

A Young Mind, Neglected:  
Exploring the Impact of Early Omissions on Executive Function Development  
and Paths Forward for Public Policy-Based Intervention

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“The question is not whether we can afford to invest in every child;  
it is whether we can afford not to.”

-Marian Wright Edelman

## ABSTRACT

Child neglect is a widespread and growing crisis in the United States, particularly among the youngest members of the child population. Yet, the developmental outcomes of neglect have received disproportionately less attention than those of abuse, and of maltreatment more generally, across scientific literature. This exploration focuses on the immediate and long-term impacts of early acts of omission—neglect—on the development of executive function (EF). EF in populations exposed to early neglect is examined during two developmental stages: early childhood and adulthood. Preliminary empirical data point to immediate global deficits in EF in early childhood populations exposed to early acts of omission, as well as long-term deficits in EF in adults previously exposed to early omissions. Empirical and theoretical evidence also indicates the promise of investigating potential differences in hot and cool EF deficits in those exposed to early omissions, as well as the likelihood that immediate and long-term outcomes on EF in those exposed to early omissions are distinct from those exposed to early commissions—abuse. This analysis highlights the need for future research to take a developmental and dimensional approach in order to more effectively identify the impacts of early neglect on development of EF. Implications of this research for early intervention through public policy, using Minnesota state policies and services as a template for innovation, are addressed.

*Keywords: Maltreatment, Neglect, Abuse, Early Childhood, Executive Function, Hot, Cool*

**CONTENTS**

- 1. Introduction.....5
  - 1.1. Framing the Discussion.....10
  - 1.2. Maltreatment.....12
  - 1.3. Executive Function.....16
    - 1.3.1. A Hot/Cool Approach.....19
- 2. Evaluating Executive Function in the Neglected Child.....20
  - 2.1. Early Omission and General Executive Function Development.....21
    - 2.1.1. Immediate Impacts on Executive Function in Early Childhood.....21
    - 2.1.2. Long-Term Impacts on Executive Function in Adulthood.....25
  - 2.2. A Gap: Hot Executive Function and Early Childhood Maltreatment.....29
  - 2.3. Distinguishing the Impacts of Neglect and Abuse on Executive Function.....33
    - 2.3.1. Immediate Differences Between Early Omission and Commission.....33
    - 2.3.2. Long-Term Differences Between Early Omission and Commission.....38
  - 2.4. Looking Forward.....39
- 3. Early Intervention: Proposals for Public Policy Advancement.....40
  - 3.1. Evidence for Early Childhood Education Intervention.....41
  - 3.2. Policy Context for Evidence-Based Recommendations.....43
  - 3.3. Minnesota and the Potential of an Early Omission Coalition.....47
- 4. Conclusion.....56

## 1. INTRODUCTION

Jerry Seinfeld said that “a two-year-old is like having a blender, but you don’t have a top for it” (Burkeman, 2014). While this comment, as spoken by a renowned comedian, invokes the silly image of noise, mess, and pure chaos a toddler so often leaves in their wake, Seinfeld’s metaphor also extends beyond the comedic. Like an uncovered blender, the contents of which grow and change with each added ingredient, a toddler is rapidly changing in response to their environment, and those environmental adjustments hold the potential to impact the adult they will later become. Like an uncovered blender, a toddler should not be left alone.

Child neglect in the United States is a rampant and growing issue, numerically outpacing all other forms of child maltreatment. While in 1990, just below half of maltreated children experienced neglect, of the roughly 676,000 children classified as maltreated in the United States in 2016, three quarters experienced neglect, 18.2% physical abuse, and 8.5% sexual abuse (Child Trends DataBank, 2016; U.S. Department of Health & Human Services, 2018). Neglect is also the leading reason for foster care entry, with the Department of Children and Families citing neglect in the circumstances associated with removal in 61%, or nearly 170,000, of the 273,539 cases of children’s removal from their homes in FY2016 (U.S. Department of Health and Human Services, 2017). The opioid crisis has contributed to the growth in the vast number of children facing neglect, as parental substance abuse and neglect—indicators that are often linked—have risen in prevalence together as the two leading reasons for foster care entry (Williams & Devooght, 2017; Young, 2016). It is also the youngest children in the United States who are at the most severe risk of maltreatment. More than one quarter of reported child maltreatment victims in FY2016 were under the age of three, with children under one year showing the highest rates of victimization (U.S. Department of Health & Human Services, 2018). Roughly half of

children entering foster care in FY2016 were below age five (U.S. Department of Health and Human Services, 2017).

