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Father Knows Best: The Interactive Effects of Fathering Quantity and Quality on Child Self-Regulation

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Father Knows Best: The Interactive Effects of Fathering Quantity and Quality on Child Self-Regulation

A Dissertation Presented

by

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DEDICATION

To my grandfather, R.A. Phani Shayi, whose lessons and love have guided me always

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ABSTRACT

FATHER KNOWS BEST: THE INTERACTIVE EFFECTS OF FATHERING QUANTITY AND QUALITY ON CHILD SELF-REGULATION

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In the past decade, developmental research has seen a surge of work regarding fathers and their influences of various aspects of child outcomes- cognitive and socioemotional. Studies show that father involvement, or "quantity" of time the father spends with the child, as well as fathering "quality", or the characteristics marking the father-child relationship (warmth, supportiveness, sensitivity etc.), can both contribute to variance in the development of individual differences in child outcomes such as language skills, academic success and psychological well-being. One facet of adaptive development, *self-regulation* (SR), is a robust and consistent predictor of high academic success, fulfilling interpersonal relationships, and overall life satisfaction. SR has been studied extensively in its relation to mother parenting effects. Some work with fathers shows that positive fathering (autonomy-supportiveness, sensitivity, responsiveness, cognitive stimulation) is related to higher levels of SR- both cognitive and emotional. However, no fathering studies to our knowledge have looked at the potential additive or interactive effects of fathering quantity of involvement and quality of caretaking on self-regulatory capacity in children.

In this study, I used a sample of fathers and 3-5-year-olds in two urban cities (Springfield, MA and Philadelphia PA, N = 88 dyads) to examine the relationship between father involvement (self-reported "quantity") and father parenting behaviors (observed and self-reported "quality") on child self-regulation (cognitive regulation, measured as observed executive function [EF], and emotion regulation, measured as father-reported effortful control [EC]). Results showed that quantity of father involvement and fathering positivity (warm affect, responsiveness, positive control) showed a crossover interaction effect to predict variance in child EF and EC (controlling for family socioeconomic status and child vocabulary skills). Father involvement was positively predictive of higher levels of EF and EC *only* when the quality of fathering was high in positivity (self-reported). When fathering was low in positivity (self-reported), the relationship between quantity of father involvement and child EF and EC became negative. This work points to the importance of taking a comprehensive view when assessing paternal parenting effects on development and also suggest potential targets for fathering intervention studies.

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CHAPTER 1
GENERAL LITERATURE ON FATHERING

1.1 Introduction

Fathers and their parenting behavior have been studied in relation to a variety of child outcomes (Cabrera, 2020; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008). There is much research to indicate that certain aspects of fathering, specifically high levels of involvement in childcare, and supportive and sensitive quality of caregiving, are predictive of adaptive behavioral and socioemotional adjustment, and better cognitive skills (Barker, Iles, & Ramachandani, 2017; Meuwissen & Carlson, 2018; Meuwissen & Carlson, 2015; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008; Towe-Goodman et al., 2014). One child outcome that has not been well studied, in relation to fathers' caregiving behaviors, is child self-regulation capacity, though studies with mothers have shown that child self-regulation is associated with various aspects of maternal caregiving (Mathis & Bierman, 2015; Morris, Silk, Steinberg, Myers & Robinson, 2007). It is yet unknown whether variation in the *quantity* of fathering (i.e., amount of time spent with their children) and the *quality* of the father-child relationship (i.e., characteristics of the type of caregiving, warm affect, supportiveness, control, sensitivity etc.) are redundant, additive, or interactive in their associations with individual differences in child self-regulation. The current study examined the potential additive and interactive statistical effects of fathering quality and quantity in a community sample of fathers and 3-to-5-year-old preschoolers.

In the last few decades, there has been a surge of interest in studying fathers and the role they play in children's development (Bakermans-Kranenberg, Lotz, van-Dijk, & van Ijzendoorn, 2019; Lamb & Lewis, 2013; Lamb & Lewis, 2010; Pleck, 2010). Much of the past research has

focused on associations between fathers' absence/non-residence and the development of child psychopathology rather than specific elements of the father-child relationship. However, due to current changes in familial environments and cultural norms, the concept of fatherhood today has evolved to include a lifespan perspective on paternal influences on children's development (Esping-Andersen & Billari, 2015; McGill, 2014). Statistics show that fathers in the United States spend an average of eight hours/week on childcare and ten hours/week on household chores (compared to 2 hours/week on childcare in the 1980s and 7 hours/week on childcare and 6 hours/week on household chores in 2008; Pew Research Center, 2018). Today, many fathers themselves are placing more importance on being involved in caregiving and on forming close and warm relationships with children (Bakermans-Kranenberg, Lotz, van-Dijk, & van Ijzendoorn, 2019; Cabrera & Tamis-LeMonda, 2013). Fathers are no longer seen as merely existing in the home context as a "bonus parent" to mothers, but today are viewed as important as mothers in that they are as loving, affectionate, involved, nurturing, and consistent in the raising of their children (Gerson, 2010; Pleck, 2010).

The key theory to explain the mechanisms through which parents transfer skills such as self-regulation to their children is social learning theory. Social learning theory postulates that children learn by observing and imitating the most relevant role models (Bandura, 1981; 1977). According to this theory, parents can exert a strong influence on self-regulation, since they are the ones who children spend the most time with across various types of social situations. Parents serve as "external" regulators for children when they are young, allowing children to engage with the environment, soothing them when they are distressed, and providing modeling/learning opportunities for children to explore the world around them. Accordingly, parental socialization practices, the emotional climate of the parent-child relationship, and how contingently and

consistently parents respond to the child, are key contextual factors that are predictive of individual differences in concurrent and subsequent child SR. For example, children learn how to respond to challenging "dysregulating" situations in part by observing how their parents reacts to negative events or control their attention and behavior when they are distressed by multiple demands. Through modeling and reinforcement, parents provide many of the essential socialization experiences for children to internalize social rules and self-regulatory skills that build their regulation capacity (Bernier, Carlson, Deschenes, & Matte-Gagne, 2012; Bernier, Carlson & Whipple, 2010; Carlson, 2009).

In this study, using social learning theory as the key basis mechanism, I explored whether the relationship between quantity of father involvement can have differing effects on individual differences in child self-regulation capacity depending on the quality of the father-child relationship. For example, even if the father spends a large amount of time in childcare activities, it mat not be strongly associated with self-regulatory capacity in the child if the relationship between the father and child is not marked by modeling behavior and positive reinforcement, which according to social learning theory is the key for transferring such skills.

1.2 Quantity of Father Involvement and Child Development

The quantity of father involvement (i.e., amount of time father spends with child) has been shown to facilitate cognitive development (Bronte-Tinkew, Carrano, Horowitz & Kinukawa, 2008; Cano, Perales & Baxter, 2019; Sarkadi et al., 2008), and is consistently associated with lower levels of behavioral problems such as aggression, higher levels of social/relational functioning and higher levels of educational achievement (for a meta-analysis, see Jeynes 2015; Downer & Mendez, 2005; Flouri & Buchanan, 2004). By participating in daily childcare activities such as helping get ready for school and assisting with homework, fathers

have a chance to provide their children with appropriate cognitive stimulation (e.g., asking questions, using mental terms, elaborating on children's thoughts) that may give children a chance to exercise their thinking/reasoning skills via parental role modeling, direct instruction, and language exchanges (Diamond & Lee, 2011; Hill, 2015). Quantity of involvement may also be a direct reflection of the father's dedication and positive attention to the child-rearing process, facilitating attachment and trust between the father and child, and thus internalization of what happens in the parent-child interaction (Lamb & Lewis, 2013)—that is, greater quantity of involvement may be associated with more positive and less negative qualities of fathering behavior.

1.3 Quality of Fathering Behaviors and Child Development

Empirical studies show that variation in the quality of fathering behaviors (such as supportive presence, warmth/sensitivity, positive types of control/behavioral monitoring) is associated with higher levels of children's cognitive ability, social competence, behavioral maturity, and other skills that aid healthy development over the life span (Sarkadi, Kristiansson, Oberklaid & Bremberg, 2008). In particular, positive and sensitive fathering have been shown to be consistent statistical predictors of better child outcomes including: language development (e.g., literacy skills, vocabulary knowledge, phonological awareness; Cabrera, Shannon & Tamis-Lemonda, 2007; Chacko, Fabiano, Doctoroff & Fortson, 2017; Duursma, 2016; Fliek, Daemon, Roelofs & Muris, 2015; Martin, Ryan & Brooks-Gunn, 2010; McElwain, Halberstadt & Volling, 2007; McKelvey, Burrow, Mesman, Pemberton, Bradley & Fitzgerald, 2012; Moller, Majdandzic & Bogels, 2015; Pancsofar & Vernon-Feagans, 2006; Paulson, Keefe & Leiferman, 2009; Sethna et al., 2017; Tamis-Lemonda, Shannon, Cabrera & Lamb, 2004); cognitive regulation (e.g., executive function, inhibitory control, working memory, attentional control;

Karreman et al., 2008; Meuwissen & Carlson, 2015; Richardson, Bocknek, McGoron, & Trentacaosta, 2019; Towe-Goodman et al., 2014); and socioemotional adjustment (e.g., lower levels of emotional/behavioral problems such as aggression, peer maladjustment, depressive symptomology, ADHD symptoms; Gaumon & Paquette, 2013; Gryczkowski, Jordan, & Mercer, 2010; Keown, 2012; Kroll, Carson, Redshaw & Quigley, 2016; Kuppens, Grietens, Onghena & Michiels, 2009; McCoy, George, Cummings & Davies, 2013; McKelvey et al., 2012; Opondo, Redshaw, Savage-McGuinn & Quigley, 2016; Webster, Low, Siller, & Hackett, 2013). The conclusion from this literature is that when the father-child relationship is emotionally positive and marked by behavioral monitoring, sensitivity, autonomy support, and adaptive cognitive stimulation, it provides social learning opportunities for children to take action and self-monitor their behavior and engage appropriately with the environment, facilitating optimal development. The results from these studies also provide more support for social learning theory as the mechanism through which children learn from parents- by talking through distressful situations, offering appropriate coping techniques, setting sensible boundaries, and providing emotional security, children gradually internalize these rules and translate them to various scenarios that require appropriate engagement with the environment.

1.4 Child Self-Regulation

Child self-regulation (SR) is a major and heavily studied domain of child development. It is defined as the modulation of attention, emotional responses, cognitions, and goal-oriented behaviors (Zeytinoglu, Calinks, Swingler & Leerkes, 2017). It is further broken down into *emotion regulation (ER)* and *cognitive regulation* (typically operationalized as *child executive function, EF*; Bridgett, Burt, Edwards & Deater-Deckard, 2015). ER involves the awareness, comprehension and appropriate modulation of emotions, and EF refers to higher-order mental

processes involved in planning, redirecting, inhibiting prepotent responses to facilitate goal-oriented behavior. Both types of regulatory domains are thought to subserve successful overall self-regulation.

Individual differences in both ER and EF have been linked to a variety of adaptive outcomes including cognitive and socio-emotional competencies and adjustment (Mischel et al., 2011). Children who are poorly regulated in childhood are more likely to have lower levels of adult education attainment (McClleland, Acock, Piccinn, Rhea & Stallings, 2013), lower adult incomes (Moffitt et al., 2011), poorer academic functioning (for a review, see Zelazo, Blair, & Willoughby, 2016; Spinrad et al., 2004) and more substance use and abuse, risky sex behavior, physical illness, and psychopathology (DeWall, Baumeister, Stillman & Gailliot, 2007; Fillmore & Rush, 2002; Graziano, Calkins & Keane, 2010; Quinn & Fromme, 2010). In this paper, I examine both ER and EF as they relate to facets of fathering behavior.

Young children heavily rely on their caregivers for modeling and support as they learn to self-regulate (Bernier, Carlson & Whipple, 2010). Thus, much of the developmental research on SR has emphasized the role of parenting style and behaviors in predicting individual differences in child SR. One explanation is that as children grow older, they move from "external" to "internal" (i.e., self) regulation of thoughts, emotions and behaviors based on what they have learned from their parents (Calkins, Smith, Jill & Johnson, 1998; Eisenberg, Spinrad & Eggum 2010).

1.5 Links between Child Emotion Regulation (ER) and Parenting

One component of child SR that has been studied heavily in its relation to caregiving behavior is child ER- how children understand and respond to arousal of positive and negative

emotions. Although there is some prior research on child SR and fathering (as just noted), most of the empirical work on parenting and child ER has involved only mothers. Negative maternal parenting has been found to be consistently indicative of poor outcomes. Mothers who used harsh parenting methods such as scolding and physical control have children who are more likely to use maladaptive ER strategies (not using distraction methods and orienting to/manipulating to the forbidden object) and noncompliance during a prohibited toy task (Calkins, Smith, Gill & Johnson, 1998). In one study using mother reports of her parenting, mediation analyses found that poor child ER mediated the relationship between harsh parenting, increased child aggression and child- reports of experiencing negative feelings more intensely and in an unregulated manner (Chang, Schwartz, Dodge & McBride-Chang, 2003). In another study, children whose parents reported using methods such as threatening or stonewalling and/or reported having high levels of distress in response to children's' negative emotions, displayed anger more intensely in a task where they were asked to discuss a source of conflict, albeit less frequently (Eisenberg et al., 2001; Snyder, Stoolmiller, Wilson & Yamamoto, 2003). Similarly, in another study, mothers who reported blaming the child for conflict in the mother-child relationship had children who endorsed more anger coping strategies in a structured interview (McDowell, Kim, O'Neil & Parke, 2002). Thus, it is possible that harsh parenting may socialize children to minimize or inhibit the expression of negative emotions, but such suppressed emotions may result in intense and dysregulated displays when they are expressed.

