapt to the diverse situations that one faces in life. For the young child, a way of regulating negative emotion that helps the child deal with adversity (e.g., emotional avoidance) may compromise classroom learning if the child avoids work when it becomes more difficult and emotionally challenging. In the present study, the term adaptive is used to refer to behavior that promotes the ability to learn and to form healthy relationships, including compliance with rules.

Second, skillful emotion regulation is effective, as well-regulated individuals not only possess knowledge about emotion regulation strategies but are able to effectively modulate their emotional experience and/or expression toward the achievement of a particular goal (Thompson & Calkins, 1996). Third, social and contextual

appropriateness are important components of skillful emotion regulation; a well-regulated child would be expected to be able to refrain from laughing when a classmate falls on the playground and to persevere during a difficult or frustrating exam. It is impossible to evaluate emotion regulation apart from the context in which it occurs; a child's loud yells of distress have very different implications in the face of a playground struggle with a peer and an attempt to escape from a would-be abductor. Therefore, it is important to consider the appropriateness of emotional and regulatory behavior in a particular context in order to determine whether it is likely to promote healthy development. Finally, flexibility is thought to be essential aspect of regulation, though little research has examined it. In other words, skillful emotion regulation includes the ability to use different emotion regulation strategies and to adjust emotion-driven behavior to different situational demands. For example, a child may be required to regulate emotion differently in order to persevere at a difficult or boring activity in one situation and to distract oneself from a desired object in another, tasks that are thought to put qualitatively different demands on the child (e.g., Kochanska et al., 2001).

Historically, studies of emotion regulation have examined the degree (amount, intensity) of a child's negative emotional reactions (or moods) as well as, usually assessed independently and not in specific relation to the child's emotions, the child's use of particular regulatory strategies. Differences in these aspects of children's behavior are then used to distinguish skillful from less skillful emotion regulation. Although this approach has produced some informative findings, it also has certain limitations (Cole, Martin, & Dennis, 2004). Strategies are often designated as "good" or "bad" without clear justification, and some are confounded with emotion itself (e.g., "venting" as a

maladaptive regulatory strategy). Moreover, this approach tends to focus on micro-momentary information, relating it to the presence of symptoms or risk factors, without the step of discerning whether the child demonstrates a pattern of emotion regulation that constitutes emotional competence and health or a pattern that raises concern.

Some studies have taken a more global approach to behavioral observations (e.g., Casey, 1996; Cole, Barrett, & Zahn-Waxler, 1992; Cummings, 1987; Maughan & Cicchetti, 2002; Maughan, Cicchetti, Toth, & Rogosch, 2007; Zahn-Waxler et al., 1994), addressing a child's style or pattern of emotion regulation. In various ways, each of these studies has assessed children's emotional and behavioral responses during a particular task, such as the presentation of an emotional vignette or exposure to background anger, at a global level; such work aims to capture a broad, clinical sense of the effect of children's emotions on their behavioral organization rather than to identify the occurrence of specific emotions or behaviors. Observational ratings are informed by multiple dimensions of emotion and behavior, including duration, intensity, and frequency and both facial and vocal cues. Characterizations such as adaptive, undercontrolled or ambivalent, and overcontrolled or unresponsive (Cummings, 1987; Maughan & Cicchetti, 2002) or regulated, disregulated/disorganized, and immobilized (Casey, 1996) have been used to globally describe children's behavior during emotion-provoking situations. Such classifications distinguish children with higher levels of behavior problems from those who have lower symptoms levels (Casey, 1996; Maughan & Cicchetti, 2002; Zahn-Waxler et al., 1994), supporting their validity as a measurement of children's emotion regulation abilities. The use of a global approach to observations of

emotion regulation allows for a general characterization of multiple dimensions of children's behavior with the goal of identifying children's overall regulatory patterns.

The present study used a modification of a global emotion regulation system developed for young children (Zahn-Waxler et al., 1994). In this approach, a child's behavior during a task (3 to 4 minutes, on average) informs a determination of (a) the predominant mood of the child as either calm or distressed, and (b) the apparent effect of that mood on the child's behavior, i.e. facilitating appropriate and adaptive action or producing disruptive and socially inappropriate conduct. That is, child behavior is classified in a manner that is consistent with clinical judgments, taking into account multiple pieces of behavioral information about a child's apparent emotional state and actions. Moreover, the judgment regarding the appropriateness of the behavior is made not relative to other children of the same age but to the developmental standard to which the child will be held by the time the child reaches formal school age. Children's emotion regulation is, therefore, evaluated by its resemblance to a developmental trajectory toward healthy child functioning. The uniqueness and strength of this approach lies in its identification of behavior patterns reflective of regulation – i.e. whether regulation is adaptive, effective, appropriate, and flexible – rather than the presence or absence of specific emotions or strategy attempts that may not paint a full picture of a child's behavior.

Emotion regulation and behavior problems

There is considerable evidence that children differ in the degree to which they react negatively to and become behaviorally disorganized or inappropriate during challenging laboratory tasks, variations that predict concurrent and subsequent behavioral

outcomes in childhood and adolescence (e.g., Calkins, Bandon, Williford, & Keane, 2007; Cole, Zahn-Waxler, & Smith, 1994; Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996; Eisenberg, Cumberland et al., 2001; El-Sheikh, Cummings, Kouros, Elmore-Staton, & Buckhalt, 2008; Lengua, 2002; Shaw, Keenan, & Vondra, 1994; Zeman, Shipman, & Suveg, 2002). Theoretically, deficits in emotion regulation should underlie many different types of psychopathology (Berenbaum, Raghavan, Le, Vernon, & Gomez, 2003; Cicchetti, Ackerman, & Izard, 1995; Cole, Michel et al., 1994; Gross & Munoz, 1995; Keenan, 2000). Children who lack adaptive, appropriate, and effective strategies for regulating emotions are likely to be overwhelmed by their emotions, and their patterns of emotion regulation lead to behaviors that are maladaptive by various criteria (Cole & Hall, 2008). Indeed, the criteria for a host of disorders include symptoms involving difficulties with emotions and their regulation, including depression (anhedonia, prolonged sadness or irritability, excessive guilt), anxiety disorders (difficulty controlling persistent fear or worry, avoidance), eating disorders (excessive fear of weight gain, restrained emotional expression), and disruptive behavior disorders (anger/hostility, poor frustration tolerance, mood lability, lack of remorse/guilt; American Psychiatric Association, 2000). In addition, there is a growing body of empirical evidence indicating that children's emotion regulation abilities are consistently associated with developmental outcomes, both in terms of social competencies (e.g., Denham et al, 2003; Shields et al., 2001) and psychopathology (e.g., Calkins & Dedmon, 2000; El-Sheikh et al., 2008; Maughan & Cicchetti, 2002; Shaw et al., 1994). The use of ineffective emotion regulation strategies by children as young as 24 months is related to higher concurrent externalizing behavior problem scores (Calkins & Dedmon, 2000). Poorly regulated

elementary school-aged children exhibit more concurrent internalizing symptoms (Maughan & Cicchetti, 2002) and higher levels of later oppositional-defiant behaviors (Cole et al., 1996) than children who show better emotion regulation. This pattern continues for both internalizing and externalizing symptoms in later elementary school (e.g., Eisenberg, Gershoff et al., 2001; Lengua, 2002; Rydell, Berlin, & Bohlin, 2003; Zeman et al., 2002) as well as into adolescence (e.g., Garnefski, Kraaij, & Spinhoven, 2001). The links between poor emotion regulation and a variety of behavioral and emotional difficulties throughout childhood suggest that children's ability to appropriately and effectively cope with their distress, including negative emotions produced by exposure to stressors, likely plays a key role in the development of psychopathology.

In contrast, preschool- and early elementary school-aged children who use more effective emotion regulation strategies and fewer ineffective ones and who present as more emotionally well-modulated overall exhibit fewer externalizing symptoms both concurrently (Cole et al., 1996; Cole, Zahn-Waxler et al., 1994) and at a later age (Cole et al., 1996; Gilliom et al., 2002). Early skill at emotion regulation has also been linked with a variety of other aspects of healthy development, including social and emotional competence in preschool and kindergarten (e.g., Denham et al., 2003), preschool classroom adjustment (Shields et al., 2001), and early academic performance (Graziano, Reavis, Keane, & Calkins, 2007; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003). Overall, research suggests that skillful emotion regulation predicts lower levels of behavior problems and higher levels of socio-emotional and academic competence. The apparent role of emotion regulation in the promotion of children's mental health and

well-being suggests that it may be an important factor to examine toward understanding children's developmental pathways following exposure to risk.

Emotion regulation as a protective factor

Children's emotion regulation abilities have been linked with their behavioral outcomes in a variety of circumstances, including in children who are exposed to stressors that increase the probability they will exhibit maladaptation (e.g., Lengua, 2002; Silk, Shaw, Forbes, Lane, & Kovacs, 2006). It is important to note that the presence of risk does not necessitate a negative developmental outcome; the concept of risk itself connotes a degree of uncertainty concerning outcomes (Masten & Wright, 1998; Sameroff, Gutman, & Peck, 2000). Whether or not risk has a negative impact on an individual can often be linked to the presence of protective factors, variables that modulate the effect of hazards or risks on adaptation and outcomes (Masten et al., 1990). Individuals who possess a high enough level of a given protective factor may be buffered against the negative effects of environmental stressors (Luthar, 1991) such that they do not experience increased difficulties at higher levels of exposure to risk.

Protective factors can be either characteristics of the individual or psychosocial factors that operate as environmental influences on a child's functioning. Several aspects of children's environments have been found to moderate the relation between risk and outcomes, including high quality parenting (Masten et al., 1999) and social support (Seifer, Sameroff, Baldwin, & Baldwin, 1992). In addition, there are certain individual characteristics that are thought to promote positive outcomes in the face of risk, including high intelligence (Masten et al., 1999), temperamental adaptability (Corapci, 2008; Stright, Gallagher, & Kelley, 2008), an internal locus of control (Werner & Smith, 1992),

good social skills (Luthar, 1991), and high self-esteem or self-worth (Seifer et al., 1992; Werner & Smith, 1992). Internal factors may play a more persistent protective role, as they follow an individual throughout life and are more pervasive than environmental factors, which are prone to change across time. In the present study, we focus on one internal child variable, emotion regulation, which has generally been found to be an important predictor of children's developmental outcomes (e.g., Calkins & Dedmon, 2000) as well as to act as a protective factor for some children at risk for the development of behavioral or emotional problems (e.g., Lengua, 2002; Silk et al., 2007).

There is a growing body of work indicating that skillful emotion regulation either accounts for the relation between risk and outcomes or protects children and adolescents from the harmful effects of a variety of risk factors, including maternal depression, interparental hostility, harsh parenting, and economic strain. For example, children of depressed mothers who are able to be emotionally positive during a frustrating task are less likely to develop internalizing behavior problems than those who do not exhibit this ability (Silk et al., 2006). Also, adolescents' reactions to interparental hostility are moderated by their emotion regulation abilities, such that teenagers who are skilled in a variety of domains of emotion regulation are less likely to interact with their fighting parents in a hostile manner (Schultz, Waldinger, Hauser, & Allen, 2005). The relationship between harsh parenting and kindergarteners' aggression has been found to be mediated by children's emotion regulation skill (Chang, Schwartz, Dodge, & McBride-Chang, 2003). In addition, children's self-regulatory abilities, including perseverance during a frustrating task, have also been found to promote competence and protect against the development of behavior problems in children who are exposed to

particular parenting beliefs and techniques associated with economic strain (Brody, Flor, & Gibson, 1999; Brody et al., 1994). This small collection of studies suggests that emotion regulation plays a protective role for risk-exposed children across development. However, emotion regulation has rarely been examined as a protective factor in relation to the number or type of different risk factors to which children are exposed; existing work has also tended to focus on children in the elementary and secondary school years. The present study targets these gaps in the literature by considering the buffering role of emotion regulation in younger children (e.g., during the toddler and preschool years) facing exposure to multiple risks.

Children who are skilled at regulating their own emotions are expected to be able to better handle the stress produced by exposure to multiple risks and to behave appropriately even in the face of these challenges. Children who are poor emotion regulators, in contrast, would be expected to become overwhelmed by the negative emotions produced by the presence of multiple stressors and may not be able to appropriately organize their behavior in the face of their strong emotions. What is not known about emotion regulation as a protective factor is whether it is being less stressed by experimental challenges (i.e., remaining calm in such tasks) or coping with negative emotions skillfully (i.e. being able to act appropriately rather than becoming disruptive) that buffers well-regulated children against the negative effects of stress. The present study aims to identify the particular aspects of skillful emotion regulation – calm emotion versus behavioral appropriateness during a challenging task – that protect against the development of behavior problems in early childhood.