This ongoing crisis among the most vulnerable members of the population expounds a clear need for copious, meticulous research on neglect and its potential impacts. Yet, notable theoretical and informational gaps exist in the current literature, preventing both a clear understanding of the problem as well as a clear pathway toward a solution. The theoretical basis of, and empirical approaches within, maltreatment research have often taken a general approach to the topic of maltreatment, distinguishing only between maltreated and non-maltreated children, rather than thoroughly analyzing subcategories in a more nuanced approach (Aber, Allen, Carlson, & Cicchetti, 1989; Cicchetti, 2016; Hein & Monk, 2016; Barnett, Manly, & Cicchetti, 1993; Cicchetti & Valentino, 2006; Manly, 2005). The “neglect of neglect”, acknowledged for nearly forty years, persists in maltreatment research (Wolock & Horowitz, 1984; Schumacher, Smith Slep, & Heyman, 2001; Hildyard & Wolfe, 2002; Stoltenborgh, Bakermans-Kranenburg, & van Ijzendoorn, 2012). In direct opposition to the real, and growing, numerical discrepancy, less attention has been paid across maltreatment research to child populations that have suffered neglect than has been paid to populations that have suffered abuse (National Scientific Council on the Developing Child, 2012), and this phenomenon extends to the facet of this research examining psychological impacts of maltreatment. Across many existing studies that focus on child neglect or distinguish neglect from other forms of maltreatment, evidence suggests that neglect can have unique immediate and long-term impacts on children’s cognitive, emotional, and behavioral outcomes (Maguire et al., 2015; Fishbein et al., 2009; Crouch & Milner, 1993; Perez & Widom, 1994; Kotch et al., 2008; National Scientific Council on the Developing Child, 2012). Yet, remaining gaps in this research leave the unique

immediate and long-term impacts of neglect on many important psychological outcomes of interest unclear.

Multiple critical psychological outcomes of interest are associated with the construct of executive function (EF). A multidimensional construct encompassing several processes that exert control over attention, cognition, and behavior, EF is thought to underlie successful self-regulation, allowing individuals to pursue goal-directed behaviors and adaptive responses (Hofmann, Schmeichel, & Baddeley, 2012; McClelland, Cameron, Wanless, & Murray, 2007; Barkley, 2001; Friedman et al., 2006; Zhou, Chen, & Main, 2012). As a lynchpin at the intersection of affective and cognitive development, EF is a construct of notable importance in the developmental trajectory, thought to affect a variety of outcomes from affect regulation to decontextualized problem solving (Zelazo & Müller, 2002; Kerr & Zelazo, 2004). In the context of maltreatment generally, EF has emerged as a construct of interest in the literature, and deficits in EF have been consistently reported in a variety of maltreated populations (Gould et al., 2012; DePrince, Weinzierl, & Combs, 2009; Viola, Tractenberg, Pezzi, Kristensen, & Grassi-Oliveira, 2013; Beers & De Bellis, 2002). Given its importance and its ties to maltreatment, EF presents a uniquely fruitful avenue as an outcome of interest in research addressing the psychological impacts of neglect.

In analyzing neglect and EF, there is also reason to isolate the period of early childhood—a stage that starts at birth and lasts through age five, encompassing a child's infancy, toddlerhood (0-3), and preschool years (3-5) (Manly, Kim, Rogosch, & Cicchetti, 2001)—as a period of interest. Not only is the crisis of neglect most severe among children in this stage of development, with tens of thousands of early childhood neglect cases occurring each year (U.S. Department of Health & Human Services, 2018), but research has long confirmed that these are

important years of psychological development, characterized by rapid psychological growth across multiple dimensions (Shonkoff & Phillips, 2000). This developmental pattern is also true for EF in particular, as extensive research highlights the significant development of EF that occurs during the stage of early childhood (Diamond, 2006; Garon, Bryson, & Smith, 2008; Best & Miller, 2010).