Similarly, mothers' expressivity of emotions and beliefs about emotions also play a role in socialization of child ER. Mothers who report high levels of negativity in their relationship with their child and low levels of acceptance of their children's negative emotions have children who perform poorly on ER tasks such as gift delay. These children also exhibit higher levels of

aggression and externalizing behavior (Eisenberg et al., 2001; Ramsden & Hubbard, 2002). Conversely, mothers' self-reported positive expressiveness (frequent expressions of happiness and gratitude) has been related to better ER and higher inhibitory control in their children (Eisenberg et al., 2001).

To our knowledge, there have been only two studies focusing on fathers and their parenting as it pertains to children's ER. The most recent study showed that when fathers of two-year-olds were observed to be high in responsiveness during a frustration task, children performed better on a forbidden toy task (e.g., they used more distraction and self-soothing techniques)—however, this was true only for those children had high resting respiratory sinus arrythmia, a cardiovascular variable that indicates good SR capacity of temperament (Richardson, Bocknek, McGoron, & Trentacosta, 2019). The second study showed a curvilinear relationship between father-reported physical play when the child was two years old (i.e., active outside play, rough-and-tumble play) and observed child ER at the age of kindergarten entry. Father-toddler play was associated with better child ER at kindergarten entry, only at moderate levels of play; very low or very high levels of play both were associated with poorer ER (Bocknek, Dayton, Raveau, & Richardson, 2017). In sum, even though the relevant literature on child ER and fathers' parenting is new, the research on both mothers' and fathers' parenting links with child ER suggests that highly engaged and positive parenting help foster children's skills to regulate emotions. However, more research needs to be done on fathers, to replicate and extend prior studies by examining potential additive and interactive effects of the quantity and quality of fathering, to better whether the underlying mechanism operates at all levels of the moderator and identify certain subgroups of the population that the link may be stronger/weaker for.

1.6 Links between Child Executive Function (EF) and Parenting

Now turning to another component of successful self-regulation, cognitive regulation involves the higher order cognitive processes that underlie flexible goal-directed behavior such as turn-taking and complying with rules and instructions in a classroom setting. *Executive function* performance (EF) is a commonly examined, broad aspect of cognitive regulation, encompassing working memory (ability to store and actively maintain and update information), inhibitory control (ability to suppress a dominant responses that is irrelevant to task at hand) and attention-shifting (ability to shift across rules, tasks and operations). As with ER, relationships with caregivers provide opportunities and support that are needed for developing these skills (Carlson, 2009).

Child EF has been shown to be impacted by both negative and positive parenting. Four dimensions of parenting have been commonly studied in relation to child EF: autonomy support, scaffolding, cognitive stimulation, and sensitivity/responsiveness versus hostility/rejection (Fay-Stammbach, Hawes, & Meredith, 2014). In a study of one to two-year olds, it was found that children whose mothers who were observed to be more autonomy supportive (granting the child opportunities to explore, allowing child to lead interaction, encouraging children's opinions, choices, decisions, and problem solving) when they were one year old had higher EF scores on a control/conflict task when they were two years old (Bernier, Carlson & Whipple, 2010). Similarly, other longitudinal work shows that lower levels of maternal control (i.e., low intrusiveness and physical control) is related positively to children's EF two years later (Bindman, Hindman, Bowles, & Morrison, 2013; Meuwissen & Carlson, 2019; Roskam, Meunier, Stievenart, & Noel, 2013).

In another longitudinal study, maternal scaffolding (i.e., deliberate use of verbal or nonverbal actions to help children engage with a challenging task) at age two was found to be predictive of EF at age four even when controlling for children's language and prior EF ability (Bernier et al., 2010; Hughes & Ensor, 2009). In cross-sectional studies, mothers' elaborative utterances and guidance have been seen to be associated positively with cognitive flexibility at age two years and inhibitory control at age four years (Bibok et al., 2009; Bindman, Hindman, Bowles & Morrison, 2013; Brophy-Herb, Stansbury, Bocknek, & Horodynski, 2012; Hackman et al., 2014; Hopkins, Lavigne, Gouze, LeBailly, & Bryant, 2013).

Several longitudinal studies have shown that the amount of cognitive stimulation the parent provides (e.g., having educational materials in the home, providing opportunities to develop cognitive skills through enriched interactions such as reading) has been associated with increased levels of inhibitory control and cognitive flexibility two years later (Clark et al., 2013) and increased attentional control one year later (Mezzacappa, Buckner, & Earls, 2011). Cross-sectional work shows positive links between parents' cognitive stimulation and child sustained attention capacity, impulsivity, working memory performance, and planning ability (Hackman et al., 2014).

With regard to the literature on children's EF, there are many studies of mothers' self-reported and observed sensitive and warm caregiving (e.g., positive affect, absence of hostility) showing concurrent and longitudinal prediction of better EF in children (for a review, see Bernier et al., 2017). In regard to fathers, there are only four studies. First, a longitudinal study found that sensitive fathering (e.g., using praise, showing warm affect) during play with two-year-olds predicted better child EF including working memory, attention-shifting, and inhibitory control at three years of age (Towe-Goodman et al., 2014). Second, in a study of three-year-

olds, fathers who were controlling and harsh (e.g., behaved intrusively, showed cold voice and affect) during an observer-rated free play interaction, had children who performed less well on EF tasks (Meuwissen & Carlson, 2015). Third, a three-wave longitudinal study (two- to eight-years of age) found that higher levels of mothers' and fathers' observed positive control behaviors (e.g., limit-setting, verbal praise) and lower levels of their negativity (e.g., rejection, hostility) were concurrently and longitudinally related to better child performance on inhibitory control tasks (Roskam, Stievenart, Meunier, & Noel, 2014). Fourth and finally, a study of four-year-olds found that higher levels of self-reported harsh parenting by mothers and fathers were related to lower levels of parent-reported child metacognitive and inhibitory control abilities (Lucassen et al., 2015). In sum, the work on fathers and their influence on child EF shows similar results as the work done with mothers- positive characteristics in the father-child relationship foster and boost child regulatory capacity, whereas negative characteristics hinder this development.

1.7 The Gap in Knowledge Regarding Fathers

Thus, there is a plethora of work to suggest the importance of parenting on ER and EF development during the first few years of life. Most of this research has been done on mothers, though in the past decade, there has been a shift to focus on all caregivers in the child's environment (Pleck, 2010). The studies mentioned above that specifically studied fathers and their parenting (e.g., Meuwissen & Carlson, 2015; Meuwissen & Englund, 2016; Roskam, Stievenart, Meunier, & Noel, 2014; Towe-Goodman et al., 2014) show similar results to those found in studies with only mothers. Specifically, consistently sensitive, warm, and supportive fathering promotes—and negative, hostile fathering impedes—child SR development (Lucassen

et al., 2015; Meuwissen & Carlson, 2015; Richardson, Bocknek, McGoron, & Trentacosta, 2019; Roskam, Stievenart, Meunier, & Noel, 2014; Towe-Goodman et al., 2014).

However, fathering and mothering may not always show the same associations with child SR. There is evidence that father-child relationships and interactions may provide children with enriching or impeding experiences that are distinct from the mother-child relationship and interactions. For example, compared to mothers, fathers tend to engage in more high-energy and unpredictable play that may be an important context for children to practice SR skills (Grossman, Grossmann, Kindler, & Zimmermann, 2008). Also, when children interact with multiple caregivers, especially caregivers who differ in their parenting styles, they are exposed to a wider diversity of stimulation. This requires children to switch "rule sets" when interacting with each distinct caregiver, i.e., they may need to remember fathers may be more likely to encourage risk-taking behavior whereas mothers may be more cautious. These varying interactions may help build skills such at attentional control, set-shifting ability etc., thus promoting general EF (Meuwissen & Englund, 2016). Therefore, it is important for research on the parenting antecedents of EF to include all caregivers in the child's environment.

Another key issue that has to be addressed in fathering research is the need to distinguish fathering *quantity* (i.e., amount of time spent with the child) from fathering *quality* (i.e., positivity, sensitivity, supportiveness, autonomy support) of parenting behaviors. Most studies of fathering and child SR have examined quantity and quality of fathering separately, and have not examined their interrelations with each other, or simultaneously with child outcomes. Some correlational work on non-resident fathers has suggested that mere contact with the father, i.e., quantity of time spent with fathers has little to no benefit on outcomes such as internalizing symptomology and academic success. These studies suggest however, the quality of nom-

resident fathering, especially authoritative fathering high in warmth, limit-setting and support is predictive of lower levels of externalizing symptoms and rates of high school dropouts (for a review, see Amato & Gilbreth, 1999). Generally speaking, this research posits that high-quality nonresident father engagement with children is associated with benefits for children, but that time with children, in and of itself, may not be. This corroborates the view that quantity of father involvement may be a "necessary but not sufficient" factor for positive child outcomes. Also, since all of the studies in this meta-analysis utilized correlations, it also emphasizes the need to explore quantity and quality in the same equation when predicting outcomes, to see how they work together additively or interactively.

To our knowledge, there are only two studies that have tested whether fathering quantity and quality statistically interact, and both were examining associations with secure attachment formation. In a study of three-year-olds, Brown and colleagues (Brown, Mangelsdorf & Neff, 2012) found that fathers' self-reported longer amounts of time spent on caregiving activities throughout the week was especially important for the child's security of attachment if the father was low in sensitivity (i.e., less warm and supportive in interactions with their child), i.e., the positive link between quantity of involvement and attachment was stronger for fathers low in sensitivity. This suggests that in families in which the father-child relationship may be poorer in quality, a greater quantity of fathers' engagement in childrearing activities may compensate in fostering adaptive outcomes for children.

However, another study (Brown, McBride, Shin & Bost, 2007) showed the opposite effect. Fathering quality moderated the link between quantity of involvement and attachment security, such that higher involvement was related to poorer attachment security, if fathers displayed negative parenting behaviors (higher intrusiveness and lower positivity). In these

dyads, a higher quantity of involvement was related to less secure attachment. Thus, the findings conflict between these two studies: Brown et al. (2012) reported that spending more time with the child compensated for a poorer-quality relationship, but Brown et al. (2007) found that spending more time together exacerbated the potential deleterious effect of a poorer-quality relationship. What is clear is that fathering quantity and quality may be interactive in their associations with variance in child functioning. Tests of such interaction effects are needed for the full range of child outcomes, using adequately powered samples, to more clearly elucidate how these two aspects of paternal behavior function in children's development.

1.8 Current Study

The current study aimed to examine how fathering quality and quantity work together additively or interactively to statistically predict individual differences in child SR. It is important to examine potential nonadditive (i.e., interaction) effects between potential predictors, because information about independent additive effects of those predictors is incomplete and misleading if those predictors' effects are actually conditioned on the level(s) of the other predictors (Lavrakas, 2008). Based on the previous studies, two competing hypotheses were tested with regard to the interaction of fathering quality and quantity: 1) fathering positivity will buffer the negative effects of lower quantity of father involvement on deficits in child ER and EF; versus 2) fathering negativity will exacerbate the negative effects of lower quantity of father involvement on child ER and EF.

CHAPTER 2

METHODS

2.1 Participants

The present study incorporated a community sample of fathers with 3-5-year-old children in Springfield, MA and a sample from two preschools in Philadelphia, PA. Recruitment was primarily accomplished through in person contact and sending home flyers with children. Fathers received $25 as compensation. Children received stickers and a toy. The UMass Institutional Review Board approved the study (protocol ID: 2018-5151; see Appendix A). Participants completed an informed consent procedure and signed consent forms (see Appendix B) Children completed verbal assents before starting testing.

The present sample included 88 father-child dyads. Fathers were 24 to 63 years old (mean [*M*] = 39.91, standard deviation [*SD*] = 6.84); their toddler-aged children were 4.25 years old on average (age range: 35- 68 months; 52% female). In 86% of the families, the participating father was the biological father of the study child. In terms of ethnicity, fathers were allowed to select all ethnicities that they identified with: 55% of the fathers (49 fathers) identified as Caucasian, 20% as Asian (18 fathers), 18% as African American (16 fathers), 13% as Hispanic (12 fathers), 3.4 % as Middle- Eastern (three fathers), 2.2% as American- Indian (two fathers) and 4.5% identified as other (four fathers).

The study child was the only child in 31% of the families (28 families), 48% of the families had two children in the home (43 families), and 15.9% of families (14 families) had more than two children. Three participants did not answer the question as to how many children were in the home. Sixty-eight percent of the fathers (60 participants) had at least a Bachelor's

degree or higher (18 fathers had a Bachelor's degree, 15 had a Master's degree and 27 had an MD/PhD/JD). Twenty-eight percent of the fathers (25 participants) had an Associate's degree or lower (two fathers had an eighth grade education, one completed some high school, 19 had a GED/high school diploma and three had an associate's degree). Three fathers did not respond as to how much education they had completed. Eight percent of families (seven fathers) reported a total yearly family income of less than $25,000/year, 50% of families (44 fathers) had an income between $25,000 and $100,000/year, and 35% (31 fathers) had incomes above $100,000/year. Five percent of fathers (four fathers) did not report their total income and two percent (2 fathers) reported they did not know their total income.

