EXPLORING THE ROLE OF PARENTING PROCESSES IN THE
INTERGENERATIONAL TRANSMISSION OF EMOTION REGULATION AND
COGNITIVE REGULATION

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BY
Justin T. Carreras

APPROVED: Sarah Gray, Ph.D.
Sarah A.O. Gray, Ph.D.
Advisor

Stacy Overstreet, Ph.D.
Stacy Overstreet, Ph.D.

David Corey, Ph.D.
David Corey, Ph.D.

Jeffrey Lockman, Ph.D.
Jeffrey Lockman, Ph.D.
Abstract

Research has shown that self-regulation, including emotion regulation and cognitive regulation, is important for a wide range of outcomes across the lifespan. Healthy self-regulation may be particularly important during early childhood, as children transition from co-regulation with their caregiver to learning how to self-regulate, and as they transition to formal schooling and the expectations associated with it. Research has also shown a consistent link between parents’ self-regulatory abilities and that of their children, suggesting that self-regulation may be intergenerationally transmitted. This report explores whether parenting processes that promote children’s emotional and cognitive development are specific to the relations between emotion regulation and cognitive regulation in mother and child. The current study tested these relations in a low-income, community sample of 160 dyads of mothers (age range = 20-46-years-old) and their preschoolers (age range = 3-6-years-old). Results indicated that more emotional dysregulation in mothers predicted more emotional dysregulation in children, however, unsupportive parenting responses did not mediate this relation. Mothers’ cognitive working memory did not predict children’s cognitive regulation and was not related to mothers’ cognitively stimulating parenting. Additionally, neither mothers’ emotion regulation nor cognitive regulation related to children’s performance on behavioral self-regulation tasks. Results further support the wider body of literature that demonstrate strong relations between parental and child emotion regulation and emotion-focused parenting processes, however, this study failed to demonstrate links between parent and child cognitive regulation and parenting processes that stimulate cognitive development. Possible explanations and recommendations for future research are offered.
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Exploring the Role of Parenting Processes in the Intergenerational Transmission of Emotion Regulation and Cognitive Regulation

Self-regulation is a complex and multifaceted process, consisting of behavioral, emotional, cognitive, and physiological regulatory capacities. Healthy self-regulatory capacities have been associated with numerous positive outcomes, whereas maladaptive self-regulation has been shown to consistently relate to a wide variety of negative outcomes. For example, adaptive self-regulation relates to greater self-esteem and academic achievement in children (Spinrad et al., 2012; Valiente et al., 2013) and higher educational attainment and annual income in adults, whereas poor self-regulation, such as difficulty regulating one’s emotions, thoughts, impulses, and behaviors has been associated with impaired physical health (Ryan, Kuhl, & Deci, 1997), engaging in risky and addictive behavior (Strauman, 2017), violence and aggression (Beauchaine, 2015), and externalizing and internalizing disorders broadly (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Martin & Dahlen, 2005). In fact, maladaptive self-regulation has been implicated in approximately 75% of diagnosable mental health disorders (Werner & Gross, 2010). For this reason, self-regulation has increasingly been conceptualized as a transdiagnostic process, presenting more as an underlying feature of many aspects of mental health, rather than a symptom of isolated diagnoses (Davidson & Frank, 2014; Fernandez, Jazaieri, & Gross, 2016). The pervasiveness of the impact of self-regulation underlines the importance of understanding this process.

Self-Regulation in Preschool-aged Children

Although the effects of self-regulation have been shown to manifest across the lifespan, there may be a specific developmental relevance to understanding regulatory
processes during early childhood. Specifically, for preschool-age children, regulation transitions from being dependent on coregulation with the parent to being a more autonomous and self-driven process (Calkins, 2011). Research on parent-child coregulation stems from the developmental neuroscience literature demonstrating that self-regulatory capacities depend on the prefrontal cortex and limbic regions. However, those specific regions are not developed during the first years of life (Beauregard, Lévesque, & Paquette, 2004). As such, children rely on their parents for help regulating from both a physiological and behavioral standpoint (Lunkenheimer, Kemp, Lucas-Thompson, Cole, & Albrecht, 2017b). The research suggests that these early self-regulatory abilities begin to emerge during the preschool years (Ochsner & Gross, 2004). However, because self-regulatory skills do not develop all at once, preschool-aged children are in a period of transition between regulation facilitation from their parents and being able to self-regulate. Additionally, it is at this age that children begin to internalize the behaviors and techniques their parents use to help them regulate (Olson & Lunkenheimer, 2009). Therefore, as Calkins (2011) suggests, preschool-age children are doubly reliant on the self-regulation abilities of their parents, because parents are not only regulating for their children, but they are also teaching their children how to regulate for themselves, both by teaching them how to handle their emotions explicitly and by modeling what self-regulation looks like.

In addition to being an important time period in the development of self-regulation, preschool marks a transition into formal schooling. Research has shown that several forms of regulatory functioning during the preschool years have implications for school adjustment, as well as later academic success (Blankson et al., 2017). In a review
of the literature on self-regulation and its impact on school readiness, Blair and Raver (2015) highlight the ability to maintain attention during class periods, the necessity of regulating one’s behaviors and emotions to maintain positive relationships with classmates and faculty, the need to behave according to a expectations of the classroom, and the ability to modulate emotions and stress reactions to new settings and individuals.

The research shows that there are both short-term and long-term effects of self-regulation on school-related outcomes, including healthy relationships with teachers and other adults in the school (Hamre & Pianta, 2001), fewer problem behaviors and disciplinary issues (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009), and foundational academic skills such as reading and mathematics (McClelland et al., 2007).

**Defining Self-Regulation Across Multiple Domains**

As mentioned, many researchers conceptualize self-regulation as a multifaceted process, and according to Bodrova and Leong (2006), self-regulation can be divided into two broad categories: emotion regulation and cognitive regulation. Researchers have proposed that while both forms of self-regulation are highly interconnected and interdependent, they draw upon different processes and may be implicated in distinct outcomes (Brock, Rimm-Kaufman, Nathanson, & Grimm, 2009). For example, cognitive regulation represents the conscious use of attentional control, effortful control, and executive functioning to plan, organize, and engage in appropriate responses. These functions are more effortful in nature and originate in the prefrontal cortex (Beauchaine, 2001; Eisenberg, Hofer, & Vaughan, 2007; Rothbart & Sheese, 2007). On the other hand, emotion regulation originates in subcortical regions, is more emotionally driven, and is conceptualized as being either an over-controlled, inhibited reaction to fear, or an under-
controlled, impulsive reaction to an enticing stimulus (Bridgett et al., 2015; Valiente et al., 2013). Indeed, Nigg (2017) argued that the interconnected yet distinct characteristics of the domains should compel researchers across fields to integrate multiple domains of self-regulation in their work.

Similar to Nigg, others advocate that distinguishing between these factors helps to prevent an oversimplification and allows for a more precise understanding of self-regulation as a whole (Zelazo & Muller, 2002). It is important to not only differentiate between these two interrelated but distinct processes from a theoretical perspective, but also to assess the differences between emotion regulation and cognitive regulation in practice. As such, behavioral rating scales, such as the Behavior Rating Inventory of Executive Function-2 (BRIEF-2; Gioia, Isquith, Guy, & Kenworthy, 2000) differentiate between emotion control capacities and cognitive control capacities. Clinicians benefit from differentiating between these capacities and are able to more precisely tailor recommendations and interventions to clients depending on their strengths and weaknesses. Therefore, while cognitive regulation and emotion regulation are interrelated, there is significant benefit to exploring them independently.

**Intergenerational Transmission of Self-Regulation**

As self-regulation is a significant underlying component of numerous disorders and problem behaviors, and because adaptive self-regulation strategies have such an important impact on children’s short-term and long-term success (Bridgett et al., 2015), it is important to examine the etiology of differences in regulatory abilities. One possibility is that there is an intergenerational component to the development of self-regulation, and that children acquire their profiles of self-regulation from their parents, likely through
both heritable and environmental pathways. Research has consistently demonstrated a positive correlation between parents’ and children’s self-regulatory capacities (Deater-Deckard, 2014). In fact, a comprehensive literature review identified 46 studies that have examined both parent and child self-regulation, as conceptualized across any domain of self-regulation, with the majority showing significant relations (Carreras, Unpublished Report). While a correlation between parents’ regulatory capacities and that of their child is not explanatory in and of itself, it does suggest that self-regulatory abilities may be transmitted from one generation to the next.

Nearly all of the identified studies that have examined intergenerational associations in self-regulation reported positive correlations between parents’ and children’s self-regulation. Furthermore, these relations were found in studies that examined processes related to cognitive regulation (Bridgett et al., 2011; Brieant, Holmes, Deater-Deckard, King-Casas, & Kim-Spoon, 2017a; Cuevas et al., 2014; Cumberland-Li et al., 2003; Jester et al., 2009; Valiente et al., 2007), as well as those emotional regulatory processes (Bornstein & Suess, 2000; Buckholdt, Parra, & Jobe-Shields, 2014; Gray, Theall, Lipschutz, & Drury, 2017; Kim, Pears, Capaldi, & Owen, 2009; Lunkenheimer, Kemp, Lucas-Thompson, Cole, & Albrecht, 2017a; Morelen, Shaffer, & Suveg, 2016; Saritaş, Grusec, & Gençöz, 2013). This relation also seems to persist as children age, as some of these studies have found relations between parent and child self-regulation from infancy through to young adulthood. Additionally, though the majority of studies that examine the relation between parent and child self-regulation examined self-regulation along a single domain of self-regulation, a few assessed relations across multiple domains. For example, Davenport et al. (2011) found positive
relations between parents and children’s cognitive regulation through effortful control and emotion regulation through emotional reactivity. In addition, Kim et al. (2017) found positive relations between parents and children’s executive functioning, an indicator of cognitive regulation, and physiological reactivity, an indicator of emotion regulation. Samuelson et al. (2012), Hirschler-Guttenberg et al. (2015), and Shih et al. (2018) each found evidence of cross-domain intergenerational transmission. They found that parents’ emotion regulation predicted child emotion regulation and executive functioning, parents’ effortful control, a measure of cognitive regulation, predicted child effortful control and emotion regulation, and parents’ physiological regulation, a measure of emotion regulation, predicted child physiological regulation and effortful control, respectively.

While most of the studies in the literature found relations between parent and child self-regulation, a few did not. For example, Pears, Capaldi, and Owen (2007) did not observe a relation between parents’ and children’s cognitive regulation. However, this study assessed parents’ cognitive regulation when they were adolescents, whereas other work observing positive intergenerational associations has assessed parents’ self-regulation concurrent with children’s self-regulation (Bariola, Gullone, & Hughes, 2011; Buckholdt et al., 2014; Morelen et al., 2016). Additionally, Epstein et al. (2008) did not detect a correlation between parent and child impulsivity, and Hirschler-Guttenberg and colleagues (2015) identified relations between parent and child self-regulation for children diagnosed with Autism Spectrum Disorder, but not for typically developing children. Despite these few studies that did not detect significant relations, the literature provides considerable support for an intergenerational link between parent and child self-regulation.
Parenting as a Mechanism of Transmission

Despite the consistent relation between parent and child regulation, the literature examining the mechanisms of transmission is sparse. One likely process through which self-regulation may transmitted from one generation to the next is parenting processes. There is considerable theoretical support that parenting processes be recognized in a pathway of parent to child self-regulation. Kopp (1982) was the first to suggest that parenting processes are instrumental in the development of child self-regulation, proposing that as children age, they continually become more autonomous in their regulatory abilities, and parenting processes facilitate that progress. Additionally, Dix (1991) suggested that the ability to engage in those parenting processes is dependent on how parents make sense of and regulate their own emotional experiences. Gottman, Katz, and Hooven (1996) further expanded on Dix’s theory by adding that through meta-emotion, or understanding the emotions and thoughts about one’s own emotions or the emotions of others, parents are able to guide their parenting processes to “emotionally coach” (p. 248) their children to make sense of their own emotions. Wahler and Dumas (1989) suggested that cognitive regulatory abilities, such as attentional control and working memory, help parents to prioritize their attention and emotions to respond to their children. Eisenberg and colleagues (1999) suggest that how parents discuss emotions with their children matters, but added that the way in which parents respond to their children’s emotionality is also a determinant of how children learn to regulate. These theories emphasize the importance of parenting as an emotional and cognitive process. However, these theorized links between parent and child self-regulation were
mostly implied rather than specifically indicated as a mechanism for intergenerational transmission of self-regulation.