There is corresponding evidence that this period of greater plasticity translates to a period of greater vulnerability (Cameron, 2001; Gee & Casey, 2015; Sabatini et al., 2007), and maladaptive experiences of various types, when experienced during early childhood, have the potential to negatively impact development of critical psychological processes. There is evidence to suggest that maltreatment experiences during early childhood, as compared to those that occur at later developmental stages, present unique risks for multiple aspects of children's psychological development. For instance, Manly and colleagues analyzed the timing of maltreatment as a predictive factor for several behavioral outcomes in children and found the severity of neglect and abuse experiences, especially in the infancy, toddlerhood and preschool periods, predicted outcomes such as internalizing and externalizing behavior, aggression, and withdrawal (Manly et al., 2001). Children also demonstrated more maladaptive outcomes following chronic maltreatment, and particularly when onset occurred during infancy, toddlerhood, or preschool years. This evidence indicates that young children are not only at heightened risk of becoming victims of maltreatment, but also at heightened risk of certain psychological outcomes following those maltreatment experiences. These indications of psychological vulnerability to maltreatment during early childhood exemplify how it is critical to examine the stage of early childhood as one of particular importance with regard to both neglect

and EF and to deliberately investigate the adverse impacts neglect during early childhood may have on the development of EF.

Further evidence indicates the usefulness of distinguishing the unique impacts of neglect, as compared to other forms of maltreatment, during this period of early childhood. A developmental review by Trickett and McBride-Chang (1995) yielded evidence across multiple studies that neglected children in infancy, toddlerhood, and early childhood demonstrate the most severe cognitive delays—more severe than multiple other maltreated populations. Manly and colleagues also found that physical neglect in preschool-age children was a particularly strong predictor for certain maladaptive outcomes, such as withdrawn and internalizing behaviors, which were distinct from the outcomes of peers who had been differently maltreated during the same period (Manly et al., 2001). These findings indicate that neglect during early childhood may lead to different or poorer immediate outcomes in children’s psychological development than other forms of maltreatment, highlighting the importance of isolating impacts that may occur both as a result of maltreatment experiences within certain stages of development—in particular, early childhood—and also as a result of certain subtypes of those maltreatment experiences—in particular, neglect. As such, these studies highlight the importance of the developmental and dimensional approach that is taken in this analysis, which specifically explores the early childhood stage of development and differentiates between the distinct dimensions of omission and commission within the broad construct of maltreatment.

Early EF development demands further attention in the context of this developmental and dimensional approach to maltreatment, and particularly in an approach that focuses on omission, as critical information may be gained from identifying immediate and long-term deficits in EF that emerge in populations that have experienced early neglect. At the intersection of

maltreatment and EF research, a select few studies focus on the interactions between neglect and EF, even fewer examine neglect's immediate impacts on EF during the period of early childhood, and fewer still contrast between neglect and abuse populations within that demographic. Similarly, in examining long-term impacts, few studies examine early neglect's long-term impacts on EF during adulthood, and fewer still contrast between the EF skills of adults exposed to early neglect versus abuse. The empirical evidence that exists is riddled with inconsistencies—operating under multiple definitions of key constructs, measuring outcomes using a wide range of methods, recruiting “neglect” samples from populations with notably different experiences, and failing to clearly isolate developmental stages of interest (Hostinar, Stellern, Schaefer, Carlson, & Gunnar, 2012; Viola et al., 2013; Gould et al., 2012; Manly et al., 2001). Despite the critical developmental purpose of EF, the importance of the period of early childhood in its development, and the potential threat of neglect to its derailment, much remains to be decisively discovered about this intersection of scientific literature (Jurado & Rosselli, 2007; Diamond, 2006; Garon et al., 2008). It is of utmost necessity to gain a clearer understanding of neglect's potential impacts on EF, specifically when the experience occurs during early childhood.

### *1.1 Framing the Discussion*

This investigation takes a developmental and dimensional approach to exploring the intersection of maltreatment and EF research, focusing on the developmental stage of early childhood and on maltreatment experiences that fall into the category of acts of omission. The central aim is to identify, through exploration of empirical data and through theoretical analysis,

the impacts of early omission on EF development as well as corresponding promising approaches to public policy-based early interventions.