2.2 Procedures

Fathers were given the choice of doing the study at the lab, the child's pre-school or in their homes (twenty-three families completed the study in the lab, four families chose home visits, all others completed the study at the child's preschool). Fathers filled out questionnaires on an iPad during the visit. Children completed a vocabulary assessment and a battery of executive function (EF) tasks. Fathers and children were also observed for 10 minutes during two dyadic father-child interaction tasks.

2.3 Measures

- **Fathering Quantity (Self-Report Only).** Fathers completed the My Time Spent As A Parent questionnaire which assesses the quantity of father involvement in the child's life (Glysch & Vandell, 1992). This questionnaire uses a Likert scale of 1-5 (1 = partner's "job", 2 = mostly partner's "job", 3 = we share it "equally", 4 = mostly my "job", 5 = my "job", or 6 = not applicable) to assess division of labor in marriage. It includes 16 items

such as “giving child a bath”, “buying toys for child” and “taking child on outings”, a mix of recreational activities as well as routine caregiving activities, $M = 2.99$, $SD = 0.44$, $\alpha = 0.79$.

- **Fathering Quality (Self-Report and Observed).** Fathers’ self-reported negative and positive parenting feelings were assessed using the Parent Feelings Questionnaire (PFQ; Deater-Deckard, 1996), a 24-item questionnaire that assesses negative (13 items, $\alpha = 0.88$) and positive feelings (11 items, $\alpha = 0.45$) towards the child. On a 1-5 scale (1 = definitely untrue to 5 = definitely true), fathers were asked to rate their relationship to the child on items such as “My child and I fight or argue more than I would like to” and “Sometimes my child’s behavior makes me so angry I can barely stand it” and “Sometimes I raise my voice with my child, especially after I’ve had a bad day”. For negativity, $M = 2.39$, $SD = 0.82$; for positivity, $M = 4.73$, $SD = 0.27$.

  For observed fathering quality, fathers and children completed two frustrating cooperation tasks while they were being video recorded: drawing a house using an Etch-A-Sketch drawing toy and moving a marble through a tilting maze box. For each game, the father and child were assigned one of two dials that operated the toy and instructed not to touch each other’s dial. Dyads were given five minutes for each game (Blankenship, Chaz-Friedman, Riggins & Dougherty, 2019; Helm, McCormick, Deater-Deckard, Smith, Calkins & Bell, 2020).

  Trained observers subsequently coded the recorded interactions using the Parent Child Interaction System (PARCHISY), which includes global 7-point Likert-type rating scales (ranging from 1 = none, to 7 = very frequent/constant) on constructs for the father, the child, and the dyad. Fathers were scored on *positive content/control* (use of praise,

explanation, open-ended questions, etch: *M* = 4.3, *SD* = 1.31; marble: *M* = 4.12, *SD* = 1.12), *negative content/control* (use of criticism/physical control of child, etch: *M* = 2.08, *SD* = 1.32; marble: *M* = 2.07, *SD* = 1.18), *positive affect* (smiling/ laughing, etch: *M* = 3.69, *SD* = 1.31; marble: *M* = 3.89, *SD* = 1.07), *negative affect* (frowning, cold/harsh voice, etch: *M* = 1.42, *SD* = 0.66; marble: *M* = 1.53, *SD* = 0.72), *responsiveness* (to child's questions, comments and behaviors, etch: *M* = 5.69, *SD* = 0.82; marble: *M* = 5.69, *SD* = 0.75), *on-task behavior* (persistence with respect to the task given, etch: *M* = 6.40, *SD* = 0.83; marble: *M* = 6.25, *SD* = 0.85) and *verbalizations* (amount of speaking to child, etch: *M* = 5.39, *SD* = 0.94; marble: *M* = 5.21, *SD* = 0.80).

A total of nine coders scored the father-child interactions. Coders were trained to obtain an inter-rater reliability of > .70 (inter-rater intra-class *r*). Intra-class correlation coefficients for the average of all coding pairs was ICC = .71. To derive an overall positive parenting score, I examined the constructs of positive control, positive affect, responsiveness, on-task behavior, and verbalizations for each task separately using a principal components analysis. For both the Etch-A-Sketch and Marble maze task, father positive control, positive affect, and responsiveness loaded onto one factor which explained 50% of the variance in positive parenting (55.6% for etch and 46.2% for marble). Loadings for indicators ranged from 0.63 to 0.81. The three scores were standardized for each task and averaged. The averaged score was re-standardized to yield an overall positivity z-score for each task. Both tasks' observed positivity z-scores were then averaged and standardized again for a final single composite observed positivity z-score for each father.

To derive an overall negative parenting score, the correlations between the constructs of negative control and negative affect were estimated. For both tasks, control and affect were highly correlated (r = 0.66 for etch and 0.63 for marble); therefore, both variables were standardized, averaged, and re-standardized for an observed negativity z-score for each task. Both tasks' observed negativity scores were averaged and standardized again for a final single composite observed negativity z-score for each father.

- **Executive Function (EF)**. Children completed four EF tasks in the lab or at the childcare center: Bear/Dragon, Dimensional Card Sort, forward digit span, and backward digit span (Carlson, 2009; Frye, Zelazo & Palafai 1995).
    - *Bear/Dragon*. To begin, children were asked to imitate ten modeled actions (e.g., ''Touch your ears''). They were then introduced to two puppets—a ''nice bear'' and a ''naughty dragon''—and instructed children to do what the bear asked them to do but not to follow the dragon's commands. In practice trials, the experimenter moved the bear's mouth and said (in a high-pitched voice), ''Touch your nose,'' and then moved the dragon's mouth and said (in a low gruff voice), ''Touch your tummy.'' Children passed the practice if they followed the bear's command but ignored the dragon's command. Children were given practice trials for both the bear and dragon till they demonstrated they understood the rule. After six trials, if children did not understand the rule for the dragon puppet, the experimenter held the child's hands down to remind them not to do the action. After a verbal rule check for both the bear and dragon to ensure children understood the game, 10 test trials were administered with alternating bear and

dragon commands. After five test trials, all children received a reminder of the rules regardless of performance. Even if children did not pass the verbal rule check, if they attempted any of actions during the task, their scores were used. Six children refused to do the task, for a total $N = 82$.

Each child's performance was coded independently by two coders (each child received two sets of scores, one from each coder). For the Bear trials, scores ranged from 0 (failure to move), 1 (wrong movement: e.g., touches nose when told to clap hands), 2 (partial commanded movement: e.g., commanded to clap hands and brings hands together but does not clap), and 3 (full commanded movement: e.g. commanded to clap hands and claps hands). For Dragon trials, scores ranged from 0 (full commanded movement: e.g., commanded to clap hands and claps hands), 1 (wrong movement: e.g., commanded to clap hands and touches nose), 2 (partial commanded movement: e.g., commanded to clap hands, begins to move hands together then stops), 3 (no movement plus strategy [anything the child deliberately does to help prevent them from performing a full commanded movement]: e.g., shakes head, sits on hands, clasps hands together, says "no") and 4 (no movement, no strategy: e.g., commanded to clap hands, does nothing). Since I was looking for complete agreement between coders for each child, any video that had a discrepancy in codes between the coders was viewed again by the coders together to try to reach consensus. Out of 82 videos, 17 videos had to be watched and coded again to reach consensus. Both coders' ratings were averaged for a final score for each child on the bear ($M = 13.78$, $SD = 3.31$) and dragon trials ($M = 14.77$, $SD = 6.77$).

- *Dimensional Card Sort.* In the Dimensional Card Sort, children were shown two boxes, one with a picture of a "red rabbit" on the front and one with a picture of a "blue boat". The experimenter told the child they would first sort cards according to "shape" ("In the shape game, rabbits go in the rabbit box and boats go in the boat box."). The experimenter modeled two trials, one rabbit and one boat. Following this, children were asked to sort stimuli according to shape for five trials. Then, the experimenter told the child the rule had changed and how they would be sorting according to "color" ("In the color game, red ones go in the red box and blue ones go in the blue box."). Experimenter modeled two trials, one red and one blue. Children were asked to sort the stimuli based on color for five trials. The correct number of trials post-switch was used, $M = 4.62$, $SD = 1.06$. Only one child refused to do the task, for a total $N = 87$.
- *Forward and Backward Digit Span.* Both the forward and backward digit span tasks involved the experimenter reading a series of single-digit numbers from 0 to 9. In the forward version, children were asked to repeat the sequence in the same order. They were given up to six practice trials before starting the test trials. The experimenter began the task with a two-digit sequence, with one digit added after two subsequent trials (2 two-digit trials followed by 2 three-digit trials, followed by 2 four-digit trials etc.). Children were given two different chances to repeat a new length sequence correctly. If the child could not repeat a sequence correctly after two chances, the task ended. The highest sequence length correctly completed was used, $M = 3.79$, $SD = 1.14$. Five children refused to do the task, for a total $N = 83$.

In the backward span version, children were asked to repeat the sequence in reverse. They were given up to six practice trials before starting the test trials. If children did not understand the rules after six trials, the experimenter continued onto the test trials. The experimenter began the task with a two-digit sequence. One digit was added in every other subsequent trial. Children were given two chances to repeat a new length sequence correctly. If the child could not repeat a sequence correctly after two chances, the task ended. As with backward digit, the highest sequence length correctly completed was used, $M = 0.74$, $SD = 1.11$. Sixteen children refused to do the task, for a total $N = 72$.

Since the goal was to assess an overall EF score, all four task scores were examined using principal components analysis—a procedure used in prior studies (e.g., Cuevas et al., 2014). The first principal component accounted for 43% of the variance, and absolute values of loadings ranged from 0.56 to 0.81. All four task scores were standardized and averaged, and this average score standardized again, to yield a composite EF z-score that was widely and normally distributed. Children received a composite EF score if they completed three of the four tasks.

- **Effortful Control (EC; a Measure of ER).** Fathers reported on their child's Effortful Control by completing the Child Behavior Questionnaire-Very Short Form as a measure of child ER. The CBQ utilizes a seven-point Likert-type scale (1 = extremely untrue of your child to 7 = extremely true of your child) and has demonstrated strong internal-consistency reliability in many studies (e.g., Rothbart, Ahadi, Hersehy & Fisher, 2001). Effortful Control was measured using 12 items ($M = 5.39$, $SD = .67$) spanning indictors of inhibitory

control, attentional focusing, low-intensity pleasure, and perceptual sensitivity. It demonstrated good internal consistency, $\alpha = .66$.

- **Language Skills.** Since child vocabulary skills are correlated with both EF and ER at this age, it was included as a covariate in the analyses (Weiland, Ulvestad, Sachs & Yoshikawa, 2013). Children completed the Expressive Vocabulary Test, which is a measure of expressive vocabulary and word retrieval (1st edition EVT, Williams, 1997). Children were shown a picture and asked to respond with one word that is an acceptable label, provide a synonym or answer a specific question about the item. The EVT has well-established test-retest reliability, r = 0.77- 0.99 (Williams, 1997). In the current study, the age-standard scores ranged from 74-141, M = 105.52, SD = 14.64.
- **Family Socioeconomic Status.** Family socioeconomic status (SES) is a well-established correlate of child EF and ER (Sarsour et al., 2010; Schultz, Izard, Ackerman & Youngstrom, 2001) so it also was used as a covariate in the analyses. Families were asked to report the highest level of education completed by the father and mother and total annual family income, as well as the number of family members living in the home (to compute per capita income; total income/number of people in the home). Principal components analysis revealed that the first component explained 71% of the variance, and loadings ranged from .82- .87. Father education, mother education, and per capita income variables were standardized, averaged and standardized again to create an SES composite z-score that was widely and normally distributed.

CHAPTER 3

RESULTS

3.1 Descriptives and Correlations

Descriptives statistics and bivariate correlations between all study variables can be found in Tables 1 and 2. Mean scores on fathering quantity represent frequency or amount of involvement in childrearing activities relative to the parenting partner. Fathers reported relatively low quantity of involvement in caregiving compared to parenting partners. Turning to fathering "quality", the distribution for father self-reported positivity was negatively skewed, with fathers reporting high levels of positivity on average (M = 4.73; range: 3.91- 5.00 on the 1-5 Likert scale). Fathers' self-reported negativity was normally and widely distributed (M = 2.39; range: 1.00- 4.62 on the 1-5 Likert scale). For observed positivity (before z-scoring the composite used in analyses), the distribution was normally and widely distributed (M = 4.57; range: 2.58- 6.08 on the 1-7 scale). For observed negativity (before z-scoring the composite, which was the one used in analyses), the distribution was positively skewed; fathers engaged in very low levels of observed negative control and affect (M = 1.76; range: 1.00- 4.25 on the 1-7 scale).

Bivariate correlations revealed that observed and self-reported positivity were positively correlated, but observed and self-reported negativity were not associated. Fathering quantity was not significantly associated with any fathering quality variables (i.e., observed and self-reported positivity and negativity). Higher child ER covaried with higher child EF and higher child EVT scores. Observed father positivity covaried with higher child EF and child EVT scores. Conversely, observed and self-reported father negativity covaried with lower child EVT scores.

