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EXPLORING THE UNIQUE AND INTERACTIVE CONTRIBUTION OF TEMPERAMENT
AND EXECUTIVE FUNCTIONING TO PARENTING BEHAVIORS

by

YURI SHISHIDO

Under the Direction of Robert D. Latzman, Ph.D.

ABSTRACT

Although research is unequivocal concerning the important role of parenting in the prediction of a range of youth psychosocial outcomes, few empirical studies have examined potential contributions of parental individual differences factors to variability in parenting behaviors. Among the few studies that have, individual differences in affective dimensions of temperament (i.e., Negative Temperament [NT] and Positive Temperament [PT]) and executive functioning (EF) have individually emerged as potential key processes underlying parenting behaviors; however, they have yet to be examined jointly. Thus, using a latent variable approach, within a racially and ethnically diverse community sample of 166 parents, the current study investigated the joint and interactive contribution of affective dimensions of temperament and EF

in the explanation of parenting. Further, despite conceptual overlap, parenting research has historically employed two distinct conceptual approaches: parenting practices and styles. The current study thus fitted a single integrative three-factor model (i.e., positive parenting, negative parenting, and corporal punishment) of parenting behaviors that included both styles and practices. Results of the integrative structural model of parenting suggested that parenting behaviors are can be conceptualized within a single, three-factor model, allowing for the incorporation of historically distinct conceptions of parenting. Further, results revealed that affective dimensions of temperament and EF were uniquely but differentially associated with all parenting domains. Specifically, corporal punishment was most notably explained by PT and low EF, whereas positive parenting and negative parenting were explained by PT and NT, respectively. Furthermore, EF moderated the associations between both NT and PT and positive parenting – as compared to the parents with high EF, for parents with low levels of EF, both low PT and high NT were associated with lower positive parenting. These findings indicate that EF likely serves as a buffer against the negative effects of temperament on positive parenting. All told, the current study provides support for an integrative model of parenting behaviors cutting across various conceptions and parental temperament and EF, and their interaction, as potential critical processes associated with individual variability across parenting behaviors.

INDEX WORDS: Temperament, Executive Functioning, Parenting, Parenting Practices,
Parenting Styles, Structural Equation Modeling

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YURI SHISHIDO

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in the College of Arts and Sciences

Georgia State University

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2017

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DEDICATION

To my mother, Setsuko, and my son, Sekai.

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1 INTRODUCTION

Parenting has been unequivocally found to predict a range of negative and positive youth psychosocial outcomes (e.g., Dishion & Patterson, 2006; McLeod, Weisz, & Wood, 2007). Despite theoretical and empirical literatures highlighting the importance of parenting as a predictor of a range of youth outcomes (e.g., Belsky, 1984), relatively little empirical research has examined which parental characteristics, beyond demographic factors, may contribute to individual variability in parenting behaviors (Shaffer & Obradović, 2017). Given that parenting can often be challenging and stress inducing (Capsi & Moffitt, 1993), parents' ability to regulate their emotional and behavioral reactivity and respond more constructively, functions hypothesized to be influenced by variability in temperament and executive functioning (EF), are critical processes for more adaptive parenting (Rueger, Katz, Risser, & Lovejoy, 2011). With regard to potential contributors to parenting, the extant literature has provided considerable support for parental individual differences in affective dimensions of temperament as potential processes associated with parenting (Bridgett et al., 2011; Latzman, Elkovitch, & Clark, 2009; Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009; Rueger et al., 2011). More recently, parental EF has also emerged as a potential predictor of parenting (Chico, Gonzalez, Ali, Steiner, & Fleming, 2014; Deater-Deckard, Sewell, Petrill, & Thompson, 2010a; Deater-Deckard, Wang, Chen, & Bell, 2010b). Surprisingly, however, parental temperament and EF have never been examined jointly in the explanation of parenting behaviors.

Using a latent variable approach, the current study examined the unique and interactive contribution of affective dimensions of temperament and EF in service of advancing our understanding of processes associated with individual variability in parenting behaviors. Furthermore, knowledge of how EF interacts with temperament, with EF potentially serving as a

moderator of the effects of temperament on parenting behaviors, helps to delineate the regulation of automatic affective and behavioral responses, critical parenting processes in the face of challenging affect and behaviors in youth.

1.1 Parenting and Youth Outcomes

A substantial empirical literature has confirmed that parenting plays a critical role in the prediction of both adaptive and maladaptive psychosocial outcomes in youth. Parenting has historically been distinguished with regard to conceptualization and measurement between parenting practices and styles; parenting practices refer to parenting behaviors toward their children (e.g., parental involvement, monitoring, discipline, punishment; Frick, 1991), while parenting styles are concerned with general approaches to parenting behaviors (authoritarian, authoritative, permissive; Robinson, Mandleco, Olsen, & Hart, 1995, 2001). Although typically defined, assessed, and studied separately, both parenting practices and styles conceptually overlap and can be grouped into three separable dimensions, positive or adaptive parenting, negative or maladaptive parenting, and corporal punishment which has been included in negative parenting in some studies, based on their respective links to positive or negative youth outcomes (Frick, Kimonis, Dandreaux, & Farell, 2003; Robinson et al., 1995, 2001). Whereas negative parenting (e.g., poor parental monitoring, inconsistent discipline, non-reasoning and punitive) is associated with negative psychosocial adjustment in youth, positive parenting (e.g., parent involvement, warmth, autonomy granting) is associated with more positive youth outcomes. For example, negative parenting has repeatedly been linked to a myriad of negative behavioral, emotional, social, and academic outcomes in youth, including: externalizing problems, such as delinquency, disruptive behavior and substance abuse (Dadds, Maujean, & Fraser, 2003; Dishion & Patterson, 2006; Pardini, Fite, & Burke, 2008; Wills & Yaeger, 2003), internalizing problems

(McLeod et al., 2007; Wood, McLeod, Sigman, Hwang, & Chu, 2003), social and interpersonal competence, and poor academic achievement (Swanson, Valiente, Lemery-Chalfant, & O'Brian, 2011). Conversely, positive or adaptive parenting has been found to contribute to a range of positive developmental outcomes in youth, including: school readiness and academic performance (Hess, Holloway, Dickson, & Price, 1983; Pettit, Bates, & Dodge, 1997) and general psychosocial development (Fine, Voydanoff, & Donnelly, 1993; Zahn-Waxler & Radke-Yarrow, 1990). Further, positive parenting has shown to serve as protective and resilience factors in the context of childhood adversity (Walther et al., 2012; Latzman & Latzman, 2015; Latzman, Shishido, Latzman, Elkin, & Majumdar, 2014) and positive treatment gains among youth with psychopathology (Diamond & Siqueland, 2001; Henggeler, 2001).

Among these three parenting dimensions, negative and positive parenting are more commonly studied (Frick et al., 2003). As noted above, in some studies, corporal punishment has been either included in negative parenting or excluded from analysis partially due to its relatively low occurrence and reliabilities, making it more challenging to analyze as an independent construct as described in more detail in the Method section. Nevertheless, corporal punishment (e.g., hitting, slapping, grabbing, and spanking a child) is most frequently conceptualized as a distinct dimension in both the factor analytic (Essau, Sasagawa, & Frick, 2006) and theoretical literature (e.g., Frick et al., 2003). For example, the social, environmental model of corporal punishment posits that children who are exposed to physical punishment learn to model physical violence as an acceptable strategy for solving interpersonal conflicts, which then interfere with their development of more cooperative, prosocial conflict resolution strategies. Alternatively, the temperament model asserts that corporal punishment is a response to, not a cause of, aggressive and difficult behaviors of youth. In other words, it is youth's difficult emotional and behavioral

dispositions that lead to more occurrence of corporal punishment (e.g., Paolucci & Violato, 2004). Regardless of theoretical differences, multiple meta-analytic reviews over the last decade (e.g., Gershoff & Grogan-Kaylor, 2016; Larzelere & Kuhn, 2005; Paolucci & Violato, 2004) have shown positive associations between corporal punishment and disruptive behavior and emotional difficulties, but not cognitive problems, in youth. These empirical and theoretical findings support the assertion that parenting behaviors have a distinct three-factor model, allowing for the potential conceptual integration of parenting practice and style approaches. Collectively, results highlight the importance of examining specific contributing factors to the explanation of parenting behaviors in efforts to elucidate potential mechanisms underlying youth psychosocial outcomes.

1.2 Promising Factors associated with Parenting

As noted earlier, in the parenting literature, two domains that have been examined and found to explain individual variability in parenting include individual differences in affective dimensions of temperament (e.g., Belsky, 1984; Clark, Kochanska, & Ready, 2000; Kochanska, Friesenborg, Lang, & Martel, 2004; Latzman et al., 2009; Prinzie et al., 2009) and EF (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b). As described in more detail below, temperament, with known links to a range of psychosocial outcomes, represents the factor that has been more widely studied in associations with parenting behaviors, whereas EF, which is most commonly examined with regard to externalizing behaviors (e.g., antisocial behaviors, substance use, attention deficit hyperactive disorder [ADHD]), reflects a relatively new construct in the investigation of parenting behaviors. Examined individually, affective dimensions of temperament and EF have been identified as potential mechanisms associated with parenting behaviors.

1.2.1 Temperament

Temperament refers to individual differences in patterns of emotional and behavioral reactivity and self-regulation that are genetically influenced, biologically based, and although shaped by socialization and contextual experiences, significantly preserved across the life span (Rothbart & Bates, 2006). Reactivity represents autonomic affective and behavioral responses to events or contexts, while self-regulation reflects the ability to modulate reactivity. A considerable structural literature has shown that trait temperament has a distinctive three-factor model, in which two of the dimensions, namely negative temperament and positive temperament (NT and PT, respectively), are considered affective (e.g., Clark & Watson, 1991; Watson, Gamez, & Simms, 2005). Specifically, NT refers to a tendency for negative emotional and behavioral reactivity, including fear, sadness, and anger, whereas PT refers to a propensity for positive affect, including joy, interest, and excitement, as well as reward sensitivity and sociability (Clark & Watson 1991; Rothbart & Bates, 1998; 2006). In sum, temperament traits describe individual tendencies, dispositions, and capacities that influence individuals' adaptation or maladaptation to the environment throughout life (Clark & Watson, 1999; Rothbart & Bates, 1998, 2006). Indeed, temperament traits have established links to a wide range of psychosocial outcomes (e.g., Kotov, Gamez, Schmidt, & Watson, 2010; Muris & Ollendick, 2005; Rettew & McKee, 2005), including parenting.