In the analysis of early omission and its impacts on EF, I offer three central contributions. First, I identify immediate outcomes of early omissions on EF development, identified during the stage of early childhood, as well as long-term outcomes, identified during adulthood, based on empirical contributions thus far in research examining the particular impacts of early neglect on EF development. A critical analysis of existing findings reveals preliminary indications that early acts of omission have both immediate and long-term adverse impacts on EF development, manifesting as global EF deficits that are measurable during preschool years as well as during adulthood. Secondly, I identify an empirical gap surrounding the distinct impacts of early maltreatment on “hot” and “cool” EF. In calling attention to this observed gap, and the potential adverse impacts of omissions on hot EF, I highlight a need to broaden the scope of future research to include investigation of hot EF and its interaction with neglect in early childhood in order to gain critical insight into the developmental underpinnings of important affective outcomes in neglected children. Finally, I offer empirical and theoretical support for distinct impacts of early omission versus early commission on both immediate and long-term EF development. This analysis progresses into a discussion regarding the implications of this research for public policy, using Minnesota as a template for innovative intervention. Underscoring the importance of putting research into action, I offer recommendations for promising policy advancements that reflect current scientific understanding of early omissions’ impacts on EF development. These broad policy recommendations have the potential to be adapted and expanded in accordance with different state policy landscapes and as empirical findings at the intersection of maltreatment and EF research increase in number and in quality.

## *1.2 Maltreatment*

Hundreds of thousands of children every year endure maladaptive experiences arising within their home environments and in the context of their familial and caregiving relationships (U.S. Department of Health & Human Services, 2018). Such experiences are typically characterized by researchers under the broad term *maltreatment*—a category of interpersonal trauma that includes a range of negative acts, often induced by a caregiver, such as physical, sexual, and emotional abuse, physical and emotional neglect, and witnessing domestic violence, among others. The construct of maltreatment in scientific research has a strong, integrated theoretical basis, a sufficiently thorough examination of which is beyond the scope of this paper. However, several key observations from this literature are important throughout this discussion.

Even as increasingly complex etiological and developmental theories of maltreatment arise in the literature, the bulk of these theories retain a focus on the general construct of *maltreatment*, rather than theoretical distinctions that may be drawn between the diverse experiences that encompass the construct (Aber et al., 1989; Cicchetti, 2016; Barnett et al., 1993; Cicchetti & Valentino, 2006; Manly, 2005). This general approach is also reflected in a great deal of the empirical offshoots of this theoretical work (Aber et al., 1989; Hein & Monk, 2016; Shea, Walsh, MacMillan, & Steiner, 2005). Many such studies, using between-group experimental designs, offer comparisons between developmental outcomes in a group of maltreated children versus a control group of non-maltreated, otherwise demographically matched, children. In such studies, within the maltreated group, the range of maltreatment types and the proportion of the sample that has experienced each subtype of maltreatment can vary substantially across different study samples, without those subtypes being analyzed as variables of interest. While valuable theoretical progress and empirical data has certainly been gained

through this general approach, the approach has limitations—limitations that are highlighted through this discussion. In embarking on a study that analyzes maltreated children as one unified sample, conclusions are drawn about maltreatment's developmental impact that inevitably lack the specificity necessary to understand the true nature of certain developmental alterations. By directly addressing the potential differences in immediate and long-term outcomes on EF development based on the type of maltreatment experienced during early childhood, this analysis demonstrates that the inherent assumption of many existing theoretical works and empirical investigations—that maltreatment can be conceptualized and analyzed as a unified experience—may not withstand further scrutiny in this empirical domain. As such, this analysis provides an opportunity to critique this general approach to maltreatment research and to present an approach with the potential to more precisely inform early intervention and public policy.

There is no single approach to addressing subtypes of maltreatment. As a construct, maltreatment is used very differently across facets of scientific literature, with studies on the developmental sequelae of maltreatment delving into varying degrees of specificity about the individual subtypes and recruiting participants with various groupings of those subtypes, under various definitions of those subtypes. As a construct that transcends academia, maltreatment raises complex issues of characterization in *how* we define the subtypes of maltreatment, and *who* gets to define them (Giovannoni, 1989). The clinician, the social worker, the lawyer, the researcher, the teacher, and the layperson all have different conceptions of what the term encompasses, as well as different judgment criteria by which to determine whether a child has been, and in what way they have been, maltreated. Many studies that do distinguish between subtypes of maltreatment recruit from populations whose maltreatment history has been determined under dramatically different definitions, including institutionalized children, children

in the child welfare system, children who meet criteria on self-reported questionnaires of childhood trauma, among others. With the differences in usage and lack of clear, standardized definitions, parsing out the differential impact of subtypes of maltreatment poses quite a challenge (Cicchetti & Lynch, 1995).