Characteristics of emotion regulation as a protective factor

Because children make considerable advances in their ability to skillfully regulate emotion as they transition from toddlerhood to school age (Kochanska et al., 2000, 2001; Kopp, 1982, 1989), the protective function of emotion regulation may influence development in these early years. Specifically, children who are faced with a challenge, such as a blocked goal, but are able to harness their emotions in socially appropriate and developmentally advantageous ways are likely to remain behaviorally organized and on task, rather than becoming disruptive and socially inappropriate, despite the negative emotions evoked by the challenge (Cole, Michel et al., 1994; Eisenberg, Gershoff et al., 2001). As the protective effects of emotion regulation have generally only been studied in somewhat older children (Brody et al., 1994, 1999; Lengua, 2002; Silk et al., 2006), the present work aims to explore whether skillful emotion regulation promotes positive development in preschool-aged children exposed to stressors.

Research on risk and protective factors focuses not only on identifying the constructs that support or interfere with well-being but also illuminating the mechanisms by which these influences operate (Grant et al., 2003; Rutter, 1990). In this vein, we aimed to identify the specific aspects of emotion regulation that promote positive outcomes in young children, despite exposure to risk, toward the goal of elucidating the mechanisms by which it functions as a protective factor. The precise aspects of emotion regulation that are crucial for mental health outcomes have not been fully specified. For instance, is there an important difference between a child's ability to remain *predominantly* cheerful or content despite some frustration during a challenging task and a child's ability to act appropriately despite being predominantly frustrated? In this

project, we define emotion regulation not by moment to moment changes in behavior but in a larger developmental context, involving judgments about the apparent effect of a child's predominant emotional response to a challenge on the quality of the child's behavior (Cole et al., 2004). That is, we aim to evaluate a child's emotional and behavioral responses in relation to the developmental goal toward which the child is striving (i.e. the expectations for behavior in a school setting). Therefore, it is less important to us know whether the child expressed a particular positive or negative emotion or employed a specific regulatory strategy; rather, we are interested in the degree to which the child's emotional responses preserve the child's ability to behave in socially and task appropriate ways.

A child who is generally calm despite some frustration is more likely to be able to behave appropriately in the context of the situation. Evidence makes clear that more negative emotion in the face of a challenge is associated with behavior problems (Cole, Zahn-Waxler et al., 1994; Eisenberg, Cumberland et al., 2001; Eisenberg et al., 2005; Lengua, 2002, 2003), while the ability to remain positive when emotionally challenged has been found to protect against the development of internalizing symptoms in children of depressed mothers (Silk et al., 2006). It has also been suggested that some children's resistance to becoming negative during a challenge reflects the ability to view oneself and one's situation in a positive light (Fredrickson, 2001; Lengua, 2002), helping these children to remain organized and task-oriented even when they are stressed.

However, the ability to behave appropriately (i.e., be well-regulated) during a difficult task (e.g., waiting for a prize) has also been linked to better adjustment (Cole, Zahn-Waxler et al., 1994; Eisenberg, Gershoff et al., 2001; Lengua, 2002, 2003).

Furthermore, the finding that toddlers' use of distraction as an appropriate emotion regulation strategy moderates the relation between negative emotion and conflict with peers (Calkins, Gill, Johnson, & Smith, 1999) suggests that it is not the presence of negative emotion that predicts adjustment problems but the ability to remain well-regulated even when upset or frustrated. Both of these patterns of emotion regulation differ from that of children at risk for behavior problems, whose negative emotion derails their activity and leads to disruptive, inappropriate behavior (Cole, Zahn-Waxler et al., 1994; Hall & Cole, 2007; Hill, Degnan, Calkins, & Keane, 2006). Therefore, theory and empirical work provide evidence to support both views, but work comparing the relations of these different aspects of emotion regulation to behavior problems is lacking. The present study examined both of these aspects of emotion regulation – remaining positive during a challenge and being able to regulate behavior appropriately despite negative affect – as potential contributors to the hypothesized buffering effect of emotion regulation on children's behavioral outcomes in the presence of multiple risks.

It is clear that emotion regulation is a component of mental health and that children who are able to regulate their negative emotions in the face of challenge or stress are less likely to develop psychopathology. Therefore, emotion and emotion regulation processes are logical and important targets for early intervention (Izard, 2002). Emotion regulation is a central component of interventions targeting behavior change in adults and older children with disorders, such as depression and borderline personality disorder (e.g., Kovacs et al., 2006; Linehan, 1993) and has more recently become the focus of a number of interventions aimed at younger children. One line of research has focused on teaching mothers how to effectively and sensitively respond to their infants' signals,

including negative affect (e.g., Cohen, Lojkasek, Muir, Muir, & Parker, 2002; Nysten, Moran, Franklin, & O'Hara, 2006). Another line of work has focused on developing and testing interventions to improve emotion regulation skill in preschool age children. A notable example of this is the PATHS program (Promoting Alternative Thinking Strategies; Greenberg, Kusché, Cook, & Quamma, 1995), an intervention that has been effective in improving the socio-emotional competence, including several aspects of emotion regulation, of preschool age children (Domitrovich, Cortes, & Greenberg, 2007). When upset, children are taught to take a break from their activity, identify the problem, and verbalize their emotions. Through repetition of this sequence, children learn to identify their personal patterns of emotional reactions and to appropriately modulate their behavior when distressed (Kusché & Greenberg, 1994). An intervention used with economically strained preschoolers, the emotions course (EC), is based on functional theories of emotion and has produced improvements in children's emotion knowledge and emotion regulation abilities by focusing on the functional experience and expression of emotion (Izard, Trentacosta, King, & Mostow, 2004).

Children's behavioral and emotional self-regulatory abilities have been found to be fairly stable across childhood and into adolescence (Colman, Hardy, Albert, Raffaelli, & Crockett, 2006; Raffaelli, Crockett, & Shen, 2005), and behavior problems that begin in early childhood are also fairly stable into later years (see Campbell, 1995, for a review); therefore, early intervention with poorly regulated children at risk for adjustment difficulties is important for decreasing the individual and societal burdens of disorder during the later child and adolescent years. Toward this goal, the identification of the particular aspects of emotion regulation – remaining calm and content or behaving

appropriately when emotional – that promote healthy development is likely to inform continuing research on the development and use of effective emotion regulation and emotion-based interventions.

Conceptualizations of risk

In the research reported here, the effect of children's abilities to regulate their emotions – that is, the degree to which they are able to behave in an appropriate and goal-oriented manner even when they are emotionally challenged – was examined in the presence of risk. Risk factors are, by definition, characteristics of an individual or of the environment that are associated with negative outcomes (Masten et al., 1990). Risk factors can be conceptualized as either discrete, highly stressful events (e.g., the death of a parent; Sandler, Reynolds, Kliwer, Ramirez, 1992) or more constant, daily stressors (e.g., family conflict; Luthar, 1991). Exposure to risk is thought to be the mechanism by which some children deviate from normal development onto a pathway toward maladaptation and negative outcomes (Cicchetti, 2006); risk factors may put undue stress on a child, reducing the child's ability to cope effectively and appropriately and leading to the development of behavior problems or emotional disorder symptoms as the child attempts to manage the negative emotions produced by the stressors. The identification of the risk factors that are likely to detrimentally affect children's outcomes, therefore, is crucial to both understanding early development and designing effective intervention and prevention programs.

There are a number of different approaches to the conceptualization of risk and, therefore, its measurement. Two of the most frequently employed approaches conceptualize effects of risk as either additive or cumulative. Additive models consider

each individual risk factor as unique and risks not interchangeable in their effects on children, whether examined in isolation or in conjunction with one another (Ackerman, Izard, Schoff, Youngstrom, & Kogos, 1999). For example, an additive approach to risk might examine the influences of maternal depression and exposure to neighborhood violence separately in order to determine how they differentially affect developmental outcomes. Such models allow researchers to consider the influence of the strength of each risk factor (i.e. the frequency with which parental conflict occurs) as well as to distinguish the specific risk factors that are most important in predicting children's outcomes (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Jones, Forehand, Brody, & Armistead, 2002). Additive models are typically employed when there are a small number of risk factors to be studied and the conceptual aim of the research is to tease apart the individual effects of each stressor. In these cases, data are generally in the form of continuous variables and are analyzed by entering each risk factor separately. A weakness of this model lies in the fact that risk factors are often fairly nonspecific (e.g., Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987), with a given stressor predicting maladaptation in a variety of domains or a particular disorder being predicted by a number of different risk factors. In addition, additive approaches are limited statistically by the potential for multicollinearity among stressors (Hooper, Burchinal, Roberts, Zeisel, & Neebe, 1998).

Cumulative models of risk posit that it is exposure to a number of different risk factors, rather than the specific nature of the risk factors themselves, that best predicts outcomes (Rutter, 1979, 1983; Sameroff, Seifer, Baldwin, & Baldwin, 1993). This conceptual approach emphasizes that stress affects children cumulatively, such that

exposure to multiple risk factors has the potential to produce a negative developmental outcome, regardless of which specific stressors these are, with more impact than the sum of the effects of the individual stressors. The logic is based on the assumption that internal and external resources are expended each time one copes and that the expense rises as stressor exposure increases and one's resources are "spread thin". This view is consistent with evidence that the process of self-regulation draws on individual resources that can be depleted over time (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998).

The cumulative model is based on multiple lines of research. First, risk factors tend to cluster together instead of occurring in isolation (Evans, 2003; Seifer et al., 1992), so a child who is exposed to one stressor is likely to be exposed to others as well. Second, many risk factors have relatively nonspecific effects, meaning that they predict a variety of types of disorder and maladaptive outcomes but that individual risk factors have not generally been linked with specific outcomes (e.g. Sameroff et al., 1987). Cumulative models of risk have been supported by studies showing that most children exposed to any one of a number of risk factors do not show maladjustment; however, as the number of risk factors to which children are exposed increases, their levels of behavior problems and psychological distress also increase, while positive characteristics such as social competence decrease (Evans, 2003; Evans & English, 2002; Forehand, Biggar, & Kotchick, 1998; Loeber et al., 2005; Seifer et al., 1996). For statistical analysis, the cumulative model assigns a single numerical score for each risk that is considered present, such that risk is quantified by the total number of risk factors.

There are, however, potential methodological problems with a cumulative approach to risk (e.g., Burchinal, Roberts, Hooper, & Zeisel, 2000). The model

conceptualizes risks as either present or absent, necessitating the use of some criterion for determining risk presence on a given stress factor (e.g., a cut off point designating the frequency or intensity at which marital conflict constitutes a risk factor), which may be somewhat arbitrary. While this approach has been used frequently and has produced significant results (e.g., Forehand et al., 1998; Gutman, Sameroff, & Cole, 2002; Gutman, Sameroff, & Eccles, 2003; Sameroff, Seifer, Zax, & Barocas, 1987), it obscures potential influences that involve the *level* or *intensity* of the individual risks.

Evidence for the relative predictive power of additive versus cumulative approaches to risk is mixed, but there is support for the predictive power of each approach (e.g., Deater-Deckard et al., 1998). For example, a cumulative index of risk explains more variance in childhood behavior problems than any individual risk factor but less than a set of risk factors entered as a block of individual predictors (Ackerman et al., 1999). Other studies have found the number of risk factors to be a better predictor of children's outcomes than a model in which risks are considered in parallel but individually (Evans & English, 2002; Sameroff et al., 1993). Given the mixed evidence for each of these approaches, the present study examined the effects of risk on young children's behavioral symptoms using both approaches: an additive (individual) risk model and a cumulative index model.

Risk for the development of behavior problems

A variety of specific influences have been established as risk factors that predict emotional and behavioral difficulties in children and adolescents. For the present study, we selected six risk factors that have consistently shown relations to child developmental outcomes, particularly symptom levels. The risk factors we examined were economic

strain, interparental conflict (physical and psychological), daily hassles (general and parenting), and stressful life events.

Economic strain. The degree to which a family lacks economic resources has consistently emerged as a predictor of negative physical, academic, emotional, and behavioral outcomes (see McLoyd, 1998, for a review). Specifically, children living in low-income families have been found to have more behavior problems than children in higher-income families, a link that is present in early childhood (Duncan, Brooks-Gunn, & Klebanov, 1994), middle childhood (Deater-Deckard et al., 1998; Dodge, Pettit, & Bates, 1994), and adolescence (Conger, Ge, Elder, Lorenz, & Simons, 1994; Fergusson, Horwood, & Lynsky, 1994) and in both urban (Duncan et al., 1994) and rural (Conger et al., 1994) settings. In addition, economic strain has been linked with higher levels of psychological distress, including anxiety and depressed mood, as well as lower self-esteem in children (Evans, 2003). Unfortunately, children living in low-income families are also less likely to receive treatment for their behavioral or emotional problems than their counterparts in higher-income families (Brooks-Gunn & Duncan, 1997). For this reason, understanding the processes that promote positive outcomes in the face of economic strain is particularly important for the development of interventions to target children most in need.