1.2.2 Temperament and Parenting

A reliable literature has recognized that affective dimensions of temperament play a critical role in determining individual variability in parenting behaviors (Bridgett et al., 2011; Latzman et al., 2009; Prinzie et al., 2009; Rueger et al., 2011). Parenting is a dynamic and reciprocal process, where both parents and youth characteristics, in particular, temperament,

individually and jointly, affect the expression of specific parenting behaviors (Belsky, 1984; Maccoby, 1992). With regard to parents' temperament/personality traits, both individual cross-sectional and longitudinal studies (e.g., Clark et al., 2000; de Haan, Dekovic, & Prinzie, 2012; Kochanska et al., 2004; Lutzman, et al., 2009; Prinzie et al., 2012) and a meta-analytic study (Prinzie et al., 2009) have reported consistent associations between affective dimensions of temperament and parenting. Specifically, whereas PT-related dimensions positively correlate with positive parenting (e.g., warmth, responsiveness, supportiveness, autonomy granting, consistent discipline, positive parenting), NT-related dimensions are positively associated with negative parenting (e.g., hostility, coerciveness, behavior control, overprotection, overreaction, poor monitoring, inconsistent discipline), but with more equivocal findings concerning associations between temperament traits and corporal punishment. For example, Lutzman and colleagues (2009) found that mothers high on NT-related dimensions reported higher inconsistent discipline, whereas those high on PT-related dimensions evidenced higher positive parenting. In contrast, in this study, corporal punishment evidenced no associations with high-order NT or PT scales but was related to Mistrust, a primary trait within NT (Lutzman et al., 2009). Similarly, a meta-analysis (Prinzie et al., 2009) revealed that parents' high levels of Extraversion (PT-related dimension) and low levels of Neuroticism (NT-related dimension) were positively associated with parental warmth and autonomy granting (positive parenting styles), while low levels of Neuroticism were related to low autonomy control (positive parenting styles). In a more recent longitudinal study, Prinzie et al. (2012) reported that father's high on emotional stability (low Neuroticism) predicted less overactive and more positive parenting styles six years later. Overall, converging lines of research support the importance of considering parent's temperament in the investigation of parenting behaviors.

1.2.3 Executive Functioning

EF represents a set of higher order cognitive processes associated primarily, although not exclusively, with the prefrontal cortex (PFC). The PFC is thought to control a wide range of cognitive abilities that are critical for adaptive function, including decision-making, planning/organizing, problem-solving, attentional flexibility, inhibitory control, and working memory (Latzman & Markon, 2010; Lezak, Howieson, Loring, Hannay, & Fischer, 2004; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). EF enables individuals to engage in goal-directed thoughts, action, and affect in the face of novel or unfamiliar contexts where previously established routines for responses are absent, or more frequently, directly interfere with the desired response (Carlson, 2011). EF is, therefore, essential for successfully navigating nearly all daily activities; impairments in EF have the potential for broad and serious consequences in general functioning that may influence the quality of life such as academic achievement and psychopathology (Hecht & Latzman, in press; Latzman, Elkovitch, Young, & Clark, 2010; Mischel et al., 2011; Moffitt et al., 2011; Snyder, 2013). Nonetheless, historically, EF is a difficult construct to define (Jurado & Rosselli, 2007) and assess, due in part to the so-called “task-impurity” problem. A target EF is measured in the context of a specific laboratory task, which necessarily involves multiple cognitive processes. Thus, scores from an EF task are confounded by variance associated with non-EF processes (e.g., processing speed, motor functioning, memory) and do not reflect an entirely pure measure of the target EF (Miyake et al., 2000; Miyake & Friedman, 2012). Nevertheless, the emerging use of factor analytic approaches has helped to make significant advances in addressing the task impurity problem. Factor analysis statistically extracts variance from common processes across multiple tasks capturing a purer estimate of the target EF process (Miyake & Friedman, 2012). Specifically, converging lines of

factor analytic studies (e.g., Litzman & Markon, 2010; Miyake et al., 2000; Miyake & Friedman, 2012) have revealed that EF has a distinct three-factor model consisting of separable yet correlated dimensions, including: inhibition (controlling or inhibiting automatic responses), shifting/conceptual flexibility (ability to switch between performing tasks at hand and new tasks while managing interference from the preceding task), and updating/ monitoring (tracking and appraising incoming task information while updating information in working memory; e.g., Litzman & Markon, 2010; Miyake et al., 2000; Miyake & Friedman, 2012). More recently, Miyake and his colleagues (Friedman et al., 2008; Miyake & Friedman, 2012) have updated the three-factor model and advanced the unity/diversity model of EF. According to the new model, three latent EF variables show some separability (shifting-, updating-, and inhibition-specific factors), while sharing a common underlying ability (“Common EF” factor). This Common EF factor encompasses the shared variance across all EF tasks and after accounting for this common variance, no unique variance remains for the inhibition-specific factor. As such, this common variance is thought to be explained by inhibition (Munakata et al., 2011). This unity/diversity model has shown considerable support among samples across the life span (e.g., Hecht & Litzman, in press; Rose, Feldman, & Jankoswki, 2011; Vaughan & Giovanello, 2010; Wiebe, Espy, & Charak, 2008). Further, the Common EF factor within the context of unity/diversity model has shown significant associations with behavioral disinhibition, a general vulnerability factor hypothesized to underlie externalizing behaviors (e.g., aggression, conduct disorder, substance use, and ADHD), indicating clinical utility of the Common EF at the latent variable level (Hecht & Litzman, in press; Miyake & Friedman, 2012).

1.2.4 EF and Parenting

A smaller but consistent literature has shown that parental EF performance is associated

with parenting behaviors. For example, mothers with poor working memory were found to show harsher, reactive parenting to youth with difficult affect and behaviors (Deater-Deckard et al., 2010a). Similarly, maternal EF, as assessed through tasks tapping attention, inhibitory control, cognitive flexibility, and working memory, was found to be associated with harsh parenting (Deater-Deckard et al., 2010b). In a more recent study, as compared to adult mothers, teenage mothers, who are thought to have less well-developed PFCs, showed poor cognitive flexibility and low levels of responsiveness to infants (Chico et al., 2014). Findings of these studies suggest that deficits across a range of EF processes are associated with negative or maladaptive parenting behaviors. These parenting difficulties are presumably due in part to EF deficits in providing flexible attention to a child's changing needs, interpreting and reappraising child behaviors in a particular situation, and inhibiting automatic emotional and behavioral responses, all leading to less adaptive responses (Barrett & Fleming, 2011; Deater-Deckard et al., 2010a, 2010b).

Furthermore, the extant literature examining parental effortful control (EC), which overlaps with EF both conceptually and empirically (e.g., Rothbart, Sheese, & Posner, 2007; Rueda, Posner, & Rothbart, 2005), has also reported strong associations with parenting. In a sample of mothers of adolescents aged 11 to 16 years, mothers high on Disinhibition and related traits such as Impulsivity (i.e., low EC) were found to demonstrate poor monitoring, inconsistent parenting, and corporal punishment (Latzman et al., 2009). Similarly, in a sample of parents of youth aged 7 to 12 years, parents low in EC showed more negative reactions (e.g., distress, punitive, minimizing) to children's negative affect (Valiente, Lemery-Chalfant, & Reiser, 2007). Conversely, mothers with high levels of EC were found to engage in less negative parenting and more positive caregiving behaviors such as playing with, reading to, and holding infants (Bridgett et al., 2011, Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013). Results of these

studies generally confirm specific associations between parental EC/EF performance and parenting, further highlighting the important role of EF in the investigation of parenting behaviors.

1.3 Temperament, EF, and Parenting

1.3.1 Temperament and EF

Although temperament traits and EF have been separately identified as potential mechanisms associated with a range of psychosocial outcomes (e.g., Litzman et al., 2010; Muris & Ollendick, 2005; Snyder, 2013; Watson et al., 2005), temperament and EF are rarely examined jointly. Thus, associations between affective dimensions of temperament and EF are more equivocal, in particular, concerning NT. Although limited, an emerging body of neuropsychological literature appears to show generally consistent associations between temperament and indicators of EF, but with variability presumably due to how EF performance is measured. For example, moderately elevated PT-related dimensions have evidenced generally positive associations with a performance of a range of EF tasks: generative verbal fluency (Phillips, Bull, Adams, & Fraser, 2002), attentional control (Rowe, Hirsh, & Anderson, 2007; Van der Stigchel, Imants, & Ridderinkhof, 2011), problem-solving (Ashby, Isen, & Turken, 1999; Isen, 2008), and working memory (Yang, Yang, & Isen, 2013). In contrast, NT-related dimensions appear to be unrelated to EF performance, possibly with the exception of positive associations with visual spatial memory (Gray, 2001; Gray, Braver, & Raichle, 2002). However, when a single EF composite score derived from indicators of multiple EF tasks was used, neither NT nor PT evidenced associations with EF (e.g., Litzman, Shishido, Litzman, & Clark, 2016). While the neuropsychological literature generally supports a specific pattern of associations between affective dimensions of temperament and EF, potential variability concerning indicators

of EF warrants further investigation into the nature of relations between temperament and EF, with particular consideration for how best to measure a target EF in the explanation of parenting behaviors.

1.3.2 Neural Correlates of Temperament and EF

Many theories of temperament presume a neural basis to individual differences in emotional and behavioral reactivity to the events and contexts (Saudino, 2005). For example, Jeffery Gray (Gray, 1982, 1987, 1991; Gray & McNaughton, 2000) posits that temperament traits vary as a function of individual differences in the sensitivity to and interactions between three “conceptual nervous systems” that can be mapped onto neural systems. The proposed conceptual nervous systems include the Behavioral Approach System (BAS), which is associated with approach behaviors in response to reward cues, and the Behavioral Inhibition System (BIS) and the Fight-Flight-Freezing System (FFFS), which activate in response to threatening stimuli. The FFFS reacts to immediate threat and generates active avoidance (panic, flight) or elimination behavior (anger, attack), whereas the BIS responds to a conflicting situation, where both needs or desires to approach as well as potential threat or punishment coexist, leading to approach-avoidance behavior (passive avoidance, vigilance, rumination; Gray & McNaughton, 2000). In this model, the BAS is linked to the frontal dopaminergic system, whereas the BIS to the amygdala and septo-hippocampal system. The septo-hippocampal system is thought to detect a conflict between concurrently available goals and to resolve the conflict through inhibiting prepotent negative thought and behavior (Gray, 1987, 1991).