To estimate additive and interactive statistical predictive effects, I estimated separate standard multiple regression equations predicting child EF and child EC, and also in separate equations- observer and self-reported fathering quality. The main effects of fathering quantity, fathering quality (observed positivity/negativity and self-reported positivity/negativity), and the two-way interaction between quantity and positivity/negativity were included as predictors. Child EVT scores and family SES were covariates in all equations.

3.2 Prediction of Child EF

- **Observed Fathering.** In the first equation (see Table 3), I examined observed father *negativity*. The equation included the main effects of fathering quantity, observed father negativity, and the two-way interaction term, quantity*observed negativity. There was a significant main effect of child EVT scores. There were no other significant effects.

  Next, I estimated a regression equation using observed *positivity*. For observed father positivity (Table 4), there was a significant effect of EVT scores and a significant main effect of observed positivity. There were no other significant effects.

- **Self-Reported Fathering.** Next, I ran regressions using self-reported fathering positivity and negativity. For self-reported negativity, there was only a significant main effect of EVT score; no other main effects or the interaction term was significant (see Table 5).

  For self-reported father positivity, there was a main effect of EVT and the two-way interaction term between quantity*self-reported positivity was significant (see Table 6). Post-hoc probing using simple slopes was used to

interpret the interaction between fathering quantity and self-reported positivity (for a pattern of results, see Figure 1). A positive association between greater fathering quantity and higher child EF was evident at higher levels of self-reported father positivity (1.5 *SD* above *M*: β = .41, p = .05; 1 *SD* above *M*: β = .26, p = .113; at *M*: β = -.05 , p = .667). In contrast, a negative association between greater fathering quantity and lower child EF was evident at lower levels of self-reported positivity (1 *SD* below *M*: β = -.35, p = .017; 2 *SD* below *M*: β = -.51, p < .009).

3.3 Prediction of Child EC

- **Observed Fathering.** For EC, in the first equation, the equation included the main effects of fathering quantity, observed father negativity, SES, EVT, and the two-way interaction term, quantity*observed negativity. There was a significant main effect of observed negativity and a significant main effect of SES (see Table 7). For observed positivity, there was a main effect of SES and a main effect of positivity (see Table 8).
- **Self-Reported Fathering.** Next, I re-ran the same equation with self-reported negativity and positivity. With self-reported negativity, there was a main effect of fathering quantity and a main effect of SES (see Table 9). For self-reported positivity, there was a main effect of SES and the two-way interaction term between quantity*self-reported positivity was significant (see Table 1).

As I did for child EF, to interpret the two-way interaction term between quantity and self-reported positivity on child EC, I conducted post-hoc probing using simple slopes at 1.5 *SD* and 1 *SD* above and below the sample mean of self-

reported positivity. The pattern of simple slopes showed that fathering quantity was associated with higher levels of child ER only at high levels of self-reported father positivity (1.5 *SD* above: β = .11, p = .420; 1 *SD* above: β = .02, p = .921). At average and low levels of self-reported positivity, the association was negative (mean: β = -.17, p = .103; 1 *SD* below: β = -.36, p = .028; 2 *SD* below: β = -.45, p = .039); see Figure 2 for the pattern of this interaction effect.

CHAPTER 4

DISCUSSION

4.1 General Discussion

Although there is plenty of research on how maternal parenting (e.g., sensitivity, warmth, autonomy-support; Bernier, St. Laurent, Matte-Gagne, Milot, Hammond & Carpendale, 2017; Fay-Stammbach, Hawes & Meredith, 2014;) may influence child SR outcomes, there is a dearth of such work on paternal parenting effects. To that end, in this paper, two aspects of fathering—the quantity of time spent with child (self-reported) and the quality of the father-child interaction (self-reported and observed) –were examined to see how they worked together additively or interactively to statistically predict individual differences in child ER and EF. Two competing hypotheses were proposed: 1) fathering positivity would buffer the negative effects of lower amounts of quantity of father involvement on child ER (measured as EC) and EF; versus 2) fathering negativity would exacerbate the negative effects of lower fathering quantity on child ER (measured as EC) and EF. In a community sample of 3-5-year-olds and their fathers, quantity of father involvement statistically predicted better child EF and EC, but only when the father-child relationship was marked by higher levels of self-reported and observer-rated positivity (e.g., warmth, responsiveness). In contrast, when the father-child relationship showed lower levels of positivity, the association between quantity of involvement and child outcomes showed the *opposite* pattern—greater involvement was associated with poorer child EF and EC.

The existing literature on fathering has focused on child outcomes such as general cognitive function and socioemotional adjustment. This work has shown that father involvement in children's lives, as well as positive fathering behaviors (such as cognitive stimulation, warm

supportiveness, and behavioral monitoring), are adaptive and beneficial to the relationship and the child's development (Barker, Iles & Ramachandani, 2017; Sarkadi, Kristiansson, Oberklaid & Bremberg, 2008). Many of these studies have examined only the *amount of time* fathers spend with their children and it's relation to child outcomes (i.e., "quantity" of fathering), or only the *specific characteristics or features* of the father-child relationship (i.e., "quality" of fathering). However, some studies have examined both fathering quantity and quality in the same study, and have found statistical interaction effects between quantity and quality, suggesting complex, non-additive processes involving individual differences in fathering and children's developmental outcomes (Brown, Mangelsdorff, & Neff, 2012; Brown, McBride, Shin & Bost, 2007).

Taking into account the literature on fathering, in the current study, I examined potential fathering effects on child SR capacity- cognitive and emotional. While the parent-child relationship is transactional and bidirectional in nature (Lansford et al., 2018), the current study's purpose was a first step: to only examine statistical predictive models of potential fathering effects, using a correlational study design. Two aims were tested: a) to examine fathering in relation to an important child outcome- child SR, and b) to examine how fathering "quantity" and "quality" may work together additively or interactively to explain individual differences in child SR. Father involvement was construed as "quantity", how much time the father spends in child-rearing activities (giving child a bath, packing a lunch for the child, making doctor appointments for the child, etc.). Fathering quality was separated into self-perceived positivity/negativity ("I make an effort to praise my child often"; "Sometimes my child brings out the worst in me") and observed positivity/negativity (praise/explanations, positive affect such as smiling and laughing, responding to child's comments and behaviors, physical controlling behavior, criticism, frowning, harsh affect). Observed and self-reported fathering were examined

separately in equations between quantity of involvement and child outcomes. Two competing hypotheses were proposed: 1) positive fathering, i.e., better fathering "quality", would mitigate the association between lower father involvement, i.e., "quantity", with child SR or 2) negative fathering, i.e., poorer fathering "quality", would exacerbate the negative effect of lower father involvement, i.e., "quantity", with child SR. Overall, results showed partial support for the second hypothesis- fathering that was low in positivity (but not necessarily high in negativity), was related to poorer child outcomes when level of involvement was high. However, when fathering was high in positivity, high quantity of involvement was related to better child outcomes.

SR involves a group of higher-order cognitive processes involved in the ability to flexibly adjust and modify behavior according to the environmental context, respond appropriately to demands, and optimize the chance to complete goal-directed behaviors (Zeytinoglu, Calinks, Swingler & Leerkes, 2017). There are two components to SR: emotion regulation (ER) and executive function (EF; Bridgett, Burt, Edwards & Deater-Deckard, 2015). The cognitive EF component is comprised of flexible thinking, working memory, attentional control/shifting, and inhibitory control. ER is involved in modulating the experience and expression of both positive and negative emotions. Recent work shows that since both types of regulation require attentional and inhibitory control and involve neural activation in the brain's frontal lobes (Kim-Spoon, Deater-Deckard, Calkins, King-Casas, & Bell, 2019). In this study, we used effortful control (EC) as a measure of ER since it is considered a key component of emotion-related regulation. For example, when people experience negative emotions, they use attentional processes, such as distracting themselves, leaving the situation, or reframing the situation as coping mechanisms to face the negative stimuli. They are also using various voluntary processes to inhibit their

prepotent response (for example, masking aggressive impulses when frightened) that can be viewed as contributing to attempts to cope actively with the negative emotion—that is, regulating their emotions (Eisenberg, Smith, Sadosky & Spinrad, 2004). EC may influence the effectiveness of emotion regulation because it supports the flexible enactment of regulatory strategies and the modulation of arousal.

It has been well-established that SR facilitates adaptive functioning in many areas of life that involve social relations and task demands (Buckner, Mezzacappa & Beardslee, 2009). For young children, development of SR is particularly important because it is a robust predictor of school readiness and academic success (Mann, Hund, Hesson-McInnis, & Roman, 2017). Given the wealth of evidence suggesting that early environmental experiences shape brain development (D'Souza & D'Souza, 2019), there is reason to believe that early caregiver interactions can impact the development of prefrontal brain systems linked with the development of such SR ability. When children are young and SR is not well developed yet, parents serve as the "external" regulators for the child by modeling appropriate actions during stressful situations, allowing children to interact with and respond to their environment while maintaining a supportive and nurturing base, and setting limits that help children meet expectations and follow rules (Bernier, Whipple, & Carlson, 2010; Senehi, Brophy-Herb & Vallotton, 2018). Research on mothers show consistent links between sensitive, autonomy-supportive parenting that is rich is cognitive stimulation, and better child SR across and beyond the preschool years (deCock et al., 2017; Tibireo, Capaldi, Kerr, Bertrand, Pears & Owen, 2017; Vernon-Feagans, Willoughby, & Garrett-Peters, 2016). Although some work has shown similar results with fathers (Meuwissen & Carlson 2014; Meuwissen & Englund, 2016; Roskam, Stievenart, Meunier, & Noel, 2014; Towe-Goodman et al., 2014), more work is needed to address specifically the links between paternal

parenting “quantity” and “quality” (as defined above) and child regulation outcomes. I addressed this gap in the current study.

In my analyses, I found significant interaction effects between quantity of father involvement and observed and self-reported fathering positivity in association with both child EF and EC. Looking at child EF as the outcome, simple slopes analyses revealed a crossover interaction effect between father quantity and father positivity. In terms of both self-reported and observed-rated positivity, the effect size of the association between quantity of involvement and EF was significant and positive only when fathers self-reported or were observed engaging in above-average levels (one standard deviation or more above the mean) of positive parenting behaviors. When fathers had below average levels of positive parenting (one standard deviation or more below mean level), the slope was still significant but became negative. Thus, children who had fathers who were highly involved and who had more positive interactions had the highest scores on the EF tasks. In contrast, the lowest EF task performance was seen in children who experienced high quantity of involvement with a father who was low in positivity.

The interaction effect was very similar when looking at child ER (measured as EC) as the outcome. When fathers self-reported above average levels of positivity (one standard deviation or more above the mean), the association between quantity of involvement and ER was positive. The association turned negative when fathers self-reported low levels (one standard deviation or more below the mean) of positivity. Fathers who self-reported that they were highly involved and highly positive in their interactions with their children, rated their children highest on EC. Fathers who self-reported that they were highly involved and low in positivity towards their children, rated their children lowest on EC. While there were no interactive effects of quantity of

involvement and observed positivity on child EC, there was a main effect of positivity, such that higher observed positivity was linked with higher father-reported EC.

Based on theory, there are a few proposed mechanisms through which characteristics of fathering quality may be linked with children's regulatory capacity. Social learning theory posits that the developmental processes of rudimentary SR starts between caregivers and children as toddlers become aware of the social control needed in the caregiver-child relationship (Bandura, 1981; Kopp, 1982; Lewis & Carpendale, 2009). Early social interactions with caregivers serve as a pathway for children to learn the importance of inhibiting a prepotent response, developing sustained and malleable voluntary attention, and using forethought for successful action (Lewis & Carpendale, 2009). Parents who model and reinforce such planning behavior, active inhibition of a reactive response, and flexible thinking help their children learn the same skills (Bernier, Whipple, & Carlson, 2010; Lucassen et al., 2015; Meuwissen & Carlson, 2015; Meuwissen & Englund, 2016; Roskam, Stievenart, Meunier, & Noel, 2014; Senehi, Brophy-Herb & Vallotton, 2018; Speidel, Wang, Cummings & Valentino, 2020; Towe-Goodman et al., 2014). A warm, positive relationship between the parent and child is essential to the dynamic transfer of such skills. Parents who coordinate their behavior with the child's actions, respond to them promptly, and show warmth may create an emotional context in which the child feels comfortable, thus promoting internalization and SR.

Social learning theory may explain why in the current study, results showed a positive effect of responsive, warm, and supportive fathering on child EF and ER (measured as EC). Fathers who used explanations and praise in in their interactions with their child provide them with a secure and warm environment that assures them of safety and acceptance (Meuwissen & Carlson, 2015; Senehi, Brophy-Herb & Vallotton, 2018; Towe-Goodman et al., 2014). This type

of environment also helps children develop expectations of their environment as predictable and reliable. Engaging in behaviors such as smiling and laughing help facilitate the child's confidence in exploration of the task at hand. In terms of responsiveness, when fathers speak to their children, they allow children to externally process their thoughts/emotions and practice use of mental terms, which is an important building block for executive function (Bindman, Hindman, Bowles & Morrisson, 2013; Vallotton & Ayoub, 2011; Brophy-Herb, Stansbury, Bocknek, & Horodynski, 2012; Chang, Shaw, Dishion & Gardner, 2015; Towe-Goodman et al., 2014).