This analysis takes a dimensional approach to understanding maltreatment and its subtypes. In their novel dimensional approach, McLaughlin and Sheridan (2016) distinguish between the dimensions of *threat*—experiences that involve harm or threatened harm—and *deprivation*—experiences in which there is an absence of expected input—within the construct of childhood adversity. In this exploration, I attempt to consistently distinguish between acts that fall under the dimensions of *commission* and *omission* within the construct of maltreatment (Erickson & Egeland, 2002; Shipman, Edwards, Brown, Swisher, & Jennings, 2005; Glaser, 2000; Mulder, Kuiper, van der Put, Stams, & Assink, 2018). The common characterizations of abuse are considered acts of commission. These may be defined as inherently active means of inflicting actual or potential harm on a child, ranging from psychological and emotional (e.g. spurning, threatening, terrorizing, demeaning, etc.) to physical (e.g. battery) and sexual (e.g. rape, assault). Although often a more ambiguous construct, the common characterizations of neglect are considered acts of omission. These acts—omissions of the expected caregiving behaviors necessary for a child’s development—can be active or passive and these, too, result in actual or potential harm to the child. They span a wide range, from psychological and emotional (e.g. ignoring the need for social interaction and social isolation) to physical (e.g. forgetting or willfully failing to feed or clothe or provide for basic needs) to supervisory (e.g. abandonment, educational neglect), and the list goes on. The dimension of omission is the primary dimension explored in this analysis.

As clearly as possible in the context of available data, I examine the impacts of acts of omission in particular on the development of EF, and I distinguish between acts of omission and commission in order to appreciate the distinct developmental outcomes associated with each. In this particular exploration, by nature limited by the data samples of others, it is inevitable that I make use of findings that have arisen under multiple research teams' definitions of the constructs of neglect and abuse as I attempt to classify the unique impacts of acts of omission on EF development and to differentiate those impacts from those of acts of commission. Further, it is inevitable that such crucial issues as chronicity and severity—two variables that are of value to the wider scientific discussion on the impacts of neglect and abuse (English et al., 2005)—are not a focus of this particular discussion and may therefore be inconsistent in the explored data. In taking a dimensional and also a developmental approach, the central variables considered in this analysis are dimension and developmental timing of maltreatment (Cicchetti, 2016). Accordingly, in the context of the critical developmental stage of early childhood, I examine the dimension of omission, and distinguish between the dimensions of omission and commission, with regard to impacts on EF.

It is additionally important to once again mention the neglect of neglect in this context. In those studies that choose to focus explicitly on a single subtype of maltreatment, it is often the default to focus on abuse. Some others selectively study cognitive and behavioral outcomes in neglected populations, without a comparison with children who have been abused (Spratt et al., 2012). EF is a research domain that demonstrates the need for increased efforts to both differentiate and compare commission and omission—capturing the need for a particular focus on omission in order to determine its precise developmental sequelae in EF, but also the necessity of comparative findings in commission in order to better draw this distinction. As such,

the observed and theorized differences in EF among children who have been subject to acts of omission by caregivers, as compared to those who have faced acts of commission, highlight the necessity of not only distinguishing between these facets of maltreatment, but also offering greater side-by-side comparisons between children who have undergone these different experiences, such that researchers may better understand the differences in developmental outcomes. Further, this discussion of EF deficits shows that it is not only the societal prevalence that implicates a need for greater focus on neglect, but also the current and potential findings in developmental psychology. Findings in EF indicate that this neglect of neglect, and greater focus on abuse, does not match the potential impact of those experiences. Thus, this paper also, through its discussion of EF, calls attention to the need to truly understand the risk factors uniquely associated with early acts of omission by caregivers and push back against this persistent neglect of neglect.