In support of the theoretical and empirical literatures concerning a neural basis of temperament, subsequent structural and functional neuroimaging studies are converging on the specific brain regions associated with affective dimensions of temperament within the PFC. As

mentioned previously, NT-related dimensions represent a tendency to experience negative affect in response to threat and punishment cues (Clark & Watson, 1991). Indeed, experimentally induced NT-related dimensions have been linked to the functioning of the neural correlates associated with sensitivity to threat and punishment, most notably, the amygdala and related limbic structures. The amygdala detects the affective salience of sensory information, leading to perception and production of negative affect and associated aversive learning (Adolphs, 2008; Adolphs & Damasio, 2000; Anderson & Phelps, 2002). Additionally, NT-related dimensions have shown to be associated with neural structures involved in reappraisal and suppression of emotional and behavioral reactivity related to negative affect, such as the right dorsolateral prefrontal cortex (DLPFC), orbitofrontal cortex and ventral and medial regions of PFC (hereafter, “OFC/VMPFC”), ventral anterior cingulate cortex (ACC), and limbic regions including the hippocampus, insula, and the portion of basal ganglia (e.g., Canli, Amin, Haas, Omura, & Constable, 2004; Davidson, Pizzagalli, Nitschke, & Putnam, 2002; Deckersbach et al., 2006; De Young et al., 2010; Kano et al., 2014; Kim, Hwang, Park, & Kim, 2008; Whittle Allen, Lubman, & Yücel, 2006).

Experimentally induced PT-related dimensions are characterized by a tendency to experience positive affect (Clark & Watson, 1991) and are related to the approach tendencies that accompany sensitivity to reward (DeYoung et al., 2010). PT-related dimensions have been linked to the neural substrates receiving rich dopaminergic projections, which have strong links to sensitivity to reward and motivation, in particular, the limbic structures such as the nucleus accumbens (NAcc). Moreover, PT-related dimensions have also shown to be associated with neural structures underlying reappraisal and regulation of approach-related behaviors, such as the left DLPFC, OFC/VMPFC, and dorsal ACC (e.g., Canli et al., 2004; Davidson et al., 2002;

Deckersbach et al., 2006; De Young et al., 2010; Kano et al., 2014; Kim et al., 2008; Whittle et al., 2006). These findings indicate that the neural substrates involved in the experience and expression of NT and PT are overlapping, but they also appear to be localized within each neural structure (e.g., the left versus right DLPFC, ventral versus dorsal ACC, respectively, for NT and PT).

Interestingly, the functioning of multiple neural substrates involved in appraisal and regulation of both NT and PT have also been found to be associated with EF. These substrates include: the OFC/VMPFC, bilateral ACC, and limbic structures such as the amygdala and ventral striatum, the portion of basal ganglia that includes the ventral caudate and putamen, and NAcc (e.g., Eschel, Nelson, Blair, Pine, & Arnest, 2007; Happeney, Zelado, & Stuss, 2004; Prencipe et al., 2011; Zelado & Cunningham, 2007; Zelado & Müller, 2002). As noted earlier, the amygdala is critical for the processing of negative affect and threat; together with the ventral striatum, the amygdala mediates reward associations and motivation functions (Adolphs & Damasio, 2000; Anderson & Phelps, 2002). The OFC/VMPFC has been found to be critically involved in reappraisal and regulation of affective and behavioral responses (Eschel et al., 2007; Ochsner, Bunge, Gross, & Gabrieli, 2002; Perlman & Pelphrey, 2011); together with the ACC, the OFC/VMPFC mediates regulation of affect and behavioral responses through their interconnection to underlying limbic structures (e.g., Happeney et al., 2004; Rolls, 2004). Results of these studies suggest that the neural substrates involved in temperament and EF are overlapping, but they are also distinct; whereas the limbic structures primarily underlie emotional and behavioral reactivity, the PFC structures (e.g., DLPFC, OFC/VMPFC, ACC) are more associated with appraisal and regulation of emotional and behavioral reactivity, functions subsumed under EF. Overall, an extensive body of neuropsychological and neuroimaging studies

provides theoretical and empirical evidence that both affective dimensions of temperament and EF are likely involved in regulation of emotional and behavioral reactivity, with EF potentially serving a modulating role of both experience and behavioral expression of affect.

1.3.3 Associations among Temperament, EF, and Parenting

Examined independently, parental individual differences in temperament (e.g., Belsky, 1984; Clark et al., 2000; Kochanska et al., 2004; Lutzman et al., 2009) and EF (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b) have been confirmed as two potential indicators of parenting. Although no studies to date have examined all domains – temperament, EF, and parenting – in concert, the theoretical and empirical literatures strongly suggest that both temperament and EF are likely involved in the regulation of affective and behavioral responses (e.g., DeYoung et al., 2010; Prencipe et al., 2011; Whittle et al., 2006; Zelado & Cunningham, 2007), a key process for adaptive parenting behaviors. Indeed, the extant literature that has examined the joint and interactive contribution of temperament and EF/EC in the explanation of psychosocial outcomes has provided support for this hypothesis. For example, the developmental literature that investigated associations between temperament and EC has found that EC moderates the effects of both NT and PT on anxiety and depressive symptoms in youth (e.g., Lonigan, Vasey, Phillips, & Hazen, 2004; Muris, Meesters, & Blijlevens, 2007; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007). More recently, in a sample of adolescent males aged 11 to 16 years, neuropsychological indicators of EF were also found to moderate the effects of NT and PT interaction on anxiety symptoms (Lutzman et al., 2016). Collectively, the small but consistent literature has indicated the potential moderating role of EF in the associations between affective dimensions of temperament and psychosocial outcomes. Taken together, the extant literature has evidenced considerable support for the notion that affective dimensions of

temperament and cognitive measures of EF likely represent potential mechanisms underlying the regulation of affective and behavioral responses, a critical process for adaptive parenting behaviors. Furthermore, parental EF likely serves to moderate the effects of affective dimensions of temperament on parenting, allowing for more adaptive parenting behaviors.

1.4 Overview of the Current Study

The overarching goal of current study was to examine the unique and interactive contribution of affective dimensions of temperament and EF in the explanation of individual variability in parenting behaviors. Although the relevant studies in the preceding review have examined associations among similar domains, no research to date has jointly examined affective dimensions of temperament and neuropsychological indicators of EF in the explanation of parenting behaviors. Furthermore, many of the relevant studies in the preceding review have several limitations. For example, many of the studies examining relations between EF and parenting (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b) used samples of mainly White participants and examined parental EF on a performance of a single EF task (e.g., working memory, cognitive flexibility) or a single EF composite score derived from indicators of multiple EF tasks (e.g., an aggregated score from attention, inhibition, cognitive flexibility, and working memory tasks) and assessed parenting behaviors mainly on negative parenting dimensions (e.g., harsh, unresponsive parenting). Additionally, several studies reporting on associations among temperament, EC/EF, and psychosocial outcomes (e.g., Lonigan et al., 2004; Muris et al., 2007) assessed EC/EF using parent-reported EC/EF scores rather than standardized task-based measures of EF. Further, within the parenting literature, many of the parenting behaviors are assessed mainly on some dimensions from either parenting practice or style measures, but not from both.

To fill the aforementioned gaps in the literature, the current study included samples of racially/ethnically diverse parents to test the generalizability of previous findings among largely White parents to other populations. The current study also improved upon the measurement limitations concerning parenting by utilizing a latent variable approach. As noted earlier, despite conceptual overlaps, parenting research has historically been conducted using two separate approaches, either parenting practices or parenting styles (Locke & Prinze, 2002), with practices and styles yet to be examined jointly. As such, parenting practices and styles were concurrently examined within a single, three-factor model to test for the conceptual integration of the two separate approaches. Consistent with previous factor analytic findings suggesting that EF has a common underlying process that encompasses the shared variance across all EF dimensions and tasks and this variance is thought to be explained by inhibition (Hecht & Lutzman, in press; Miyake & Friedman, 2012; Munakata et al., 2011), in the current study, indicators of EF tasks that largely assessed disinhibition were examined to confirm a hypothesized common process of EF. Lastly, by including all variables simultaneously in structural modeling, the current study examined the unique and interactive contribution of latent EF and temperament to parenting variables, while accounting for shared variance among these variables.

The current study had four primary aims, with hypotheses in line with the preceding review of the literature. The **first aim** of the current study was to examine associations among affective dimensions of temperament, EF, and parenting dimensions at the observed, bivariate level. In line with the extensive body of literature revealing consistent associations between temperament and parenting behaviors (e.g., Clark, et al., 2000; de Haan et al., 2012; Lutzman et al., 2009; Prinzie et al., 2009, 2012), it was hypothesized that NT and PT would be positively associated with scales subsumed within the negative parenting and the positive parenting

dimensions, respectively. In contrast but consistent with the few studies that examined the associations between temperament and corporal punishment (e.g., Lutzman, et al., 2009), it was expected that neither NT nor PT would show any associations with scales subsumed within the corporal punishment dimension. Further, although small, a burgeoning literature has demonstrated that low levels of EC/EF and trait disinhibition show positive associations with both negative parenting behaviors (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b) and corporal punishment (Lutzman et al., 2009), while higher levels of EC/EF are positively associated with positive parenting behaviors (Bridgett et al., 2011). In accordance with this literature, it was hypothesized that a performance on computerized EF tasks would emerge positively associated with scales subsumed within the negative parenting and the corporal punishment dimensions, whereas negatively associated with scales subsumed under the positive parenting dimension.

The **second aim** of the current study was to examine the fit of three measurement models to confirm the suitability of using a hypothesized three-factor parenting model, a single latent EF, and affective dimensions of temperament in subsequent structural models. In line with the parenting literature suggesting that both parenting practice and style scales can be integrated and understood within three separable domains: positive parenting, negative parenting, and corporal punishment (Frick et al., 2003; Rinaldi & Howe, 2012; Robinson et al., 1995, 2001), it was expected that parenting practices and styles would cross over the measurement boundaries and jointly load onto their respective parenting domains within a single, three-factor model. Further, consistent with the literature indicating that inhibition represents a process common across all EF tasks (e.g., Hecht & Lutzman, in press; Rose et al., 2011; Vaughan & Giovanello, 2010; Miyake & Friedman, 2012; Munakata et al., 2011; Wiebe et al., 2008), it was hypothesized that

indicators of EF would show significant factor loadings on a single latent EF factor.

Using structural equation modeling (SEM), the **third aim** of the current study was to investigate the joint contribution of affective dimensions of temperament and EF to parenting behaviors. In line with a considerable body of literature reporting consistent associations between temperament and parenting (e.g., Lutzman, et al., 2009; Prinzie et al., 2009, 2012), it was hypothesized that NT and PT would show positive associations with negative and positive parenting, respectively, whereas neither NT nor PT would evidence any associations with corporal punishment. Consistent with the emerging literature reporting associations with poor EF performance and less adaptive parenting (e.g., Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b), it was expected that EF would show negative associations with positive parenting and positive associations with negative parenting. Furthermore, in accordance with the few studies that have investigated the associations between trait disinhibition and corporal punishment (Lutzman et al., 2009), it was hypothesized that EF would be positively associated with corporal punishment.