Interestingly, there were no interactive effects involving father negativity, for either of the child outcomes. There were only main effects of perceived and observed negativity on child EC, with higher negativity associated with lower EC. There were no main or interactive effects of negativity on child EF, though some interaction terms were approaching significance (such as quantity and self-reported negativity predicting child ER, $p = .09$). There are a couple reasons why this may have been the case. The observed father positivity composite included three constructs of fathering behavior whereas the father negativity composite only included two. Thus, the observed fathering positivity may have been a more expansive and inclusive composite, with stronger predictive validity. Also, the distribution for the observed negativity composite was very positively skewed, meaning fathers engaged in very low levels of negative parenting behavior in this sample. As a result, there may not have been enough variance in the range of observed negativity scores, to capture the full extent of actual main and interactive effects.

The results of the current study are consistent with the handful of prior studies examining interaction effects between fathering quantity and quality. The results suggest that father

involvement is only beneficial to child outcomes when the involvement is also marked by a positive relationship between the father and child. In a study of 2-3 year olds, for example, Brown and colleagues found an interactive effect of involvement and negative fathering, such that that high father involvement was deleterious to child attachment security if the fathers exhibited high levels of intrusive behavior, insufficient monitoring, and low levels of positive emotion (Brown, McBride, Shin & Bost, 2007). Taken together with the interactive effects of involvement and positive fathering in this study, these findings suggest that the *qualitative aspects* of fathering need to be considered when explaining variance in child outcomes and not just the amount of time fathers spend with their children. It is possible that while fathers being involved in day-to-day childcare activities such as preparing meals and taking them to school may be indicators of their presence in the child's life, a high level of involvement is not sufficient for the development of skills as highly complex and nuanced as SR. The current results provide evidence for the social learning perspective that executive function develops most optimally via modeling and operant conditioning in the context of frequent and positive social interactions with caregivers (for a review, see Bernier, St. Laurent, Matte-Gagne, Milot, Hammond & Carpendale, 2017; ; Bandura, 1991; Fay-Stammbach, Hawes & Meredith, 2014; Lewis & Carpendale, 2009). For children to develop self-regulatory skills, parents need to be active participants in interactions with the child—not only monitoring their behavior, but providing appropriate scaffolding via positive verbal explanations, modeling actions, and introducing children to mildly stressful environments where they can practice these skills (Karremen, van Tujil, van Aken, & Dekovic, 2006; Lewis & Carpendale, 2009; Meuwissen & Carlson, 2015; Roskam, Stievenart, Meunier, & Noel, 2014; Towe-Goodman et al., 2014).

4.2 Limitations and Future Directions

The current study addresses a crucial gap in the work on fathers and their potential parenting effects on child SR outcomes. However, it also sheds light on how much additional work is warranted on this topic. One limitation is that the study examined only fathers. There is some work suggesting that children's regulatory capacities stand to gain the most from parenting when they are exposed to different types of caregiving from both parents, thus allowing them to experience a wider diversity of stimulation (Cabrera, Tamis-Lemonda, Bradely, Hofferth, & Lamb, 2000). Future studies on parenting effects on child SR should examine both caregivers' parenting behavior to explore this hypothesis and obtain a more comprehensive view of the family system. This would allow us to examine whether fathering parenting can explain individual differences in child SR above and beyond mothers' parenting. Also, most of the fathers in this study worked full-time jobs, resulting in a limited number of hours left to engage in childcare activities. This needs to be considered when examining the self-reports of quantity of involvement—in this sample, the amount of time fathers had to spend with their children was already very limited. Future studies may want to examine a more extensive measure of involvement, where number of hours *available* to spend with the child is further parsed into time spent with them in activities related to childrearing.

Another limitation is that the observations of father-child interaction were brief and occurred in different contexts depending on the father's choice. Studies would do well to use longer observations of the interactions between parent and child, while keeping the context of the observed interactions as constant as possible between families. The tasks in the current study are widely used to measure global positivity and negativity, but more specific tasks to evoke certain types of parenting such as autonomy supportiveness and verbal re-directions, may be useful to determine which facet of parenting is most predictive of variance in child SR (Meuwissen &

Carlson, 2019). Also, in the current study, fathers were observed in a variety of settings including their child's preschool, a university-based lab, or at their homes. There is some evidence to suggest that parents and children engage differently when they are in a familiar environment such as their home versus a new space such as a lab (Gardner, 2000).

An additional limitation is regarding measurement of ER. The effortful control (EC) subscale of the Child Behavior Questionnaire that was used in the current study is a well-established and widely used measure. However, also including standardized objective measures of ER, such as the delay of gratification or reward frustration tasks that also are widely used, would be more informative and allow for estimating any potential effect of informant bias. For example, parents who show more positive parenting may also report better child ER due to a "positivity bias", aside from any objectively measured association between positive parenting and child ER (Huang, Cheah, Lamb, & Zhou, 2017).

Another limitation is that the current study's cross-sectional correlational design does not permit testing of temporal patterns of covariation over time—an essential first step toward eventually testing causal effects. There is much research to indicate that parenting and child regulatory capacities are bidirectional over time, with children's stronger ER evoking more sensitive parenting from their caregivers and vice versa (Lansford et al., 2018; Tibiero et al., 2016). Thus, longitudinal work examining father involvement, parenting quality and child SR across several time points would be necessary to first parse out the temporal pattern of transactions between parenting and child constructs, and assessing the stability and change of such constructs across time and developmental periods.

A final limitation is that while the current sample was quite racially diverse (with 45% of fathers being non-White), it did not include many lower-SES families; 68% of fathers had

college educations and about half the sample had family incomes higher than $50,000/year. There is research to indicate that father involvement may be more beneficial for lower-SES children compared to middle and high-SES children (Waller & Fisher, 2006). Future work should examine these father parenting constructs in a more economically diverse sample to determine how fathering effects may differ, i.e., be more beneficial or more detrimental to certain subgroups of the population.

Despite these limitations, the current study has the potential to add to a crucial gap in fathering research. It uses a multi-method procedure to examine an understudied child developmental outcome in relation to paternal parenting, and studies two facets of fathering that are typically studied separately. Results show support for the hypothesis that greater father involvement is only beneficial to child SR when the quality of the father-child relationship is marked by higher levels of positivity. The finding that the combination of poor fathering quality (low levels of positivity) and high levels of quantity of father involvement were related to deficits in child self-regulation may have implications for parenting programs aimed at fathers, as well as the societal messages that fathers are receiving. Encouraging fathers to invest more time with their children could be a misguided effort if it is not made sure that the fathers are equipped with the skills to interact with their children in positive and supportive ways. This could have the unintended effect of contributing to a continued cycle of maladaptive parenting behavior that seemingly has negative consequences for child outcomes. Thus, intervention researchers, educators and practitioners should aim to increase the *quality* of fathering behaviors—such as encouraging displays of warmth/praise, responding to children, fostering ways maintaining children's focus, and encouraging children to explore. More broadly, my study exemplifies the importance of including fathers in parenting research, to more fully understand

the family context of development, and improve the statistical prediction and understanding of individual differences in children's development.

APPENDIX A

CERTIFICATE OF HUMAN SUBJECTS APPROVAL

Date: March 28, 2019

To: Kirby Deater-Deckard, Psychological and Brain Sciences

Other Investigator: Mamatha Chary, Psychological and Brain Sciences

From: Lynnette Leidy Sievert, Chair, UMASS IRB

Protocol Title: Fathering and Self-Regulation Protocol ID: 2018-5151

Review Type: EXPEDITED

REVISION Paragraph ID: 6,7

Approval Date: 03/28/2019

Expiration Date: 12/26/2019

OGCA #:

This study has been reviewed and approved by the University of Massachusetts Amherst IRB, Federal Wide Assurance # 00003909. Approval is granted with the understanding that investigator(s) are responsible for:

Revisions - All changes to the study (e.g. protocol, recruitment materials, consent form, additional key personnel), must be submitted for approval in e-protocol before instituting the changes. New personnel must have completed CITI training.

Renewals - All renewals need to be submitted at least 2 weeks prior to the expiration date listed on this approval letter.

Final Reports - Notify the IRB when your study is complete by submitting a Final Report Form in e-protocol.

Consent forms - A copy of the approved consent form (with the IRB stamp) must be used for each participant (Please note: Online consent forms will not be stamped). Investigators must retain copies of signed consent forms for six (6) years after close of the grant, or three (3) years if unfunded.

Use only IRB-approved study materials (e.g., questionnaires, letters, advertisements, flyers, scripts, etc.) in your research.

Unanticipated problems involving risks to participants or others - All such events must be reported in e-protocol as soon as possible, but no later than five (5) working days.

Please contact the Human Research Protection Office if you have any further questions. Best wishes for a successful project.

APPENDIX B

CONSENT FORM FOR PARTICIPATION IN A RESEARCH STUDY AT UNIVERSITY OF MASSACHUSETTS-AMHERST

Researcher: Kirby Deater-Deckard, Ph.D.
Study Title: Fathering and Self-Regulation

1. WHAT IS THIS FORM?
This form is called a Consent Form. It will give you information about the study so you can make a decision about participation in this research.

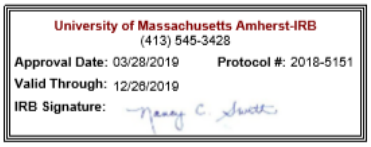
2. WHO IS ELEGIBLE TO PARTICIPATE?
Fathers who have children between the ages of 3 and 5 years are invited to participate in this study.

3. WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this study is to better understand how various aspects of fathering practices influence cognitive and emotion regulation in children.

4. WHERE WILL THE STUDY TAKE PLACE AND HOW LONG WILL IT LAST?
The study will take place at various Philadelphia preschools. The entire study will take you about 45 minutes to complete.

5. WHAT WILL I BE ASKED TO DO?
You will be asked to fill out some questionnaires on a portable tablet we will provide. These questionnaires will ask you about your demographics, home environment, extent of involvement in your child's life, your child's temperament, and your emotion regulation. You and your child will be given a few games and tasks to work on together for about 15 minutes. We will videotape this interaction to be coded later by trained observers. Your child will be asked to play some games with an experimenter and do a vocabulary assessment. The games involve saying the names of common objects, listening to and answering questions about short stories and playing some card-sorting, puppet and number games. These tasks are designed to assess language and perspective taking abilities.

6. WHAT ARE MY BENEFITS OF BEING IN THIS STUDY?
As a volunteer in this study, you will not receive direct benefits. However, we hope that the knowledge gained from this research will help to improve our understanding of the links between fathering practices and self-regulation development in children.



7. WHAT ARE MY RISKS OF BEING IN THIS STUDY?
There are no more than minimal risks posed by this study. Some participants might experience discomfort when answering questions about the negative aspects of parenting, such as anger and sadness towards the child. No drugs of any kinds are used in this research. In rare instances, a data breach is possible. However, the researchers have made every reasonable effort to maintain the confidentiality of the data.

8. HOW WILL MY PERSONAL INFORMATION BE PROTECTED?
Information and data obtained in this study will be used solely for research and educational purposes only by qualified researchers trained in human subject research. All of your study records will be identified by an alphanumeric code that will not be tied to your name, with the exception of this consent form (and payment receipt if applicable) that will be kept secure and separate from the data collected during the study. You will not be identified by name in any publication or presentation of this research. All deidentified data collected in this study will be stored on UMass Box. Data will be kept for seven years, then shredded.

9. WILL I RECEIVE ANY PAYMENT FOR TAKING PART IN THE STUDY?
You will be compensated for your time with cash. You will receive $25. You will also be compensated for travel expenses such as parking or bus fare. Your participation in the experiment is voluntary and you can withdraw at any time without penalty. You will still get the payment for the time already spent in the study.

10. WHAT IF I HAVE ANY QUESTIONS?
Take as long as you like before you make a decision. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research related problem, you may contact the primary investigator, Dr. Kirby Deater-Deckard at (413) 545-0083 or kdeaterdeck@umass.edu. If you want to talk to someone not directly connected to the study contact the Psychology Department Chair via Laura Wildman Hanlon at (413) 545-2387. If you have any questions concerning your rights as a research subject, you may contact the University of University of Massachusetts Amherst IRB at (413) 545-3428 or humansubjects@ora.umass.edu.

11. CAN I STOP BEING IN THE STUDY?
You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

12. WHAT IF I AM INJURED?
The University of Massachusetts does not have a program for compensating subjects for injury or complications related to human subjects' research, but when possible the study personnel will assist you in getting treatment as needed.

13. SUBJECT STATEMENT OF VOLUNATARY CONSENT
When signing this form I am agreeing to voluntarily enter myself and my child in this study. I have had a chance to read this consent form, and it was explained to me in a language that I use and understand. I have had the opportunity to ask questions and have received satisfactory

answers. I understand that I can withdraw at any time. A copy of this signed Informed Consent Form has been given to me.

_____ I agree for the research activities of both me and my child to be video-recorded for the purposes of this study.

Participant Signature Print Name Date

By signing below I indicate that the participant has read and, to the best of my knowledge, understands the details contained in this document and has been given a copy.