Morris and colleagues (2007) consolidated these theories to construct a model for how parents’ regulatory capacities influence the development of their children’s regulation. They state that children likely learn self-regulation in part through observing their parents’ attempts at regulating, (i.e., through parental modeling), but also through sensitive and emotion-focused parenting processes, which function as a form of emotion socialization. Furthermore, they propose that both processes are dependent on the parent’s own self-regulatory abilities. If parents are unable to regulate themselves appropriately, they will struggle to respond to their children’s own distress in a functional way and will model maladaptive regulatory strategies. As such, parents’ own self-regulation supports their ability to organize and orient their parenting processes in the service of aiding in the development of their child’s self-regulation. Additionally, while Morris and colleagues wrote primarily about emotion regulation specifically, Calkins (2011) theorized that these parenting processes are likely implicated across all domains of children’s self-regulation, including cognitive regulation. For example, if a mother does not use cognitive regulation to exhibit attentional control, she may miss opportunities to foster her child’s cognitive development by simply being distracted.

These theories above suggested that processes related to sensitive, emotion-focused parenting, such as responses that are warm and consistent, demonstrate awareness of the child’s emotional needs and cues, and are functionally appropriate (Ainsworth, 1999; De Wolff & van IZjendoorn, 1997), are potential environmental mechanisms behind the intergenerational transmission of self-regulation (Ainsworth,
This general pattern of parenting has been shown to relate to a range of important outcomes for children broadly (Belsky, Bell, Bradley, Stallard, & Stewart-Brown, 2007), including self-regulatory outcomes like cognitive regulation and emotion regulation (Belsky & Fearon, 2002; Bernier, Carlson, & Whipple, 2010). Additionally, there is considerable evidence linking these parenting processes to behavioral, emotional, cognitive, and physiological self-regulation (Bernier et al., 2010; Eisenberg et al., 2005; Skowron et al., 2011; Spinrad et al., 2012).

Therefore, it may be that within the construct of sensitive parenting there are distinct parenting processes that are domain specific. For instance, emotion socialization-focused responsive parenting (i.e., how parents respond to and engage with children’s emotionality) may have implications for children’s emotion regulation. As Morris and colleagues (2007) discussed, the way in which parents respond to children’s emotions may influence how children learn to make sense of their own affect. For example, parental responses that are supportive and affirming of children’s affect may lead children to feel capable of managing stressful emotions. Conversely, responses that invalidate or punish children’s negative emotions, or responses that are hostile and match the child’s emotionality, may lead children to believe that their emotions are too problematic to be managed and regulated. Similarly, children’s cognitive regulation may be more dependent on parenting processes that stimulate children’s cognitive development. Parents who are intentional about stimulating children’s attention during daily activities and are consistent about encouraging children to problem solve and engage in increasingly more sophisticated tasks may help children to develop their
cognitive regulation abilities, such as attentional control and executive functioning. Conversely, parents who struggle to organize their own attentional control and executive functioning may struggle to recruit the resources necessary to facilitate their children’s cognitive exploration and growth.

**Parent Self-Regulation and Parenting Processes: Empirical Support.** The literature suggests a relation between parenting processes and parent self-regulation, as well as between parenting processes and the multiple domains of children’s self-regulation. While the literature linking each domain of regulation to parenting processes is not large, taken together there are numerous studies that have examined these relations across the processes that underly the self-regulation domains. However, there are still gaps and limitations in this line of work.

In terms of studies that have examined relations between parent self-regulation and parenting processes, some have demonstrated that cognitive regulation capacities are related to a range of parenting processes. Effortful control, a form of cognitive regulation, has been shown to be related to parental involvement in interactions with children (Boutwell & Beaver, 2010; Bridgett et al., 2011). Additionally, executive functioning, conceptualized as either working memory, attention, or inhibitory control, is also related to parenting processes. Researchers have found that parental executive functioning also predicts responsiveness to children (Chico, Gonzalez, Ali, Steiner, & Fleming, 2014; Cumberland-Li et al., 2003; Gonzalez, Jenkins, Steiner, & Fleming, 2012; Musser, Kaiser-Laurent, & Ablow, 2012a). It may be that parents with stronger executive functioning skills are better able to recruit the cognitive resources needed to engage their children and challenge them to grow intellectually.
A relation between parent emotion regulation and parenting processes has also been shown in the literature, albeit in a relatively smaller body of work. Parental emotion regulation has been associated with broad parenting processes, including parents’ child-directed discipline (Lorber, 2012; Lorber & O’leary, 2005) and sensitive parenting broadly (Carreras, Carter, Heberle, Forbes, & Gray, 2019; Hughes & Gullone, 2010; Kim, Teti, & Cole, 2012; Martini, Root, & Jenkins, 2004; Skowron, Kozlowski, & Pincus, 2010). Importantly, though, three studies found evidence that parents with stronger emotion regulation skills also seem to be better able to respond specifically to children’s emotions in a supportive and warm way (Buckholdt et al., 2014; Hirschler-Guttenberg et al., 2015; Morelen et al., 2016). Relatedly, research on physiological reactivity has also shown that parental emotional reactivity, a component of emotion regulation, is implicated in how parents respond to their distressed children (Joosen et al., 2013; Musser et al., 2012; Skowron, Cipriano-Essel, Benjamin, Pincus, & Van Ryzin, 2013). Therefore, these studies indicate that parents that are emotionally reactive and have difficulty modulating that reactivity are more likely to respond negatively to their children’s distress.

These studies demonstrate empirical support for the theorized link between parent self-regulation and parenting processes, as well as a domain-specific link to specific parenting processes such as emotion-focused parenting or cognitively stimulating parenting. In a review of this literature linking parenting processes to parent self-regulation, Crandall (2015) states that the evidence suggests that the greater the self-regulatory capacities, the more sensitive and responsive parents are in their reactions and the less punitive and harsh they are to their children. She also notes that there are several
confounding contextual factors, including parent education, income, and stress, but that the majority of the studies control for those contextual factors and the relations hold. In sum, there is considerable empirical evidence that parent self-regulation is related to parents’ emotional and behavioral responses to their children’s emotionality, as well as engagement in fostering children’s cognitive development.

**Parenting and its Relation to Child Self-Regulation: Empirical Support.** An extensive body of literature also supports a relation between specific parenting processes and child self-regulation (Bernier et al., 2010; Eisenberg et al., 2005; Rochette & Bernier, 2014). For example, research has shown relations between parenting processes that stimulate children’s cognitive development and children’s cognitive regulation processes such as attentional control, effortful control, and executive functioning. Specifically, studies show that parenting behavior that is either disengaged or overly demanding is associated with poor executive functioning skills in children, whereas parenting behavior that is involved and challenges children in a functionally appropriate way is associated with greater executive functioning skills among children (Hutchison, Feder, Abar, & Winsler, 2016; Sosic-Vasic et al., 2017). Additionally, research has shown that parenting behavior that encourages and supports their children’s problem-solving, as opposed to intrusively solving problems for them or not supporting them, and who ask children open-ended questions rather than closed-ended questions tend to have children with greater cognitive regulation abilities (Kao, Nayak, Doan, & Tarullo, 2018; Spruijt, Dekker, Ziermans, & Swaab, 2018). Therefore, there is evidence in the literature that parenting behavior that stimulate children’s cognitive development is related to processes that underly children’s cognitive regulation.
Additionally, a considerable number of studies have provided support that parenting processes related to emotion socialization parenting are linked to children’s development of emotion regulation skills (Calkins & Hill, 2007; Diaz & Eisenberg, 2015). For example, studies have shown that parents that exhibit supportive and patient responses to their children’s negative affect or behavior tend to have children that show more adaptive regulatory abilities (Hoffman, Crnic, & Baker, 2006; Swanson, Valiente, Lemery-Chalfant, Bradley, & Eggum-Wilkens, 2014). Furthermore, parents who demonstrate awareness and understanding of the emotional experiences of their children tend to have children that are better able to regulate their own emotions (Katz, Maliken, & Stettler, 2012). Conversely, studies have shown that when parents exhibit behavior that is not accepting of their children’s emotional responses it is related to lower levels of emotion regulation in children (Ramsden & Hubbard, 2002). Finally, when parents report meeting children’s negative emotionality with strategies that include hostility, punishment, or negativity, children are more likely to be more dysregulated and have more problem behaviors (Chang, Park, Singh, & Sung, 2009; Fabes, Leonard, Kupanoff, & Martin, 2001). In fact, a meta-analysis by Karreman and colleagues (2006) found that for families of preschool children specifically, there were notable effects sizes for the relation between parenting processes and children’s self-regulation. Therefore, there is significant empirical evidence that emotion-focused parenting such as well-regulated responses to children’s emotions or behavior are important predictors of the development of children’s self-regulation.

**Parenting as it Relates to Both Parent and Child Self-Regulation.** Despite the considerable theoretical support and empirical evidence for a relation between parenting
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processes and both parent and child self-regulatory capacities, only 18 identified studies have examined both parent and child self-regulation and included measures of parenting processes. In addition, only six of those studies tested parenting as a mechanism of the intergenerational transmission of self-regulation. As will be shown, those studies are mixed in their findings, differ on which specific parenting processes are examined, and are not without their limitations.

Four of the six studies found that emotion-focused parenting processes mediated the relation between parent and child self-report of emotion regulation (Buckholdt et al., 2014; Gunzenhauser, Fäsche, Friedlmeier, & von Suchodoletz, 2014; Morelen et al., 2016; Saritaş et al., 2013). Buckholdt et al. (2014) found that parents with higher emotion dysregulation were more likely to invalidate their children’s emotional expressions, and that invalidation of emotions mediated the positive relation between parent and child emotion dysregulation, in a sample of racially diverse, female adolescents and their parents. Gunzenhauser et al. (2014) found the same pattern of results in a sample of upper-middle class German parents and children. Morelen et al. (2016) also found that negative responses to children’s emotions mediated the positive relation between parent and child emotion regulation. Each of these studies assessed parent and child emotion regulation via questionnaires completed by the parent and measured parental reactions to children’s emotional responses via parent report on the Coping with Children’s Negative Emotions Scale (CCNES; Fabes et al., 2001). Like the three other studies, Saritas et al. (2013) found that mothers’ negative responses to children, but not warm responses, mediated the relation between maternal and child emotion regulation. However, unlike the other three studies, they assessed parenting
reactions via adolescent report of their memories of their mothers’ behaviors from their childhood. The results of all four of these studies emphasized the role that parents’ negative or harsh responses to children’s emotions, but not positive responses, have on the intergenerational transmission of emotion regulation processes. Additionally, each of these studies demonstrated significant mediation across a range of age groups and demographics, enhancing the generalizability of these findings.

The other two studies examined parenting sensitivity more broadly and found that it mediated the relation between parent and child self-regulation. Kim and Kim (2018) found that sensitive parenting mediated the relation between self-reported effortful control in children and parents in a sample of South Korean families, and Cuevas and colleagues (2014) tested the effect of parental engagement when children were 10, 24, 36, and 48 months old, observing that these parenting processes partially mediated the relation between mother and child executive functioning at 36 and 48 months, but not before. Notably, Valiente et al. (2007) found that parental effortful control predicted parent responses to children’s emotions, and that parent responses predicted children’s effortful control, however, they did not formally test a mediated pathway. Likewise, Samuelson, Krueger, and Wilson (2012) found that parent self-regulation was predictive of children’s self-regulation, and that responsive and supportive parenting behaviors were related to both parent and child emotion regulation and cognitive regulation, but they also did not test these relations medially. To date, there have not been any studies to test cognitively stimulating parenting processes specifically as a mediator of both parent and child self-regulation.
However, despite these strong findings suggesting parenting processes may account for the intergenerational transmission of self-regulation, this literature is not without limitations. First, most of the studies to examine intergenerational effects were cross-sectional. This limits our ability to make causal claims about the temporal order of the effects found in these studies. Specifically, when examining parent and child self-regulation cross-sectionally, it is impossible to claim that the parents’ dysregulation precedes the child’s dysregulation. Indeed, it is likely that the effect is bidirectional, and parent and child influence each other’s regulatory capacities in the context of their interactions together. In the same way, making temporal claims about the effects of parenting processes and child dysregulation would also be difficult, as it is possible that parenting processes influence child regulation, as has been theorized, but also that a highly dysregulated child may lead to more negative or unsupportive parenting responses. However, it should be noted that there are longitudinal studies that suggest parent self-regulation predicts child self-regulation (Cuevas et al., 2014; Pears et al., 2007; Verhoeven, Junger, Van Aken, Deković, & Van Aken, 2007). While this relation is surely transactional, examining this in a cross-sectional way is still valuable as a means of understanding the role of parenting processes in this relation.

A second shortcoming in this body of literature is that many of the studies rely on self-report data of cognitive regulation and emotion regulation as well as parenting processes. This is a limitation for multiple reasons. First, it is problematic to ask individuals to report on their own emotion regulation when a defining characteristic of emotion dysregulation is being unaware of and unclear about their emotional responses (Gratz & Roemer, 2004). Zelkowitz and Cole (2016) examined the most common self-
report measures of emotion regulation, including the Emotion Regulation Questionnaire (ERQ; Gullone & Taffe, 2012) and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), and determined that self-report measures of emotion regulation do not show convergent validity. However, they note that reliance on self-report is still the standard in emotion regulation research, and thus, this limitation persists.