Physical and psychological interparental conflict. Another major risk factor for the development of a variety of behavioral and emotional difficulties in children is domestic violence or interparental conflict (Davies, Sturge-Apple, Cicchetti, & Cummings, 2007; Dawkins, Fullilove, & Dawkins, 1995; Katz, Hessler, & Annett, 2007). Elementary school aged children whose parents report higher levels of conflict

have more aggressive and overall externalizing symptoms (Deater-Deckard et al., 1998), while exposure to interparental conflict in adolescence has been found to predict psychosocial maladjustment concurrently and into young adulthood (Forehand et al., 1998). Even young children show higher levels of behavior problems in the face of interparental conflict (e.g., Frosch & Mangelsdorf, 2001; Martin & Clements, 2002), a link that may be explained by a diminished stress response, indexed by cortisol reactivity, upon repeated exposure to conflict (Davies et al., 2007). Experimental research suggests that exposure to angry interadult conflict evokes negative emotions such as anger, anxiety, and sadness in normally developing children and that these reactions are heightened when the conflict is unresolved or when it includes a physical component (Cummings, Simpson, & Wilson, 1993; Cummings, Vogel, Cummings, & El-Sheikh, 1989). The emotional security hypothesis (Davies & Cummings, 1994, 1998) posits that marital conflict promotes a sense of insecurity and endangerment in children, who may develop behavior problem symptoms in their efforts to cope with and/or control their parents' conflict and to regain a sense of personal security (e.g., withdrawing to avoid exposure, acting out to interrupt the conflict). Such findings suggest that constant exposure to parental conflict may interfere with the optimal emotional development that underlies mental health.

General and parenting daily hassles. In the general literature on stress, events have been conceptualized as major life stressors (e.g., divorce, death of a family member; Dodge et al., 1994) or as daily hassles (e.g., mediating sibling conflicts, dissatisfaction at work; Gross, Sambrook, & Fogg, 1999). When considering the stressors to which children are exposed, it is important to appreciate that risk effects can be direct or

indirect. That is, the child's experience may be modified directly by exposure to a stressor (e.g., a family moves) but may also be influenced through the effects on parenting (e.g., a highly stressed parent is insensitive and negative toward a child). Therefore, the present study considered both stressful life events and parents' daily hassles. Constant, daily stressors may include both general daily hassles and difficulties that are specific to parenting. The quantity of general daily hassles parents report has been consistently linked to their children's internalizing and externalizing symptoms across development, in early childhood (Gross et al., 1999), middle childhood (Thompson, Merritt, Keith, & Murphy, 1993) and adolescence (Self-Brown, LeBlanc, & Kelley, 2004). Similarly, parenting stress (e.g., childrearing hassles and difficulties related to raising a family) has been found to predict behavior problem symptoms in young children both longitudinally, when stress exposure occurs in infancy (Shaw, Owens, Vondra, Keenan, & Winslow, 1996), and concurrently (Shaw, Winslow, Owens, & Hood, 1998). Parents who are under a great deal of stress have been found to be more controlling and less sensitively responsive to their children, practices that, in turn, are predictive of child behavior problems (Crnic & Belsky, 1990).

Stressful life events. In addition to constant, daily hassles, major stressful events in a family's life have been found to impact children's adjustment (Dodge et al., 1994; Fergusson et al., 1984). The number of stressful life events a family experiences has been linked with aggressive, externalizing, and overall symptom levels in elementary school aged children in multiple samples (Ackerman et al., 1999; Deater-Deckard et al., 1998). Parents' reports of stressful life events in infancy have even been found to predict behavior problem levels 4 ½ years later (Abidin, Jenkins, & McGaughey, 1992). As with

daily and parenting hassles, it has been suggested that discrete stressors affect children both directly and via their effect on parenting practices (Abidin et al., 1992).

Several domains of children's performance and well-being – including academic performance, social skill, and behavior problems – may be jeopardized by exposure to stressors (Masten & Coatsworth, 1998). The present study focused on the effects of risk on the development of externalizing behavior problem symptoms in young children.

Children who exhibit behavior problems in early childhood are likely to continue to have difficulties into later childhood and beyond (Campbell & Ewing, 2000), and children who show behavior problems in the preschool years may have already been exposed to identifiable risk factors in infancy and toddlerhood (Shaw, Owens, Giovannelli, & Winslow, 2001). Therefore, continued study of these difficulties in early childhood is valuable because of its potential contribution to early intervention with children who are likely to experience long-term adjustment difficulties.

The present study focuses on young children's externalizing symptoms. Parents are most concerned about externalizing behaviors – such as oppositionality and aggression – and report higher levels of these types of symptoms than internalizing problems in their young children (Gilliom & Shaw, 2004; Harden et al., 2000; Larzelere, Amberson, & Martin, 1992). This is likely due to the fact that adults become concerned about the disruptive behavior of young children more than they have insight into the internal processes that might be causing distress to the child. In addition, the knowledge base with regard to behavior problem trajectories and associated risks in young children is better established for externalizing difficulties than internalizing symptoms (e.g., Calkins & Dedmon, 2000; Owens & Shaw, 2003; Shaw et al., 2001), and, for some

children, externalizing or aggressive behavior has a high level of stability from early to later childhood and adolescence (Campbell, 1995; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Nagin & Tremblay, 1999). Therefore, we examined children's parent-reported externalizing behavior problem symptoms as the result of exposure to stress.

In sum, many factors can put a child at risk for the development of behavior problems. The present study examined the impact of six possible risk factors – economic strain, interparental psychological aggression, interparental physical violence, daily hassles, parenting stress, and major life events – on the development of behavior problems in young children, considering also the role of emotion regulation as a moderator of outcomes in the face of risk.

The present study

The present study tested the following model: in the face of risk, children who regulate their emotion skillfully (i.e. are able to remain calm and/or behave appropriately and adaptively in the face of a challenging situation) have fewer externalizing symptoms. That is, a moderation effect was predicted in which the more frequently a child demonstrates the ability to remain predominantly calm and react behaviorally to a challenging situation in the way expected of a school-aged child, the weaker the relation between exposure to risk factors and child behavior problems. Exposure to risk was assessed in the cumulative risk model by a single index representing the number of different risk factors to which a child has been exposed; this index represented whether children had been exposed to major stressful events (e.g., parent loses a job), general life hassles (e.g., parent has a difficult day at work), family hassles (e.g., pressures associated with child care and family life), marital distress (marital conflict), and economic strain

(degree to which financial resources are strained by family needs). In addition, exposure to risk was assessed in the additive risk model by considering each of the above risk factors as a separate, continuous variable. In other words, risk was examined both cumulatively (i.e. the number of risks present) and additively or individually (i.e. along a continuum of risk for each stressor). Differences in children's levels of risk exposure were predicted to account for differences in children's behavior problems. Two different aspects of emotion regulation skill – the ability to remain calm during a challenge and the ability to behave in a socially appropriate manner during a challenge – and their combination (a weighted emotion regulation measure) were examined as the specific moderating factors.

To test the hypothesis that emotion regulation ability moderates the relation between risk and behavior problem symptoms, a time-lagged design was used. Risk was measured when the children were 30 months old, emotion regulation at 36 months, and behavior problems at 48 months.

The specific hypotheses of the study were as follows:

1. Exposure to risk predicts externalizing behavior problems in early childhood, whether risks are examined individually or cumulatively.
 - a. Additively, a higher level of any individual, continuous risk factor will be associated with a higher level of behavior problem symptoms.
 - b. When risk is examined cumulatively, the more risk factors in a child's life, regardless of the specific combination of sources of stress, the more behavior problem symptoms will be present.

2. Children's emotion regulation skill exhibited during a challenge will predict externalizing behavior problems.
 - a. Specifically, children who are able to remain predominantly emotionally calm (i.e. positive or neutral) will have fewer symptoms.
 - b. Also, children who are able to remain behaviorally appropriate and persist toward a goal in the context of a frustrating task will have fewer symptoms.
3. Finally, the quality of child emotion regulation will moderate the relation between risk (stressors) and outcome (behavior problems). The outcomes of children who face multiple risk factors will be determined by their ability to exhibit calm emotion and/or adaptive and appropriate behavior in the face of frustration: children who are skillful emotion regulators will have fewer externalizing behavior problem symptoms than those who are poor regulators when the two groups are faced with the same level of elevated risk. Children facing lower levels of risk are not expected to differ in outcome according to risk status.

Method

Participants

The children whose data were used for the present project are participants in a larger longitudinal study of the development of emotion regulation between the ages of 18 and 48 months. Families were recruited from rural and semi-rural communities in the North Atlantic United States. Inclusionary criteria included (a) that the family meet criteria for being "economically strained," i.e. with annual household incomes above the U.S. criteria for poverty but below the national median income for their family size, and

(b) that the target child would be 18 months old (+/- 3 weeks) at the first visit. Children were seen 8 times during the original target period, at ages 18, 24, 30, 36, 42, and 48 months (multiple visits occurred at some age points). A 9th visit was also conducted when the child was 5 years old.

Families who met economic and child age inclusionary criteria were identified by cross-referencing public birth announcements with census tract maps of communities with a high density of families that met the inclusionary criteria. Through this effort, 124 children completed the initial home and laboratory visit at age 18 months (Time 1). The mean annual household income of the families at Time 1 was \$40,655 (SD = 14,996). The parents identified 94.4% of the children as White, and at Time 1, the sample was composed of 69 (55.2%) boys and 55 (44.8%) girls. The majority of children were from a two-parent home (97.6%); over half had at least one sibling (58.9%). The majority of mothers (63.7%) had completed at least some college; almost all fathers (95.9%) had completed high school and about half (55.5%) had completed at least some college. In terms of maternal employment, 28% of mothers described themselves as unemployed or homemakers, 32% of mothers worked part-time, and 39% of mothers worked full-time. Most (92%) of fathers were self-reported to be employed full-time.

Of the original sample, four families dropped out of the larger study before the first data collection point in the present study. Therefore, 120 families with relatively complete data were included in the present study.

Procedure

In the larger study, at each laboratory visit (conducted at ages 18, 24, 36, and 48 months and 5 years), children participated in a series of challenging and non-challenging

tasks. For the present study, data was used from the 36-month lab visit. The challenging tasks were designed to elicit frustration in young children and are commonly used in research on early emotion regulation. Each represented a laboratory analogue of the types of challenges children face in the ordinary course of their young lives, eliciting emotions such as frustration and placing demands on the child such as patience (waiting) or persistence (to overcome a difficult obstacle blocking a desired goal). For the purposes of the present study, three challenging tasks were selected. Each challenging task was relatively brief and was rectified at the end. In addition, each was preceded and followed by non-challenging, enjoyable activities. Preliminary work (Hall & Cole, 2007) indicated that there was little variability in child emotion regulation during non-challenging tasks; most children are emotionally calm and focused on the task goal during the activities designed to be non-challenging. Therefore, these tasks were not included in this study. The tasks coded for use in the present study are outlined below. Mothers were briefed on each procedure in advance of the task and had an instruction sheet in the room with them as well.

Wait task (Carmichael-Olsen, Greenberg, & Slough, 1985). The developmental task in this procedure is to tolerate a boring wait for something highly desirable. At the beginning of the wait task, the experimenter brought a small “surprise” wrapped in shiny paper and ribbon, a boring toy (e.g., a plastic toy car missing its wheels), and a clipboard with questionnaires into the room. The experimenter said to the mother, “Here is the work that I told you about,” and to the child, “You can play with this [the boring toy], and here is a surprise for you.” As soon as the experimenter left the room, the mother told the child to wait to open the prize until she had completed her work. In most cases, the

procedure lasted 8 minutes, timed from the point at which the mother first issued the challenge of waiting to the child. Mothers were instructed to behave as they typically would when they had to require that the child wait. The questionnaires they were given allowed them to discuss the wait (e.g., how typical the child's reaction during this wait was, how the wait made the mother and the child feel). For the purposes of the present study, in order to facilitate the global judgments about the child's behavior, the wait task was divided into two (four minute) sections that were more parallel in length to the other tasks.

Lock box (Goldsmith & Reilly, 1993). The developmental task for this procedure is to persist toward a goal when attempts are thwarted. The child was first shown a series of toys and asked to choose a toy to keep and take home. This toy (e.g., a small figurine of a popular TV or movie character) was placed inside of a large, clear Plexiglas box closed with a padlock. The experimenter then taught the child how to unlock the box using one of two keys on a key ring. After being shown how to open the padlock, the child was instructed that the experimenter had to do work in another room and that the child should unlock the box and access the toy while the experimenter was absent. The experimenter then gave the child a different key ring containing two keys, neither of which would open the box. The procedure lasted for 3 minutes, timed beginning when experimenter left the room.

Perfect circles (Goldsmith & Reilly, 1993). The developmental goal of this task is to tolerate criticism of one's work and persist at attempts to do the task well. In this task, the child was asked to draw "the perfect green circle" on a sheet of plain white 8" x 11" paper. Each time the child drew a circle, the experimenter criticized it in a neutral tone of

voice (e.g., “That one’s too flat, skinny, small,” etc.) and asked the child to draw another one. This task lasted for 3 ½ minutes. Coding began immediately after the first criticism by the experimenter.

Measures

Child emotion regulation. The quality of child emotion regulation during these challenging tasks was evaluated at 36 months using a coding system designed to assess a child’s overall emotion regulation; specifically assessed were the child’s dominant emotional valence and the quality of the child’s behavior (e.g., how organized and appropriate to the task the behavior is; adapted from Zahn-Waxler et al., 1994).