Signature of person obtaining consent Print Name Date

Table 1. Descriptive Statistics

	M	*SD*
Fathering Quantity, Self-Reported	2.99	0.44
Fathering Quality:		
Observed Positivity	4.57	0.81
Self-reported Positivity	4.73	0.27
Observed Negativity	1.76	0.83
Self-reported Negativity	2.39	0.82
Child Emotion Regulation (Effortful Control)	5.39	0.67
Child Executive Function:		
Dimensional Card Sort	4.62	1.06
Backward Digit Span	0.74	1.11
Forward Digit Span	3.79	1.14
Bear/Dragon	14.28	5.04
EF composite z-score	0.00	1.00
Child Expressive Vocabulary Test	105.49	14.60
Family Socioeconomic Status z-score	0.00	1.00

Table 2. Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Quantity	1												
2. (S) Positivity	-.05	1											
3. (O) Positivity	-.11	.40**	1										
4. (S) Negativity	-.08	-.37**	.08	1									
5. (O) Negativity	.06	-.14	-.54**	-.13	1								
6. ER (EC)	-.18	.28*	.28*	-.08	.08	1							
7. DCCS	-.17	.34**	.20	-.11	-.12	.33**	1						
8. Backward Digit	-.10	.27*	.17	-.10	-.09	.33**	.23*	1					
9. Forward Digit	.01	.13	.15	.15	-.15	.13	.09	.35**	1				
10. Bear/Dragon	-.09	.32**	.3**	.06	-.28**	.26*	.54**	.41**	.4**	1			
11. EF (*z*)	.10	.33**	.28**	.05	-.26**	.34**	.69**	.71**	.64**	.88**	1		
12. EVT	.05	.14	.21*	.33**	-.24*	.12	.22*	.19	.38**	.47**	.47**	1	
13. SES (*z*)	-.14	.03	.14	.13	-.09	.4**	.15	.06	.09	.02	.06	.12	1

* $p < .05$, ** $p < .01$ (all two-tailed tests)

Note: S = self-reported, O = observed, ER (EC) = emotion regulation, measured as effortful control, DCCS = Dimensional Card Sort, EF = executive function, EVT = expressive vocabulary test, SES = socioeconomic status

Table 3. Multiple Regression Analysis Predicting Child Executive Function from Fathering Quantity and Observed Father Negativity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Fathering Quantity	-.17	.10	-.19	-1.77	.088
Observed Negativity	-.02	.09	-.02	-.22	.826
Expressive Vocab Test	.45	.09	.48	4.49	.000
Socioeconomic status	-.04	.09	-.05	-.46	.647
Step 2:					
Quantity* (O) Negativity	-.09	.10	-.10	-.93	.358

Table 4. Multiple Regression Analysis Predicting Child Executive Function from Fathering Quantity and Observed Father Positivity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Fathering Quantity	-.12	.10	-.13	-1.23	.222
Observed Positivity	.20	.09	.22	2.14	.036
Expressive Vocab Test	.42	.10	.46	4.44	.000
Socioeconomic status	-.09	.09	-.11	-1.01	.317
Step 2:					
Quantity* (O) Positivity	.11	.11	.11	1.04	.300

Table 5. Multiple Regression Analysis Predicting Child Executive Function from Fathering Quantity and Self-Reported Father Negativity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Fathering Quantity	-.20	.10	-.21	-1.99	.051
Self-Reported Negativity	-.18	.10	-.20	-1.82	.073
Expressive Vocab Test	.49	.10	.54	4.90	.000
Socioeconomic status	-.03	.09	-.03	-.33	.744
Step 2:					
Quantity* (S) Negativity	-.12	.11	-.13	-1.14	.260

Table 6. Multiple Regression Analysis Predicting Child Executive Function from Fathering Quantity and Self-Reported Father Positivity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Fathering Quantity	-.1	.09	-.1	-1.07	.289
Self-Reported Positivity	.27	.08	.31	3.31	.002
Expressive Vocab Test	.37	.09	.41	4.16	.000
Socioeconomic status	-.03	.09	-.03	-.33	.744
Step 2:					
Quantity* (S) Positivity	.23	.10	.23	2.27	.026

Table 7. Multiple Regression Analysis Predicting Child Emotion Regulation (Measured as Effortful Control) from Fathering Quantity and Observed Father Negativity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Quantity	-.14	.08	-.19	-1.79	.079
Observed Negativity	.15	.08	.22	2.01	.048
Expressive Vocab Test	.08	.08	.11	.98	.330
Socioeconomic Status	.26	.07	.38	3.48	.001
Step 2:					
Quantity* (O) Negativity	-.03	.08	-.05	-.45	.658

Table 8. Multiple Regression Analysis Predicting Child Emotion Regulation (Measured as Effortful Control) from Fathering Quantity and Observed Father Positivity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Quantity	-.09	.07	-.12	-1.16	.250
Observed Positivity	.14	.07	.21	1.92	.059
Expressive Vocab Test	.01	.07	.02	.17	.864
Socioeconomic status	.20	.07	.29	2.72	.008
Step 2:					
Quantity* (O) Positivity	.14	.08	.18	1.66	.101

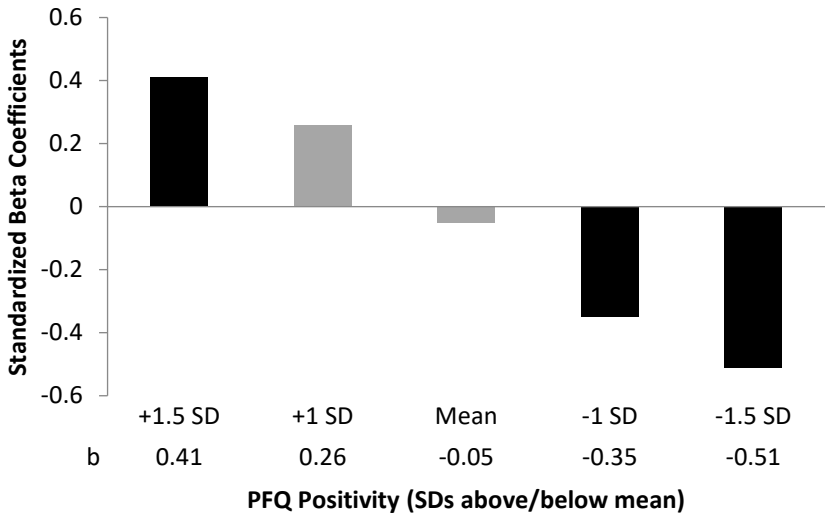
Table 9. Multiple Regression Analysis Predicting Child Emotion Regulation (Measured as Effortful Control) from Fathering Quantity and Self-Reported Father Negativity

	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Quantity	-.17	.08	-.25	-2.22	.030
Self-Reported Negativity	-.14	.07	-.21	-1.88	.065
Expressive Vocab Test	.06	.08	.98	.72	.475
Socioeconomic status	.26	.07	.39	3.65	.001
Step 2:					
Quantity* (S) Negativity	-.14	.08	-.19	-1.72	.090

Table 10. Multiple Regression Analysis Predicting Child Emotion Regulation (Measured as Effortful Control) from Fathering Quantity and Self-Reported Father Positivity

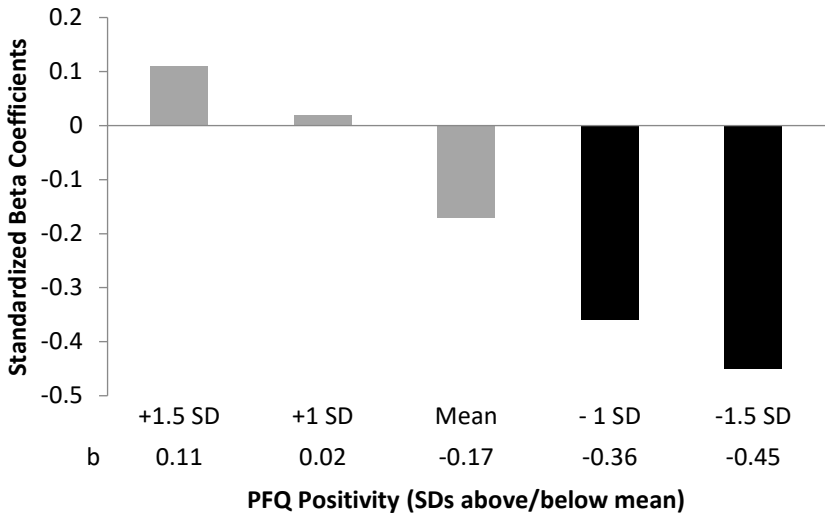
	B	*S.E.*	*β*	*t*	*p*
Step 1:					
Quantity	-.07	.08	-.11	-1.09	.281
Self-Reported Positivity	.16	.07	.24	2.37	.021
Expressive Vocab Test	-.02	.07	-.03	-.28	.782
Socioeconomic status	.26	.07	.39	3.67	.000
Step 2:					
Quantity* (S) Positivity	.18	.08	.24	2.21	.03

Figure 1. Effect Sizes of Simple Slopes of Self-Reported Fathering Positivity as a Moderator of Link between Fathering Quantity and Child Executive Function



Bar graph depicting the effect sizes of simple slopes at all levels of the moderator (self-reported positivity) on the relationship between father involvement (i.e., "quantity") and child executive function. Black bars indicate simple slopes significant at $p < .05$.

Figure 2. Effect Sizes of Simple Slopes of Self-Reported Fathering Positivity as a Moderator on the Link between Fathering Quantity and Child Emotion Regulation (Measured as EC)



Bar graph depicting the effect sizes of simple slopes at all levels of the moderator (self-reported positivity) on the relationship between father involvement (i.e., "quantity") and child emotion regulation (measured as effortful control). Black bars indicate simple slopes significant at $p < .05$.

BIBLIOGRAPHY

Adamsons, K. (2018). Quantity versus quality of nonresident father involvement: Deconstructing the argument that quantity doesn't matter. *Journal of Child Custody*, *15*(1), 26-34. doi: 10.1080/15379418.2018.1437002

Amato, P., & Gilbreth, J. G. (1999). Nonresident fathers and children's well-Being: A meta-analysis. *Journal of Marriage and the Family, 61*, 557- 561.

Bakermans-Kranenburg, M. J., Lotz, A., Alyousefi-van Dijk, K., & van IJzendoorn, M. (2019). Birth of a father: fathering in the first 1,000 days. *Child Development Perspectives, 13*(4), 247-253. doi: 10.1111/cdep.12347

Barker, B., Iles, J. E., & Ramchandani, P. G. (2017). Fathers, fathering and child psychopathology. *Current Opinions in Psychology, 15*, 87-92. doi: 10.1016/j.copsyc.2017.02.015

Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development, 81*(1), 326-339. doi: 10.1111/j.1467-8624.2009.01397.x

Bernier, A., St-Laurent, D., Matte-Gagné, C., Milot, T., Hammond, S. I., & Carpendale, J. I. M. (2017). Parenting and young children's executive function development. In M. J. Hoskyn, G. Iarocci, & A. R. Young (Eds.), *Executive functions in children's everyday lives: A handbook for professionals in applied psychology* (p. 70–87). Oxford University Press. doi: 10.1093/acprof:oso/9780199980864.003.0006

Bibok, M. B., Carpendale, J. I., & Müller, U. (2009). Parental scaffolding and the development of executive function. *New Directions for Child and Adolescent Development, 2009*(123), 17-34. doi: 10.1002/cd.233

Bindman, S. W., Hindman, A. H., Bowles, R. P., & Morrison, F. J. (2013). The contributions of parental management language to executive function in preschool children. *Early Childhood Research Quarterly*, *28*(3), 529-539. doi: 10.1016/j.ecresq.2013.03.003

Blair, C., & Raver, C. C. (2015). School readiness and self-regulation: A developmental psychobiological approach. *Annual Review of Psychology, 66*, 711-731. doi: 10.1146/annurev-psych-010814-015221

Blair, C., Granger, D. A., Willoughby, M., Mills-Koonce, R., Cox, M., Greenberg, M. T., ... & Fortunato, C. K. (2011). Salivary cortisol mediates effects of poverty and parenting on executive functions in early childhood. *Child Development, 82*(6), 1970-1984. doi: 10.1111/j.1467-8624.2011.01643.x

Blankenship, S. L., Chad-Friedman, E., Riggins, T., & Dougherty, L. R. (2019). Early parenting predicts hippocampal subregion volume via stress reactivity in childhood. *Developmental Psychobiology*, *61*(1), 125-140. doi: 10.1002/dev.21788

Bocknek, E. L., Dayton, C., Raveau, H. A., Richardson, P., Brophy-Herb, H. E., & Fitzgerald, H. E. (2017). Routine active playtime with fathers is associated with self-regulation in early childhood. *Merrill-Palmer Quarterly*, *63*(1), 105-134. doi: 10.13110/merrpalmquar1982.63.1.0105

Bridgett, D. J., Burt, N. M., Edwards, E. S., & Deater-Deckard, K. (2015). Intergenerational transmission of self-regulation: A multidisciplinary review and integrative conceptual framework. *Psychological Bulletin*, *141*(3), 602-654. doi 10.1037/a0038662

Bronte-Tinkew, J., Carrano, J., Horowitz, A., & Kinukawa, A. (2008). Involvement among resident fathers and links to infant cognitive outcomes. *Journal of Family Issues*, *29*(9), 1211-1244. doi: 10.1177/0192513X08318145

Brophy-Herb, H. E., Stansbury, K., Bocknek, E., & Horodynski, M. A. (2012). Modeling maternal emotion-related socialization behaviors in a low-income sample: Relations with toddlers' self- regulation. *Early Childhood Research Quarterly, 27*(3), 352-364. doi: 10.1016/j.ecresq.2011.11.005

Brown, G. L., Mangelsdorf, S. C., & Neff, C. (2012). Father involvement, paternal sensitivity, and father− child attachment security in the first 3 years. *Journal of Family Psychology, 26*(3), 421-431. doi: 10.1037/a0027836

Brown, G. L., McBride, B. A., Shin, N., & Bost, K. K. (2007). Parenting predictors of father-child attachment security: Interactive effects of father involvement and fathering quality. *Fathering, 5*(3), 197-201.