Additionally, there is a tendency for individuals to bias their responses on self-report measures to make their behavior appear more socially desirable and acceptable (Van De Mortel, 2008). This seems to be especially true when measuring parenting processes, particularly with regard to questions about punishment, hostility, and harsh reactions to children (Morsbach & Prinz, 2006), likely due to fears about being judged or even reported to child protective services. While there were studies that used observational means of assessing parenting processes (Cuevas et al., 2014; Kim et al., 2009; Lunkenheimer et al., 2017b; Moore et al., 2009), future examinations would benefit from using a multi-method approach to assessing both self-regulation and parenting processes.

Taken together, these studies provide evidence that specific parenting processes may be mechanisms for the intergenerational transmission of self-regulation, as all of the studies that conducted analyses of indirect effects found at least partial indirect effects of parenting processes on the relation between parent and child self-regulation. However, these studies do not examine whether certain parenting processes may be domain specific with respect to cognitive or emotional self-regulation. Furthermore, while these studies provide evidence that the way in which parents respond to their children’s negative emotionality may be a mechanism of transmission, none of the studies examine cognitive stimulation behaviors as a potential mechanism. However, these studies do provide a
framework for thinking about the role of parenting in the intergenerational transmission of self-regulation.

**Self-Regulation and Parenting in the Context of Sociodemographic Risk.**

While understanding environmental contributions to the emergence of self-regulation is important for all families, it may be especially important for families that are at higher risk for psychological problems due to sociodemographic risk factors, such as poverty, racial minority status and pursuant experiences of structural racism, and exposure to violence. For instance, there is long-established theory that suggests parenting can be a buffering agent in the context of high-stress environments (Jackson, 2000; Jarrett, 1997; McLoyd, 1998). Conversely, parenting processes can also be a mechanism for how stressful environments to impact children, as environmental stressors can serve to diminish the capacity for consistent parenting (McLoyd, 1990). Furthermore, regulatory strategies may differ depending on context. As Blair and Raver (2012) note, individuals may learn to alter their regulatory strategies in response to stressful environments through a process called experiential canalization. Self-regulation that may be interpreted as maladaptive in some settings may be contextually adaptive in high-risk contexts.

Likewise, from a life history theory perspective, increased contextual stressors lead some individuals to specialize their regulatory strategies to meet the harsh needs of their environment (Suor, Sturge-Apple, Davies, & Cicchetti, 2017). Currently, the research on the relation between parenting and self-regulation is especially sparse for families facing a disproportionate level of sociodemographic risk factors (Crandall et al., 2015). With this in mind, it may be particularly important to understand these relations for families that experience greater sociodemographic risk factors.
In summary, research has shown consistent relations between parent and child self-regulation, indicating an intergenerational transmission of self-regulation. Furthermore, the literature demonstrates a link between specific parenting processes (i.e., emotion-laden responses to children and stimulation of cognitive development) and both parent and child self-regulation. Based on theoretical and empirical research, it may be that parents’ emotion regulation is specific to children’s emotion regulation rather than cognitive regulation and vice versa. Additionally, specific parenting processes, such as emotion-focused responses to children’s affect and facilitation of children’s cognitive growth, may distinctly explain those domain-specific intergenerational associations. It may be through these parenting processes that self-regulation is transmitted from one generation to the next. While there are some studies that support this potential mechanistic pathway, several gaps in the literature still exist. Specifically, few studies examined domain specificity in either the relation between parent and child self-regulation or in relation to specific parenting processes. Additionally, only a few studies examined parenting as a mechanism of the transmission of self-regulation from parent to child and no studies examined whether certain parenting processes were mechanisms of transmission for specific domains of self-regulation. Finally, none of these identified studies of intergenerational self-regulation explore these concepts in the context of high socio-demographic risk.

**Hypotheses**

The goal of this study is to examine the specificity of the relation between different domains of maternal and child self-regulatory processes in a sample of high sociodemographic risk families. Specifically, we will examine whether maternal emotion
regulation and cognitive regulation have specific associations with children’s emotion regulation and cognitive regulation. An additional goal of this study is to examine the role of specific parenting processes as potential mechanisms of the intergenerational transmission of these maternal and child self-regulatory abilities. As such, the following hypotheses will be tested.

1.)

a. Higher levels of maternal emotion dysregulation will predict higher levels of children’s emotional reactivity, above and beyond the effect of maternal working memory, when controlling for covariates (See Figure 1).

b. There will be a significant indirect effect of mothers’ unsupportive responses to children’s negative emotionality in the relation between maternal emotion dysregulation and children’s emotional reactivity (See Figure 2).

2.)

a. Higher maternal working memory will predict higher levels of children’s effortful control, above and beyond the effect of maternal emotion dysregulation, when controlling for covariates (See Figure 3).

b. There will be a significant indirect effect of mothers’ stimulation of children’s cognitive development and autonomy support on the relation between maternal working memory and children’s effortful control (See Figure 4).

3.) As emotion regulation and cognitive regulation are complex and multifaceted processes, multiple methods of assessment will be used to measure these child
self-regulation outcomes. Preliminary analyses will examine relations between observed and parent-reported child emotion regulation and cognitive regulation, as well as other key study variables. As these measures assess related but distinct processes, all hypotheses will be run twice: once with parent reported self-regulation outcomes and once with observed, performance-based self-regulation outcomes, allowing for greater specificity in interpreting the findings.

**Methods**

**Participants**

Mother and child dyads were recruited from Head Start programs, pediatric clinics, and through referrals from other participants; all participants were near or below the federal poverty level (100-185% of federal poverty guidelines). The total sample was comprised of 175 distinct mother-child dyads. For mothers that participated in the study with multiple children, only the oldest child dyad data was included, resulting in a final sample size of 160 dyads. Child age ranged from 36 to 72 months-old (3 to 6-years-old), with a mean age of 51.51-months-old, and 51% of child participants were female. Mother age ranged from 20 to 46-years-old, with a mean age of 30.24-years-old. The sample predominately self-identified as Black (83.4%), while 9.6% self-identified as White, 0.6% Asian, and 6.4% other. Participants were also asked to report on their ethnicity and were asked to choose either Hispanic/Latino or non-Hispanic/Latino. 10.9% of mothers described their ethnicity as Latina. Mothers’ education level ranged from 8th grade to attainment of a college degree, with 1.3% reaching 8th grade or less, 7.2% completing up to 1-3 years of high school, 31.4% receiving their high school diploma/GED, 33.3% completing 1-3 years of college, and 9.8% attaining a college
degree. Approximately one-third of mothers worked a full-time job, one-third worked a part-time job, and the final third were not currently working a paid job. All participants had to be proficient in English in order to complete the interviews; 85.5% listed English as their native language, 7% listed Spanish, 0.6% listed French, 0.6% listed Arabic, and 1.2% listed Spanish and English combined. Five dyads were excluded from analyses including observational parenting data due to the mother and child speaking Spanish during the interaction.

**Procedures**

Mothers and children for this study were part of a larger study that examined the impact of violence exposure on child outcomes. For this study, 522 mothers of preschool-aged parents completed a screening study at Head Start and WIC programs, including demographic variables and the Life Events Checklist (Gray, 2004), on which they reported on their own and their child’s experiences of witnessing and experiencing potentially traumatic events, for which they received a $5 Walmart gift card. Participants were intentionally sampled across a range of exposure to violence, with participants with familial exposure to violence oversampled. Specifically, all mothers who reported child exposure to violence or parental exposure to interpersonal violence were invited to participate. Additionally, some dyads with no violence exposure in parent or child were also invited to participate. In the current study, both violence exposed dyads and their matches were included together for analyses. Exclusion criteria included not being the child’s biological mother, the child not meeting the 3 to 5-year-old age criteria at the time of screening, parent unable to complete the interview in English, or a diagnosis of a global developmental delay or autism spectrum disorder by parent report.
Participants then completed two, two-hour data collection visits, either at the participants’ homes or in the lab per parent preference. Participants received $50 gift cards upon the completion of each visit. With the exception of maternal cognitive regulation scores, data for this report are derived from the first visit, during which mothers and children completed a dyadic parent-child interaction task, which consisted of a free play task and a puzzle task. For the free play task, graduate-level research assistants gave the dyad toys and instructed them to play as they normally would. For the puzzle task, the dyad was given several geometric puzzle pieces and a picture and was instructed to arrange the pieces to look like the picture, and the mother could help with her words but not her hands. Subsequently, one of the graduate-level research assistants completed structured interviews with mothers to assess life events, and a second graduate-level research assistant completed behavioral and cognitive tasks with the child. Additionally, mothers completed several self-report measures of their own self-regulation and parent-report measures of their child’s self-regulation. During the second visit, mothers and children completed interaction tasks, and then the children completed behavioral tasks while mothers were administered a standardized cognitive measure.

Measures

Sociodemographic Information and Other Covariates. Parents reported on their own and their children’s race, ethnicity, age, marital status, and education. Parent and child violence exposure was assessed using a modified version of the Exposure to Violence Inventory (Selner-O’Hagan, Kindlon, Burka, Raudenbush, & Earls, 1998), which yields a sum count of the total number of violent events seen or experienced.
Maternal Emotion Dysregulation. The *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) was used to assess maternal emotion regulation. Mothers completed the 36-item scale by rating items on a 5-point Likert scale (1 – 5). The DERS includes a total score, as well as a score for each of 6 subscales (Non-Acceptance of Emotional Responses, Difficulties Engaging in Goal-Directed Behavior, Impulse Control Difficulties, Lack of Emotional Awareness, Limited Access to Emotion Regulation Strategies, and Lack of Emotional Clarity). In the initial validation study, construct and predictive validity were both good (Gratz & Roemer, 2004) and two-month test-retest reliability was also good (*r* = .88; Gratz & Roemer, 2004). In the current study, reliability was good (α = .89).

Maternal Cognitive Regulation and Verbal Comprehension. Maternal cognitive regulation and verbal abilities were assessed using the *Woodcock-Johnson-III-Tests of Cognitive Abilities* (WJ-III-COG; Schrank, 2011), which provides valid and reliable measures of cognitive abilities for individuals preschool-aged to late adulthood. Mothers’ Working Memory cluster standard scores, which can be obtained from the Numbers Reversed and Auditory Working Memory subtests, were used as measures of cognitive regulation. Working memory scores from cognitive tests are often used as a measure of cognitive regulation, often in conjunction with verbal fluency measures and inhibition tasks. Mothers’ verbal abilities were derived from the standard score of the Verbal Comprehension subtest. Mothers’ verbal abilities scores will be included as covariates in analyses that incorporate mothers’ working memory scores.

Children’s Observed Emotion Regulation and Cognitive Regulation. The *Preschool Self-Regulation Assessment* (PSRA; Smith-Donald, Raver, Hayes, &
Richardson, 2007) was used to measure children’s self-regulation. The PSRA was designed to assess self-regulation using a battery of behavioral tasks. Notably, the PSRA was developed in a sample of Head Start children. In accordance with a two-factor stratification by Metcalfe and Mischel (1999) as well as others (Brock et al., 2009; M. Willoughby & Carolina, 2011), we divided these tasks into two sum scores: hot self-regulation (HSR), which is a measure of emotion regulation, and cool self-regulation (CSR), which is a measure of cognitive regulation.

HSR scores were comprised of a timed snack delay task and a toy peek challenge. For the snack delay task, children were given a snack to try and were then told to sit with their hands palm-down on the table. Another snack was then placed under one see-through cup which was face down and a second cup was placed face up next to it. The research assistant instructed the children to keep their palms on the table until told, and that when told they should take the snack from one cup and place it in the other cup for later. Four trials were conducted (10 seconds, 20 seconds, 30 seconds, and 60 seconds), and research assistants recorded whether the children waited until directed or lifted their hands, touched the cup, or ate the snack. The outcome variable is the mean wait time.

For the toy peek challenge task, research assistants told the children that they bought them a surprised but forgot to wrap it. The children were then instructed to turn around with their backs to the table and not to look while the researcher “wrapped” the gift for one minute. Children were rated on whether they looked and at how many seconds in they looked. They were then repositioned to face the table and told to wait an additional minute before touching the gift. The outcome variable is dichotomously coded as a pass/fail whether children peeked at the gift.
CSR scores were comprised of three tasks: timing a balance beam tempo walk, the total number of correct pencil taps across trials, and turn-taking during tower building. In the balance beam task, children were asked to walk along a six-ft. long piece of table for three timed trials. On the first trial they were instructed to pretend the tape was a balance beam, on the second trial, they were asked to walk as slowly as possible on the balance beam, and on the third trial, the research assistant repeated the instructions in an exaggerated tone. All three trials were timed. The outcome variable is the difference in seconds between the slow and regular speed trials. On the pencil tap task, children were asked to tap a pencil twice when the research assistant tapped theirs once and to tap a pencil once when the research assistant tapped theirs twice. After children demonstrated understanding of the task, 16 trials were administered, and incorrect responses were tallied. The outcome variable is the total number of correct trials. For the turn-taking tower task, the children were presented with six blocks and were instructed that they and the research assistant would take turns stacking the blocks to build a tower. After a practice trial, the research assistant moved the practice tower to the side and presented the children with 12 more blocks, once again instructing them to take turns to stack the blocks. The outcome variable was coded dichotomously as whether or not the child successfully took turns.