Coders were trained to an accuracy level of 80% with master coders. The training focused on the coder’s ability to accurately and reliably make two judgments about the child’s behavior during each target segment of the challenging tasks. First, the coder was required to use a child’s facial and vocal expressions to judge whether the child’s predominant tone was positive (happy, joyful, content), negative (angry, sad, anxious, generally distressed), mixed (equal positive and negative emotion), or neutral. It is important to note that this judgment does not exclude the experience of other emotions during the task (e.g., displaying some negative emotion but being predominantly positive or displaying some positive emotion but being predominantly distressed). Rather, the codes are meant to capture the child’s main overall or dominant emotional tone during each task.

Second, the coder was required to use the child’s actions during the same time periods to classify the child’s overall behavior as organized or disruptive. Specifically, each task was defined by a particular developmental objective (listed above in the task

descriptions). The coder determined the degree to which the child's dominant emotional tone appeared associated with behavior that was either organized toward the specific goal of the task, appropriate but not goal-oriented, or disruptive (i.e., socially inappropriate). As discussed previously, the standard was not based on the child's age but on the longer term developmental goal of how children are expected to behave, most of the time, in a kindergarten classroom (e.g., tolerating frustration, attempting to complete difficult tasks). The behavioral codes were:

- *Organized, on-task*: the child's emotion is appropriate and organizes behavior, i.e. is in the service of working toward the identified goal of the task.
- *Organized, off-task*: the child's emotion organizes behavior, but the behavior is not focused on the identified goal of the task.
- *Disorganized, disruptive*: the child's emotion disorganizes behavior to the degree that it is likely that a typical adult would stop or change the behavior and it interferes with the child's performance on the task or social interactions.
- *Disorganized, immobilized*: the child's emotion disorganizes behavior to the degree that the child "shuts down," becoming inactive toward either the activity or the interaction.

As emotion and organizational quality are rated separately, the coding system allows for any combination of emotion and behavior and does not conflate negative emotion and disruptive behavior as is often found in the literature. For example, a child can appear predominantly happy but disorganized and disruptive (e.g., acting silly and interfering with the mother's activity) or negative but organized and on-task (e.g., persisting at solving a problem despite frustration).

Using Cohen's (1960) κ , interrater reliability was estimated for the emotion and organization coding. Fifteen to 20% of the lab visits at each age point were coded for reliability. Once the emotion ratings were combined for analysis (e.g., positive and neutral, negative and mixed; see below), κ for the emotion ratings was .58, and Kappa for organization ratings was .71. While these κ values are lower than generally desired, general percent agreement between coders was high (91% for emotion ratings and 85% for organization ratings). As κ is percent agreement corrected for chance, the low κ values reflect not a lack of agreement between raters but the prevalence of certain codes over others in the data.

The coded emotion regulation data was aggregated in order to make it more meaningful for analysis. Specifically, the emotion data was aggregated to create two composite codes: *calm* (positive or neutral) and *negative* (negative or mixed). This was done because of the slightly lower reliability in distinguishing between positive and neutral emotion and the rare occurrence of mixed emotion. For the present study, as we were examining the protective characteristics of skill at emotion regulation, only the calm emotion and organized on task behavioral codes were included in analyses. The number of tasks during which a child was predominantly calm were summed to create a score ranging from 0-4; the same aggregation method was used for organized, appropriate behavior codes. In addition, a weighted emotion regulation score, designed to capture a global sense of both the emotional and behavior components of regulation, was calculated; children received a 1 for each calm designation, a 1 for each organized on task behavioral score, and a 2 for each task in which they were both calm and behaviorally appropriate, resulting in weighted scores ranging from 0 to 8.

Risk factors. To assess risk, both cumulatively and additively (individually), a set of six risk factors was derived from the following measures of stress when the child was 30 months of age:

1. Economic stress was assessed with income-to-needs ratios (an index of economic strain; Mayer & Jencks, 1989), which reflect the relation of a family's financial means to the national standard. In the present study, the score given to a family indicates whether their annual income is equal to (1), below (<1), or above (>1) the national poverty level for a household of the same size.
2. Parenting stress was assessed using the Parenting Daily Hassles scale (PDH; Crnic & Greenberg, 1990), a 45-item measure that allows parents to rate (a) the frequency of occurrence of each potential hassle and (b) its intensity (perceived impact or stressfulness). The PDH includes two separate scales: child/family hassles and general life hassles. In the present study, a sum score was created for each parent's intensity ratings for the items on each scale (e.g., the mother's ratings on all the child/family hassles items was summed).
 - a. Child/family hassles. Items (n = 20) on this scale assess the occurrence and stressfulness of family and childrearing hassles, such as sibling fighting, child noncompliance, and child demands that interfere with adult activities. The Intensity (stressfulness) scale has a range from 1 (no hassle) to 5 (big hassle) and has good internal consistency (alpha = .90; Crnic & Greenberg, 1990), good validity in the prediction of children's behavior problems and family relationships (Creasey & Reese, 1996), and good

- b. General life hassles. Items ($n = 25$) on this scale are from a hassles measure developed by the Lazarus workgroup, which assesses everyday hassles that are not specific to childrearing (e.g., “Too many things to do,” “Things breaking down around the house”; Kanner, Coyne, Schaefer, & Lazarus, 1981; Rowlinson & Felner, 1988). As with the child/family hassles, the general life hassles Intensity (stressfulness) scale has a range from 1 (no hassle) to 5 (big hassle) and has good internal consistency ($\alpha = .95$; Rowlinson & Felner, 1988) and validity (Kanner et al., 1981), while test-retest reliability is fair ($r = .48$; Kanner et al., 1981), given that one’s experience of everyday stress is likely to fluctuate over time. The alpha for our sample was .92 for mothers and .89 for fathers.
3. Major life stress was measured by the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978), a scale that assesses the occurrence (yes or no), type (positive or negative), and subjective effect (4-point scale from no effect to great effect) of 57 major stressful life events over the past year. Items include events such as getting married, death or illness of a family member, and a change in job status. In the present study, the sums of the reported effect of each event that occurred and was denoted as negative were calculated for each parent; in other words, each parent received a score reflected the perceived stressfulness of all negative events. The measure has fair internal consistency ($\alpha = .63-.64$), which is acceptable given that the occurrence of some life events would not

4. Interparental conflict was measured by the Revised Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996), a 78-item measure of the tactics used in conflict with a marital partner. Both partners reported on their own and each other's behaviors on a scale from 1-6, with higher scores representing more frequent events. Each parent received a score representing the sum of the endorsed items. The measure shows good construct and discriminant validity (Strauss et al., 1996). Scores from two subscales of the CTS2 were used:
 - a. Physical aggression. Items on the Physical Assault subscale (e.g., "I pushed or shoved my partner") were summed to create a risk factor representing physical aggression. The scale has good internal consistency (alpha = .86; Strauss et al., 1996) and good test-retest reliability (r = .76; Vega & O'Leary, 2007). The alphas for mother and father self- and other-directed physical aggression in our sample ranged from .67 to .85, with a mean of .77.
 - b. Psychological aggression. Items on the Psychological Aggression subscale (e.g., "I insulted or swore at my partner") were summed to create a risk factor representing psychological aggression. The scale has good internal consistency (alpha = .79; Strauss et al., 1996) and good test-retest reliability (r = .69; Vega & O'Leary, 2007). The alphas for mother and

Risk information was derived from questionnaire data completed by the child's primary caregivers. In almost all cases, these were the biological mother and father, except for one case in which the child is being reared by grandparents and two in which the child was adopted by foster parents. Given that data was obtained from both parents for most children, and the goal with risk assessment was to capture parents' perceived levels of stress, the higher score (across mother and father report) was used in the calculation of the level of each type of risk for each family.

To assess cumulative risk with continuous variables, a priori thresholds that reflect the presence of risk are used (e.g., Evans, 2003; Forehand et al., 1998). In the present study, the threshold was set as a score in the top quartile (25%) for the sample for variables without another logical cutoff point (see Forehand et al., 1998; Gutman et al., 2002, 2003; Sameroff, Seifer, Zax et al., 1987). For four of the stressors included – major life events, daily hassles, parenting stress, and psychological marital aggression – scores equal to or greater than this cutoff were assigned a risk index score of 1 and those below, a risk index score of 0. For economic stress, a family was considered to have economic risk if the family's income-to-needs ratio was 2.0 or less, a cutoff that has been considered to reflect economic strain even for families living above the poverty line (e.g., Ackerman, Brown, & Izard, 2004; NICHD Early Child Care Research Network, 1997). For physical aggression between parents, risk was considered to be present for all participants who receive a score above 0 for either mother-to-father or father-to-mother aggression. The number of risks present for each family was then counted to create a

single cumulative risk index, with a possible range of 0 (no risks present) to 6 (all risks present).

To examine risk additively, the continuous scores for each factor were used. A single continuous measure of risk was created by standardizing each risk factor (i.e. calculating the z-score) and summing the six standardized scores. A single measure of continuous risk was thus created in order to reduce the amount of error included in the analyses with continuous risk (i.e. to only have error associated with one term rather than six separate risk factors; Wachs, 1991) and to facilitate the creation of interaction terms with emotion regulation.

Child behavior problems. At 60 months, child behavior problems were assessed with the Child Behavior Checklist (CBCL; Achenbach, 1991) completed by the child's mother. The CBCL is a 103-item questionnaire in which the parent rates the frequency of occurrence of problem behaviors as 0 (never), 1 (sometimes), or 2 (often). The CBCL yields a number of scores (Total Problems, Externalizing Problems, and Internalizing Problems) in addition to subscales (e.g., Somatic Complaints, Aggressive Behavior). For the purpose of the present study, the total Externalizing Problems raw score was used. For this scale, items reflect problems with aggressive, oppositional, and overactive behavior. The CBCL has shown good reliability ($\alpha = .84$; Lengua, 2002) and validity (Achenbach, 1991).

Results

Missing data and data transformation

As is nearly inevitable in longitudinal studies, several families had incomplete data. Specifically, seven children lacked one parent's LES (all fathers), eight were missing one parent's PDH (all fathers), and 10 were missing one parent's CTS2 (nine fathers, one mother). As risk data was calculated using the highest report when mother and father scores were compared, the risk data from the parent who completed the questionnaire(s) was used for these cases. In addition, there were eight children whose parents completed the CTS2 but one parent omitted one item from the scales used. For these participants, the other parent's report of that item was substituted (e.g., if the father did not answer the item, "How often did you yell at your partner," the mother's rating of the item, "How often did your partner yell at you" was substituted) when the scale score was computed.

There were also some cases for which a full time point was missing (e.g., children whose parents did not complete the risk questionnaires, families who missed the lab visit when emotion regulation was assessed). Specifically, of the 120 participants, five cases were missing all 30 month parent-reported risk data, three were missing 36 month child emotion regulation data, and four were missing 48 month mother reports of child behavior problems. To address missing data, expectation maximization (EM) was used to estimate appropriate values to replace missing data points. EM is a missing data estimation method in which existing data from all participants – both existing data from the variables with missing values and data from other sample variables – are used to estimate the most likely values of data that are missing (Tabachnick & Fidell, 2007).

Prior to the use of EM, Little's MCAR test was performed to determine whether the data to be estimated were missing completely at random (MCAR), a requirement for use of data estimation methods such as EM (Schafer & Graham, 2002). Results suggested there was no detectable pattern to data missingness, $\chi^2=33.90$, $df=37$, $p=.615$; EM was therefore used to replace missing data.

Before analyses were performed, data were examined for normality. Two variables, major life events and physical aggression, had skewed and kurtotic distributions. To normalize these distributions, the major life events variable was square root transformed and the physical aggression variable was inverse transformed.

Data analysis

Preliminary analyses and descriptive statistics. The original plan was to test a model using structural equation modeling (SEM). However, a satisfactory latent risk variable could not be created for the risk construct; multiple confirmatory factor analyses with different combinations of the hypothesized risk factors were performed and resulted in either nonconvergence or unbalanced results (i.e. in which one risk factor carried most of the effect). The relatively low magnitude of correlations among observed risk variables (see Table 2) likely explain this problem.

Therefore, hierarchical regression analyses were used to predict child externalizing behavior problems from different types of family risk, quality of child emotion regulation, and the interaction between risk and emotion regulation. Specifically, six regressions were performed to examine the effects of each of two different methods for assessing risk (additive/continuous and cumulative) and their interaction with each of three different aspects of emotion regulation quality (weighted emotion regulation, calm

emotion, and appropriate behavior). In each regression, one composite risk variable and one emotion regulation variable were entered on step 1, and the risk/emotion regulation interaction term was entered on step 2. In each case, the dependent variable was child externalizing behavior problem symptoms. Prior to analyses, all predictor variables were centered (i.e. the mean was subtracted from each value in order to create a new variable with a mean of zero) to reduce the potential for multicollinearity (Aiken & West, 1991). Interaction terms were created from the centered predictors.

Means, standard deviations, and ranges for each of the individual and composite family risk variables, and the child emotion regulation and externalizing behavior problem scores are presented in Table 1; the intercorrelations are presented in Table 2. Table 1 reveals reasonable variability for each of the risk measures, including the cumulative risk index; for the latter, the mean number of risks was between one and a half and two. Table 1 also indicates that the full range of emotion regulation codes was observed, with the sample including children who were calm and behaviorally appropriate across all activities as well as those who were emotionally negative and behaviorally inappropriate (i.e. off task or disruptive) during all coded tasks.