The **fourth and final aim** of the current study was to examine the interactive contribution of affective dimensions of temperament and EF in the investigation of parenting behaviors. Due to the relative lack of literature reporting on relations among all three domains (i.e., temperament, EF, and parenting), *a priori* hypotheses for the interactive effects were tentative. Nevertheless, drawing from the recent findings suggesting that EF/EC moderates the associations between temperament and various psychosocial outcomes (Lonigan et al., 2004; Muris et al., 2007; Lutzman et al., 2016), it was hypothesized that EF would moderate the effects of temperament on parenting behaviors. More specifically, the effects of temperament on parenting behaviors were expected to vary by the levels of EF. That is, it was expected that for

parents with high levels of NT or low levels of PT, both of which have been linked to maladaptive parenting, EF would moderate the effect of temperament and allow for more adaptive parenting behaviors.

2 METHOD

2.1 Participants

Participants included a racially/ ethnically diverse sample of 166 parents or primary caregivers (hereafter “parents”) of youth aged 6 to 15 years recruited through two means: 1) the Saturday School, an educational enrichment program at Georgia State University (GSU), and 2) the GSU undergraduate research pool. Recruitment through the Saturday School included direct mailing to participating families, fliers distributed on campus, and advertisements placed on the Saturday School’s website. Students with appropriately-aged children were recruited from an undergraduate research participant pool. Inclusion criteria for participants consisted of self-reported English-proficiency. Table 1 presents demographic characteristics of all participants.

2.2 Procedures

Participants were asked to provide informed consent prior to beginning the study. Following informed consent procedures, participants completed a study protocol during a single up to 2-hour visit to a computer laboratory room. Participants recruited through the Saturday School were compensated with a 5% discount for future classes, whereas undergraduate subject pool participants received two-course credits as part of their required research exposure. The University’s Institutional Review Board approved all study protocols and materials.

2.3 Measures

In addition to self-reporting demographic information about themselves and their children, participants completed a series of computer administered self-report surveys to assess

their temperament and parenting practices and styles. All cognitive tasks were computer administered.

Table 1. Demographic characteristics

Parent Age in Years (M/SD)	38.71/±7.35
Child Age in Years (M/SD)	8.88/±2.25
Parent Gender (Female %)	75.90
Child Gender (Female %)	48.80
US Born (%)	71.50
Race/Ethnicity	
Black/African-American	48.80
White/Caucasian	28.90
Asian/Asian-American	14.50
Hispanic/Latino*	0
Other	7.80
Number of Country of Origin	20
Number of Native Languages	23
Married (%)	68.30
College degree attained (%)	64.80
Combined household income (%)	
<\$10,000	4.90
\$10,000 to \$20,000	4.90
\$21,000 to \$40,000	12.20
\$41,000 to \$60,000	14.60
\$61,000 to \$100,000	19.50
>\$100,000	43.90

Note: $N = 166$. * <5% of White/Caucasian also identified as Hispanic/Latino.

2.3.1 Parenting

Alabama Parenting Questionnaire (APQ; Frick, 1991). Participants reported on parenting practices using the APQ, which consists of 42 items rated along a 5-point Likert-type scale ranging from 1(never) to 5 (always). The APQ is designed to assess five aspects of parenting practices (Positive Parenting, Parental Involvement, Inconsistent Discipline, Poor Monitoring/Supervision, Corporal Punishment) related to disruptive behavior problems in youth, which can further be combined into three primary dimensions: Positive Parenting, Negative Parenting, and Corporal Punishment (Frick et al., 2003). The APQ scales have shown adequate internal consistency reliabilities ($\alpha > .70$ for all scales; Frick et al., 2003, Essau et al., 2006), while relatively lower reliabilities have been reported on Negative Parenting dimensions (Poor Monitoring/Supervision, Inconsistent Parenting) and Corporal Punishment (α 's=.50's; Dadds et al., 2003; Essau et al., 2006). With regard to Corporal Punishment, parents tend to endorse a single method of corporal punishment, resulting in a lower correlation among three Corporal Punishment items (i.e., hitting, spanking, slapping). Nevertheless, the APQ has been found to distinguish clinic-referred children with conduct problems from a normal control group (Chi & Hinshaw, 2002; Essau et al., 2006). The APQ evidences good test-retest reliabilities over the 2-week period ($r > .80$ for all scales), good convergent validity with related questionnaires (Dadds et al., 2003; Essau et al., 2006). Consistent with the literature (Dadds et al., 2003; Essau et al., 2006), in the current sample, internal consistency reliabilities (Cronbach's alphas) were .82, .84, .56, .45, .57 for Positive Parenting, Parental Involvement, Inconsistent Discipline, Poor Monitoring/Supervision, and Corporal Punishment scales, respectively.

Parenting Styles and Dimensions Questionnaire – Short Form (PSDQ-SF; Robinson et al., 1995, 2001). Participants report on parenting styles using the PSDQ-SF, a modified version

of the PSDQ, which consists of 32 items rated along a 5-Likert type scale ranging from 1 (never) to 5 (always). The PSDQ-SF assesses seven parenting style dimensions (Warmth/Involvement, Reasoning/Induction, Autonomy, Physical Coercion, Verbal Hostility, Non-Reasoning/Punitive, Permissive) which are further grouped into three parenting styles derived from Baumrind's (1971) theory of parenting: Authoritative (e.g., responsive to feelings and needs), Authoritarian (e.g., use physical punishment), and Permissive (e.g., difficulty with disciplining). The extant literature has shown Authoritative Parenting style and subdimensions to be associated with positive psychosocial outcomes such as social competence, independence, and academic success, while correlating Authoritative and Permissive Parenting styles and subdimensions to negative outcomes such as externalizing problems in youth (e.g., Rinaldi & Howe, 2012). On average, the PSDQ has shown good internal consistency reliabilities across studies in multiple cultural contexts ($\alpha > .70$ for Authoritarian and Authoritative Parenting styles and subdimensions), but with relatively lower reliabilities on the Permissive Parenting style, and good concurrent validity with related questionnaires (for a review, see Olivari, Tagliabue, & Confalonieri, 2013; Robinson et al., 1995). In the current sample, internal consistency reliabilities (Cronbach's alphas) were .85, .85, .76, .63, .80, .48, and .63 for Warmth/Involvement, Reasoning/Induction, Autonomy, Physical Coercion, Verbal Hostility, Non-Reasoning/Punitive, Permissive parenting style dimensions, respectively. As was the case with the APQ scales, relatively low reliabilities of Negative Parenting (i.e., Non-Reasoning/Punitive and Permissive scales) and Corporal Punishment (i.e., Physical Coercion) scales were consistent with the previous literature (Olivari et al., 2013; Robinson et al., 1995).

2.3.2 Temperament

General Temperament Survey (GTS; Clark & Watson, 1990). Participants report on their temperament traits using the GTS; a factor analytically derived measure of the Big Three model of temperament. The GTS is a 90-item, true-false questionnaire that yields measures of NT (28 items; e.g., "I often feel nervous and stressed"), PT (27 items; e.g., "People would describe me as a pretty enthusiastic person), consisting of two subdimensions (Positive Affect and Energy), and Disinhibition (35 items; e.g., "I'll take almost any excuse to goof off instead of work"). The GTS has shown good internal consistency reliabilities, with reported alpha coefficients of .91 for NT and .84 for PT, as well as construct validity with related questionnaires (Watson, Clark, McIntyre, & Hamaker, 1992). In the current sample, internal consistency reliabilities (Cronbach's alphas) were .93 and .84, for NT and PT scales.

2.3.3 Executive Functioning

Antisaccade (Hallet, 1978; Kane, Bleckley, Conway, & Engle, 2001). Participants were administered a computerized antisaccade task designed to assess inhibition of reflexive saccade across three trials: neutral, prosaccade, and antisaccade. In this task, participants were asked to identify a set of briefly presented letters (E and F) by pressing E and F keys, but to not respond to an asterisk (*). First, the letters and asterisk are presented in the center of the screen (neutral). The letters and asterisk are then shown on either left or right side of the screen, with the asterisk appearing on the same side of the screen as the letters (prosaccade). Lastly, the letters and asterisk are presented randomly on either left or right side of the screen (antisaccade). It is difficult for participants to inhibit reflective urge to respond to a flashing asterisk that appears suddenly in the peripheral visual field. Performance is typically calculated based on the mean response time differences between neutral and prosaccade or antisaccade trials, and accuracy

rates of each trial. In the current study, the mean response time differences between neutral and antisaccade trials, which primarily assess disinhibition, was used, with higher scores indicating higher disinhibition. The Antisaccade tasks have shown good test-retest correlations ($r = .78 - .80$ over 1- to 4-week period, $r = .69 - .89$ over 2-month period) in response time among healthy samples (e.g., Ettinger et al., 2003; Klein & Berg, 2001).

Go/NoGo (McVay & Kane, 2009; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997). Participants were administered a computerized Go/NoGo task designed to assess sustained attention and response inhibition. In this task, participants were asked to identify Go stimuli (letter X) by pressing a space bar, whereas inhibiting a response to NoGo stimuli (letter O). The ability to withhold a response to the NoGo stimuli was made difficult by the high frequency of responding to the Go stimuli. Performance is typically calculated based on rates of accuracy, omission (misses), commission (false alarms), and ignores (no responses). In this study, commission rates which represent failures to inhibit responses were used, with higher scores suggesting higher disinhibition. The Go/NoGo tasks have shown good test-retest reliability ($r = .80 - .82$ over 1- to 4-week period) in response time (e.g., Rosa et al., 2014).

Stroop (Kane & Engle, 2003). Participants were administered a computerized Stroop task designed to assess inhibition of a dominant automatic response across three trials: neutral, congruent, and incongruent. In this task, participants were asked to press a key that is the same as 1) a color word printed in black ink (neutral), 2) a color word printed in matching color (congruent), and 3) a name of color words that are printed in a different color than the presented words (incongruent). It takes longer for participants to name colors of incongruent words than to name colors of congruent words due to the interference of conflicting stimulus cues. Performance is typically calculated based on the mean response time differences between neutral

and congruent or incongruent trials or accuracy rates for each trial. In the current study, the mean response time differences between neutral and incongruent trials designed to assess inhibition of automatic responses were used, with higher scores suggesting higher disinhibition. The Stroop tasks have shown good test-retest reliability (r 's $> .80$'s; Homack & Ricco, 2004; Siegrist, 1997).