Task-level scores were z-scored, checked for outliers, winsorized, and then summed within domain. Construct validity for the PSRA was $r = .62$ (Smith-Donald et al., 2007). Denham and colleagues (2012) demonstrated that the CSR and HSR had strong predictive validity. In the current study, reliability between the tasks that comprise CSR and HSR was poor, with $\alpha = .38$ and $\alpha = .57$ respectively.
Maternal Report of Child Emotion Regulation. Maternal reports of children’s emotion regulation were collected using the Emotionally Reactive subscale of the Child Behavior Checklist 1.5-5 (CBCL 1.5-5; Achenbach & Rescorla, 2000). The CBCL 1.5-5 provided a total problem behavior score, two broadband scores for internalizing and externalizing behaviors, and seven specific syndrome scores (emotionally reactive, anxious–depressed, somatic complaints, withdrawn, sleep problems, attention problems, aggressive behavior). The Emotionally Reactive subscale consisted of 9 individual items on a 0 to 2 rating scale, where 0 is “Not True” and 2 is “Very True or Often True.” The outcome variable of interest was a summed score of those 9 items. The Emotionally Reactive subscale of the CBCL 1.5-5 shows good criterion validity and test-retest reliability ($\alpha = .87$ Achenbach & Rescorla, 2000). Cronbach’s alpha was $\alpha = .96$ in the current study.

Maternal Report of Child Cognitive Regulation. Maternal reports of their child’s cognitive regulation were collected using the Child Behavior Questionnaire – Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006). The CBQ-VSF is a 36-item measure of children’s temperament. Parents are asked to rate their child on a 7-point scale, with 1 corresponding to Extremely untrue of your child and 7 corresponding to Extremely true of your child. The outcome of interest for this study is an Effortful Control scale score, which is comprised of 12 items that assess inhibitory control, attention focusing, low intensity pleasure, and perceptual sensitivity. In their initial development study, Putnam and Rothbart reported acceptable internal consistency ($\alpha = .78$) for the Effortful Control scale. In a validation study, the Effortful Control scale of the CBQ-VSF was found to have moderate to high convergent validity as compared to
standard behavioral measures of effortful control. Reliability was good in this current study ($\alpha = .87$).

**Mothers’ Use of Emotion-Focused Parenting.** Emotion-focused parenting was measured using self-reports of mothers’ unsupportive responses to children’s negative emotionality, collected using the *Coping with Children’s Negative Emotions Scale* (*CCNES*; Fabes, Leonard, Kupanoff, & Martin, 2001). This measure required mothers to respond with how they would react to their children in 16 hypothetically distressing situations. Each item had six possible methods of responding to the scenario. Mothers rated how likely they were to respond to each of the six types of responses using a 7-point Likert scale. Of the six types of responses, there were three unsupportive responses (Punitive Reactions, Minimizations, and Distress Reactions) and three supportive responses (Emotion-focused Reactions, Expressive Encouragement, and Problem-focused Reactions), and these subscales yielded an Unsupportive Responses composite and a Supportive Responses composite. The CCNES has been found to have good internal and test–retest reliability and good concurrent and construct validity (Fabes et al., 2001). For current study, the variable of interest was the Unsupportive Responses composite, which had good internal consistency in this sample ($\alpha = .83$).

**Mothers’ Use of Cognitively Stimulating Parenting.** Mother and child dyads were observed during interactions using the *Parent-Child Interaction Rating Scales* (*PCIRS*; Sosinksy, Carter, & Marakovitz, 2004). The PCIRS is an adaptation from The NICHD Study of Early Child Care Parent-Child Interaction Rating Scales (MCIRS; NICHD Early Child Care Research Network, 1999), The Caregiver-Child Affect, Responsiveness, and Engagement Scales (C-Cares; Tamis-LeMonda et al., 2002), the
Parent-Child Early Relational Assessment (PCERA; Clark, 1999), and the Emotional Availability scales (Biringen, Robinson, & Emde, 1994). The dyad was video-taped as they engaged in a five-minute free-play exercise and a four-minute puzzle task. Dyads were rated on a 7-point scale (1 – 7) for 23 items. The scales of interest for this study were the stimulation of cognitive development scale and the respect for child’s autonomy scale. A mean score was computed from those scales. The stimulation of cognitive development scale measured the degree to which a mother tries to foster her child’s cognitive and mental development. The respect for child’s autonomy scale reflected the degree to which a mother recognizes, respects, and promotes her child’s individuality and exploration. The outcome variable of interest was the mean score of the stimulation of cognitive development and respect for child’s autonomy scales. In a validation study, coders had 90% agreement and weighted kappas of .61, and other studies have also demonstrated strong metrics (Jones Harden, Denmark, Holmes, & Duchene, 2014). In the current study, raters were graduate students and research assistants in their early to mid-twenties who identified as White and were not parents themselves. Raters were aware that their own identities and experiences were different from those of the participants they were rating and were made aware of the role of ethnicity and inherent bias in observations of mother-child interactions (Harvey et al., 2009). During training, raters coded the same participants until an acceptable inter-rater reliability was reached, after which raters double coded 20% of the sample and inter-rater reliability on these scales was excellent (ICC = .92).

**Children’s Verbal Comprehension.** Children’s verbal comprehension was assessed using the Peabody Picture Vocabulary Test – 4th Edition (PPVT-4; Dunn &
Dunn, 2013). The PPVT-4 is a measure of receptive vocabulary without requiring reading or writing. The test is intended for children and adults ages 2.6 years-old through 90+ years-old. Standard scores of children’s verbal comprehension abilities will be included as covariates for analyses involving measures of children’s cognitive regulation.

**Results**

**Preliminary Analyses**

Key study variables were examined for missing data. Five dyads were excluded from analyses including maternal emotion regulation due to the participants not completing the DERS. Twenty-one participants did not respond to between one and three items on the DERS, and mean substitution was used for those participants. Twenty-one participants were omitted from analyses involving mothers’ working memory scores as they did not complete the working memory subtests of the Woodcock-Johnson. Working memory assessment occurred during the second visit and these participants were lost to follow-up. However, it is possible that this data are not missing at random, as mothers that have greater difficulties with executive functioning may also be most likely to be lost to follow-up. Seven participants did not complete the CBCL and thus children’s emotionally reactive scale scores could not be computed, and as such those participants were excluded from analyses involving children’s emotionally reactive scores. Mean substitution was used for in the case of participants missing fewer than 8 percent of items on the CBCL. Twelve cases were excluded from analyses involving children’s effortful control, due to the mothers not completing the CBQ-VSF.

The amount of missing data on the PSRA varied depending on the task, as research assistants discontinued tasks that they deemed the children unable to understand.
This occurred with certain tasks more than others; for example, the pencil tap task had 23 participants that were not able to complete the task. Little’s test of missing at random was conducted for the PSRA tasks and pencil tap was found to not be missing at random. As such, much like mothers’ working memory scores, it is likely that these results are biased and overrepresent children that were more cognitively mature during these tasks. To that point, all cases were dummy coded based on whether they were missing data for any of the PSRA tasks. Correlations were then run with child age, and results indicate a significant correlation only for the pencil tap task, such that younger children were more likely to be missing pencil tap data. Ultimately, hot self-regulation (HSR) composites were calculated for 144 participants and cool self-regulation (CSR) composites were calculated for 136 participants. Twenty participants did not complete enough of the CCNES to calculate scale composite scores for mother’s responses to children’s negative emotions. Finally, 6 participants did not have scores on either the cognitive stimulation or respect of child’s autonomy items on the PCIRS, and thus stimulation of cognitive development scores could not be calculated for those items.

Key study variables were assessed for normality. Only mothers’ working memory and children’s HSR were normally distributed in our sample, as all other Kolmogorov-Smirnov tests of normality were significant at $p < .05$. Maternal emotion dysregulation, children’s emotional reactivity, and mothers’ unsupportive responses to children’s emotions were all highly positively skewed, whereas children’s effortful control was highly negatively skewed. Mothers’ reports of children’s emotional reactivity, effortful control, and their own unsupportive responses, as well as children’s CSR score were all highly leptokurtic. However, regression and mediation analyses were
conducted using bootstrapping, which do not assume normality. Preliminary analyses for
multicollinearity revealed that the assumption was not violated for the variables of
interest.

**Descriptive Statistics**

Descriptive statistics for study variables of interest and key sociodemographic
variables are presented in Table 1. There were 82 female child participants and 78 male
child participants, and independent samples t-tests were conducted to determine if there
were significant differences for male and female children across key study variables
(Table 2). Male and female children only significantly differed on scores of effortful
control on the CBQ-VSF, $t = -2.37, p = .019$, such that female participants had
significantly higher ratings of effortful control. In total, mothers endorsed that 55
children (34.4%) had been exposed (seen, heard, or experienced) to violence, and Table 3
compares means of key study variables by child violence exposure. Children who had
been exposed to violence were significantly more likely to perform worse on HSR tasks
on the PSRA, $t = 3.14, p = .002$. Additionally, mothers of children who had been
exposed to violence were significantly more likely to report unsupportive responses to
their children’s negative emotions, $t = -1.99, p = .049$. Finally, 134 mothers (83.8%)
endorsed having been exposed to violence themselves. Table 4 compares means of key
study variables by mother violence exposure. Only mothers’ ratings of their children’s
emotional reactivity on the CBCL significantly differed by mothers’ violence exposure, $t$
$= -2.69, p = .009$, such that mothers who were exposed to violence reported their children
to be more emotionally reactive.
Exploring Relations Between Hot and Cool Self-Regulation Tasks

Correlations between individual PSRA tasks were examined to determine if HSR and CSR composites constituted distinct constructs in this sample. Partial correlations between all PSRA tasks were computed, controlling for child age (Table 5). Results indicated that the balance beam task, which has been shown to load on a cognitive regulation factor along with the tower task and pencil tap tasks in several other studies in Head Start samples (Smith-Donald et al., 2007; Willoughby, Kupersmidt, & Voegler-Lee, 2012), was not significantly related to any of the other four tasks. Additionally, each of the remaining four tasks were significantly related to one another. A factor analysis was then conducted with the four tasks (excluding balance beam). The factor analysis was deemed appropriate with these tasks given that the Kaiser-Meyer-Olkin Measure of Sampling Adequacy value was greater than 0.6 (0.72) and the Bartlett’s Test of Sphericity was significant at $p < .001$. Results yielded only one factor, as only one factor had an eigenvalue greater than 1.0 (1.96), and that factor explained 48.9% of the variance. Component and communality coefficients are presented in Table 6 and a scree plot is presented in figure 5. The results of this factor analysis suggest that rather than having two distinct HSR and CSR constructs in this sample, these four tasks are likely tapping into one construct of self-regulation more generally.

While the HSR and CSR demonstrated poor psychometrics, we nonetheless examined these subscales in relation to other variables of interest; additionally, given the factor analytic findings suggesting a single, behavioral self-regulation factor, we additionally examined associations with a single PSRA self-regulation composite drawn from the tower, pencil tap, gift wrap, and snack delay tasks. The HSR composite was not
significantly correlated with maternal report of children’s emotional reactivity ($\rho = 0.03$, $p = .767$), nor was the CSR composite significantly correlated with maternal report of children’s effortful control ($\rho = 0.10$, $p = .255$), as they were hypothesized to, indicating that observed measures of child self-regulation did not correlate with the maternal reports of child self-regulation. Partial correlations, covarying for child age, were conducted between each of the four individual PSRA tasks and maternal reports of child’s emotional reactivity and effortful control. These results suggest that in our sample, in contrast to other samples with similar demographics, the behavioral PSRA data do not reflect two factors of hot and cool self-regulation, but rather capture one unitary measure of self-regulation. Additionally, in this sample, behavioral assessment of self-regulation did not correspond to parent-report measures of maternal and child self-regulation in this sample.

Given the partial correlations covarying for age and the results of the factor analysis, both of which indicated that the balance beam task is not related to the other four tasks, a single, unitary self-regulation score was computed by summing the remaining four tasks, however, this score was not significantly correlated with any of mothers’ emotion dysregulation, mothers’ working memory, children’s emotional reactivity, or children’s effortful control. However, this unitary measure of performance on behavioral self-regulation tasks will be included in place of the HSR and CSR scores in later analyses (Cronbach’s $\alpha = 0.65$).