Table 2 shows the relatively low magnitude of relations among the individual risk variables, noted earlier as the reason for the inability to create a satisfactory latent risk factor within SEM. Each of the six risk factors was significantly correlated with at least one but no more than two other risk factors. All individual risk factors were correlated with the cumulative risk index.

Of note is the fact that only three of 21 predicted relations between risk and emotion regulation emerged. Moreover, the significant correlations were not in the

expected direction. There was a small but significant *positive* relation between parents' perceived stressfulness of major life events and children's tendency to maintain appropriate behavior during the challenging tasks, $r(118) = .17, p < .05$. Similarly, children whose parents reported more frequent physical marital violence at child age 30 months were better regulated at 36 months, both in terms of frequency of being behaviorally appropriate during frustrating tasks and of the weighted emotion regulation scores, $r(118) = .18, p < .05$ and $r(118) = .16, p < .05$, respectively. The cumulative risk index was not related to any of the measures of emotion regulation. In addition, children's ability to remain calm during the challenges was not related to any of the risk measures.

Hypothesis 1: Associations between risk and behavior problems. First, the relation between risk and behavior problems was examined through bivariate correlations (Table 2). Two of the six individual risk factors, parenting hassles and general life hassles, were positively correlated with children's externalizing behavior problem symptoms, $r(118) = .23, p < .05$ and $r(118) = .20, p < .05$, respectively. Similarly, the cumulative risk index was correlated with externalizing symptoms, $r(118) = .24, p < .05$.

Second, the relations between risk and child externalizing problems were examined in the context of different aspects of emotion regulation through regression analyses. Risk (first additively/continuously, then cumulatively) and emotion regulation (calm emotion, behavioral appropriateness, and the weighted composite) were entered on step 1 of each regression. As shown in Table 3, in each of the three regressions using 30 month additive risk, risk was a significant predictor of 48 month externalizing symptoms;

the beta weight for additive risk in the regressions with three different aspects of emotion regulation ranged from .25 to .27, with a mean of .26.

Similarly, 30 month cumulative risk was a predictor of 48 month externalizing behavior problem symptoms in each of the three regressions in which it was entered. The beta weight for cumulative risk ranged from .22 to .56, with a mean of .34. Therefore, the overall amount of risk exposure consistently predicted children's externalizing symptoms.

Hypothesis 2: Associations between emotion regulation and behavior problems.

Bivariate correlations revealed small relations between certain aspects of emotion regulation and children's externalizing scores (Table 2). Specifically, the more often children remained calm during the 36 month challenging tasks, the fewer behavior problems symptoms their mothers reported a year later, $r(118) = -.16, p < .05$. In addition, the weighted measure of emotion regulation – a count of the frequency of children's calm, appropriate demeanor during challenging tasks – was related to externalizing symptoms, such that the more frequently a child was able to be calm and to behave appropriately when emotionally challenged, the fewer symptoms the child's mother reported, $r(118) = -.18, p < .05$. The number of tasks during which a child stayed appropriately on task did not predict later externalizing symptoms.

In the regression analyses, the relations of the three emotion regulation variables (calm emotion, behavioral appropriateness, weighted emotion regulation) with externalizing behavior were examined in the context of each index of risk (additive/continuous and cumulative). None of the 36 month emotion regulation variables significantly contributed to variance in children's 48 month externalizing problems when

risk at child age 30 months was considered (see Table 3). The number of tasks during which a child behaved appropriately approached significance in the context of additive risk ($p < .07$), but given the number of regressions, marginally significant values are not interpreted as effects. Similarly, the weighted measure of emotion regulation approached significance in the context of both additive and cumulative risk, both p 's $< .10$.

Hypothesis 3: Moderation of relation between risk and behavior problems by emotion regulation. In each of the six regressions, the interaction of risk and an emotion regulation variable was entered to examine whether any aspects of emotion regulation moderated the relation between risk, measured either additively or cumulatively, and externalizing symptoms. None of the interaction terms was significant, indicating that emotion regulation does not moderate the effect of risk on behavior problem symptoms in this sample. One interaction term approached significance: that between cumulative risk and children's behavioral appropriateness ($p < .07$). To ascertain the nature of this interaction for future research purposes, the interaction was plotted using simple regression equations (Figure 1). The predicted level of behavior problem symptoms was plotted at two levels of the predictor variable, cumulative risk (1 SD above and below the mean); two separate plot lines represent high and low numbers of tasks during which a child was rated as behaviorally appropriate (again, 1 SD above and below the mean). At lower levels of risk exposure, children have similar levels of externalizing symptoms, regardless of their behavior during the lab tasks; however, at higher levels of risk, and as expected, children who show better behavioral regulation have fewer symptoms than children who less frequently exhibit appropriate behavior during the challenges.

Discussion

The primary aim of the present study was to test the prediction that emotion regulation in early childhood buffers the child from the negative effects of exposure to risk. Partial support was found for some of the premises on which the prediction was based. First, the premise that exposure to risk was associated with child behavior problems was shown. Specifically, earlier exposure to general risk, whether estimated in terms a collection of individual factors or as a unified construct, predicted later externalizing symptoms. However, when risk factors were examined separately, not all types of putative stressors contributed to externalizing symptoms. Second, certain aspects of emotion regulation, conceptualized as an overall skill of the child, were modestly related to behavior problems but in the opposite direction than predicted. Finally, contrary to predictions, the findings did not provide evidence that the emotion regulation skill at age 36 months buffered the effects of exposure to multiple risks on children's behavior problems one year later.

Emotion regulation as a buffer

The main goal of the study was to test the hypothesis that emotion regulation skills buffer a young child from exposure to conditions that are known to create risk for behavior problems. The evidence did not provide strong support for this prediction, although there were some findings that suggest that it requires further empirical examination. Specifically, the evidence did not clearly rule out the possibility that children's ability to behave in an appropriate, goal-oriented manner during challenging situations protects them against the negative effects of risk. It appears that it is competence in persisting at behavior that is socially and contextually appropriate, even

when a task is difficult and one becomes frustrated, that may be protective, consistent with past research linking particular behaviors and regulatory strategies with lower levels of disruptive behavior in early to mid-childhood (Calkins & Dedmon, 2000; Cole, Zahn-Waxler et al., 1994; Eisenberg et al., 2005; Gilliom et al., 2002). In contrast, the ability to merely stave off negative emotion, while associated with fewer symptoms, does not appear to show promise as a buffer against the effects of stressors on the development of disruptive behavior problems. The ability to resist becoming upset or to positively reframe a situation so that it is less distressing (e.g., to look forward to the exciting prize that is in the wrapped package rather than focus on the difficulty of waiting) may serve more of a protective function against the development of internalizing difficulties, such as depression and anxiety (Silk et al., 2006). Children skilled at regulating the experience of emotion itself may be protected from the types of emotion-driven distorted thinking that characterizes these disorders (APA, 2000; Muris & Field, 2008), even though it is clear that being emotionally negative when challenged predicts a variety of adjustment difficulties (Eisenberg, Cumberland et al., 2001; Eisenberg et al., 2005; Lengua, 2003).

Other studies have found support for aspects of children's emotional and behavioral self-regulatory abilities as either buffers against (Lengua, 2002; Schultz et al., 2005; Silk et al., 2006) or mediators of (Brody & Flor, 1998; Chang et al., 2003; Eisenberg et al., 2005; Schwartz & Proctor, 2000) the impact of risk exposure on developmental outcomes. However, these studies differ from the present study in several important ways. First, most examined a single risk factor, such as maternal depression (Silk et al., 2006) or harsh parenting (Chang et al., 2003), rather than multiple stressors (although several stressors may have been present). It is likely that the experience of

living in a family stressed by multiple risks is qualitatively different from that of interacting with parents whose resources are taxed by a single stressor, as highly stressed families consistently report more psychological distress and poorer adjustment in their children (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Deater-Deckard et al., 1998; Evans & English, 2002). However, work exploring whether emotion regulation skill may protect children from developing behavioral difficulties following exposure to multiple stressors has been limited (e.g., Lengua, 2002).

Second, emotion regulation has previously only been explored as a buffering or mediating factor in children who were older than those studied in the present work (e.g., Lengua, 2002, 2003; Schultz et al., 2005; Schwartz & Proctor, 2000). The youngest children in past studies were an average of 4.5 to 5 years old (Chang et al., 2003; Silk et al., 2006); in contrast, the children in our sample were only 36 months old, a full one and a half to two years younger, when their emotion regulation skills were observed. While many children have become skilled self-regulators of frustration by their third birthday (Hall & Cole, 2007; Kochanska et al., 2000, 2001), between ages 36 and 72 months there are marked gains in children's ability to consistently regulate their emotions in effective and appropriate ways, even when they are frustrated (e.g., Blandon, Calkins, Keane, & O'Brien, 2008; Gilliom et al., 2002). Skill at regulating one's emotions may be more likely to serve a protective function in older childhood and adolescence. Early in development, children are more likely to have difficulty behaving appropriately when they are emotionally challenged (Kochanska et al., 2001). However, by the time they are somewhat older, with the support of sensitive caregivers (Calkins & Johnson, 1998; Colman et al., 2006), children have acquiring skills for modulating negative emotion, and

their appropriate behavior is less likely to be derailed when they are upset (Hall & Cole, 2007; Kalpidou et al., 2004). Therefore, older children are more likely to cope independently and adaptively with the negative emotion that results from living in a stressful household environment because their regulatory skills have developed over time (Saarni, 1999). Links between children's emotion regulation skill and behavior problems clearly exist early in development, when children are as young as 2 years of age (Calkins & Dedmon, 2000), though it is not clear how stressors affect these relations in very young children.

While we chose to examine the protective quality of emotion regulation in 36-month-old children due to the developing nature of this skill in the toddler years, the normally-occurring variation in children's abilities may relate to this null finding. It may be that because regulatory skill is still developing at this age, variations in emotion regulation quality do not strongly predict behavior problems; some children who will become skilled at moderating their own emotions when they are slightly older may still be struggling with this task at this age. Emotion regulation may not emerge as protective until children are past this period of normal developmental variation and differences in regulatory skill are more meaningful. With this issue in mind, further longitudinal work is needed to clarify when emotion regulation begins to serve a protective function in risk-exposed youngsters.

Third, only a small subset of the research on risk and protection as it relates to emotion regulation is longitudinal (Eisenberg et al., 2005; Schultz et al., 2005), and existing longitudinal studies involve preteens and adolescents. When risk, emotion regulation, and outcome are measured concurrently, it is difficult to determine whether a

buffering effect is occurring; in contrast, only longitudinal research allows researchers to tease apart the developmental sequence of the effects of risk and emotion regulation on the emergence of behavior problems. The present study is the first of its kind to longitudinally examine the potential protectiveness of early emotion regulation skill under the condition of multiple stressor exposure. Given the uniqueness of the present study in these three ways, it is difficult to conclude whether a buffering effect exists prior to school age. In light of evidence from other studies that support the possibility of early buffering effects, further research with young children is needed.

It is also important to note that our study of multiple risk differs from others in the average amount of risk exposure. While the average family in our sample experienced between one and two stressors, studies of multiple risk have often included a majority of families exposed to 3 or more stressors (Ackerman et al., 1999; Burchinal et al., 2000; Sameroff et al., 1993). Some inconsistencies between past and present findings may be related to the fact that our sample was not particularly high-risk. In addition, many studies of multiple risk include a majority of families living near or below the poverty line, in contrast to our economically strained sample composed mostly of families making less money than the average family but more than those living in poverty. This distinction may partially explain the difference in risk exposure, as families living below the poverty line experience a greater deal more stress than others (McLoyd, 1998).

If competent emotion regulation is protective in early childhood, a possible explanation for the failure of this study to detect an effect may lie in the measurement of emotion regulation. First, it is possible that observations of children's emotional expressions did not fully capture their emotional experience. While observations of

children's facial and vocal emotional expressions are generally assumed to be accurate representations of the emotional experiences of children in this age group (e.g., Calkins & Dedmon, 2000; Grolnick, Bridges, & Connell, 1996; Silk et al., 2007), children who are less outwardly expressive of their emotions or who control these expressions with more skill may experience emotions of which researchers are not aware. Young children have often not been considered accurate reporters of their own internal states; however, evidence increasingly points to preschoolers' abilities to reliably provide basic reports of their internalizing symptoms (Luby, Belden, Sullivan & Spitznagel, 2007; Luby, Heffelfinger, Koenig-McNaught, Brown, & Spitznagel, 2004; Martini, Strayhorn, & Puig-Antich, 1990; Vasey, Crnic, & Carter, 1994). Therefore, it may be important to include young children's self-reports of their own emotions, as reliance on others' reports and observations introduces the possibility of an undetected mismatch between children's expression and actual experience of emotion.