Balloon Analog Risk Test (BART; Lejuez et al., 2002). Participants were administered a computerized BART task. The BART is designed to assess risk-taking related constructs, such as behavioral disinhibition and sensation seeking behaviors. In this task, similar to real world settings, risk-taking is rewarded up until a point where further excessive risk-taking results in poor outcomes; participants are presented with 20 balloons, one at a time, and instructed to “pump” each balloon as large as possible by pressing a key, but without popping the balloon. Each pump increases the points earned, but if the balloon pops, all points from that trial are lost. Performance is calculated based on the average number of pumps adjusted for unexploded balloons for each of 20 trials. Thus, higher scores indicate higher disinhibition. The BART has shown adequate internal consistency reliabilities, with reported alpha coefficients of .70 (Lejuez et al., 2007), test-retest reliability across one-year intervals (MacPherson, Magidson, Reynolds, Kahler, & Keijueux, 2010), and convergent validity with related questionnaires of disinhibition (Lejuez et al., 2002, 2007).

2.4 Analyses

2.4.1 Demographics

Previous research has identified associations between parents and children's ages and genders with parenting behaviors. For example, maternal age has been consistently found to show positive associations with positive parenting and negative associations with negative parenting behaviors (e.g., Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982; Schlomer &

Belsky, 2012; Trillingsgaard & Sommer, 2016). In addition, a limited but informative body of research has shown that parenting behaviors may vary by parent-child gender-match, that is, mother-son/daughter or father-son/daughter; fathers are more likely to be involved and use corporal punishment with boys than girls, while mothers are more likely to engage in positive parenting behaviors and inconsistent parenting with girls than boys (e.g., Essau et al., 2006; Neiderhiser, Reiss, Lichtenstein, Spotts, & Ganiban, 2007). Further, in a study of 11- to 16-year old male youth (Latzman et al., 2009), youth age was found to be associated positively with Poor Monitoring and negatively with Corporal Punishment; older male youth reported more Poor Monitoring, while younger youth received more Corporal Punishment. Thus, consistent with previous parenting research, both parents and children's ages and genders were included as covariates in all structural analyses.

2.4.2 Descriptive Statistics and Preliminary Analyses

First, descriptive statistics were calculated for all the variables. Next, zero-order correlations were performed to examine the associations among, indicators of NT and PT, a performance on EF measures, and the scale scores from parenting practice and style dimension measures.

2.4.3 Measurement Models

All structural analyses for the measurement models were conducted using Mplus 7.3 (Muthén & Muthén, 1998-2012). First, three separate measurement models were specified to confirm the suitability of using a hypothesized three-factor parenting model, a single latent EF factor, and affective dimensions of temperament (NT, PT) in subsequent structural models. As described above, the scores from five parenting practice scales and seven parenting style scales were specified as indicators of three latent parenting factors: APQ Positive Parenting and

Involvement, PSDQ Regulation, Warmth/Involvement, and Autonomy were fitted as indicators of a positive parenting factor, APQ Poor Monitoring and Inconsistent Discipline, PSDQ Verbal Hostility, Non-Reasoning/Punitive, and Permissive Parenting scales were indicators of a negative parenting factor, and APQ Corporal Punishment and PSDQ Physical Coercion dimensions were fitted on a corporal punishment factor (See Figure 1). Of note, due to the highly positively skewed distribution of scores, corporal punishment factor was derived through equal loading of the scaled scores from two parenting measures (i.e., the APQ Corporal Punishment and the PSDQ Physical Coercion) using the count variables in Mplus (Klein, 2011; Swartout, Thompson, Koss, & Su, 2015). Unfortunately, this approach does not yield traditional model fit indices. Nevertheless, if fit indices are favorable in the model before including the factor estimated with count variables, corporal punishment in this case, and factor loadings of the full model remain significant after including this factor, the potential fit of this full measurement model can be inferred as good (L. K. Muthén, February 02, 2012; Swartout, 2013). Accordingly, a preliminary measurement model was specified without corporal punishment to determine the model fit of the three-factor model of parenting. Further, when the count variables are employed, standardized factor loadings and residual variances are not available in Mplus (Muthén & Muthén, 1998-2012). As such, unstandardized factor loadings were used as indices of the strength of associations with corporal punishment factor.

Consistent with the literature indicating that inhibition represents the Common EF factor that encompasses the shared variances across all EF tasks (e.g., Hecht & Latzman, in press; Rose et al., 2011; Vaughan & Giovanello, 2010; Miyake & Friedman, 2012; Munakata et al., 2011; Wiebe et al., 2008), the scores from the four EF tasks (i.e., the Antisaccade, Go/NoGo, Stroop, and BART) were set to load on a single latent EF factor. Next, three parcels were created from

NT items on the GTS to indicate NT, while the two PT subscales were used to indicate PT. This approach is advantageous for subsequent analyses because the use of parcels instead of individual items (e.g., NT has 27 items, PT has 26 items) to estimate two latent temperament constructs results in a substantially decreased number of observed variables, thereby increasing power (Little, Cunningham, Shahar, & Widaman, 2002). Specifically, NT, a single scale construct, was measured by three parcels through combining items with higher loadings and those with lower loading, which allows the balanced parcels (Little et al., 2002). PT was measured by two subscales (Positive Affect and Energy; Clark & Watson, 1990, 1991). Lastly, to examine the fit of the measurement models are adequate to interpret results, multiple fit indices were considered, including: chi-square test of model fit, the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), the Comparative Fit Index (CFI; Bentler, 1990), the Tucker Lewis Index (TLI; Tucker & Lewis, 1973), and the Standardized Root Mean Square Residual (SRMR; Bentler, 1995).

2.4.4 Structural Equation Modeling (SEM)

Consistent with the measurement model for parenting, a preliminary SEM model was specified without corporal punishment to determine model fit. Next, an omnibus SEM model was specified that included corporal punishment to examine the joint contribution of affective dimensions of temperament and EF to parenting. Of note, this SEM model was specified allowing three residual correlations as theoretically appropriate per modification indices (see Figure 1). Next, two separate SEM models were fitted to determine the interactive effects of affective dimensions of temperament and EF in the explanation of parenting. To keep the number of model predictors to a minimum, interaction terms (EF x PT, EF x NT) were entered in the models separately, then, along with EF, NT, and PT, were simultaneously regressed on the

three parenting dimensions. Parents and children's ages and genders were included as covariates in all analyses. As explained above, the model fit is determined based on the combination of fit indices in the preliminary SEM model and the un/standardized coefficients and factor loadings in the subsequent SEM models. Of note, when fitting moderation models with latent variable interaction terms, standardized coefficients are not available (Muthén & Muthén, 1998-2012). Thus, unstandardized coefficients were used as indices of the strength and direction of associations among variables in moderation models.

3 RESULTS

3.1 Preliminary Bivariate Analyses

As shown in Table 2, bivariate association between temperament traits were moderate. All parenting scales were positively correlated with each other within their respective domains with the exception of Poor Monitoring, which was associated only with APQ Inconsistent Parenting and PSDQ Verbal Hostility scales but not PSDQ Non-Reasoning/Punitive and Permissive Parenting scales. Additionally, at the observed, bivariate level, corporal punishment scales were highly correlated with each other but also correlated with some of the negative parenting scales (PSDQ Verbal Hostility, Non-Reasoning/Punitive, and Permissive Parenting). Additionally, bivariate correlations between affective dimensions of temperament and negative and positive parenting scales were generally moderate and consistent. More specifically, NT and PT evidenced positive associations with all negative parenting (r 's = .31 to .41) except for APQ Poor Monitoring, and all positive parenting (r 's = .17 to .30) scales with the exception of APQ Positive Parenting, albeit this association approached significance, respectively. In contrast, neither NT nor PT was associated with corporal punishment scales with the exception of NT evidencing a positive correlation with PSDQ Physical Coercion.

Among the four EF tasks, only performance on the BART task was positively correlated with Go/NoGo and Stroop performance (r 's = .22 and .19, respectively). Further, associations between performance on EF tasks and parenting scales were limited to BART and Go/NoGo performance and were relatively small (r 's = $-.17$ and $-.23$). Specifically, BART performance was negatively associated with three positive parenting scales (i.e., APQ Positive Parenting and Involvement and PSDQ Warmth/Involvement), whereas a performance of the Go/NoGo task evidenced positive associations only with APQ Corporal Punishment. Antisaccade and Stroop performance was unrelated to any of parenting scales. Lastly, no bivariate associations emerged between temperament traits and performance of any of EF tasks, but the association between PT and BART performance approached significance.

Table 2. Bivariate correlations among indicators of NT and PT, the scores from EF tasks, and the scores from parenting practices and style scales.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Negative Temperament																		
2 Positive temperament	-.36																	
3 BART	.05	-.15																
4 Go/NoGo	-.05	.01	.22															
5 Stroop	.02	.06	.19	.12														
6 Antisaccade	-.01	.08	.06	.10	.13													
7 Positive Parenting	-.09	.14	-.23	.07	-.14	.02												
8 Involvement	-.15	.17	-.17	.06	-.11	.03	.76											
9 Warmth/Involvement	-.15	.25	-.21	.08	-.01	.01	.68	.67										
10 Regulation	-.10	.28	-.10	.01	-.01	-.03	.55	.55	.65									
11 Autonomy	-.10	.30	-.13	-.11	.12	-.04	.34	.38	.53	.59								
12 Poor Monitoring	.01	.09	.09	-.003	-.001	.06	-.08	-.10	-.13	-.08	-.03							
13 Inconsistent	.31	.01	-.08	.07	-.12	.12	.22	.12	-.01	-.07	-.01	.16						
14 Vernal Hostility	.41	-.20	.10	-.01	-.07	.002	-.23	-.20	-.31	-.22	-.26	.21	.29					
15 Non-Reasoning	.37	-.01	.01	.06	-.01	.09	-.08	-.12	-.11	-.23	-.30	.12	.37	.45				
16 Permissive	.31	-.08	.09	.03	.04	.05	.05	-.08	-.05	-.18	-.17	.12	.47	.26	.40			
17 Corporal	.03	.05	.05	.20	.15	.04	.09	.12	-.02	.06	-.12	-.03	.13	.19	.25	.05		
18 Physical Coercion	.21	-.04	.01	.14	.08	.01	.03	.03	-.12	.04	-.11	-.06	.21	.33	.13	.16	.75	
Mean	7.84	20.06	32.21	.02	-.27	-.23	4.01	3.80	4.84	4.47	3.91	1.25	2.22	2.02	1.64	2.00	1.58	1.55
SD	7.19	5.14	14.89	.02	2.04	3.18	.71	.78	.74	.74	.85	.33	.62	.80	.59	.65	.56	.56
Minimum	.00	2.00	1.32	.00	-8.47	-40.24	1.80	1.80	2.20	1.80	1.40	1.25	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	28.00	27.00	74.08	.10	7.91	2.17	5.00	5.00	5.80	5.40	5.40	2.60	4.00	5.00	4.00	4.80	3.33	3.67

Note. $N=166$. Mean, SD, Minimum, and Maximum are for the scores/indicators measured in the current study. SD = standard deviation. Significant correlations $p < .05$ are shown in boldface.