**Bivariate Correlations**

Bivariate correlations of study variables of interest are also presented in Table 7. Correlations are presented in Spearman’s rho ($\rho$) as all key study variables were not normally distributed. Sociodemographic variables that significantly correlated with
outcome variables in any of the analyses were entered as covariates. As expected, maternal emotion dysregulation and children’s emotional reactivity were significantly correlated ($\rho = 0.41$, $p < .001$), such that the mothers’ higher ratings of their own dysregulation were associated with their rating their children as more emotionally reactive. Mothers with higher scores of emotion dysregulation were significantly more likely to engage in unsupportive reactions to their children’s negative emotions ($\rho = 0.30$, $p < .001$). As expected, children’s emotional reactivity was not significantly correlated with their effortful control ($\rho = 0.08$, $p = .341$), suggesting that emotion regulation and cognitive regulation are distinct constructs. However, contrary to hypotheses, children’s emotional reactivity was also not correlated with their observed HSR ($\rho = 0.03$, $p = .767$). Expectedly, children’s emotional reactivity was significantly correlated with mothers’ unsupportive reactions to children’s negative emotions ($\rho = 0.18$, $p = .033$) but not mothers’ stimulation of cognitive development ($\rho = -0.10$, $p = .224$), suggesting child emotion regulation is correlated with maternal emotion-focused parenting but not mothers’ cognitively stimulating parenting. Children’s HSR, designed to measure emotion regulation, was significantly correlated with their effortful control ($\rho = 0.19$, $p = .036$) and not their emotional reactivity ($\rho = 0.01$, $p = .879$), despite the inverse being expected.

Contrary to expectations, mothers’ working memory scores were not correlated with any other variables of interest, however, maternal emotion dysregulation was also significantly negatively correlated with children’s effortful control ($\rho = -0.19$, $p = .019$), indicating that mothers who reported more emotion dysregulation also reported lower effortful control in their children. Children’s effortful control was correlated with
mothers’ stimulation of cognitive development ($\rho = 0.17, p = .040$), but not mothers’ unsupported reactions to negative emotions ($\rho = 0.12, p = .152$), indicating a correlation between child cognitive regulation and cognitively stimulating parenting, but not emotion-focused parenting. Children’s CSR, designated as a measure of cognitive regulation, was not correlated with either effortful control ($\rho = 0.02, p = .813$) or emotional reactivity ($\rho = 0.10, p = .255$), despite being hypothesized to be correlated with effortful control. Children’s observed HSR and CSR were significantly correlated with one another ($\rho = 0.65, p < .001$). HSR and CSR were not significantly correlated with either maternal emotion dysregulation or working memory, nor were they correlated with either of the parenting processes.

Bivariate correlations were examined between sociodemographic variables and key study variables. Mothers’ level of educational attainment was not related to any of the key study variables. Interestingly, mothers’ verbal comprehension abilities, as assessed by the Woodcock-Johnson-III-Tests of Cognitive Abilities, was related to several key study variables. Unsurprisingly, mothers’ verbal comprehension abilities were correlated with their working memory abilities ($\rho = 0.52, p < .001$). Additionally, mothers’ verbal comprehension abilities were correlated with their use of cognitively stimulating parenting processes ($\rho = 0.35, p < .001$). Like with mothers’ verbal comprehension, children’s verbal comprehension, as assessed by the Peabody Preschool Vocabulary Test, was also significant ($\rho = 0.27, p = .002$). Children’s verbal comprehension was also related to effortful control scores ($\rho = 0.19, p = .022$), children’s CSR ($\rho = 0.26, p = .002$), and mothers’ use of cognitively stimulating parenting processes ($\rho = 0.33, p < .001$).
Mother and Child Emotion Regulation and Emotion-Focused Parenting

Hypothesis 1a was that maternal emotion dysregulation would be positively associated with child emotional reactivity above and beyond the effect of maternal working memory. The model predicting child emotional reactivity, with covariates (maternal verbal comprehension, maternal education level, maternal exposure to violence, child age, and child sex), maternal emotion dysregulation, and maternal working memory as predictors explained approximately 16% of the variance in child emotional reactivity ($R^2 = 0.16$, $F_{Δ}(2, 127) = 7.07$, $p = .001$; see Table 8). As expected, maternal emotion dysregulation was a significant predictor of increased child emotional reactivity ($b = 3.68$, SE = 0.98, $t = 3.76$, $p < .001$).

Hypothesis 1b was that there would be an indirect effect of mothers’ unsupportive responses to their children’s negative emotions on the relation between maternal emotion dysregulation and child emotional reactivity. Contrary to expectations, there was no indirect effect of unsupportive responses on the relation between mothers’ emotion dysregulation and children’s emotional reactivity ($b = 0.01$, 95% CI [-0.30, 0.46]; see Figure 6).

Given that we saw significant bivariate correlations between maternal emotion dysregulation, mothers’ unsupportive parenting responses, and children’s emotional reactivity, but did not observe a significant indirect effect, correlations between the DERS, children’s emotional reactivity, and the three subscales of mothers’ unsupportive responses were examined (see Table 9) to determine if separate aspects of unsupportive parenting response styles are related to mother and child emotion regulation. As noted, mothers’ emotion dysregulation was significantly correlated with children’s emotional
reactivity. However, only one of the three subscales of mothers’ unsupportive responses were related children’s emotional reactivity; specifically, mothers’ minimization of their children’s negative emotions was related to children’s emotional reactivity ($\rho = 0.19, p = .030$). Interestingly, mothers’ minimization of their children’s negative emotions was not significantly correlated with mothers’ emotion dysregulation; however, the other two subscales of mothers’ unsupportive responses, responding with distress ($\rho = 0.30, p < .001$) and responding with punishment ($\rho = -0.17, p = .048$), were correlated with mothers’ emotion dysregulation. As such, it appears that while the unsupportive responses composite score was related to both maternal and child emotion regulation, separate subscales of indirect responses related to each. Specifically, maternal emotion dysregulation was related to maternal self-report of responding to children with distress or punishment, whereas children’s parent-reported emotional reactivity was associated with mothers’ minimization of their children’s negative emotions.

**Mother and Child Cognitive Regulation and Cognitively Stimulating Parenting**

Hypothesis 2a was that maternal working memory would positively predict child effortful control above and beyond the effect of maternal emotion dysregulation. The model predicting child effortful control, with covariates (maternal verbal comprehension, maternal education level, maternal exposure to violence, child age, and child sex), maternal emotion dysregulation, and maternal working memory as predictors explained approximately 7% of the variance in child effortful control and was not significant ($R^2 = 0.07, F(2, 128) = 2.22, p = .120$; see Table 10). Contrary to the hypothesis, maternal working memory was not a significant predictor of increased child effortful control ($b = 0.01, SE = 0.01, t = 1.22, p = .226$).
Hypothesis 2b was that there would be an indirect effect of mothers’ stimulation of cognitive development and autonomy on the relation between maternal working memory and child effortful control. However, there was no indirect effect of unsupportive responses on the relation between maternal working memory and children’s emotional reactivity ($b < 0.01$, 95% CI [-0.00, 0.01]; see Figure 7).

**Behavioral Performance Measures of Children’s Self-Regulation**

Hypothesis 3 was that the same pattern of results that were observed in hypotheses 1 and 2, would be demonstrated when using observed, performance-based measures of children’s emotion regulation and cognitive regulation. However, we did not find support for a two-factor (emotion regulation and cognitive regulation) model of the PSRA, and rather partial correlations and a factor analysis revealed a single, unitary factor. As such, rather than re-running analyses with the emotion and cognitive factors, as hypothesized, analyses were conducted with the unitary measure of performance on behavioral self-regulation tasks. First, we explored whether either maternal emotion dysregulation or working memory predicts children’s performance on behavioral self-regulation tasks, when controlling for maternal verbal comprehension, maternal education level, maternal exposure to violence, child age, and child sex (see Table 11). Results revealed that the total model explained only 2% of the variance ($R^2 = 0.19$, $F (6, 103) = 4.03$, $p = .001$), and maternal emotion dysregulation and working memory only added 1% of the explained variance ($R^2 \Delta = 0.01$, $F\Delta (2, 103) = 0.82$, $p = .444$). Neither maternal emotion dysregulation ($B = 0.45$, $t = 1.00$, $p = .319$), nor working memory ($B = 0.02$, $t = 0.97$, $p = .334$) significantly predicted children’s performance on behavioral self-regulation tasks.
Additionally, we examined the hypothesized mediational pathways explored in the previous hypotheses. Specifically, there would be indirect effects of mothers’ emotion-focused parenting and cognitively stimulating parenting processes of relations between mothers’ emotion regulation and cognitive regulation and children’s performance on behavioral self-regulation tasks. In the model examining an indirect effect of unsupportive parenting responses on a relation between maternal emotion dysregulation and children’s performance on behavioral self-regulation tasks, we did not observe significant direct ($b = 0.43, p = .322$) or indirect effects ($b = 0.003, 95\% CI [-0.16, 0.21]$; see Figure 8). Likewise, in the model examining a potential indirect effect of mothers’ use of cognitively stimulating parenting processes on the relation between maternal working memory and children’s performance on behavioral self-regulation tasks, we did not observe significant direct ($b = 0.01, p = .503$) or indirect effects ($b = 0.004, CI [-0.001, 0.01]$; see Figure 9).

**Discussion**

The aim of the current study was to examine the relations between mothers’ emotion regulation and cognitive regulation abilities with those of their children, as previous research has established a strong and consistent link between parental and child self-regulatory abilities (Deater-Deckard, 2014). It was hypothesized that mothers’ emotion regulation abilities would be positively related to their children’s emotion regulation abilities, and that mothers’ cognitive regulation abilities would be positively related to their children’s cognitive regulation abilities. Additionally, given that researchers have argued that emotion regulation and cognitive regulation are interdependent yet distinct domains of self-regulation (Brock et al., 2009; Metcalfe &
Mischel, 1999), and that distinguishing between the domains provides for a more precise understanding of self-regulation (Nigg, 2017; Zelazo & Muller, 2002), the current study aimed to explore whether mothers’ emotion regulation would predict children’s emotion regulation above and beyond the effect of mothers’ cognitive regulation, and vice versa.

Finally, based on Morris et al.’s (2007) tripartite model of the intergenerational transmission of self-regulatory capacities, this study examined whether mothers’ parenting processes would be a mechanism by which mothers’ emotion regulation and cognitive regulation relate to their children’s regulatory abilities. Specifically, it was hypothesized that mothers’ emotion-focused parenting, such as unsupportive response style to children’s negative emotions, would mediate the proposed relation between mothers and children’s emotion regulation. Likewise, it was hypothesized that parenting processes that stimulate children’s cognitive growth and autonomy would mediate the proposed relation between mothers and children’s cognitive regulation. This study was the first to examine these questions in the context of high sociodemographic risk factors and only the second in a sample of preschool children specifically.

**Mother and Child Emotion Regulation and Emotion-Focused Parenting Processes**

Results of this study provide support for the underlying assumption that mother’s emotion regulation abilities are strongly positively correlated with the emotion regulation abilities of their children. This, of course, is consistent with the majority of the literature examining parent report of child emotion regulation (Buckholdt et al., 2014; Morelen et al., 2016). We also found that mothers’ emotion regulation predicted children’s emotion regulation above and beyond the effect of mothers’ cognitive regulation. Additionally, and as expected, we saw a strong correlation between mothers’ emotion regulation
abilities and their use of emotion-focused parenting processes, as measured by unsupportive responses to their children’s negative emotions. Furthermore, mothers’ use of unsupportive responses to their children’s negative emotions was also positively correlated with maternal report of children’s emotion regulation.

Contrary to predictions, we did not find support for the hypothesis that mothers’ unsupportive responses to children’s negative emotions would be a mechanism by which emotion regulation abilities are transmitted from mothers to their children. The lack of indirect effects is inconsistent with the tripartite model of the intergenerational transmission of emotion regulation proposed by Morris and colleagues (2007), and then later added to by Calkins (2011) who proposed this model also applies to cognitive regulation as well. Additionally, it is inconsistent with the findings from other studies that have looked at related parenting processes as potential mediators of the relation between parent and child emotion regulation and cognitive regulation (Buckholdt et al., 2014; Gunzenhauser, Fäsche, Friedlmeier, & von Suchodoletz, 2014; Kim & Kim, 2018; Li et al., 2019; Morelen et al., 2016; Saritaş, Grusec, & Gençöz, 2013). However, we did find support for part of the model, specifically that mothers’ difficulty with emotion regulation positively predicted children’s difficulty with emotion regulation, and that both were positively related to mothers’ use of unsupportive responses to their children’s emotions.