Buckner, J. C., Mezzacappa, E., & Beardslee, W. R. (2009). Self-regulation and its relations to adaptive functioning in low income youths. *American Journal of Orthopsychiatry, 79*(1), 19-30. doi: 10.1037/a0014796

Cabrera, N. J., & Tamis-LeMonda, C. S. (Eds.). (2013). *Handbook of Father Involvement: Multidisciplinary perspectives*. New York: Routledge

Cabrera, N. J. (2020). Father involvement, father-child relationship, and attachment in the early years. *Attachment & Human Development, 22*(1), 134-138. doi: 10.1080/14616734.2019.1589070

Cabrera, N. J., Shannon, J. D., & Tamis-LeMonda, C. (2007). Fathers' influence on their children's cognitive and emotional development: from toddlers to pre-K. *Applied Development Science, 11*(4), 208-213. doi: 10.1080/10888690701762100

Cabrera, N., Tamis-LeMonda, C. S., Bradley, R. H., Hofferth, S., & Lamb, M. E. (2000). Fatherhood in the twenty-first century. *Child Development, 71*(1), 127-136.

Calkins, S. D., Smith, C. L., Gill, K. L., & Johnson, M. C. (1998). Maternal interactive style across contexts: Relations to emotional, behavioral and physiological regulation during toddlerhood. *Social Development, 7*(3), 350-369. doi: 10.1111/1467-9507.00072

Cano, T., Perales, F., & Baxter, J. (2019). A matter of time: Father involvement and child cognitive outcomes. *Journal of Marriage and Family, 81*(1), 164-184.

Carlson, S. M. (2009). Social origins of executive function development. *New Directions For Child and Adolescent Development, 2009*(123), 87-98. doi: 10.1002/cd.237

Chacko, A., Fabiano, G. A., Doctoroff, G. L., & Fortson, B. (2017). Engaging fathers in effective parenting for preschool children using shared book reading: a randomized controlled trial. *Journal of Clinical Child & Adolescent Psychology*, 1-14. doi: 10.1080/15374416.2016.1266648

Chang, L., Schwartz, D., Dodge, K. A., & McBride-Chang, C. (2003). Harsh parenting in relation to child emotion regulation and aggression. *Journal of Family Psychology, 17*(4), 598-606. doi: 10.1037/0893-3200.17.4.598

Chang, H., Shaw, D. S., Dishion, T. J., Gardner, F., & Wilson, M. N. (2015). Proactive parenting and children's effortful control: Mediating role of language and indirect intervention effects. *Social Development, 24*(1), 206-223.

Clark, C. A., Sheffield, T. D., Wiebe, S. A., & Espy, K. A. (2013). Longitudinal associations between executive control and developing mathematical competence in preschool boys and girls. *Child Development, 84*(2), 662-677. doi: 10.1111/j.1467-8624.2012.01854.x

Cuevas, K., Deater-Deckard, K., Kim-Spoon, J., Watson, A. J., Morasch, K. C., & Bell, M. A. (2014). What's mom got to do with it? Contributions of maternal executive function and caregiving to the development of executive function across early childhood. *Developmental Science, 17*(2), 224-238. doi: 10.1111/desc.12073

Cuevas, K., Deater-Deckard, K., Kim-Spoon, J., Wang, Z., Morasch, K. C., & Bell, M. A. (2014). A longitudinal intergenerational analysis of executive functions during early childhood. *British Journal of Developmental Psychology, 32*(1), 50-64. doi: 10.1111/bjdp.12021

D'Souza, D., & D'Souza, H. (2019). Emergent and constrained: Understanding brain and cognitive development. *Journal of Neurolinguistics, 49,* 228-231.

Deater-Deckard, K. (1996). The Parent Feelings Questionnaire. *London: Institute of Psychiatry*.

Deater-Deckard, K., Pylas, M., & Petrill, S. A. (1997). The Parent-child interaction system (PARCHISY). *London: Institute of Psychiatry*.

De Cock, E. S., Henrichs, J., Klimstra, T. A., Maas, A. J. B., Vreeswijk, C. M., Meeus, W. H., & van Bakel, H. J. (2017). Longitudinal associations between parental bonding, parenting stress, and executive functioning in toddlerhood. *Journal of Child and Family Studies, 26*(6), 1723-1733.

DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental social psychology*, *43*(1), 62-76. doi: 10.1016/j.jesp.2005.12.005

Diamond, A, & Lee, K. (2011). Interventions shown to aid Executive Function development in children 4 to 12 years old. *Science, 333(2)*, 959–964. doi: 10.1126/science.1204529.

Downer, J. T., & Mendez, J. L. (2005). African American father involvement and preschool children's school readiness. *Early Education and Development*, *16*(3), 317-340.

Duursma, E. (2016). Who does the reading, who the talking? Low-income fathers and mothers in the US interacting with their young children around a picture book. *First Language*, *36*(5), 465-484. doi: 10.1177/0142723716648849

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, *6*, 495-525. doi: 10.1146/annualrev.clinpsy.121208.13128

Eisenberg, N., Gershoff, E. T., Fabes, R. A., Shepard, S. A., Cumberland, A. J., Losoya, S. H., ... & Murphy, B. C. (2001). Mother's emotional expressivity and children's behavior problems and social competence: Mediation through children's regulation. *Developmental Psychology*, *37*(4), 475-490. doi: 10.1037//0012-1649.37.4.475

Eisenberg, N., Valiente, C., Morris, A. S., Fabes, R. A., Cumberland, A., Reiser, M., ... & Losoya, S. (2003). Longitudinal relations among parental emotional expressivity, children's regulation, and quality of socioemotional functioning. *Developmental Psychology*, *39*(1), 3-12. doi: 10.1037/0012-1649.39.1.3

Esping-Andersen, G., & Billari, F. C. (2015). Re-theorizing family demographics. *Population and Development Review*, *41*(1), 1-31.

Fay-Stammbach, T., Hawes, D. J., & Meredith, P. (2014). Parenting influences on executive function in early childhood: A review. *Child Development Perspectives*, *8*(4), 258-264. doi: 10.1111/cdep.12095

Fillmore, M. T., & Rush, C. R. (2002). Impaired inhibitory control of behavior in chronic cocaine users. *Drug & Alcohol Dependence, 66*(3), 265-273. doi: 10.1016/S0376-8716(01)00206-X

Fliek, L., Daemen, E., Roelofs, J., & Muris, P. (2015). Rough-and-tumble play and other parental factors as correlates of anxiety symptoms in preschool children. *Journal of Child and Family Studies*, *24*(9), 2795-2804. doi: 10.1007/s10826-014-0083-5

Flouri, E., & Buchanan, A. (2004). Early father's and mother's involvement and child's later educational outcomes. *British Journal of Educational Psychology, 74*(2), 141-153. doi: 10.1348/000709904773839806

Frye, D., Zelazo, P.D., & Palafai, T. (1995). Theory of mind and rule-based reasoning. *Cognitive Development 10*(4), 483-494.

Gardner, F. (2000). Methodological issues in the direct observation of parent–child interaction: Do observational findings reflect the natural behavior of participants? *Clinical Child and Family Psychology Review*, *3*(3), 185-198. doi: 10.1023/A:1009503409699

Gaumon, S., & Paquette, D. (2013). The father–child activation relationship and internalizing disorders at preschool age. *Early Child Development and Care*, *183*(3-4), 447-463. doi: 10.1080/03004430.2012.711593

Gerson, K. (2010). The unfinished revolution: How a new generation is reshaping family, work, and gender in America.

Glysch, R. L., & Vandell, D. L. (1992). Associations between family of origin relation-

ships and parental involvement with 1-month-old infants, presented at the Southwestern Society for Research in Human Development, Tempe, 1992. Tempe, AZ.

Graziano, P. A., Keane, S. P., & Calkins, S. D. (2010). Maternal behavior and children's early emotion regulation skills differentially predict development of children's reactive control and later effortful control. *Infant and Child Development*, *19*(4), 333-353. doi: 10.1002/icd.670

Grolnick, W. S., & Farkas, M. (2002). Parenting and the development of children's self-regulation. *Handbook of Parenting*, *5*, 89-110.

Grossmann, K., Grossmann, K. E., Kindler, H., & Zimmermann, P. (2008). A wider view of attachment and exploration: The influence of mothers and fathers on the development of psychological security from infancy to young adulthood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research, and Clinical Applications* (p. 857–879). The Guilford Press: New York, NY.

Gryczkowski, M. R., Jordan, S. S., & Mercer, S. H. (2010). Differential relations between mothers' and fathers' parenting practices and child externalizing behavior. *Journal of Child and Family Studies*, *19*(5), 539-546. doi: 10.1007/s10826-009-9326-2

Hackman, D. A., Betancourt, L. M., Gallop, R., Romer, D., Brodsky, N. L., Hurt, H., & Farah, M. J. (2014). Mapping the trajectory of socioeconomic disparity in working memory: Parental and neighborhood factors. *Child Development*, *85*(4), 1433-1445. doi: 10.1111/cdev.12242

Hammond, S. I., Müller, U., Carpendale, J. I., Bibok, M. B., & Liebermann-Finestone, D. P. (2012). The effects of parental scaffolding on preschoolers' executive function. *Developmental Psychology*, *48*(1), 271-292.

Helm, A. F., McCormick, S. A., Deater-Deckard, K., Smith, C. L., Calkins, S. D., & Bell, M. A. (2020). Parenting and children's executive function stability across the transition to school. *Infant and Child Development, 29*(1), e2171.

Hill, N. E. (2015). Including fathers in the picture: A meta-analysis of parental involvement and students' academic achievement. *Journal of Educational Psychology*, *107*(4), 919-934. doi: 10.1037/edu0000023

Hopkins, J., Lavigne, J. V., Gouze, K. R., LeBailly, S. A., & Bryant, F. B. (2013). Multi-domain models of risk factors for depression and anxiety symptoms in preschoolers: Evidence for common and specific factors. *Journal of Abnormal Child Psychology*, *41*(5), 705-722. doi: 0.1007/s10802-013-9723-2

Huang, C. Y., Cheah, C. S., Lamb, M. E., & Zhou, N. (2017). Associations between parenting styles and perceived child effortful control within Chinese families in the United States, the United Kingdom, and Taiwan. *Journal of Cross-cultural Psychology*, *48*(6), 795-812. doi: 10.1177/0022022117706108

Hughes, C. H., & Ensor, R. A. (2009). How do families help or hinder the emergence of early executive function? *New Directions For Child and Adolescent Development, 2009*(123), 35-50. doi: 10.1080/87565640903325691

Jeynes, W. H. (2015). A meta-analysis: The relationship between father involvement and student academic achievement. *Urban Education*, *50*(4), 387-423. doi: 0.1177/0042085914525789

Karreman, A., Van Tuijl, C., Van Aken, M. A., & Deković, M. (2008). Parenting, coparenting, and effortful control in preschoolers. *Journal of Family Psychology, 22*(1), 30. doi: 10.1037/0893-3200.22.1.30

Karreman, A., Van Tuijl, C., van Aken, M. A., & Deković, M. (2006). Parenting and self-regulation in preschoolers: A meta-analysis. *Infant and Child Development: An International Journal of Research and Practice, 15*(6), 561-579. doi: 10.1002/icd.478

Keown, L. J. (2012). Predictors of boys' ADHD symptoms from early to middle childhood: The role of father–child and mother–child interactions. *Journal of Abnormal Child Psychology, 40*(4), 569-581.

Kim-Spoon, J., Deater-Deckard, K., Calkins, S. D., King-Casas, B., & Bell, M. A. (2019). Commonality between executive functioning and effortful control related to adjustment. *Journal of Applied Developmental Psychology, 60*, 47-55. doi: 10.1016/j.appdev.2018.10.004

Kopp, C. B. (1982). Antecedents of self-regulation: a developmental perspective. *Developmental Psychology, 18*(2), 199-214.

Kroll, M. E., Carson, C., Redshaw, M., & Quigley, M. A. (2016). Early father involvement and subsequent child behavior at ages 3, 5 and 7 years: Prospective analysis of the UK millennium cohort study. *PloS One, 11*(9), e0162339. doi: 10.1371/journal.pone.0162339

Kuppens, S., Grietens, H., Onghena, P., & Michiels, D. (2009). Measuring parenting dimensions in middle childhood: Multitrait-multimethod analysis of child, mother, and father ratings. *European Journal of Psychological Assessment, 25*(3), 133-140. doi: 10.1027/1015-5759.25.3.133.

Lamb, M. E., & Lewis, C. (2013). Father-child relationships. *Handbook of Father Involvement: Multidisciplinary Perspectives, 2*, 119-135.

Lamb, M. E., & Lewis, C. (2010). The development and significance of father-child relationships in two-parent families. *The Role of the Father in Child Development, 5*, 94-153.