3.2 Measurement Models

As described above, three measurement models were separately fitted to confirm the appropriateness of using a hypothesized three-factor model of parenting, a common EF factor, and affective dimensions of temperament (NT, PT). To test for the fit of three-factor model of parenting, a preliminary measurement model was specified without corporal punishment.

Although the chi-square test of model fit was significant ($\chi^2 = 62.81$ (31), $p < .01$), the remaining fit indices were adequate to interpret results (RMSEA = .08; CFI = .93; TLI = .89; SRMR=.09), indicating that this model fits the data well (Hu & Bentler, 1999; Kline, 2011). Next, the full three-factor model of parenting was fitted with corporal punishment. As shown in Figure 1, the overall model fit was adequate to interpret results as indicated by the aforementioned fit indices in the preliminary model as well as the significant factor loadings of all items on negative parenting (.23 to .68), positive parenting (.56 to .91), and corporal punishment (.13).

The overall fit of the measurement model for EF was also adequate to interpret results as evidenced by a non-significant chi-square test of model fit ($\chi^2 = .89$ (3), $p = .83$) as well as fit indices (RMSEA = .00; CFI = 1.00; TLI = 1.10; SRMR=.03). Further, all items loaded moderately and consistently on a single EF factor (.31 to .45). Similarly, the fit of the measurement model for temperament was adequate to interpret results as indicated by non-significant chi-square test of model fit ($\chi^2 = 10.94$ (5), $p > .05$) as well as fit indices (RMSEA = .09; CFI = .99; TLI = .97; SRMR=.08). Furthermore, all items loaded significantly and consistently on NT (r 's = .88 to .95) and PT (r 's = .66 and .69). Collectively, results of these

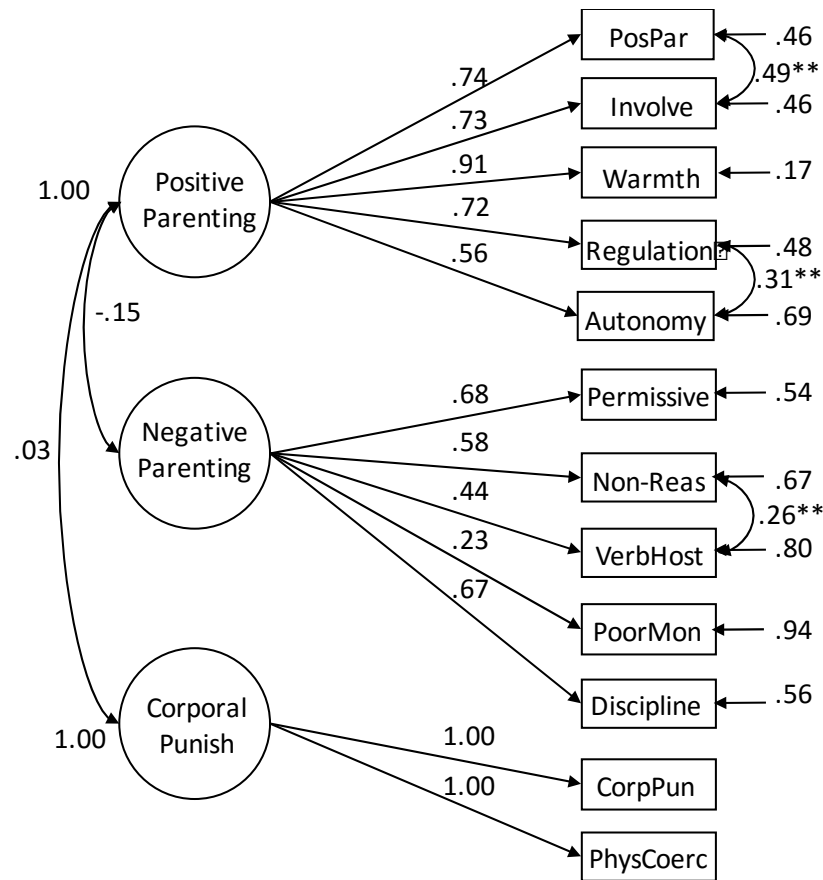


Figure 1. Measurement model depicting the three-factor model of parenting.

Note. $N = 166$. As described in the text, latent parenting factors are indicated by APQ and PSDQ scale scores. Latent corporal punishment is estimated using the count variables function in Mplus. Numbers between latent variables represent standardized coefficients; ** $p < .01$, * $p < .05$. Numbers on paths between indicators and latent variables represent standardized factor loadings; all factor loadings are significant. Numbers on arrows pointing to each indicator represent standardized residual variances; all variances are significant. Corporal Punish = Corporal Punishment, PosPar = APQ Positive Parenting, Involve = APQ Involvement, Warmth = PSDQ Warmth/Involvement, Regulation = PSDQ Regulation, Autonomy = PSDQ Autonomy, Permissive = PSDQ Permissive Parenting, Non-Reas = PSDQ Non-Reasoning/Punitive, VerbHost = PSDQ Verbal Hostility, PoorMon = APQ Poor Monitoring, Discipline = APQ Inconsistent Discipline, CorpPun = APQ Corporal Punishment, PhysCoerc = PSDQ Physical Coercion.

measurement models individually confirmed the suitability of using the three-factor model of parenting, the single EF factor, and affective dimensions of temperament (NT, PT) in subsequent structural models in the current study.

3.3 Structural Equation Modeling

3.3.1 Unique Effects of Temperament and EF

As noted earlier, a preliminary SEM model was first specified without corporal punishment to test for the fit of the full SEM model to examine the unique effects of temperament and EF to explain parenting. The overall fit of the preliminary SEM model was adequate to interpret results ($\chi^2 = 378.75$ (210), $p < .01$; RMSEA = .07; CFI = .86; TFI = .84; SRMR = .09). Next, a full SEM was fitted that included corporal punishment to examine the joint effects of affective dimensions of temperament and EF in the explanation of parenting. Similarly, the overall fit of the full SEM model was deemed adequate to interpret results based on the aforementioned fit indices of the preliminary SEM model, coupled with the significant standardized coefficients and factor loadings on all items (L. K. Muthén, February 07, 2012; Swartout, 2013). As shown in Figure 2, factor loadings on all items were significant on their respective factors and largely identical to those for the respective measurement models. More specifically, all items loaded significantly and consistently on NT (.88 to .94) and PT (.66 and .71), moderately and consistently on EF (.31 to .56), and significantly but somewhat variably on negative parenting (.25 to .63), positive parenting (.57 to .90), and corporal punishment (.04). Parents' age was significantly associated with all parenting factors, with the magnitude of associations greatest on corporal punishment. Children's gender was associated only with negative parenting. Parents' gender and children's age were unrelated to any domains of parenting. Further, as illustrated in Figure 2, when examined jointly, affective dimensions of

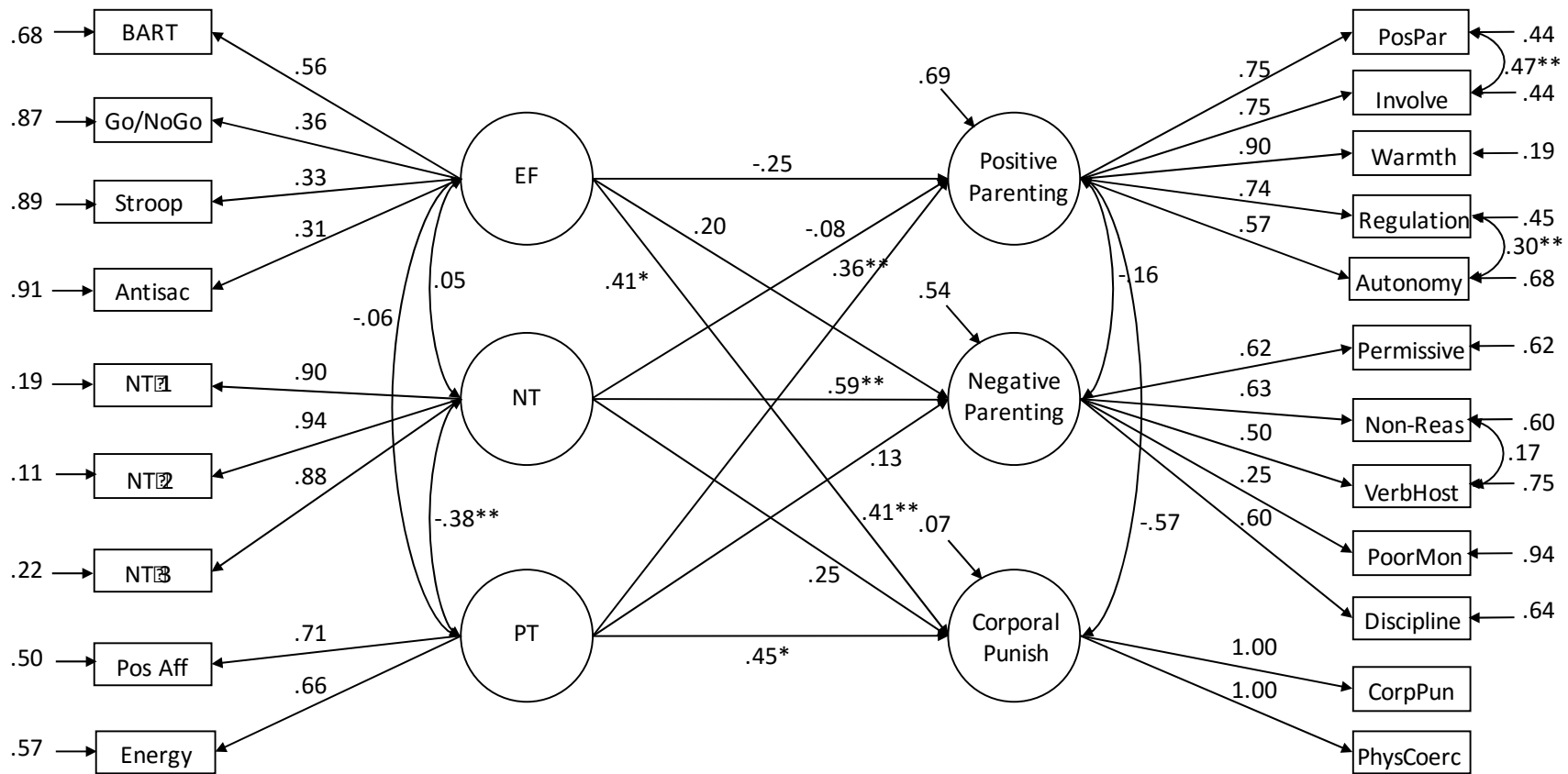


Figure 2. Structural model depicting latent affective dimensions of temperament and EF in the explanation of parenting.