One potential explanation for why we did not observe the expected mediation is that specific dimensions of unsupportive parenting responses seem to differentially relate to mother and child emotion regulation. Given that there were significant relations between mothers’ emotion regulation, children’s emotion regulation, and emotion-
focused parenting processes, but the expected indirect effect of those parenting processes on the relation between mother and child emotion regulation was not significant, subscales of mothers’ emotion-focused parenting were examined. It was found that children’s emotional reactivity was only related to the minimization subscale of mothers’ unsupportive responses to their children’s negative emotions, whereas mother’s emotion dysregulation was only related to the distress reactions and punitive reactions subscales of mothers’ unsupportive responses. As such, it may be that it is important for mothers to regulate their own emotions before responding to their children as to avoid responding reactively and with their own distress or by punishing the child for having negative emotions. However, it may be that the unsupportive parenting response that is more impactful to children’s own emotional reactivity is when their mothers minimize, discredit, or invalidate their emotions.

Additionally, the current study is the first study to test this model of unsupportive responses to children’s emotions as a mediator of intergenerational transmission of emotion regulation is a high sociodemographic risk sample. More specifically, the sample for the current study is the only one that was high in violence exposure, low-income, or primarily racial minority status participants. However, much is known about self-regulation and parenting in such samples more generally. Child rearing and child development in the context of high sociodemographic risk may have additionally complexities due to structural barriers, discrimination, and community violence that are not present in the samples of the other studies that have examined this model. It may be that in these contexts, parents who respond in more reactive, frustrated, and angry ways to their children may actually socialize their children to emotion regulation in ways that
are adaptive in the short-term given their environment, but have negative effects for long-term functioning in broader society (McLoyd, 1990). Additionally, it is important to consider that the parenting processes that parents engage in to socialize their children and the way in which their children understand those parenting processes are both shaped by the culture and context that they are in (García Coll et al., 1996). As such, it may be that parenting processes that mediate intergenerational emotion regulation in other samples, such as responding to children with distress and punishment, are not as salient in this sample. Therefore, not only would it be difficult to compare behaviors in a sample of mostly African American families in low-income and high violence contexts with a predominantly White and middle-class body of research, it may also be misleading, as behaviors that may be considered maladaptive in one context may be adaptive in a higher risk context.

**Mother and Child Cognitive Regulation and Cognitively Stimulating Parenting Processes**

Contrary to expectations, we did not see similar relations between mother and child cognitive regulation abilities as we did for mother and child emotion regulation abilities. Mothers’ cognitive regulation, as operationalized as working memory scores on a cognitive test, did not predict maternal report of children’s cognitive regulation; however, as expected, neither did mothers’ emotion regulation. Additionally, mothers’ cognitive regulation was unrelated to their use of cognitively stimulating parenting processes despite being observed in other studies (Chico et al., 2014; Cumberland-Li et al., 2003; Musser, Kaiser-Laurent, & Ablow, 2012b). However, as expected, maternal reports of children’s cognitive regulation were significantly correlated with mothers’ use
of cognitively stimulating parenting processes – specifically, mothers’ stimulation of
cognitive development during a parent-child interaction was associated with higher
effortful control in her child. We did not find support for our hypothesis that mothers’
stimulation of cognitive development would be a mechanism of transmission for the
relation between mothers’ and children’s cognitive regulation, given that there was no
relation between mothers’ and children’s cognitive regulation in this sample.

Given that these relations have been otherwise observed consistently throughout
the literature (Brieant, Holmes, Deater-Deckard, King-Casas, & Kim-Spoon, 2017b;
Cuevas et al., 2014; Deater-Deckard, 2014), it was unexpected that we did not see the
same in our sample. One possible explanation for why we did not observe this expected
relation is due to how mothers’ cognitive regulation was operationalized for this study.
In this study, mothers’ cognitive regulation was operationalized as a working memory composite score from a well-respected test of cognitive abilities. While it is common to use working memory scores to measures adults’ executive functioning abilities, parents’ working memory scores have been shown to relate to their children’s self-regulation and their own parenting practices independent of inhibitory or attentional control measures, controlling for other cognitive abilities (Deater-Deckard, Sewell, Petrill, & Thompson, 2010). Additionally, Kim and colleagues (2017) specifically utilized mothers’ working memory scores as their measure of their executive functioning in their study of intergenerational cognitive regulation. However, relying solely on tests of working memory was likely too limited of a measure of cognitive regulation in this study. Cognitive regulation capacities are thought to be comprised of working memory, inhibitory control, and attentional control (Diamond, 2013), and as such, the majority of
studies that use working memory measures supplement them with more robust measures as well (Bridgett, Kanya, Rutherford, & Mayes, 2017; Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013; Jester et al., 2009). Therefore, working memory does not seem to be an adequate measure of cognitive regulation as conceptualized in this study.

However, this current study did find relations between mothers’ use of stimulation and promotion of child’s autonomy with maternal report of children’s cognitive regulation, as was predicted. Additionally, mothers’ use of cognitively stimulating parenting processes also predicted children’s performance on self-regulation behavioral tasks. These findings suggest that the more mothers are able to attend to their children, promote their cognitive development directly, and foster their autonomy to solve problems on their own, the better the children are able to intentionally shift their attention and cognitive control when needed. These findings are consistent with several studies of parenting processes and children’s cognitive regulation (e.g., Bernier, Carlson, & Whipple, 2010; Blair, Raver, & Berry, 2014; Spinrad & Eisenberg, 2007). However, it may be that with a more robust measure of mothers’ cognitive regulation, findings would have mirrored those of the emotional regulation analyses, such that mothers’ cognitive regulation would have shown the relations seen in the literature to their parenting processes and children’s cognitive regulation (Cuevas et al., 2014; Cumberland-Li et al., 2003; Deater-Deckard et al., 2010; Deater-Deckard, Wang, Chen, & Bell, 2012; Valiente et al., 2007). Another potential explanation for why the cognitive regulation analyses did not mirror those of the emotion regulation analyses is that the emotion regulation constructs were all measured via mothers’ self-report, whereas the cognitive regulation constructs were assessed using observational and self-report methods. As such, it may be
that shared method variance may account for some of the relations between the emotion regulation constructs that are not seen for the cognitive regulation constructs.

**Differences in Maternal Report and Performance-Based Measures of Child Self-Regulation**

A final goal of this study was to examine how maternal report of children’s emotion regulation and cognitive regulation compares to performance-based, behavioral measures of children’s emotion regulation and cognitive regulation. Children’s performance on behavioral tasks was measured using the Preschool Self-Regulation Assessment (PSRA), which was intended to measure behavioral emotion regulation and cognitive regulation. In this sample however, we did not find evidence for a two-factor model of self-regulation in contrast to previous reports using the same measure with similar populations (Brock et al., 2009; Metcalfe & Mischel, 1999; Willoughby & Carolina, 2011). Of the five behavioral tasks, two were expected to load onto a hot self-regulation (HSR) measure of emotion regulation, and three were expected to load onto a cool self-regulation (CSR) measure of cognitive regulation. However, in this study, one of the CSR tasks, balance beam, was unrelated to any of the other CSR tasks, and the other four tasks were all correlated to one another, regardless of their classification as CSR or HSR. A factor analysis without the balance beam task revealed only one factor with all of the remaining four tasks included. Additionally, these tasks were not related to mothers’ emotion regulation or cognitive regulation, nor were they related to maternal report of children’s emotion regulation or cognitive regulation.

The above method by which children’s observed behavioral measures of emotion regulation and cognitive regulation were assessed via the Preschool Self-Regulation Assessment.
Assessment (PSRA) marks a potential limitation of this study. The use of a two factor stratification of children’s performance on behavioral self-regulation tasks to assess emotion regulation and cognitive regulation abilities is not unique to this study (Brock et al., 2009; Metcalfe & Mischel, 1999; Smith-Donald et al., 2007; Willoughby & Carolina, 2011), however it does appear that this distinction between hot and cool self-regulation was not as defined in this sample as in previous studies. Given the high interrelatedness of the individual tasks, it may be that the tasks actually measured a unitary self-regulation construct in this sample. For example, it may be that tasks designed to be emotional in nature still relied on children’s attention and working memory, and tasks that were designed to be cognitive in nature had also had elements that were emotionally evocative.

Given the support for the single, unitary self-regulation construct, key study analyses were run with the unitary measure, rather than the two emotional and cognitive factors. However, mothers’ emotion dysregulation and cognitive working memory scores did not predict children’s performance on this unitary self-regulation measure. Additionally, we did not find support for the originally hypothesized mediational models whereby mothers’ emotion regulation and cognitive regulation would predict children’s performance on behavioral self-regulation tasks via emotion-focused and cognitively stimulating parenting processes, respectively. Furthermore, children’s performance on behavioral self-regulation tasks was not significantly related to mothers’ emotion regulation and cognitive regulation, nor was it related to mothers’ use of emotion-focused or cognitively stimulating parenting processes, which was unexpected and is inconsistent with previous research. Numerous studies have shown relations between parents’ emotion regulation and cognitive regulation and children’s observed performance on
behavioral self-regulation tasks (see Bridgett et al., 2015 for a review). Additionally, several studies have shown relations between emotion-focused parenting practices and children’s observed self-regulation (Binion & Zalewski, 2018; Cumberland-Li et al., 2003; Morelen et al., 2016; Song, Miller, Leung, Lumeng, & Rosenblum, 2018). It is possible that these behavioral self-regulation tasks did not measure the constructs we intended them to measure in this sample, especially given that they were not related to maternal report of children’s self-regulation capacities. However, it should be noted that raw scores for the PSRA tasks in this study were comparable to raw scores from other studies (Brock et al., 2009; Denham et al., 2012; Smith-Donald et al., 2007; Willoughby & Carolina, 2011), suggesting that the children in our sample understood the tasks and performed similar to their counterparts from other studies. Additionally, it is possible that behavioral tasks such as the ones found in the PSRA are highly dependent on other factors apart from cognitive regulation, such as gross and fine motor skills, global cognitive abilities, and experience and familiarity with the objects used in the tasks.

**Strengths and Limitations**

The current study is the first to examine specific parenting processes as mechanisms for the intergenerational transmission of self-regulation in a high sociodemographic risk population of mothers and their preschooler-aged children. In fact, it is one of only a few studies of this kind to examine these processes in a sample other than White middle-class families. As such, the majority of this literature is not generalizable to more diverse and low socioeconomic status populations, such as the sample in this current study. Additionally, it is the only known study to explore specificity between emotion and cognitive regulatory abilities and parenting processes.
This study also entered the conversation regarding intergenerational transmission of self-regulation at a time when the discussion in the field has turned to exploring potential parenting processes that underly the transmission of self-regulation, and as such, this study is on the forefront of asking these mechanistic questions.

A major limitation of this study is that it is cross-sectional and correlational in nature, and therefore we cannot assume cause and effect relations. This is especially problematic in a study of intergenerational transmission of self-regulation, as it would not allow for us to conclude that a dysregulated mother precedes a dysregulated child. Indeed, it is likely that the relation is bidirectional and that dysregulation in either the parent or child may lead to dysregulation in the other. Additionally, the ability to draw cause and effect inferences is necessary for true mediational analyses, and as such, longitudinal designs are preferable. While there is still utility to assessing indirect effects with cross-sectional data (Hayes, 2009), others argue that estimates of indirect effects from cross-sectional data are often misleading as compared to longitudinal data (Maxwell & Cole, 2007). Though this current study is in line with the majority of studies in the literature on intergenerational self-regulation, future studies would benefit from assessing these relations longitudinally to allow for a true analysis of cause and effect.

An additional limitation of this study is that we were not able to control for the length of time children were enrolled in early childhood education programming. Research has shown that early childhood education is linked to improvements in children’s self-regulation (Fuhs, Farran, & Nesbitt, 2013; Williford, Vick Whittaker, Vitiello, & Downer, 2013). Therefore, it may be that participation in preschool accounts for a portion of children’s self-regulation development in addition to the parenting
behaviors examined in this study. Additionally, our sample was not a clinical sample and thus findings should be interpreted with caution when referring to a clinical population. Relatedly, in our sample, mothers’ ratings of emotion dysregulation were low, and while the measure does not provide a clinical cutoff point, the mean rating was 1.80 on a 4-point Likert scale (1-4). Furthermore, mothers’ ratings of the children’s emotional reactivity were also low with a standard score of 53.15, well short of the clinically significant cutoff score of 70. As such, it may be that our sample did not have the variability in emotion dysregulation needed to see significant effects of mechanisms of intergenerational transmission of self-regulation. Additionally, this study did not assess for additional psychological stressors that may impact parents’ ability to regulate themselves. For example, while the sample was all low-income and exposure to violence was controlled for, mothers’ perception of distress was not accounted for. As self-regulation is often thought of as a finite resource, it may be that some parents may typically have strong regulatory skills but when faced with significant stressors, their capacities to regulate themselves become overwhelmed.