### *1.3 Executive Function*

Decades ago, Jean Piaget noted that neither purely cognitive nor purely affective states exist (1962). Rather, our minds engage in a complex interplay between cognition and emotion—between “affectivity and intelligence.” This complex relationship and constant interaction between human emotion and cognition has been a pursuit of many researchers in psychology over time, but it has recently garnered substantial, heightened attention in areas of literature across psychology and neuroscience aiming to understand with greater specificity the biological and cognitive mechanisms that allow for self-regulation. A key construct of interest within this discussion is EF. An oft debated term with many definitions, EF broadly encompasses several processes involved in the conscious control of thoughts, actions, and emotions (Zelazo &

Carlson, 2012). These deliberative processes, particularly when studied in later childhood, adolescence, and adulthood, are often broken down into three main subsets: working memory, attentional (set) shifting, and inhibitory control (Diamond, 2013; Hughes, 2011; Zhou et al., 2012; Carlson, 2005). Several other processes are sometimes, though less consistently, included that fall under this broad understanding of the construct of EF. For the central three processes in particular, these are understood by many researchers to be interconnected—representing not unitary or distinct abilities, but three interrelated, yet separable, processes (Lerner & Lonigan, 2014). Accordingly, a number of tasks exist that test older subjects' performance on specific sub-processes, and many studies present those individual scores. Due to the understanding of these processes as closely interrelated, however, EF is most often presented in a composite score—a score that may reflect a variety of different tests, the groupings of which change across studies. This lack of precise definition belies the construct's critical importance. Widely understood as an underlying component of the ability to engage in goal-oriented behavior, effective EF is considered to be a central factor in what allows human beings to willfully inhibit an automatic response in favor of a more strategic response, to intentionally allocate attentional resources toward valuable facets of the surroundings, to store pertinent images and pieces of information in memory, including rules and faces, and to change that information and corresponding future behavior as new information is brought to light. Ineffective EF is also understood to underlie many critical outcomes in psychopathology (Snyder, Miyake, & Hankin, 2015).

As Piaget identified in 1962, this interplay between cognition and emotion can be traced back to the earliest years of childhood. Copious research since Piaget makes clear that self-regulatory processes have their origins in early childhood, and the time from a child's birth through the child's fifth birthday is one of rapid development of EF. Substantial research on EF

in early childhood has resulted in multiple approaches to studying EF during these early years and myriad different perspectives on early EF development—both in terms of theoretical understanding and empirical assessment (Zelazo, Müller, Frye, & Marcovitch, 2003; Best & Miller, 2010; Anderson, 2002; Garon et al., 2008). Within this wealth of prior analysis, these theoretical, methodological, and empirical considerations are of interest to this discussion.

A number of studies promote a unidimensional approach to evaluating EF in early childhood, advising that a cumulative EF score is the most suitable measure for this developmental stage. However, there is evidence to suggest that elementary forms of the central subcomponents of EF are distinguishable in preschool-age children and that key processes within EF—namely working memory and inhibitory control—while closely correlated, are still separable factors in children aged 45 to 63 months, with divergence between the two increasing with age (Garon et al., 2008; Lerner & Lonigan, 2014). As such, the idea of early detection of multidimensionality, particularly the differentiability of inhibitory control, is considered.

Further, it is worth noting that EF is measured in a wide variety of ways in early childhood, including reliable, validated tasks that measure particular processes within EF, task batteries that test multiple processes, observational behavioral approaches that aim to understand EF in action in less structured formats, and parental evaluation. Given these multiple approaches, this discussion necessarily makes use of multiple types of EF data. The predominant approach to analysis focuses on EF behavioral outputs, relying on data representing behavioral performance on a variety of oft-used EF-specific tasks and task batteries. However, out of necessity due to limited research, examples of pertinent, but less structured, observational behavioral data as well as some parental report data are also included.

### *1.3.1 A Hot/Cool Approach*

Researchers have also embarked on a direction of EF research that, though still understudied, has increasingly gained traction in recent years. Metcalfe and Mischel (1999) provide a useful theoretical backdrop for this research in their proposal of a ‘hot-cool systems’ model for self-regulation, which they frame specifically in the context of delay of gratification. This model identifies a “cool” cognitive system, which engages in top-down cognitive control over the “hot” emotional system’s bottom-up, emotional response. In the study of EF, this hot/cool structure has been approached differently.