Note. $N = 166$. As described in the text, a latent EF is indicated by a performance from four EF tasks. Latent temperament traits are indicated by parcels created from NT items on the GTS for NT and two PT subscales for PT. Latent parenting factors are indicated by APQ and the PSDQ scale scores. Numbers between latent variables represent standardized coefficients; ** $p < .01$., * $p < .05$. Numbers on paths between indicators and latent variables represent standardized factor loadings; all factor loadings are significant. Numbers on arrows pointing to each indicator and latent variable represent standardized residual variances; all variances are significant except for corporal punishment. All covariances (e.g., parents and children's ages and genders) are estimated in the model. EF = Executive Functioning (Disinhibition), NT = Negative Temperament, PT = Positive Temperament, Corporal Punish = Corporal

Punishment, Antisac = Antisaccade, Pos Off = Positive Affect, PosPar = APQ Positive Parenting, Involve = APQ Involvement, Warmth = PSDQ Warmth/Involvement, Regulation = PSDQ Regulation, Autonomy = PSDQ Autonomy, Permissive = PSDQ Permissive Parenting, Non-Reas = PSDQ Non-Reasoning/Punitive, VerbHost = PSDQ Verbal Hostility, PoorMon = APQ Poor Monitoring, Discipline = APQ Inconsistent Discipline, CorpPun = APQ Corporal Punishment, PhysCoerc = PSDQ Physical Coercion

temperament and EF was uniquely but differentially associated with all parenting domains; corporal punishment was most notably explained by PT ($\beta = .45, t = 2.05, p < .05$) and EF ($\beta = .41, t = 2.30, p < .05$), but with the associations with NT approached significance ($\beta = .25, t = 1.68, p = .09$). Positive parenting was notably explained by PT ($\beta = .36, t = 2.77, p < .01$), but with the associations with EF approached significance ($\beta = -.25, t = -1.82, p = .069$). In contrast, negative parenting was explained only by NT ($\beta = .59, t = 5.54, p < .01$).

3.3.2 Interactive Effects of Temperament and EF

Next, two separate SEM models were fitted to examine the interactive effects of affective dimensions of temperament and EF to explain parenting. As described above, these structural models represented moderation models in which an interaction term (EF x PT, EF x NT) was individually entered along with EF, NT, and PT, and were simultaneously regressed on parenting. For both models, the overall model fit was adequate to interpret results based on the aforementioned fit indices of the preliminary SEM model (Muthén L.K., February 07, 2012; Swartout, 2013). In the moderation models, EF x PT (unstandardized coefficients = .41, $t = 2.99, p < .01$) and EF x NT (unstandardized coefficients = -.39, $t = -2.52, p < .05$ for EF x NT) separately evidenced significant associations with positive parenting. In contrast, no interactive effects of temperament and EF emerged in associations with negative parenting (unstandardized coefficients = -.26, $t = -1.17, p > .05$ for EF x PT; unstandardized coefficients = .21, $t = .87, p > .05$ for EF x NT) and corporal punishment (unstandardized coefficients = -.37, $t = -.49, p > .05$ for EF x PT; unstandardized coefficients = .40, $t = .71, p > .05$ for EF x NT). To examine the specific form of the interactions, the slope of the final equations was computed at points that corresponded to high and low levels of the predictor variables (± 1.0 SD; see Aiken & West, 1991). As shown in Figure 3 and 4, whereas for parents with high EF, PT did not evidence

associations with positive parenting, for those with low EF, low PT was more associated with lower positive parenting. Similarly, as compared to parents with high EF, for those with low EF, high NT contributed more to lower positive parenting.

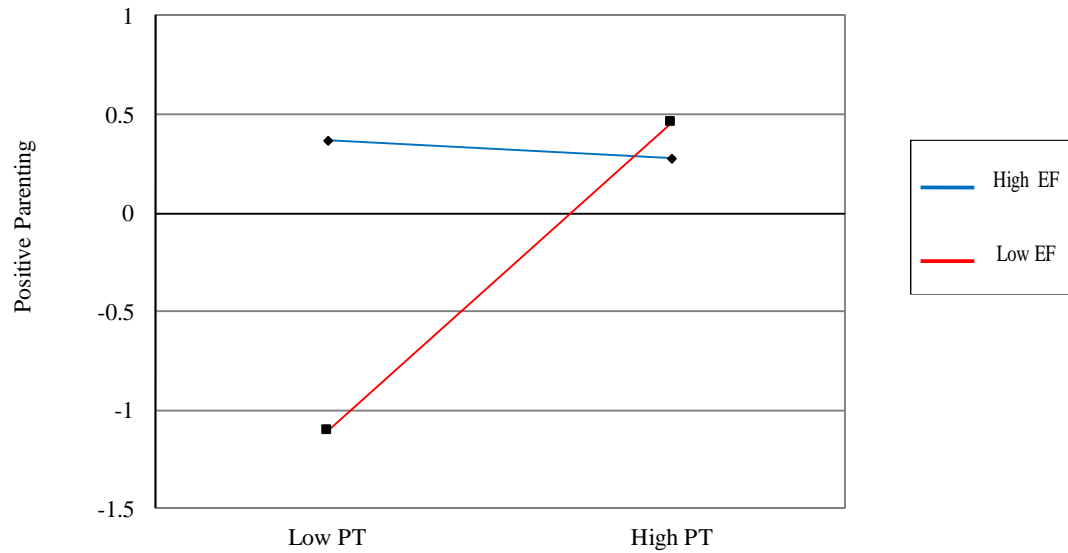


Figure 3. Interaction between PT and EF: associations with positive parenting. High and low values correspond to +1.0 and -1.0 SD from the mean, respectively.

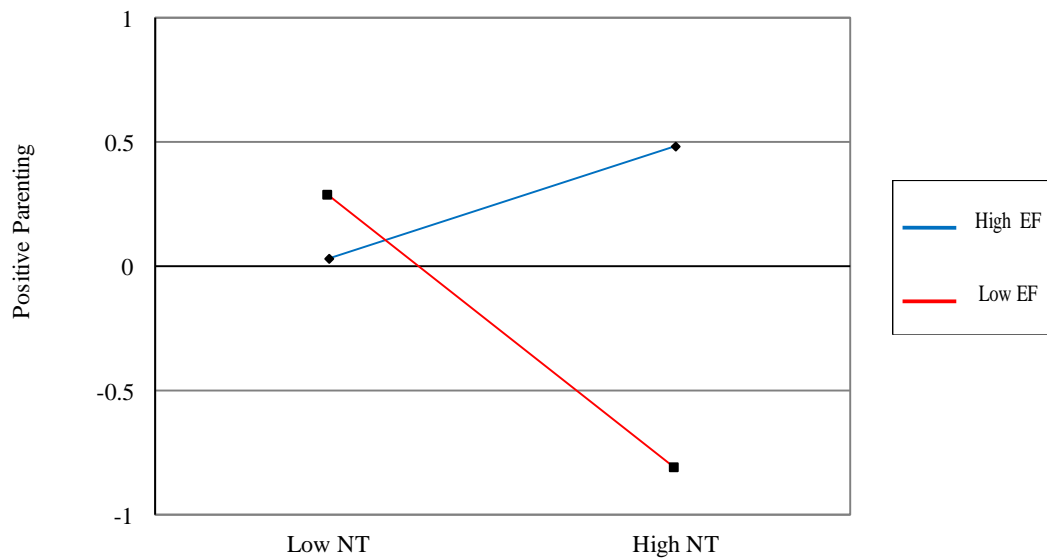


Figure 4. Interaction between NT and EF: associations with positive parenting. High and low values correspond to +1.0 and -1.0 SD from the mean, respectively.

4 DISCUSSION

Although parental individual differences in affective dimensions of temperament (e.g., Bridgett et al., 2011; Latzman et al., 2009; Prinzie et al., 2009; Rueger et al., 2011) and EF (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b) have individually identified as potential mechanisms underlying parenting, they have not to date been examined jointly in the explanation of parenting. Given that parenting can be challenging and stressful (Capsi & Moffitt, 1993), parents' ability to regulate their emotional and behavioral reactivity, functions hypothesized to be influenced by variability in temperament and EF, likely represent a critical process in the investigation of parenting. In addition to the lack of literature examining the triangular associations among temperament, EF, and parenting, as previously described, the existing literature that has examined associations among relevant domains evidence notable limitations concerning the measurement of parenting and EF (Bridgett et al., 2011; Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b; Lonigan et al., 2004; Muris et al., 2007).

Using a latent variable approach, the current study improves upon the measurement limitations concerning parenting by confirming the three-factor model of parenting, allowing for conceptual integration across historically distinct parenting practice and style approaches (Locke & Prinze, 2002). Results of the current study confirm that parenting practices and measures can be integrated and understood within a single, three-factor model consisting of positive parenting, negative parenting, and corporal punishment. More importantly, through this approach, affective dimensions of temperament and EF were concurrently examined as potential explanatory mechanisms associated with parenting in a racially/ethnically diverse sample of parents. Results revealed that affective dimensions of temperament and EF were uniquely but differentially associated with all parenting domains. That is, corporal punishment was explained by both temperament (PT) and low EF and positive parenting was explained by PT, with the associations with low EF approached significance. In contrast, negative parenting was explained only by temperament (NT). Furthermore, EF moderated the associations between temperament and positive parenting. Specifically, as compared to parents with high EF, for those with low EF, both low PT and high NT were more associated with lower positive parenting. Taken together, the current findings confirm that parenting behaviors are uniquely and interactively explained by temperament and EF, highlighting the importance of considering both affective dimensions of temperament and EF, and their interaction, in the explanation of parenting behaviors.

4.1 Three-Factor Model of Parenting

Parenting research has historically been conducted using two distinctive approaches with respect to conceptualization and measurement: parenting practices and styles (Locke & Prinze, 2002), but these approaches have never been examined jointly. A single three-factor structural model integrating parenting practices and styles proved a good fit to the data. The contribution of

each parenting scale was significant, but with some variability in the magnitude of factor loadings within negative parenting domain. The lowest factor loadings came from Poor Monitoring (.23), potentially reflecting its lack of coherence with the other negative parenting scales. Indeed, at the observed, bivariate level, Poor Monitoring represented the only scale that was not associated with all other negative parenting scales, indicating potentially limited shared variance with other scales within negative parenting domain. Further, parental monitoring has been found to play a more important role during late middle childhood to adolescence (e.g., Kerr & Stattin, 2000). Indeed, the APQ Poor Monitoring scale includes items that are more relevant to older youth (e.g., *you go out after dark without an adult with you, you stay out in the evening past the time you are supposed to be home, you fail to leave a note or to let your parents know where you are going*; Frick, 1991). Given the relatively young age of the sample ($M_{\text{age}} = 8.88 \pm 2.25$), with youth aged 6 to 10 years old accounting for over 80% of the current sample, parents in the current study are less likely to endorse these items in the Poor Monitoring scale, leading to lower factor loading of this scale on negative parenting. Future research is needed to examine whether the Poor Monitoring scale evidences higher loading onto negative parenting domain in the sample of older aged youth, which represents more empirical coherence, to confirm that results of current study reflect differences in children's age in the investigation of parenting.