The majority of the research, as well as the measures used here, were developed with predominantly White, middle-class samples. As our sample is predominantly African American, it may be that measures of constructs in our study do not accurately account for cultural differences. For instance, emotion regulation has been shown to differ across cultures in terms of both process (Matsumoto et al., 2008; Potthoff et al., 2016) and consequences and attitudes toward regulating emotions (Butler, Lee, & Gross, 2007; Qu & Telzer, 2017). Additionally, research has suggested that coders are more likely to rate African American mothers higher in unsupportive parenting practices than
White mothers, yet those practices are less likely to produce maladaptive outcomes in African American children than in is seen for White children (Labella, 2018). Therefore, it is likely that our measures of these parenting processes are not appropriate for African American populations, as behaviors that may be thought of as unsupportive in White families are likely not unsupportive in African American families. Finally, Harvey (2009) notes that observers are more likely to be biased in their ratings of parent-child interactions if there is an ethnic or racial mismatch between the observer and the participants. In the current study, the trained coders were White, non-Hispanic, which would be a mismatch with a majority of our sample. Therefore, the subjective ratings of parenting behaviors were likely influenced by implicit biases among the White coders, and as such, their ratings should be viewed with caution. For future studies, researchers should try to alleviate this problem by recruiting more diverse coders and research assistants, as well as offering trainings on implicit biases.

Another limitation of the current study may be relying solely on mothers’ working memory scores as a measure of cognitive regulation, as well as behavioral measures of children’s self-regulation. Future research may benefit by turning to self- and parent-report measures instead of performance-based measures. As mentioned, cognitive regulation is typically assessed using performance-based measures, specifically measures of working memory and inhibition. However, Spiegel and colleagues (2017) note that these performance based measures are not as ecologically valid when assessing these cognitive self-regulatory abilities as they are for emotionally-driven self-regulation. They argue this is due to the fact that performance-based measures are situational and highly constrained, rather than generalizable to the real world. In a study comparing
performance-based and rating scale measures of cognitive regulation, Toplak, West, and Stanovich (2013) found only small congruence between the two types of measures. As such, it is recommended that behavioral rating scales should be used to allow for more ecologically valid interpretations of cognitive regulation scores (Barkley & Murphy, 2010).

Alternatively, rating scales may not be the best measures of parenting processes. Research has shown that when rating their own parenting processes and styles, parents are more likely to rate themselves based on how they believe they should behave towards their children, rather than how they actually behave (Klimes-Dougan & Zeman, 2007; O’Neal & Magai, 2005). In the current study, mothers’ response to children’s emotions was measured via mothers’ own ratings. It may be that observational measures of how mothers respond to their children may have been a more accurate measure than their own self-report. Just as cognitive stimulation and promotion children’s autonomy was assessed via observations of parent-child interactions, future research would benefit from emotion socialization behaviors observationally.

Finally, it should be noted that it is possible that some of our data were not missing at random, and the missing data may have significantly the results. Specifically, the two key study variables that were missing the most responses were mothers’ working memory scores and children’s behavioral performance on the pencil tap task. Mothers’ working memory scores were missing due to being lost to follow-up, which may be a function of those mothers having greater difficulty with cognitive regulation, and children’s pencil tap scores were missing primarily due to their inability to demonstrate understanding of the task. Both of these tasks are thought to assess cognitive regulation,
and both may be missing due to mothers and children’s difficulties with cognitive regulation.

**Future Directions**

Future research would benefit from exploring more specific parentings processes that may facilitate the transmission of emotion regulation and cognitive regulation. This study, like many other studies of parenting processes and parent and child self-regulation (Bridgett et al., 2015; Leerkes, Bailes, & Augustine, 2020), have found relations between how parents respond to their children’s emotionality and their own emotion regulation, as well as their children’s emotion regulation. Specifically, it seemed that mothers’ invalidation and minimization of children’s emotions was more proximal to children’s emotion regulation than distressed and punitive responses. However, there are likely other parenting processes that serve to model for and socialize children to self-regulation. For example, little is known about the effects of parents’ use of avoidance in response to children’s distress. It may be that parents model for and socialize their children to avoid distress by either ignoring their children when they are upset or by explicitly teaching their children to avoid stressful situations. Finally, future research should also explore how parents respond to and socialize their children to other emotions as well, such as joy and excitement. For example, it would be beneficial to examine parents’ sensitivity and responsiveness to children’s bids for attention beyond simply their responses to children’s negative emotions.

Furthermore, few studies of parent and child self-regulation and parenting processes examine the role of sociodemographic risk factors. In this current study, mothers of children exposed to violence exhibited more unsupportive responses to
children’s negative emotionality than did mothers of children not exposed to violence, and children of mothers exposed to violence were more emotionally reactive than children of mothers not exposed to violence. It may be that increased stress due to factors such as poverty, violence exposure, and discrimination, lead to parents having a more difficult time recruiting the resources to regulate their emotions in a way that allows them to engage in sensitive and responsive parenting behaviors, which in turn has implications for children’s own regulation. This is consistent with previous research which suggests that parents’ abilities to regulate their emotions mediates the effect that psychological distress has on sensitive and responsive parenting in a sample of low-income, violence-exposed parents (Carreras et al., 2019). Future research should more explicitly examine the role of sociodemographic risk factors that affect parental stress.

Finally, while all of these parenting processes have been shown to be significant in the literature, they operate in tandem with the genetic influences of intergenerational self-regulation. As this current study did not assess for genetic factors, future research should incorporate studies of behavioral and molecular genetics to continue to parse out the contribution of environmental and genetic factors related to intergenerational transmission of self-regulation. Additionally, future research should explore the role of gene-by-environment interaction with regards to the role of parenting, as the genes that contribute to parents’ self-regulation abilities and may be inherited by their children may also be responsible for affecting their parenting processes. Therefore, a parent may be genetically predisposed to poor self-regulation abilities, which has an adverse effect on their ability to engage in the kinds of parenting processes that have been shown to relate to positive self-regulation outcomes for children. As a result, their children may not only
inherit that same genetic predisposition, but also be raised in the context of less adaptive parenting processes. Future research could explore whether being raised in the context of less adaptive parenting processes would lead to the expression of that genetic predisposition to poor self-regulation, as well as whether positive parenting processes would buffer a genetic predisposition to poor self-regulation.

**Clinical Implications**

The finding that mothers’ emotion regulation is related to children’s emotion regulation and emotion-focused parenting processes highlights the importance of targeting mothers’ emotion regulation skills and mothers’ approach to responding to their children – and specifically their minimization of children’s negative emotions. It may be that mothers are both modeling their own emotion regulation skills for their children and socializing them more directly through their responses. Interventions may benefit first through parent education focusing on improving mothers’ ability to regulate their emotions, for example, by working to increase impulse control, enhance awareness, and provide regulatory strategies. Mindfulness has been shown to improve not only emotion regulation abilities, but also cognitive regulation skills such as attention shifting (Hölzel et al., 2011). Additionally, several clinical studies have shown effectiveness in using dialectical behavioral therapy to improve emotional regulation specifically for parents (Ben-Porath, 2010). Furthermore, in an effort to aid in improving mothers’ emotion regulation, clinicians can focus on other stressors that inhibit their ability to regulate effectively, such as their own childhood stressors, managing large households, inter-partner conflict, and more.
Additionally, interventions should target parent-child interactions by focusing on enhancing specific parenting processes. The current study showed support for a relation between emotion socialization responsive parenting and children’s emotion regulation. According to Spinrad, Morris, and Luther (2020), this line of research suggests that promoting mothers’ expression of their own emotion, supportive responses to their children’s emotions, and open discussion about emotion would benefit emotion socialization parenting. Katz and colleagues (2020) demonstrated that an emotion coaching intervention, in which mothers were taught emotion regulation skills, how to identify opportunities for emotional intimacy and teaching with child, how to validate and talk about children’s emotions, and how to reduce anger and reactivity when children present with negative emotions, was effective in improving how mothers responded to their children’s emotionality and the quality of parent-child interactions as whole. However, they did not examine whether these improvements in parenting led to improvements in children’s emotion regulation as well. Results of the current study suggest that interventions that improve mothers’ responsiveness to children’s emotions may also lead to improvement in children’s emotion regulation.

The results of this current study also show that mothers’ use of cognitive stimulation and autonomy promotion were related to children’s cognitive regulation. This finding suggests that interventions that aid in parents’ abilities to stimulate and promote their children’s cognitive development and autonomy may be beneficial in improving children’s cognitive regulation capacities. Numerous interventions have been used to help parents to engage in parenting processes that promote their children’s cognitive development, such as parenting classes, behavioral coaching, in-home
coaching, and more. In a Head Start sample similar to that of this current study, one study demonstrated that parenting classes that promote cognitively stimulating parenting practices should: stress the importance of parent-child interactions on cognitive and academic development, teach parents how to play at home with their children, provide activities for parents to engage in that promote cognitive development, and teach parents how to best arrange their home environment (Chang et al., 2009). More intensive interventions, such as the Healthy Steps program, have also been shown to be effective in promoting cognitively stimulating parenting processes. Healthy Steps provides parents behavioral coaching from child development specialists by phone and through in-home visits, as well as written educational information and parenting groups (Minkovitz, Strobino, Hughart, Scharfstein, & Guyer, 2001). Finally, research has shown that the efficacy of these interventions tend to “wear off” after the intervention concludes (Tucker-Drob & Harden, 2012); therefore, we should work to integrate these interventions into educational and/or pediatric care to prolong exposure throughout childhood. Results of this current study indicate that not only are these interventions important for children’s cognitive development broadly, but for their cognitive regulation capacities more specifically as well.

**Conclusion**

In conclusion, the current study examined associations between mother and child emotion and cognitive regulation. It explored whether emotion-focused and cognitively stimulating parenting processes may explain a theorized intergenerational transmission of self-regulation, and whether they were specific to emotion regulation and cognitive regulation. Results demonstrated that mothers’ emotion regulation was related to both
child emotion regulation and mothers’ use of emotionally laden parenting processes. Specifically, higher maternal ratings of her own emotion dysregulation were associated with higher levels of child dysregulation, as well as with unsupportive parenting responses to children’s negative emotions. However, we did not observe unsupportive responses to mediate the relation between mothers and children’s emotion regulation. Further exploration revealed that it may be that mothers’ emotion regulation is predictive of reactive and punitive responses, but that those response styles are not related to children’s emotion regulation. Rather, mothers’ use of minimizing and invalidating responses seems to be associated with children’s emotion dysregulation. Mothers’ cognitive regulation was not predictive of children’s cognitive regulation, nor were either related to mothers’ use of cognitively stimulating parenting processes. However, this may be due to how mothers’ cognitive regulation was measured in this study. Still, mothers’ cognitive stimulation during an interaction with her child was associated with her report of her child’s effortful control, as well as children’s observed self-regulation. Finally, we did not observe the expected emotional and cognitive two-factor model of our performance-based behavioral self-regulation tasks, and instead results indicated a single, unitary construct of self-regulation for our tasks. Ultimately, results of this study provide partial support for the intergenerational transmission of self-regulation in a high sociodemographic risk sample and suggest the need for further study of parenting processes that may contribute to that transmission.
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Appendix

Figure 1. Hypothesis 1a: Maternal emotion dysregulation will positively predict child emotional reactivity above and beyond the effect of maternal working memory.

Figure 2. Hypothesis 1b. Unsupportive responses to children’s emotions mediates the relation between mothers’ emotion dysregulation and children’s emotional reactivity.
Figure 3. Hypothesis 2a: Maternal working memory will positively predict child effortful control above and beyond the effect of maternal emotion dysregulation.

Figure 4. Hypothesis 2b. Stimulation of cognitive development mediates the relation between mothers’ working memory and children’s effortful control.
Table 1. Descriptive statistics of key variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DERS Total</td>
<td>155</td>
<td>1.80</td>
<td>0.53</td>
<td>2.42</td>
<td>1.04</td>
<td>0.68</td>
</tr>
<tr>
<td>WJ Working Memory</td>
<td>139</td>
<td>95.75</td>
<td>12.06</td>
<td>68.00</td>
<td>0.28</td>
<td>0.57</td>
</tr>
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<td>CBCL Emotionally Reactive</td>
<td>155</td>
<td>53.15</td>
<td>6.03</td>
<td>33.00</td>
<td>2.09</td>
<td>5.89</td>
</tr>
<tr>
<td>CBQ- VSF Effortful Control</td>
<td>148</td>
<td>5.03</td>
<td>1.06</td>
<td>6.00</td>
<td>-1.08</td>
<td>2.46</td>
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<td>PSRA HSR</td>
<td>144</td>
<td>-0.04</td>
<td>1.10</td>
<td>5.78</td>
<td>-0.18</td>
<td>0.41</td>
</tr>
<tr>
<td>PSRA CSR</td>
<td>136</td>
<td>0.13</td>
<td>1.65</td>
<td>5.33</td>
<td>-0.30</td>
<td>-0.91</td>
</tr>
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<td>127</td>
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<td>9.87</td>
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<td>CCNES Unsupportive Reactions</td>
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<td>4.88</td>
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<td>-0.51</td>
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<td>0.95</td>
</tr>
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<td>Child Age (months)</td>
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<td>51.51</td>
<td>9.19</td>
<td>36.00</td>
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<td>-0.89</td>
</tr>
<tr>
<td>Mother Age (years)</td>
<td>159</td>
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<td>26.00</td>
<td>0.75</td>
<td>0.10</td>
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**Table 2.** Key variables by child sex.