Hot and cool EF have been identified as two separate EF processes that are harnessed in different situations, resulting in a broader conception of EF as an overarching cognitive construct that operates in a context-dependent way (Zelazo & Müller, 2002). Cool EF has been conceptualized as the processes elicited for abstract and decontextualized problem-solving, while hot EF is harnessed for problem-solving that involves regulating motivation and affect (Zelazo et al., 2003). This hot/cool EF model is substantiated by neuroscience data examining the different networks and regions implicated in each process, as cool EF has been generally linked to the dorsolateral prefrontal cortex, while hot EF seems to be associated with the orbitofrontal cortex. The distinction between hot and cool EF has also been bolstered through task batteries specifically designed to test EF competency in settings that mimic both emotionally salient and non-salient circumstances (Zelazo & Carlson, 2012). For instance, Lagattuta and colleagues’ research compared a day/night EF working memory and inhibitory control Stroop-like card task with a similar happy/sad task (Lagattuta, Sayfan, & Monsour, 2010). Every age group—from children as young as four years old to adults—made a greater number of errors and took longer to respond on the happy/sad task, as compared to the day/night task. The researchers

hypothesized that an explanation for the lack of age-based ceiling effects on this task is that the presence of emotional stimuli made the task more challenging—a conclusion that contributes to evidence of dissociable cool and hot aspects of EF and dissociable impairments in hot EF and cool EF (Zelazo & Carlson, 2012). This broad approach to EF offers many promising avenues for future research. Within this analysis, the potential importance of hot EF to the development of children’s self-regulatory capacities in emotionally salient situations is addressed. Further, possibilities for future research are explored—particularly with regard to the necessity to identify what differences emerge in children’s hot and cool EF following early exposure to acts of omission and what hypotheses further inquiry must consider.

## 2. EVALUATING EXECUTIVE FUNCTION IN THE NEGLECTED CHILD

In this analysis, I offer empirical and theoretical support for the following hypotheses. First, adverse immediate impacts of early omissions on EF are identifiable during the preschool years of early childhood. Further, these impacts of acts of omission on EF are persistent, and adults demonstrate global deficits in EF associated with early omissions. Additionally, immediate deficits in hot EF may be expected in populations exposed to early maltreatment generally, as well as those exposed to acts of omission in particular, and whether early omissions impact hot and cool EF development differently is a fruitful area for future empirical study. Finally, within the broad construct of maltreatment, acts of omission are likely to have impacts on EF development that are distinct from the impacts of acts of commission, and future research ought to compare the immediate and long-term impacts of omissions and commissions on EF in order to address this possibility.

## *2.1 Early Omission and General Executive Function Development*

This section is devoted to gaining understanding from current literature about the impact of early omissions on EF development, as observed at two stages: early childhood and adulthood. Here, I present evidence that early omissions may result in adverse immediate impacts on development of EF, measurable during the preschool years, and adverse long-term impacts on EF, measurable during adulthood.

### *2.1.1 Immediate Impacts on Executive Function in Early Childhood*

EF is an outcome of some interest particularly in research on previously institutionalized (PI) children—a group that has had nearly universal exposure to early deprivation and neglect as a result of living in an institutional caretaking environment. Yet, much of the existing research within this population measures impacts of early omissions on EF during later childhood and adolescence, while comparably little research has sought to identify the immediate impacts on EF of early omissions. As such, there is a distinct scarcity of research that isolates the developmental stage of early childhood and examines early indicators of deficits in EF in young children who have experienced acts of omission. This discussion aims to address that gap. Given the present lack in behavioral data on EF in infants and toddlers exposed to early omission, behavioral outcomes in the youngest children are not addressed in this discussion. Rather, impacts measured during the preschool years are considered the immediate impacts of those early omissions that occur at any point from birth to time of evaluation. From existing data, I therefore present available evidence regarding whether, and how, EF performance in preschool-age children is impacted by early omissions.