Second, global ratings of children's behavior may lack sufficient detail to adequately capture subtle individual differences in children's emotion regulation skills. Indeed, by age 36 months, most of the children in this study displayed the ability to remain relatively calm and behaviorally appropriate during emotionally challenging experiences. The use of a global judgment about children's behavior may overlook nuances in child self-regulation of emotion. For instance, in other work from this project, we know that there are age differences in the temporal dynamics of children's emotional responses between ages 36 and 48 months, changes that are not evident on the basis of more global judgments (Cole et al, under review). For example, in our global system, a child who smiles throughout a 4-minute task and a child who is primarily neutral but

appears very frustrated for about 30 seconds would both be categorized as calm overall. Similarly, no distinction is made between children who work persistently to open the locked box for the entire task and those who try to open the lock during most of the task but show brief periods of inactivity or mildly disruptive behavior. The experiences of these pairs of children are clearly different but are equated in a global system of classification. These methodological concerns highlight the importance of further examination of how emotion regulation may affect young children's outcomes, particularly in light of evidence from other studies that suggest that a buffer effects exists (Chang et al., 2003; Lengua, 2002; Silk et al., 2006).

A number of studies have used global ratings of children's emotion and emotion regulation patterns to link regulatory skill and behavior problems, but they differ from the present study in notable ways. Some work has created an emotion regulation index from a combination of observational and child self-report data (Cummings, 1987) or based on concurrent coding of emotion and behavior during short epochs (Davies & Cummings, 1998; Maughan & Cicchetti, 2002; Maughan et al., 2007). In contrast, the approach taken in the present study aimed to evaluate children's overall emotional expressions and behavior in relation to developmental criteria based on the goals that schools have for appropriate emotion regulation in kindergarten classrooms. In addition, no past study has examined children's global regulation patterns during tasks in which the child was faced with a challenging situation during which a specific task was given to them (e.g., to open the locked box, to wait for the present). Rather, work using more molar codes for children's regulation has involved observations of children's reactions to interadult anger (Casey, 1996; Cummings, 1987; Davies & Cummings, 1998; Maughan & Cicchetti,

2002; Maughan et al., 2007) or of their emotion and behavior during responses to stories about hypothetical social dilemmas (Zahn-Waxler et al., 1994). When children's emotion regulation skill is judged from their actual behavior in during an emotionally-challenging situation, a more fine-grained assessment of their specific emotional dynamics and behavioral strategies may be needed in order to detect the characteristics that are likely to protect a child against the development of behavior problems. Past studies have successfully distinguished between children with and without meaningful behavioral difficulties on the basis of observations of *specific* aspects of children's behavior and emotional expression (Calkins & Dedmon, 2000; Chaplin, Cole, & Zahn-Waxler, 2005; Eisenberg, Cumberland, et al., 2001; Gilliom et al., 2002). Therefore, future work should continue to explore different methods of measuring children's emotion regulation skill that will identify the particular components of self-regulation that may buffer children against risk.

Multiple risk and behavior problems

Consistent with predictions, the more risk to which a child was exposed, the more problem behaviors the child's mother reported, whether risk was conceptualized as a set of continuous individual stressors or as a composite of factors that had reached a criteria for constituting risk (cumulative risk). Past work has also shown that both approaches have predictive utility, even when they are directly compared (Ackerman et al., 1999; Deater-Deckard et al., 1998; Jones et al., 2002; Krishnakumar & Black, 2002; Sameroff et al., 1993). However, evidence is mixed as to which approach to assessing risk is a better predictor of child outcomes (e.g., Hooper et al., 1998). The present study aimed to contribute to the body of work on multiple risk by examining the predictive utility of both

approaches in a younger sample than has generally been examined in such studies. It is important to note that multiple risk was only modestly related to later externalizing problems, highlighting the fact that risk is not deterministic (Sameroff et al., 2000); exposure to stress does not predict maladaptation in all children. Rather, it increases the likelihood that later difficulty will occur. To understand why psychopathology develops in certain risk-exposed children, it is important to know about a variety of characteristics of the child and the environment, including both characteristics that are likely to promote competence and those that may interfere with it. Protective factors such as high quality parenting (Masten et al., 1999) and easy temperament (Stright et al., 2008) – and possibly emotion regulation skill – affect how and whether risk negatively affects children’s development. Such complex models require large samples with adequate assessment of each contributing factor but are important for clarifying the outcomes produced by the interaction of stress and other child and environmental characteristics. Therefore, while our results are consistent with other findings that the more stress in a child’s family, the more behavioral difficulties the child will exhibit, it is clear that risk exposure does not fully explain children’s behavioral outcomes.

Although both approaches to assessing multiple risk predicted later behavior problems, it is important to appreciate that the cumulative risk approach masks *levels* of risk exposure. That is, the standard approach to the concept of cumulative risk is that the number of stressor exposures (defined as exposure above a certain threshold) may be more important than the level of different risk exposures. The approach therefore equates all levels of risk over the threshold, ranging from just at or above threshold to very high levels that may be two or three times as frequent or intense as the “cut” point. This

problem is exacerbated by the fact that there are common practices for establishing thresholds of risk (e.g., Forehand et al., 1998; Gutman et al., 2002, 2003; Sameroff, Seifer, Zax et al., 1987), but there is no empirical evidence as to what constitutes a threshold for any given risk factor. In contrast, the additive or dimensional approach is more finely grained and includes information about the specific amount of stress exposure. Therefore, it is noteworthy that both approaches produced conceptualizations of risk that predicted behavior problems in the present study.

The utility of a cumulative approach to risk as a predictor of externalizing problems is consistent with the view that it is not the presence of any one risk factor but exposure to multiple stressors that adversely affects development (Sameroff et al., 1993, 2003). In the present study, cumulative risk exposure required that a predetermined threshold be reached for any one of a set of different risk factors, whereas additive or continuous risk could entail either modest exposure to multiple forms of risk or high exposure to a single form. Therefore, it may be difficult to tell within an additive approach whether a particular child's level of risk is heightened due to one or multiple stressors. Within a cumulative conceptualization, it is clear that it is the presence of multiple risks that increases the likelihood of behavioral difficulties. The predictive utility of both approaches in the present study suggests that the number of stressors a child experiences is important to consider and that further work is needed to compare different conceptualizations and measures of risk.

Given that past and present findings that suggest that both approaches have validity for examining the effect of multiple risk on children's outcomes, the decision about how to conceptualize risk may depend on the purpose of the study at hand. It has

been suggested that an additive risk model is most useful for identifying which *stressors* increase individual risk for an adverse outcome (Jones et al., 2002). Cumulative risk models, in contrast, allow researchers to determine which *children* are particularly at risk by providing evidence for the overall level of risk exposure that is most likely to be deleterious to a child's development, facilitating the identification of the population likely to face particular difficulty (Jones et al., 2002). Furthermore, a cumulative approach may be a useful and accurate way to represent risk when the emphasis of a study is on other concepts or other aspects of a child's development (Burchinal et al. 2000), such as in the present study, when the buffering effect of emotion regulation was of interest.

Although each risk factor studied is known to be related to child behavior problems, in the present study only parenting daily hassles were related to children's externalizing behaviors. This finding is consistent with past research linking a family's daily hassles with children's adjustment difficulties (Coplan, Bowker, & Cooper, 2003; Gross et al., 1999; Thompson et al., 1993). The interpretation of such findings is that parents who are hassled find parenting more demanding (Crnic, Gaze, & Hoffman, 2005), and the decrement in parenting leads to child behavior problems (Wakschlag & Keenan, 2001). This finding appears even when teachers, rather than parents, report on child behavior problems (Ashford, Smit, van Lier, Cuijpers, & Koot, 2008), suggesting that parenting stress increases not merely parents' perceptions of children's behavior problems but children's actual problem behaviors.

Other individual risk factors that were expected to be related to child behavior problems – major life events, economic strain, and marital conflict – were not related. Given that negative life events have been linked with behavior problems in other samples

(Ackerman et al., 1999; Dodge et al., 1994), the question is raised as to whether parents in the present study reported lower levels of stress than parents in other studies. This does not appear to be the case, as their reports were comparable to other community samples (Deater-Deckard et al., 1998; Ingoldsby, Shaw, Owens, & Winslow, 1999), and, as would be expected, they reported lower levels of event-related stress than parents from high-risk or clinic-referred families (DeKlyen, Biernbaum, Speltz, & Greenberg, 1998; Morisset, Barnard, & Booth, 1995; Schmidt, DeMulder, & Denham, 2002; Wolfe, Jaffe, Wilson, & Zak, 1985). Another possible explanation, then, is that high quality parenting promotes well-being in children even when a family has experienced frequent negative events, an effect that has been found to occur in other samples (Haine, Wolchik, Sandler, Millsap, & Ayers, 2006; Pettit, Bates, & Dodge, 1997). Sensitive and appropriate parenting may be a buffer against family stressors for young children in particular, given the great importance of children's early interactions with caregivers for healthy development (Calkins & Johnson, 1998). The potential protective role of parenting in early childhood may also relate to the diminished role of emotion regulation as an early buffer. When children are young and their regulatory skills are still developing, but interactions with parents are major determinants of behavior, parenting quality may be an important influence on the effects of stress on children. As children age, in contrast, they become more independent and skilled regulators of their emotions, depending less on parents for moment-to-moment support. Therefore, emotion regulation might be expected to surpass parenting as protective against behavioral difficulties in older children. As we did not include parenting behavior, it is not possible to examine the protective role of parenting

in the present study; the inclusion of parenting as a possible buffer in future studies will help clarify the links between stress and children's outcomes across childhood.

Finally, findings linking economic strain and marital conflict with children's behavior problems are inconsistent. Economic strain places a child at a higher risk for the development of behavior problems (e.g., Duncan et al., 1994), but a family's income is not always associated with externalizing symptoms (Ackerman et al., 2004). Similarly, interparental aggression can have a deleterious effect on child well-being (Cummings & Davies, 1994), but findings are less clear regarding specific relations between marital conflict and children's externalizing symptoms (e.g., Davies et al., 2007; Lee, 2001; Maughan & Cicchetti, 2002). The failure to find a relation between marital violence and children's behavior problems may also have been due to the somewhat lower prevalence of physical marital aggression in our sample compared to similar samples. While national estimates of the percent of couples who experience domestic violence generally range from around 12 to 20% (Caetano, Cunradi, Clark, & Schafer, 2000; Schafer, Caetano, & Clark, 1998; Straus & Gelles, 1990), studies of couples with young children have found much higher rates, ranging from 45 to 90% (Katz et al., 2007; Smith Slep & O'Leary, 2005). In contrast, about 21% of the families in our study reported at least one instance of physical violence over the previous year, comparable to national averages but lower than some estimates for families with young children like those in our sample. Furthermore, our data do not include information about children's actual auditory or visual exposure to their parents' conflict – only whether such conflict occurs – an experience likely to affect the impact of interparental aggression on children's well-being (El-Sheikh & Harger, 2001).

A difference between the present study and some others that have found relations between stressors and child problems is that the present study examined these links in a longitudinal design; the study was designed to assess the impact of risk exposure at age 30 months and emotion regulation skills at 36 months on behavior problems at 48 months in order to test a developmental buffering effect. Possibly, the relation between certain stresses and child problems is more immediate. Findings regarding the stability of stress when children are young are mixed (Crnic et al., 2005), though within economically strained families, family situation and exposure to risk are likely to change over time (Ackerman et al., 2004). If the stressors experienced by the families in our sample are not stable, exposure to *individual* risks at 30 months may not predict emotion regulation six months later and behavior problems a year and a half later. However, some work has found that risk exposure is related to later behavior problems in early childhood over both shorter (e.g., 6 months to 1 year; Crnic et al., 2005) and longer periods of time (e.g., 2 or more years; Ashford et al., 2008; Crnic et al., 2005; Ingoldsby et al., 1999; Shaw et al., 1997). Therefore, considering past research, it does not seem that our assessment of risk at age 18 months and outcome 3 years later explains the lack of an expected relation between stress and behavior problems. In order to determine whether changes in stress over time explain this finding (e.g., whether marital aggression had decreased by age 4, when behavior problems were assessed, for families in which it occurred at 30 months), risk would need to be assessed at multiple points across children's development.

Another important point is the low magnitude of relatedness among the individual risks; specifically, none of the six stressors was associated with more than two others. Stressors generally occur in multiples (e.g., Deater-Deckard et al., 1998; Hooper et al.,

1998), and it is often taken for granted that individual risk factors, such as those included in a unitary index of risk, are associated. However, studies of multiple risk often do not report relations among the risk factors examined (e.g., Forehand et al., 1998; Gutman et al., 2003; Prelow & Loukas, 2003; Seifer et al., 1992). When these relations are reported, as with the present findings, each individual risk factor is generally associated with one or more but not all of the other risk factors included in the study (e.g., Deater-Deckard et al., 1998; Hooper et al., 1998).

One implication of the low correlations among risk factors is support for the use of a multiple risk model as opposed to considering risks individually. It is clear that although risk factors are likely to cluster (Evans, 2003; Seifer et al., 1992), the presence of one stressor cannot be used as a proxy for the presence of another. While stressors ebb and flow over time, the present findings suggest that for any given family, a complete picture of risk exposure requires inclusion of a variety of different stressors. A family may experience economic strain but not generally report many day-to-day hassles outside the home or related to managing children, even over an extended period of time. Furthermore, the consistent and generally higher relations in the present study between each individual stressor and cumulative risk indicate that the more intense (i.e. more frequent or subjectively reported as more stressful) an individual stressor to which a child is exposed, the more risk factors likely to be present. This relation provides support for the use of a cumulative risk model in the consideration of the effect of multiple risks on a child when it is a summary of risk exposure, rather than a determination of the effects of individual risks, that is desired.