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<th>Variable</th>
<th>Sex</th>
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<th>SD</th>
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<td>CBCL Emotionally Reactive</td>
<td>male</td>
<td>74</td>
<td>52.82</td>
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<tr>
<td></td>
<td>female</td>
<td>79</td>
<td>53.46</td>
<td>6.27</td>
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<tr>
<td>CBQ- VSF Effortful Control*</td>
<td>male</td>
<td>74</td>
<td>4.83</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>74</td>
<td>5.23</td>
<td>0.96</td>
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<tr>
<td>PSRA HSR</td>
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<td>71</td>
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<tr>
<td></td>
<td>female</td>
<td>73</td>
<td>0.19</td>
<td>1.68</td>
</tr>
<tr>
<td>PSRA CSR</td>
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<td>66</td>
<td>0.14</td>
<td>1.74</td>
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<td>70</td>
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<td>1.57</td>
</tr>
<tr>
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<td>0.11</td>
<td>2.78</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>64</td>
<td>0.59</td>
<td>2.72</td>
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<tr>
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<td>male</td>
<td>69</td>
<td>3.69</td>
<td>0.68</td>
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<tr>
<td></td>
<td>female</td>
<td>71</td>
<td>3.75</td>
<td>0.72</td>
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<tr>
<td>PCIRS Cognitive Stimulation</td>
<td>male</td>
<td>76</td>
<td>3.70</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>female</td>
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<td>3.78</td>
<td>0.94</td>
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*Note* *t*-test significant at *p* < .05
Table 3. Key variables by child violence exposure.

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<td>DERS Total</td>
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<tr>
<td></td>
<td>Yes</td>
<td>53</td>
<td>1.82</td>
</tr>
<tr>
<td>WJ Working Memory</td>
<td>No</td>
<td>91</td>
<td>94.57</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>48</td>
<td>97.98</td>
</tr>
<tr>
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<td>100</td>
<td>52.65</td>
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<td></td>
<td>Yes</td>
<td>53</td>
<td>54.09</td>
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<td>CBQ-VSF Effortful Control</td>
<td>No</td>
<td>98</td>
<td>4.97</td>
</tr>
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<td></td>
<td>Yes</td>
<td>50</td>
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<tr>
<td>PSRA HSR</td>
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<td>97</td>
<td>0.18</td>
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<td>Yes</td>
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<td>-0.19</td>
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<td>PSRA CSR</td>
<td>No</td>
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<td>0.02</td>
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<td>CCNES Unsupportive Reactions*</td>
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<td></td>
<td>Yes</td>
<td>47</td>
<td>3.88</td>
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<td>53</td>
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Note * t-test significant at $p < .05$, *** $p < .001$
Table 4. Key variables by mother violence exposure.

<table>
<thead>
<tr>
<th>Mother Exposure</th>
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<th>SD</th>
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<tbody>
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<td>DERS Total</td>
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<td>1.66</td>
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<tr>
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<td>129</td>
<td>1.82</td>
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<tr>
<td>WJ Working Memory</td>
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<td>24</td>
<td>94.00</td>
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<td>Yes</td>
<td>115</td>
<td>96.11</td>
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<tr>
<td>CBCL Emotionally Reactive**</td>
<td>No</td>
<td>26</td>
<td>51.00</td>
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<tr>
<td></td>
<td>Yes</td>
<td>127</td>
<td>53.59</td>
</tr>
<tr>
<td>CBQ- VSF Effortful Control</td>
<td>No</td>
<td>25</td>
<td>4.95</td>
</tr>
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<td></td>
<td>Yes</td>
<td>123</td>
<td>5.05</td>
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<td>PSRA HSR</td>
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<td>25</td>
<td>0.12</td>
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<td>Yes</td>
<td>119</td>
<td>-0.07</td>
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<tr>
<td>PSRA CSR</td>
<td>No</td>
<td>22</td>
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<td></td>
<td>Yes</td>
<td>114</td>
<td>0.07</td>
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<tr>
<td>PSRA Total w/o Balance Beam</td>
<td>No</td>
<td>21</td>
<td>0.98</td>
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<td>Yes</td>
<td>106</td>
<td>0.23</td>
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<tr>
<td>CCNES Unsupportive Reactions</td>
<td>No</td>
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<td>3.69</td>
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<td>116</td>
<td>3.73</td>
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<td>3.61</td>
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<td>130</td>
<td>3.77</td>
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Note ** t-test significant at $p < .01$
Table 5. Partial correlations between PSRA tasks controlling for child age.

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<th>1. Balance Beam</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
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<td>Balance Beam</td>
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<td>0.02</td>
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<td>0.17</td>
<td>0.16</td>
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<td>Pencil Tap</td>
<td>1</td>
<td>0.23**</td>
<td>0.27**</td>
<td>0.21*</td>
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</tr>
<tr>
<td>Tower Task</td>
<td>1</td>
<td>0.30**</td>
<td>0.31***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack Delay</td>
<td>1</td>
<td>0.40***</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Gift Wrap</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* t-test significant at $p < .05$, ** $p < .01$, *** $p < .001$

Table 6. Factor analysis loadings for PSRA tasks without the balance beam task.

<table>
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<tr>
<th>Tasks</th>
<th>Component 1</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil Tap</td>
<td>.673</td>
<td>.452</td>
</tr>
<tr>
<td>Tower Task</td>
<td>.697</td>
<td>.486</td>
</tr>
<tr>
<td>Snack Delay</td>
<td>.648</td>
<td>.419</td>
</tr>
<tr>
<td>Gift Wrap</td>
<td>.718</td>
<td>.515</td>
</tr>
</tbody>
</table>

Eigenvalue 1.87

% of total variance 46.82%

Figure 5. Screen plot depicting eigenvalues and component numbers for the factor analysis for PSRA tasks without the balance beam task.
Table 7. Bivariate correlations.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
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</thead>
<tbody>
<tr>
<td>1. DERS Total</td>
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<td>-0.15</td>
<td>0.41***</td>
<td>-0.19*</td>
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<td>-0.05</td>
<td>-0.04</td>
<td>0.30***</td>
<td>0.05</td>
<td>-0.13</td>
<td>0.04</td>
<td>0.04</td>
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<tr>
<td>2. WJ Working Memory</td>
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<td>-0.09</td>
<td>0.15</td>
<td>0.02</td>
<td>-0.01</td>
<td>-0.002</td>
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<td>0.15</td>
<td>-0.01</td>
<td>-0.17*</td>
<td>0.52***</td>
<td>0.27**</td>
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<td>3. CBCL Emotionally Reactive</td>
<td>1</td>
<td>0.08</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
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<td>-0.10</td>
<td>-0.05</td>
<td>0.05</td>
<td>0.06</td>
<td>-0.02</td>
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</tr>
<tr>
<td>4. CBQ-VSF Effortful Control</td>
<td>1</td>
<td>0.13</td>
<td>0.10</td>
<td>0.19*</td>
<td>-0.11</td>
<td>0.17*</td>
<td>0.13</td>
<td>-0.07</td>
<td>-0.10</td>
<td>0.19*</td>
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<td>0.43***</td>
<td>0.77***</td>
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<td>0.23**</td>
<td>0.09</td>
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<td>0.27**</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6. PSRA CSR</td>
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<td>0.65***</td>
<td>0.07</td>
<td>0.13</td>
<td>0.47***</td>
<td>-0.06</td>
<td>-0.08</td>
<td>0.26**</td>
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<td></td>
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<td>7. PSRA Total w/o Balance Beam</td>
<td>1</td>
<td>0.08</td>
<td>0.16</td>
<td>0.44***</td>
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<td>-0.07</td>
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<td>8. CCNES Unsupportive Reactions</td>
<td>1</td>
<td>-0.06</td>
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<td>9. PCIRS Cognitive Stimulation</td>
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<td>11. Parent Education</td>
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<td>0.19*</td>
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<td>12. Mother Verbal Comprehension</td>
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<td>0.29**</td>
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</tbody>
</table>

Note * significant at p < .05, ** p < .01, *** p < .001
Table 8. Hypothesis 1a: Maternal emotion dysregulation will positively predict child emotional reactivity above and beyond the effect of maternal working memory.

<table>
<thead>
<tr>
<th>Source</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
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<tbody>
<tr>
<td>Constant</td>
<td>0.30</td>
<td>7.13</td>
<td>7.96</td>
<td>.000</td>
</tr>
<tr>
<td>Mother education</td>
<td>-0.78*</td>
<td>0.34</td>
<td>-2.34</td>
<td>.035</td>
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<td>0.13</td>
<td>.896</td>
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<td>Child sex</td>
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<td>0.86</td>
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<tr>
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<td>3.49***</td>
<td>0.91</td>
<td>3.83</td>
<td>.000</td>
</tr>
<tr>
<td>Working Memory</td>
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<td>.05</td>
<td>0.66</td>
<td>.504</td>
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R² 0.16
FΔ (2, 123) 7.33**

Note. *p<.05, **p<.01, ***p<.001
**Figure 6.** Hypothesis 1b. Unsupportive responses to children’s emotions mediates the relation between mothers' emotion dysregulation and children’s emotional reactivity.

**Table 9.** Bivariate correlations between mothers’ emotion dysregulation, children’s emotional reactivity, and subscales of mothers’ unsupportive responses to children’s negative emotions.

<table>
<thead>
<tr>
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</thead>
<tbody>
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<td>1.</td>
<td>1</td>
<td>0.41***</td>
<td>0.30***</td>
<td>-0.17*</td>
<td>0.04</td>
<td>0.06</td>
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<td>0.19*</td>
<td>0.18*</td>
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<tr>
<td>3.</td>
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<td>1</td>
<td>0.31***</td>
<td>0.30***</td>
<td>0.50***</td>
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<td>0.79***</td>
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<td></td>
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</tr>
</tbody>
</table>

Note * significant at p < .05, ** p < .01, *** p < .001
Table 10. Hypothesis 2a: Maternal working memory will positively predict child effortful control above and beyond the effect of maternal emotion dysregulation.

<table>
<thead>
<tr>
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<tr>
<td>Child sex</td>
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<td>0.18</td>
<td>2.78</td>
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<td>Emotion Dysregulation</td>
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<td>-1.23</td>
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<tr>
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<td>0.01</td>
<td>1.20</td>
<td>.234</td>
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R² 0.11

FΔ (2, 123) 1.88

p .157

Note. *p<.05, **p<.01, ***p<.001
Figure 7. Hypothesis 2b. Stimulation of cognitive development mediates the relation between mothers’ working memory and children’s effortful control.
Table 11. Hypothesis 3: Maternal emotion dysregulation and maternal working memory will predict child performance on behavioral self-regulation tasks.

<table>
<thead>
<tr>
<th>Source</th>
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<th>SE</th>
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<th>p</th>
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</thead>
<tbody>
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<td>-2.97</td>
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<td>Mother education</td>
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<td>-0.48</td>
<td>.636</td>
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<tr>
<td>Mother violence exposure</td>
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<td>-1.31</td>
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<tr>
<td>Child sex</td>
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<td>1.36</td>
<td>.176</td>
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<tr>
<td>Emotion Dysregulation</td>
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<td>0.45</td>
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<td>0.02</td>
<td>0.97</td>
<td>.334</td>
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\[
R^2 = 0.19
\]

\[
F(2, 123) = 0.82
\]

\[
p = .444
\]

*Note. *p*.05, **p*.01, ***p*.001*
Figure 8. Hypothesis 3. Unsupportive responses to children’s emotions mediates the relation between mothers’ emotion dysregulation and children’s performance on behavioral self-regulation tasks.

Figure 9. Hypothesis 3. Stimulation of cognitive development mediates the relation between mothers’ working memory and children’s performance on behavioral self-regulation tasks.
Biography

Justin Thomas Carreras was born on July 20, 1990 in New Orleans, Louisiana. He graduated from Holy Cross High School. He then graduated from the University of New Orleans summa cum laude in 2012 with a Bachelor’s of Science degree in psychology. He is now in the School Psychology doctoral program at Tulane University. He hopes to remain in the city of New Orleans and work directly with children and adolescents.