Lastly, the overall magnitude of factor loadings was greater for positive parenting than for negative parenting. This is consistent with the extant literature reporting generally higher bivariate associations among parenting scales within positive parenting than those within negative parenting (e.g., Frick et al., 2003; Rinaldi & Howe, 2012; Robinson et al., 1995, 2001), suggesting potentially higher shared variance among Positive Parenting scales than Negative

Parenting scales. Parents tend to endorse only a few methods of negative parenting behaviors (e.g., Essau et al., 2006; Frick et al., 2003), resulting in a lower correlation among items within negative parenting scales. Further, the negative parenting factor included scales (e.g., Poor Monitoring) that are more sensitive to children's age, which also likely contributed to relatively less coherence among negative parenting scales. Collectively, results of the current study confirm that parenting has a distinct three-factor model consisting of positive parenting, negative parenting, and corporal punishment. As the first investigation to test the hypothesized three-factor model of parenting, results of the current study, therefore, serve to advance the conceptual and empirical integration of parenting practices and styles using a latent variable approach. Structural findings of parenting in the current study also allow for the parenting practices and style literature, which can be understood and integrated within a common model, to jointly contribute to the advancement of the field of parenting research.

4.2 Unique Effects of Temperament and EF on Parenting

Generally consistent with hypotheses and previous findings (e.g., Bridgett et al., 2011; Latzman et al., 2009; Prinzie et al., 2009, 2012; Rueger et al., 2011), at the observed, bivariate level, affective dimensions of temperament evidenced associations with parenting scales in expected ways; NT and PT were generally positively associated with all negative and positive parenting scales, respectively. Further, bivariate associations between indicators of EF and parenting scales were limited to BART and Go/NoGo performance, and were relatively small; BART and Go/NoGo performance was positively associated with positive parenting and corporal punishment scales, respectively, whereas no other associations emerged between indicators of EF and parenting scales. These limited results likely indicate the potential task impurity problem and support the use of latent variable approach in operationalizing EF in the current study.

Temperament and EF evidenced significant unique effects on parenting, with a pattern of associations varied across parenting domains. Consistent with expectations as well as previous findings (e.g., Bridgett et al., 2011; Lutzman et al., 2009; Prinzie et al., 2009, 2012; Rueger et al., 2011), PT and NT were positively associated with positive parenting and negative parenting, respectively. Contrary to hypotheses, however, PT also emerged significantly and positively associated with corporal punishment. In a series of exploratory analyses, associations among temperament, EF, and corporal punishment were examined by individually removing EF and NT to test the significance of association between PT and corporal punishment. Results revealed that the association between PT and corporal punishment was present only when NT was included in the model. When NT was removed from the model, PT was no longer significantly associated with corporal punishment ($\beta = .31, t = 1.46, p = .14$). These findings indicate that the effect of PT is evident only when the shared variance with NT is accounted for in the model. In other words, there may be unique variance in PT that is not shared with NT that is associated with corporal punishment. PT reflects individual differences in more than affect, such as approach orientation (e.g., seeking active and exciting lives) as well as energy (e.g., having a good deal of energy and enthusiasm; Clark & Watson 1991; Rothbart & Bates, 1998, 2006), which may play a role when responding to challenging emotional and behavioral problems in youth.

As noted earlier, very little research has examined the associations between temperament and corporal punishment. In the one study to date to investigate this association, only Mistrust, but not higher-order temperament traits, was found to be related to corporal punishment (Lutzman et al., 2009). Interestingly, although Mistrust is a primary trait within NT, it represents suspiciousness and emotional detachment (e.g., pervasive suspicious and cynical attitude toward other people, feeling like betrayed even by friends; Ro, Stringer, & Clark, 2012), indicating that

it may reflect more than affect. Consistent with this, latent higher-order affective dimensions of temperament evidenced no associations with corporal punishment in the current study.

Further, consistent with hypotheses, EF was positively associated with corporal punishment, while the associations with positive parenting approached significance; however, EF evidenced no associations with negative parenting. That is, negative parenting was explained only by temperament (NT), but not EF. The lack of findings concerning the unique effects of EF on negative parenting may be due in part to what EF represents in the current study. In the literature reporting the associations between EC/EF and parenting behaviors (Chico et al., 2014; Deater-Deckard et al., 2010a, 2010b), EF/EC is typically measured using a single behavioral indicator of EF (e.g., working memory, cognitive flexibility) or a consolidated score from a performance of multiple EF tasks (e.g., an aggregated score from the attention, inhibition, cognitive flexibility, and working memory tasks), which may also reflect a range of both cognitive and non-cognitive processes other than the latent EF factor primarily assessing disinhibition. Indeed, temperamental disinhibition has been found to evidence no associations with negative parenting (e.g., Lutzman et al., 2009). Although both negative parenting and corporal punishment have repeatedly found to be positively associated with negative youth outcomes (e.g., Frick et al., 2003; Essau et al., 2006), different associations of EF with negative parenting and corporal punishment suggest potentially different mechanisms associated with these parenting domains, further supporting the three-factor model of parenting. Taken together, results of the current study indicate that when examined jointly, affective dimensions of temperament and EF evidence significant and unique contribution to all parenting domains, underscoring the importance of considering both temperament and EF in the investigation of parenting behaviors.

4.3 Interactive Effects of Temperament and EF on Parenting

With regards to the interactive effects of temperament and EF on parenting, EF moderated the associations between temperament and positive parenting. That is, as compared to parents with high EF, for those with low EF, lower levels of PT or higher levels of NT, both of which have known links to maladaptive parenting, contributed more to lower positive parenting. In sum, these findings suggest EF likely serves as a buffer against the negative effects of at-risk temperament on parenting behaviors. A combination of low PT or high NT as well as low EF likely represent risk factors associated with maladaptive parenting behaviors, potentially through ineffective regulation of their emotional and behavioral reactivity to challenging affect and behaviors in youth. Understanding the contribution of both temperament and EF, and how they may interact, therefore, serves to elucidate key processes associated with individual variability in parenting behaviors.

4.4 Limitations

Due to the cross-sectional, correlational nature of the data, the current study does not allow for causal inferences. Future longitudinal research is therefore necessary to prospectively confirm the importance of affective dimensions of temperament and EF, and their interactions, as potential mechanisms associated with parenting. Further, although the fit of the structural models was adequate to interpret results, providing potential explanations for key processes associated with parenting, it does not imply that these are the only possible models. In particular, given the bi-directional nature of parenting (Belsky, 1984; Maccoby, 1992), future research would benefit from investigating bi-directional influences of predictive variables, again underscoring the need for future longitudinal research in the explanation of parenting.

At the observed bivariate level, indicators of EF tasks evidenced somewhat limited and

inconsistent associations with temperament and parenting variables. Further, with some exception, EF tasks were also largely uncorrelated with one another at the bivariate level. This pattern of results may be due in part to the selection and calculation methods of performance on EF tasks (e.g., commission rates for the Go/NoGo, mean response time differences for the Antisaccade and Stroop tasks) used in the current study. To confirm the generalizability of findings, future research is therefore needed to examine alternative methods to operationalize a single EF factor (e.g., mean response time differences for the Antisaccade and Stroop tasks, see Appendix 1). Nevertheless, performance on all four EF tasks loaded significantly on a single EF factor. These findings suggest the limitation of using traditional task-based indicators of EF and further support the use of latent variable approach in the current study.

The current study included a community sample and an undergraduate sample of students with children comprised of diverse parents with a wide range of demographical variables, but with relative homogeneity in terms of education, potentially resulting in the restriction of degree of relations among study variables, in particular, EF. EF has been found to be positively associated with academic achievement (e.g., Best, Miller, & Niglieri, 2011; Latzman et al., 2010). Indeed, as shown in Appendix 1, high accuracy rates emerged in some EF performance (e.g., 94 to 99% across multiple trials for the Antisaccade and Stroop tasks). Further, the current sample was largely comprised of mothers (76%), which might have contributed to the lack of findings in the associations between parents' genders and parenting behaviors in the current study. Given the importance of fathers' involvement in child development research (Phares, 1992), future research is encouraged to include more fathers in the investigation of parenting behaviors.

Moreover, the parenting literature has shown that as compared to White families, African-, Asian-, and Hispanic-American families engage in more authoritarian parenting and less authoritarian parenting; however, these parenting differences do not necessarily appear to be linked to the differences in youth outcomes (e.g., Pong, Hao, & Gardner, 2005; Querido, Warner, & Eyberg, 2002), with notable variability associated with generational differences among immigrant families (e.g., Chao, 2001; Pong et al., 2005; Querido et al., 2002). These findings likely suggest a more complex pattern of contribution of multiple demographic characteristics beyond race/ethnicity to parenting behaviors. As shown in Table 1, participants varied considerably across multiple demographic characteristics. However, there were few meaningful ways to account for the highly heterogeneous nature of the sample in the current study. Overall, the use of current sample allows for an improvement in the generalization of findings as it is more representative of the heterogeneity in families in the U.S. than the traditional samples examined in the previous literature. Nevertheless, potential future research should examine a more nuanced investigation of the contribution of various demographic characteristics to parenting behaviors to test for the generalizability of findings from the current study.

4.5 Conclusions

Limitations notwithstanding, results of the current study have considerable implications for future research. Using a latent variable approach, the current findings suggest a common three-factor model of parenting, allowing for the conceptual integration of historically divided parenting practice and style conceptualizations in service of promoting synergy and productivity within the parenting literature. Additionally, through the use of structural modeling, the current study contributed to the limited literature regarding potential contributing factors to individual variability in parenting behaviors, with parenting behaviors found to be uniquely and

interactively explained by temperament and EF. All told, both affective dimensions of temperament and EF jointly and interactively contributed to the explanation of parenting behaviors in distinct ways. Results highlight the importance of considering parental individual differences factors, such as temperament, EF, and their interaction, as potential critical processes in the explanation of parenting behaviors.

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APPENDICES

Appendix 1. Accuracy rates of the Antisaccade and Stroop tasks

EF Tasks	Trials	Accuracy Rates (Mean/SD)
	Neutral	.98/±.02
Antisaccade	Prosaccade	.98/±.03
	Antisaccade	.99/±.02
	Neutral	.97/±.10
Stroop	Congruent	.99/±.05
	Incongruent	.94/±.12

Note. $N=166$. Mean and SD are for the indicators measured in the current study. SD = standard deviation.