Multiple risk and emotion regulation

Links among stressors and children's emotion regulation abilities were generally contrary to predictions. One surprising finding was that the presence of certain risks was associated with better emotion regulation in young children. Specifically, children whose parents reported more frequent physically aggressive conflict showed better emotion regulation, particularly in the form of behavioral appropriateness, during the challenging lab tasks. This finding is in contrast to both theory (Davies & Cummings, 1994, 1998) and empirical work (Katz et al., 2007) that have linked domestic violence with children's poorer emotion regulation. This seemingly contradictory finding may be explained by clinical evidence. Children exposed to marital violence show different patterns of emotion regulation strategy use than children from nonviolent homes; they are more likely to seek support and to directly intervene in a distressing situation (Lee, 2001). Interviews with children of domestically abused women suggest that these children often try to avoid exposure to the distress of their parents' conflicts, including suppressing negative emotions, using self-distraction, and leaving the situation (Peled, 1998). Children with a domestically violent parent are more likely to experience abuse themselves (Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Jouriles, Barling, & O'Leary, 1987), and children who have experienced or are at risk of experiencing physical abuse may alter their behavior so as to minimize the chance of attracting the attention of an angry or overstressed caregiver, including restricting the expression of negative emotion or disobedient behavior (Thompson & Calkins, 1996). Therefore, the children in the present sample whose parents are physically aggressive towards one another may be behaviorally better regulated, even when they are faced with a frustration

that might alter the behavior of their peers, to promote their own safety. In addition, there is important variation in the behavior of children exposed to marital violence that appears to be related to parenting quality (Casanueva, Martin, Runyan, Barth, & Bradley, 2008; Jouriles et al., 1987, 2008), with positive parenting buffering children from the negative effects of exposure to domestic violence. Again, given that parenting quality was not accounted for in this study, it is difficult to know precisely how parenting may have affected links between marital violence and children's problem behavior.

Higher levels of parental stress due to negative life events were also associated with children's appropriate behavior during a frustration. Results have been mixed as to whether older children and teenagers exposed to stressful events have poorer emotion regulation than their peers (Buckner, Beardslee, & Bassuk, 2004; Garnefski et al, 2001), but these links have not been studied in young children. While exposure to major life events that their parents report to be stressful appears to affect young children's emotional well-being (Luby, Belden, & Spitznagel, 2006), it is unclear exactly what effect the experience of multiple stressful life events has on preschoolers' emerging emotion regulation abilities. It is possible that the pattern we found is due to children's attempts to avoid attracting the negative attention of a highly-stressed parent, given that parents who report more stress are also likely to be harsher and less sensitive during interactions with their children (Crnic et al., 2005). As with marital violence, children in our sample whose parents report higher levels of ongoing stress may exhibit more appropriate behaviors, even when they are upset, because to misbehave is to risk receiving a hostile response from a parent.

It is possible that the relation between risk and emotion regulation is curvilinear, an effect not tested for in the regressions. In other words, it may be that emotion regulation skill is best predicted not by the absence of stress but by a low or moderate level of stress exposure that is well-handled. Exposure to a certain amount of stress may actually be optimal for the development of emotion regulation for multiple reasons. First, if a child's family is exposed to some stress, children may have the opportunity to observe their parents modeling appropriate strategies for dealing with distress. If stress is absent in the home, children may not be exposed to this modeling, as parents themselves are not provided with natural opportunities to model appropriate self-regulation. Second, exposure to moderately stressful events may give children the opportunities to practice their emerging self-regulatory skills within the safety of the home environment and the parent-child relationship. If children are not exposed to developmentally appropriate distressing situations during the toddler and preschool years, they may be less well-equipped to handle the negative emotions that will inevitably arise later in development. There is an emerging line of research showing that children whose mothers are exposed to moderate levels of stress during pregnancy show more advanced development at age 2 (DiPietro, Novak, Costigan, Atella, & Reusing, 2006); while it is clear that high levels of maternal stress are harmful to children (e.g., Laplante, Brunet, Schmitz, Ciampi, & King, 2008), it is suggested that exposure to a small amount of stress hormones in utero may actually stimulate development. Similarly, a curvilinear relationship may exist between stress and regulatory skill, with children who are exposed to low to moderate levels of family stressors – as opposed to virtually none – exhibiting the strongest developing emotion regulation skills.

An important pattern to note is that different stressors were associated with emotion regulation and with behavior problems. Specifically, the risk factors linked with emotion regulation were more “severe” risks – negative life events and marital violence – while only the two types of daily hassles, somewhat less acute stressors, were linked with symptomatology. One potential explanation for these findings may lie in the lagged design of the study. Children’s emotion regulation was observed six months after parents’ report of recent risk exposure; therefore, the links between negative life events and marital aggression and regulatory skill may reflect a shorter term impact of these acute stressors. In contrast, externalizing symptoms were reported 18 months after stressor exposure; a longer term build-up of daily stressors, whose effects did not appear as quickly, may explain the associations between hassles and behavior problems. Overall, the pattern of findings suggests that it is important to consider both the timing of risk exposure – how long before an outcome of interest it occurs – and the acuteness or severity of individual stressors in order to tease out the specific effects of risk on different aspects of a child’s development.

The present findings concerning the relations among risk factors and the varying links between risk and other components of a child’s development raise a larger question: what is risk? Is risk better conceptualized as a unitary construct, with a family experiencing exposure to a certain level of overall risk, or as a multidimensional composite consisting of stressors best considered individually? What are the implications of the finding that certain risk factors are associated with others, while some seem to vary independently of one another? Why are results regarding the impact of individual risk factors on specific child outcomes somewhat inconsistent? Such questions call for a more

standardized measure of risk as well as a more complete assessment of a child's environment when examining the effects of stress, as it appears difficult to accurately capture the impact of a single risk factor on child development when other potential risk factors are not considered as well. In addition, it is essential to take into consideration child age as well as the timing of risk exposure in relation to the outcome of interest.

Furthermore, it is important to note that some of the stressors that were considered in our study to be individual risk factors were not truly individual in nature. That is, "individual" risks such as parenting hassles are actually a composite of multiple stresses on a family. Similarly, economic strain may reflect a variety of related stressors, including an inadequate home environment and concern about future financial well-being. Therefore, a truly thorough exploration of risk and its effects may need to include the process of breaking down the broad risk factors that are often considered unitary constructs into smaller individual stressors. This process may allow for a better understanding of what constitutes risk and the specific ways in which stressors are linked to a variety of outcomes.

Emotion regulation and behavior problems

Findings linking children's emotion regulation abilities and externalizing behavior problems were also mixed. While children's overall emotion regulation, as well as the specific ability to remain emotionally calm during a frustrating task, was linked with fewer problem behaviors, no aspect of emotion regulation predicted behavior problems once stress was considered. This finding was surprising given that a number of studies have found children with emotion regulation difficulties to have more behavior problems (Shaw et al., 1994; Zeman et al., 2002), even when they are young (Calkins & Dedmon,

2000; Cole et al., 1996). However, the present findings highlight the importance of considering risk in predicting children's outcomes. In our sample of children followed through the toddler and preschool years, stress exposure was linked to externalizing symptoms regardless of children's skill at regulating their emotions. In contrast, by the time children are somewhat older (late elementary school), it is emotion regulation that predicts behavioral outcomes above the effect of multiple risk; by this point in development, skilled emotion regulators remain well-adjusted despite the presence of stressors in their families (Lengua, 2002). It may be that risk exposure has a more persistent effect in early childhood, but as children grow older, there is a point at which their emerging regulatory abilities begin to allow them to modulate the distress that accompanies living in a stressful family environment and to harness their emotions toward appropriate rather than disordered behavior. In addition, it is important to note, again, that if our global observational system of categorizing emotion regulation did not fully capture children's regulatory abilities, links between behavior problems and emotion regulation abilities that did not emerge in the present study may indeed exist.

However, even at the earlier ages studied here, certain aspects of children's emotion regulation abilities showed promise as predictors of mother-reported externalizing symptoms. Specifically, the prediction that children's behavioral appropriateness and their overall emotion regulation – their skill at remaining emotionally calm *or* behaving appropriately – during challenging tasks was not supported, but the evidence does not rule out the possibility that these links exist, even when risk is considered. In addition, findings were mixed for relations between the preschoolers' ability to remain predominantly emotionally positive or neutral – in other

words, the ability to stave off frustration – and externalizing symptoms. Specifically, children who remained calm during more challenges had fewer externalizing difficulties when risk was not considered, but these links disappeared when risk was included. Taken together, these findings suggest that both the emotional and behavioral components of emotion regulation may be important in promoting positive developmental outcomes. Each individual aspect of emotion regulation – the ability to remain calm during a task designed to provoke frustration and skill at persisting in goal-oriented and socially appropriate behavior – shows promise as a predictor of children’s behavioral outcomes, consistent with past research (Lengua, 2002, 2003).

Clinically, when one imagines an emotionally well-regulated child, one would expect such a child to be able to remain both emotionally and behaviorally in control, even when faced with a frustration. It is clear that a child’s behavior is a key component of emotion regulation; the term dysregulation is often associated with an individual whose behavior, regardless of emotion, is out of control, inappropriate, and/or dangerous to the individual or other people (Cole & Hall, 2008). Skillful regulation, in contrast, involves the ability to behave appropriately, preserving both task and relationship orientations and in a manner that promotes optimal development in both the short and long term (Cole, Dennis, Martin, & Hall, 2008; Cole, Michel et al., 1994). Therefore, it is not surprising that the behavioral aspect of emotion regulation appears to contribute to a conceptualization of skillful emotion regulation that may predict fewer problem behaviors.

In addition to behavior, children’s emotional responses in an affectively challenging situation appear to be an important component of a complete picture of

emotion regulation ability. It is expected that even a child considered skillful at emotion regulation will become upset or frustrated at times. However, a child who consistently reacts to situations with negative emotions is more likely to be eventually behaviorally derailed by frustration or anger, and persistent negative emotion is likely to be detrimental in the long run (Cole & Hall, 2008). Therefore, skillful emotion regulation is likely a combination of the ability to resist predominant negative emotion when a task demands attention and the capacity to stay behaviorally on track when emotionally challenged. Given the present results, it cannot be concluded that difficulty with one component is more predictive of behavior problem symptoms than difficulty with the other; further research is needed to directly compare them and tease apart their implications for well-being and optimal development.

Taken together, the present findings suggest that risk is not a unitary influence on a child's well-being but that there are intricacies to the ways in which risk may affect child outcome. Specifically, individual stressors may have different effects on children's behavior, and while emotion regulation did not emerge as protective in our young sample, it is important to consider how stress interacts with characteristics that promote healthy development in order to gain a more complete picture of the development of psychopathology and competence. Stress, resulting from exposure to multiple risks, may be buffered by children's ability to both stave off negative emotion and harness their emotions in the service of appropriate behavior; however, this pattern may not occur until children are somewhat older and these skills are better developed. Future work that addresses the limitations of the present study will continue to clarify the dynamic links among stress, emotion regulation, and behavioral outcomes across childhood.

Limitations

While the use of data from both parents in the creation of children's risk scores is a strength of the present study, it is possible that there were reporting biases in risk factor exposure and/or behavior problem symptoms, a concern when parents are reporting on their own experiences and their children's behavior (Achenbach, McConaughy, & Howell, 1987; Hunt, Auriemma, & Cashaw, 2003; Seifer, Sameroff, Dickstein, Schiller, & Hayden, 2004). Social desirability may pull for individuals to either under-report risk (to portray themselves as successfully managing their lives) or to over-report their exposure to stress (to evoke sympathy or as an external attribution of difficulties they are experiencing within the family). For example, there is evidence that adults may underreport relational violence (Archer, 1999), a trend likely related to negative societal views of domestic abuse. Reporting biases are a possible contributor to some of the unexpected present findings and may be diminished by the use of more objective measures of risk, such as observations or reports by individuals outside of the home (though it is difficult to obtain an accurate objective report of rare or sensitive behaviors, such as marital conflict).

In addition, while an observational measure of emotion regulation is also considered a methodological strength, our global system of observing and rating emotion regulation may not have accurately captured the skill of the young children in our sample, as discussed earlier. Also, emotion regulation skill was only assessed in a laboratory situation, limiting our observations to children's performance on certain tasks during one visit. It is possible that children's emotion regulation abilities were not accurately reflected in their behavior in the lab. The inclusion of additional observations, at home or

school and across multiple days, and of parent or teacher report of children's general emotion regulation skill across situations is likely to produce a more representative picture of a child's ability to modulate emotional experiences. Further work with global observational systems of describing and categorizing children's overall regulatory skill is also needed in order to develop a useful and valid observational measure of emotion regulation that can be used across laboratory settings. The consistent use of a valid observational measure would allow researchers to make more meaningful comparisons across studies and continue to reveal the mechanisms by which skillful emotion regulation promotes mental health and well-being in children.