Lansford, J. E., Rothenberg, W. A., Jensen, T. M., Lippold, M. A., Bacchini, D., Bornstein, M. H., ... & Malone, P. S. (2018). Bidirectional relations between parenting and behavior problems from age 8 to 13 in nine countries. *Journal of Research on Adolescence*, *28*(3), 571-590. doi: 10.1111/jora.12381

Lavrakas, P. J. (2008). Interaction Effect. *Encyclopedia of Survey Research Methods*.

Lewis, C., & Carpendale, J. I. M. (2009). Introduction: Links between social interaction and executive function. In C. Lewis & J. I. M. Carpendale (Eds.), Social interaction and the development of executive function. *New Directions in Child and Adolescent Development, 123*, 1–15.

Lucassen, N., Kok, R., Bakermans-Kranenburg, M. J., Van Ijzendoorn, M. H., Jaddoe, V. W., Hofman, A., ... & Tiemeier, H. (2015). Executive functions in early childhood: The role of maternal and paternal parenting practices. *British Journal of Developmental Psychology*, *33*(4), 489-505.

Mann, T. D., Hund, A. M., Hesson-McInnis, M. S., & Roman, Z. J. (2017). Pathways to school readiness: Executive functioning predicts academic and social–emotional aspects of school readiness. *Mind, Brain, and Education*, *11*(1), 21-31.

Martin, A., Ryan, R. M., & Brooks-Gunn, J. (2007). The joint influence of mother and father parenting on child cognitive outcomes at age 5. *Early Childhood Research Quarterly*, *22*(4), 423-439.

Mathis, E. T., & Bierman, K. L. (2015). Dimensions of Parenting Associated with Child Prekindergarten Emotion Regulation and Attention Control in Low-income Families. *Social Development*, *24*(3), 601-620. doi: 10.1111/sode.12112

McClelland, D. C. (2013). That urge to achieve. *Readings and Exercises in Organizational Behavior*, 70-80.

McClelland, M. M., Acock, A. C., Piccinin, A., Rhea, S. A., & Stallings, M. C. (2013). Relations between preschool attention span-persistence and age 25 educational outcomes. *Early Childhood Research Quarterly*, *28*(2), 314-324. doi: 10.1016/j.ecresq.2012.07.008

McCoy, K. P., George, M. R., Cummings, E. M., & Davies, P. T. (2013). Constructive and destructive marital conflict, parenting, and children's school and social adjustment. *Social Development*, *22*(4), 641-662. doi: 10.1111/sode.12015

McDowell, D. J., Kim, M., O'neil, R., & Parke, R. D. (2002). Children's emotional regulation and social competence in middle childhood: The role of maternal and paternal interactive style. *Marriage & Family Review*, *34*(3-4), 345-364. doi: 10.1300/J002v34n03_07

McElwain, N. L., Halberstadt, A. G., & Volling, B. L. (2007). Mother-and father-reported reactions to children's negative emotions: Relations to young children's emotional understanding and friendship quality. *Child Development*, *78*(5), 1407-1425. doi: 10.1111/j.1467-8624.2007.01074.x

McGill, B. S. (2014). Navigating new norms of involved fatherhood: Employment, fathering attitudes, and father involvement. *Journal of Family Issues*, *35*(8), 1089-1106. Doi: 10.1177/0192513X14522247

McKelvey, L. M., Burrow, N. A., Mesman, G. R., Pemberton, J. L., Bradley, R. H., & Fitzgerald, H. E. (2012). Supportive fathers lessen the effects of mothers' alcohol problems on children's externalizing behaviors. *Family Science*, *3*(3-4), 189-200. doi: 10.1080/19424620.2012.783427

Meuwissen, A. S., & Carlson, S. M. (2019). An experimental study of the effects of autonomy support on preschoolers' self-regulation. *Journal of Applied Developmental Psychology, 60,* 11-23. doi: 10.1016/j.appdev.2018.10.001

Meuwissen, A. S., & Carlson, S. M. (2018). The role of father parenting in children's school readiness: A longitudinal follow-up. *Journal of Family Psychology*, *32*(5), 588. doi: 10.1037/fam0000418

Meuwissen, A. S., & Carlson, S. M. (2015). Fathers matter: The role of father parenting in preschoolers' executive function development. *Journal of Experimental Child Psychology, 140,* 1-15. doi: 10.1016/j.jecp.2015.06.010

Meuwissen, A. S., & Englund, M. M. (2016). Executive function in at-risk children: Importance of father-figure support and mother parenting. *Journal of Applied Developmental Psychology, 44,* 72-80. doi: 10.1016/j.appdev.2016.04.002

Mezzacappa, E., Buckner, J. C., & Earls, F. (2011). Prenatal cigarette exposure and infant learning stimulation as predictors of cognitive control in childhood. *Developmental Science, 14*(4), 881-891. doi: 10.1111/j.1467-7687.2011.01038.x

Mischel, W. (2011). Self-control theory. *Handbook of Theories of Social Psychology Thousand Oaks, CA: Sage,* 1-22.

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., ... & Sears, M. R. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences, 108*(7), 2693-2698. doi: 10.1073/pnas.1010076108

Möller, E. L., Majdandžić, M., & Bögels, S. M. (2015). Parental anxiety, parenting behavior, and infant anxiety: Differential associations for fathers and mothers. *Journal of Child and Family Studies*, *24*(9), 2626-2637. doi: 10.1007/s10826-014-0065-7

Montroy, J. J., Bowles, R. P., Skibbe, L. E., McClelland, M. M., & Morrison, F. J. (2016). The development of self-regulation across early childhood. *Developmental Psychology*, *52*(11), 1744. doi: 10.1037/dev0000159

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

Opondo, C., Redshaw, M., Savage-McGlynn, E., & Quigley, M. A. (2016). Father involvement in early child-rearing and behavioral outcomes in their pre-adolescent children: evidence from the ALSPAC UK birth cohort. *BMJ Open*, *6*(11), e012034. doi: 10.1136/bmjopen-2016-012034

Pancsofar, N., & Vernon-Feagans, L. (2006). Mother and father language input to young children: Contributions to later language development. *Journal of Applied Developmental Psychology*, *27*(6), 571-587. doi: 10.1016/j.appdev.2006.08.003

Paulson, J. F., Keefe, H. A., & Leiferman, J. A. (2009). Early parental depression and child language development. *Journal of Child Psychology and Psychiatry*, *50*(3), 254-262. doi: 10.1111/j.1469-7610.2008.01973.x

Phares, V., Fields, S., Kamboukos, D., & Lopez, E. (2005). Still looking for Poppa. doi: 10.1037/0003-066X.60.7.735

Pleck, J. H. (2010). Paternal involvement: Revised conceptualization and theoretical linkages with child outcomes. In M. Lamb (Ed.), *The Role of the Father in Child Development* (5th ed., pp. 67–107). London, UK: Wiley

Quinn, P. D., & Fromme, K. (2010). Self-regulation as a protective factor against risky drinking and sexual behavior. *Psychology of Addictive Behaviors*, *24*(3), 376-389. doi: 10.1037/a0018547

Ramsden, S. R., & Hubbard, J. A. (2002). Family expressiveness and parental emotion coaching: Their role in children's emotion regulation and aggression. *Journal of Abnormal Child Psychology*, *30*(6), 657-667. doi: 10.1023/A:1020819915881

Richardson, P. A., Bocknek, E. L., McGoron, L., & Trentacosta, C. J. (2019). Fathering across contexts: The moderating role of respiratory sinus arrhythmia in predicting toddler emotion regulation. *Developmental Psychobiology*, *61*(6), 903-919. doi: 10.1002/dev.21836

Roskam, I., Meunier, J. C., Stievenart, M., & Noël, M. P. (2013). When there seem to be no predetermining factors: Early child and proximal family risk predicting externalizing behavior in young children incurring no distal family risk. *Research in Developmental Disabilities*, *34*(1), 627-639. doi: 10.1016/j.ridd.2012.10.002

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at 3-7 years: The Children's Behavior Questionnaire. *Child Development*, *72*, 1394-1408.

Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers' involvement and children's developmental outcomes: a systematic review of longitudinal studies. *Acta Paediatrica, 97*(2), 153-158. doi: 10.1111/j.1651-2227.2007.00572.x

Sarsour, K., Sheridan, M., Jutte, D., Nuru-Jeter, A., Hinshaw, S., & Boyce, W. T. (2011). Family socioeconomic status and child executive functions: The roles of language, home environment, and single parenthood. *Journal of the International Neuropsychological Society, 17*(1), 120-132. doi: 10.1017/S1355617710001335

Schultz, D., Izard, C. E., Ackerman, B. P., & Youngstrom, E. A. (2001). Emotion knowledge in economically disadvantaged children: Self-regulatory antecedents and relations to social difficulties and withdrawal. *Development and Psychopathology, 13*(1), 53-67.

Senehi, N., Brophy-Herb, H. E., & Vallotton, C. D. (2018). Effects of maternal mentalization-related parenting on toddlers' self-regulation. *Early Childhood Research Quarterly, 44*, 1-14. doi: 10.1016/j.ecresq.2018.02.001

Sethna, V., Perry, E., Domoney, J., Iles, J., Psychogiou, L., Rowbotham, N. E., ... & Ramchandani, P. G. (2017). Father–child interactions at 3 months and 24 months: contributions to children's cognitive development at 24 months. *Infant Mental Health Journal, 38*(3), 378-390.

Snyder, J., Stoolmiller, M., Wilson, M., & Yamamoto, M. (2003). Child anger regulation, parental responses to children's anger displays, and early child antisocial behavior. *Social Development, 12*(3), 335-360. doi: 10.1111/1467-9507.00237

Speidel, R., Wang, L., Cummings, E. M., & Valentino, K. (2020). Longitudinal pathways of family influence on child self-regulation: The roles of parenting, family expressiveness, and maternal sensitive guidance in the context of child maltreatment. *Developmental Psychology*, *56*(3), 608-622. doi: 10.1037/dev0000782

Spinrad, T. L., Stifter, C. A., Donelan-McCall, N., & Turner, L. (2004). Mothers' regulation strategies in response to toddlers' affect: Links to later emotion self-regulation. *Social Development*, *13*(1), 40-55. doi: 10.1111/j.1467-9507.2004.00256.x

Spinrad, T. L., Eisenberg, N., Cumberland, A., Fabes, R. A., Valiente, C., Shepard, S. A., ... & Guthrie, I. K. (2006). Relation of emotion-related regulation to children's social competence: A longitudinal study. *Emotion*, *6*(3), 498. doi: 10.1037/1528-3542.6.3.498

Tamis-LeMonda, C. S., Shannon, J. D., Cabrera, N. J., & Lamb, M. E. (2004). Fathers and mothers at play with their 2-and 3-year-olds: contributions to language and cognitive development. *Child Development*, *75*(6), 1806-1820. doi: 10.1111/j.1467-8624.2004.00818.x

Tiberio, S. S., Capaldi, D. M., Kerr, D. C., Bertrand, M., Pears, K. C., & Owen, L. (2016). Parenting and the development of effortful control from early childhood to early adolescence: A transactional developmental model. *Development and Psychopathology*, *28*(3), 837-853. doi: 10.1017/S0954579416000341

Towe-Goodman, N. R., Willoughby, M., Blair, C., Gustafsson, H. C., Mills-Koonce, W. R., & Cox, M. J. (2014). Fathers' sensitive parenting and the development of early executive functioning. *Journal of Family Psychology*, *28*(6), 867-887.

Vallotton, C., & Ayoub, C. (2011). Use your words: The role of language in the development of toddlers' self-regulation. *Early Childhood Research Quarterly*, *26*(2), 169-181.

Varghese, C., & Wachen, J. (2016). The determinants of father involvement and connections to children's literacy and language outcomes: Review of the literature. *Marriage & Family* Review, 52(4), 331-359. doi: 10.1080/01494929.2015.1099587

Vernon-Feagans, L., Willoughby, M., & Garrett-Peters, P. (2016). Predictors of behavioral regulation in kindergarten: household chaos, parenting, and early executive functions. *Developmental Psychology, 52*(3), 430-441. doi: 10.1037/dev0000087

Waller, M. R., & Swisher, R. (2006). Fathers' risk factors in fragile families: Implications for "healthy" relationships and father involvement. *Social Problems, 53*(3), 392-420.

Webster, L. L., Low, J., Siller, C., & Hackett, R. K. (2013). Understanding the contribution of a father's warmth on his child's social skills. *Fathering: A Journal of Theory, Research, and Practice about Men as Fathers, 11(1),* 90-113.

Weiland, C., Ulvestad, K., Sachs, J., & Yoshikawa, H. (2013). Associations between classroom quality and children's vocabulary and executive function skills in an urban public prekindergarten program. *Early Childhood Research Quarterly*, 28(2), 199-209. doi: 10.1016/j.ecresq.2012.12.002

Williams, K. T. (1997). Expressive vocabulary test second edition (EVT™ 2). *J. Am. Acad. Child Adolescent Psychiatry, 42*, 864-872.

Zelazo, P. D., Blair, C. B., & Willoughby, M. T. (2016). Executive Function: Implications for Education. NCER 2017-2000. *National Center for Education Research*.

Zeytinoglu, S., Calkins, S. D., Swingler, M. M., & Leerkes, E. M. (2017). Pathways from maternal effortful control to child self-regulation: The role of maternal emotional support. *Journal of Family Psychology*, *31*(2), 170-180. doi: 10.1037/fam0000271