Finally, as discussed earlier, some of the unexpected findings – including the presence of particular risks failing to predict behavior problems or being linked with better emotion regulation – may be partially explained by parenting behaviors, an element of family functioning not included in the present study. High-quality parenting is likely to protect children against the negative effects of stress (Brody et al., 1994, 1999; Masten et al., 1999) and may account for certain unpredicted findings in the present sample. The inclusion of measures of parenting behaviors, such as sensitivity and warmth, in future work may help elucidate the mechanisms by which children are adversely affected by or buffered from risk across development.

Implications and future research

The current study raises a variety of important questions regarding links among emotion regulation, risk, and behavior problems in early childhood. Our findings do not support a model of emotion regulation as protective in young children but contribute to the body of literature linking emerging emotion regulation with other aspects of

children's development. Emotion regulation is a construct that is clearly linked to well-being across childhood and merits continued study. There are a variety of methods that have been employed in the study of children's emotion regulation, and as different methodologies may produce different research outcomes, a better understanding of the most complete and accurate way to capture emotion regulation quality in childhood is needed. As the best methods for studying this construct are identified, future work will continue to clarify the complex role emotion regulation plays in children's developmental outcomes.

Given that the present findings were somewhat inconsistent with expectations based on past research, it is suggested this study be repeated with other populations in order to clarify potential explanations for the present findings. Specifically, future research should continue to investigate the interaction of multiple risk and emotion regulation in young children, including measures of the particular aspects of emotion regulation skill that may best promote positive developmental outcomes in the face of risk. In addition, future research should include a wider variety of risk factors than were examined in the present study, including factors such as quality of the neighborhood and home environment and temperamental risk, in order to more fully capture a family's experience of stress. Also, the inclusion of parenting as a factor that may potentially affect the links between risk exposure and children's outcomes is also important given its potentially significant role. Such research should be conducted with both community samples and high-risk populations.

The present findings regarding the relations of the individual risk factors to one another and to other aspects of a child's development suggest that perhaps an alternate

approach to the study of risk is needed; specifically, a person-based approach to the study of risk may help clarify the nature of multiple risk and its impact on children. In contrast to variable-based approaches such as that utilized in the present study and most studies of multiple risk, a person-based approach allows for identification of the individuals whose risk exposure puts them at particular risk for the development of behavior problems, rather than merely identifying the amount of stressor exposure that increase the likelihood of a negative outcome. Person-based approaches are particularly helpful in distinguishing clinical from non-clinical populations (e.g., Ackerman, Brown, & Izard, 2003; Greenberg, Speltz, DeKlyen, & Jones, 2001) and, in research similar to the present study, would help identify the particular children for whom risk exposure is likely to be harmful.

In addition, longitudinal work beginning in early childhood and continuing into adolescence is needed to truly illuminate the developmental timing of emotion regulation as a buffer against adjustment problems. Given that most past research has been conducted with older children, and little of it is longitudinal, it is difficult to draw conclusions about *when* children's skill at regulating their emotions emerges as a protective factor. Longitudinal studies that identify this timing will help continue to advance our knowledge of the processes that promote health and well-being throughout childhood.

Does the fact that skill at emotion regulation may not buffer children against negative outcomes until they are older imply that emotion regulation based interventions with young children are likely to be ineffective? It does not. Given the importance of proper support and guidance during a child's first several years of life for the

development of competent emotion regulation both concurrently (Calkins & Johnson, 1998) and later in childhood (Colman et al., 2006), early intervention with children struggling to appropriately modulate and harness their own emotions is crucial in order to set these children up for later success. In addition, children's exposure to risk is another important target for early intervention. Reducing a child's exposure to marital conflict or decreasing the level of a stress a parent experiences, likely improving areas of parenting such as sensitivity (Crnic & Greenberg, 1990), will help set the child up for success at emotional self-regulation. Once risk exposure has been addressed such that a child's developing emotion regulation skills are less likely to be overwhelmed and more likely to be supported in the environment, emotion-based interventions (e.g., Greenberg et al., 1995; Izard et al., 2004) may be more likely to effect a positive outcome.

In conclusion, the present study suggests that multiple risk is an important influence on the development of externalizing behavior problems in young children and that emotion regulation skill may not emerge as a buffer against negative behavioral outcomes until later in development. In addition, our findings suggest that it is important to consider both the emotional and behavioral aspects of children's emotion regulation – the ability to stave off negative emotion and to harness emotion toward the facilitation of socially and contextually appropriate behavior. Future research should include a broad range of stressors; multiple, objective measures of risk exposure, emotion regulation, and behavior problems; information about parenting quality; and an examination of the relations among these factors longitudinally across early and late childhood.

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APPENDIX A

Table 1

Means, standard deviations, and range for risk, emotion regulation, and behavior problem variables

Variable	M	SD	Min	Max
30 month risk				
Income to needs	2.49	1.02	.71	5.33
Parenting hassles	48.72	11.48	21	89
General life hassles	62.78	14.59	29	110
Major life events	5.49	6.00	0	38
Physical aggression	1.66	5.27	0	40
Psychological aggression	36.03	38.57	0	150
Cumulative risk index	1.66	1.27	0	5
36 month emotion regulation				
No. of tasks child was calm	2.88	1.05	0	4
No. of tasks child was on-task	1.38	1.00	0	4
No. of tasks child was calm or on-task	4.26	1.72	0	8
No. of tasks child was off task	1.44	1.05	0	4
No. of tasks child was disruptive	1.12	1.12	0	4
48 month behavior problems				
CBCL externalizing symptoms raw score	12.87	8.11	0	42

Table 2

Correlations among risk, emotion regulation, and behavior problem variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Income to needs	--	.02	.06	-.26	-.05	.02	-.34	.03	.11	.08	.03	-.10	-.09
2. Parenting hassles		--	.64	.08	-.01	-.04	.37	-.08	-.05	-.08	.07	-.02	.23
3. General life hassles			--	.26	.05	.12	.55	-.10	.06	-.02	.00	-.03	.20
4. Major life events				--	.06	.22	.55	-.03	.17	.08	-.04	-.06	.10
5. Physical aggression					--	.29	.21	.09	.18	.16	-.08	-.10	.02
6. Psychological aggression						--	.52	-.10	.03	-.04	-.08	.03	.12
7. Cumulative risk index							--	-.11	.09	-.01	-.11	.03	.24
8. No. of tasks calm								--	.40	.85	.18	-.55	-.16
9. No. of tasks on-task									--	.83	-.40	-.51	-.15
10. No. of tasks calm or on-task										--	-.12	-.63	-.18
11. No. of tasks off task											--	-.50	-.04
12. No. of tasks disruptive												--	.20
13. CBCL externalizing symptoms													

Bold font indicates significant 1-tailed correlations ($p < .05$)

Table 3

Hierarchical regressions of risk, emotion regulation, and the interaction of risk and emotion regulation predicting externalizing behavior problem symptoms

Variables	F	R ² change	B	β	t
Additive (continuous) risk variable					
1. <i>Step 1</i> : Continuous risk	5.78	.09	.65	.25	2.80**
No. tasks calm			-1.01	-.13	-1.44
<i>Step 2</i> : Interaction	3.91	.00	-.10	-.04	-.48
2. <i>Step 1</i> : Continuous risk	6.47	.10	.70	.27	3.06**
No. tasks appropriate			-1.33	-.16	-1.86 [†]
<i>Step 2</i> : Interaction	5.07	.02	-.33	-.13	-1.47
3. <i>Step 1</i> : Continuous risk	6.84	.11	.66	.25	2.88**
Weighted ER score			-.81	-.17	-1.93 [†]
<i>Step 2</i> : Interaction	4.98	.01	-.14	-.10	-1.11
Cumulative risk variable					
4. <i>Step 1</i> : Cumulative risk	4.61	.07	1.39	.22	2.40*
No. tasks calm			-.96	-.12	-.12
<i>Step 2</i> : Interaction	3.12	.00	-.22	-.04	-.46
5. <i>Step 1</i> : Cumulative risk	5.42	.09	1.65	.56	2.93**
No. tasks appropriate			-1.19	.72	-1.64
<i>Step 2</i> : Interaction	4.84	.03	-.99	.53	-1.86 [†]
6. <i>Step 1</i> : Cumulative risk	5.62	.09	1.46	.23	2.58*
Weighted ER score			-.74	-.16	-1.73 [†]
<i>Step 2</i> : Interaction	4.30	.01	-.38	-.11	-1.27

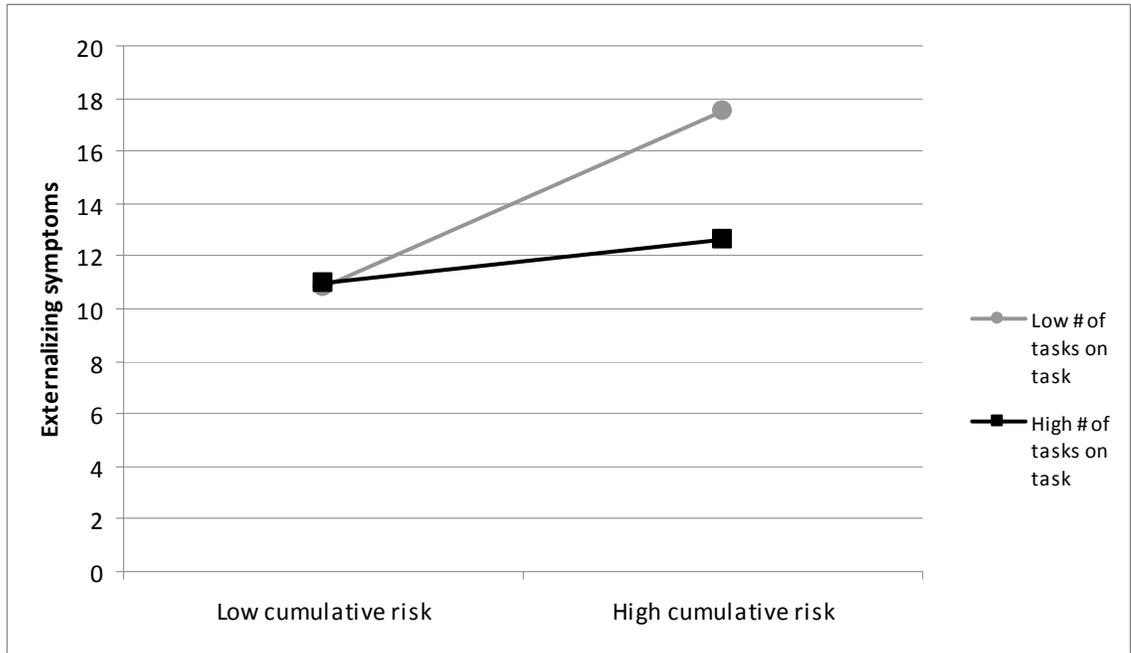
Note: Regressions coefficients are from the final step of each regression. Regression 1: overall F (3, 116) = 3.91, p < .05. Regression 2: overall F (3, 116) = 5.07, p < .01. Regression 3: overall F (3, 116) = 4.98, p < .01. Regression 4: overall F (3, 116) = 3.12, p < .05. Regression 5: overall F (3, 116) = 4.84, p < .01. Regression 6: overall F (3, 116) = 4.30, p < .01.

**p<.01, *p<.05, [†]p<.10

APPENDIX B

Figure 1

Interaction of cumulative risk and the number of tasks children's behavior was appropriate predicting externalizing symptoms



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Curriculum Vitae

EDUCATION

Ph.D., Psychology, The Pennsylvania State University, August 2009
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B.S., Psychology, University of Richmond, May 2003

GRADUATE EXPERIENCE

Teaching: Graduate Instructor, Developmental Psychology, Summer 2007
Graduate Instructor, Introductory Psychology, Summer 2008

Research: Research Assistant, Development of Toddlers Study, 2003-2008

Clinical: Staff Therapist, Pennsylvania State University Psychological
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Pre-doctoral Clinical Intern, University of Louisville Health
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PUBLICATIONS

- Cole, P. M., Radzioch, A. M., & Hall, S. E. (In press). Emotional dysregulation and the development of serious misconduct. In S. Olson & A. Sameroff (Eds.), *Regulatory processes in the development of childhood behavior problems: Biological, behavioral, and social-ecological perspectives*.
- Cole, P. M., Dennis, T., Martin, S. E., & Hall, S. E. (2008). Emotion regulation and the early development of psychopathology. In M. Vandekerckhove, C. von Scheve, S. Ismer, S. Jung, & S. Kronast (Eds.), *Regulating emotions*. Malden, MA: Blackwell.
- Cole, P. M., & Hall, S. E. (2008). Emotion dysregulation as a risk factor for psychopathology. In T. Beauchaine & S. Hinshaw (Eds.), *Child psychopathology*. New York: Wiley.
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- Bender, B. G., & Bender, S. E. (2005). Patient-identified barriers to asthma treatment adherence: Responses to interviews, focus groups, and questionnaires. *Immunology and Asthma Clinics of North America*, 25, 107-130.