Preliminary evidence in preschool-age children indicates the presence of global deficits in EF during early childhood in populations exposed to early omissions. The most comprehensive and pertinent study identified a gap in the literature on outcomes in PI children—specifically, a lack of measurement of PI children’s EF task performance immediately post-adoption, during early childhood. Hostinar and colleagues studied 83 two-and-a-half- to four-year-old children, including 54 PI children. These children had spent a period of their early childhoods in international orphanages and institutions before their adoption in the United States between 16 and 36 months of age (Hostinar et al., 2012). The researchers found the PI group, at one year post-adoption from an institution, demonstrated significantly lower composite scores on EF performance, as well as lower individual scores in each sub-task, as compared to non-adopted children. They also found that EF performance was positively correlated with the social and physical quality of the orphanage environment and with the amount of time children spent with their birth family before being placed for adoption. This evidence indicates the presence of significant, global deficits in EF performance during preschool years following a period of early omissions. Their positive correlational findings also indicate that those experiences that diminish the extent of caregiver omissions, such as time with parents early in life and social quality at the orphanage, diminish the observed EF deficits.

Two earlier studies provide more mixed results, though notable limitations of these studies limit the applicability of the findings. Jacobs and colleagues evaluated EF in a population of four- to five-year-old PI children who had lived in institutions in other countries for an average of 10.2 months before adoption (Jacobs, Miller, & Tirella, 2010). The sample included 37 children previously adopted from international institutions who were, on average, 12.2 months old at their time of arrival in the United States and 4.5 years old at time of assessment.

Through parental evaluations on the Behavior Rating Inventory of Executive Function - Preschool Version (BRIEF-P) questionnaire, Jacobs and colleagues found that 11% of the child population had “problem range” scores for the EF global composite score, with between 5 and 13% of children scoring in the “problem range” for each of the tested EF domains. Further, children who were younger at time of arrival scored significantly better than those who arrived at an older age on EF measures in such domains as inhibition, flexibility, working memory, inhibitory self-control, and emotional control. A notable feature of these results is that this analysis took place, on average, 41.9 months—nearly 3.5 years—after the children had arrived in the United States, in which time 80% of the children had received some type of local early intervention service. As such, these deficits were observed in young children who were exposed to early omissions, even when those children had lived outside of an institution for the majority of their lives, and even with the possibility that early interventions had already ameliorated some EF deficits. In a somewhat similar study, Merz and McCall gathered parental evaluations of children’s EF through the BRIEF-P for 130 adopted children, aged 2 to 5 (with a mean age of 4.03 years), who were adopted at an average age of 12.09 months (Merz & McCall, 2011). These evaluations demonstrated no significant deficits in EF, as compared to the standardization sample of 450 age-matched children. On one indicator, the Inhibit scale, previously institutionalized children performed marginally more poorly than the standardization sample, and on the Flexibility Index, they seemed to perform significantly better. At face value, these two studies provide conflicting evidence as to the measurable presence of EF deficits in preschool-age children. Yet, the most notable limitation of both of these studies is that the data were collected by parent report, not by the child’s direct performance on EF tasks. This is a significant limitation, as it is possible that the EF skills reported by parents may not be true indicators of

what would have been directly observed in the child's behavior. Further, the Jacobs study does not have a non-PI comparison population, and as such, it is difficult to determine which deficits, if any, were uniquely associated with early omissions (Jacobs et al., 2010). Even in the Merz and McCall study, which does include a comparison rating scale standardization population, the PI sample and comparison sample were assessed at different times and using different protocols, limiting the applicability of the findings gained through this comparison (Merz & McCall, 2011).

Despite this literature's limitations in quantity, available evidence on behavioral outcomes in EF during early childhood points to the potential for significant adverse impacts of early omissions on EF that are measurable during the preschool years. While evidence for omission-related deficits in EF during early childhood is mixed in studies using parental reports, several aspects of these studies limit the applicability of their findings, and overall, the empirical evidence seems to indicate that immediate adverse impacts of early omissions are observable as global deficits in performance on EF tasks in early childhood. Initial findings also emphasize the need for more early childhood research into behavioral outcomes in EF for children who have experienced early omissions. More data are needed to determine such critical factors as the specific nature of these immediate deficits (for instance, whether different immediate deficits emerge in the subcomponents of EF) and the relation of omission severity, timing, and duration to immediate outcomes in EF. Further, this evidence demonstrates that gathering children's behavioral data is a promising method for future analysis and that deficits in EF are measurable in early childhood, even without the involvement of parental reports.

It is also worth addressing that research utilizing a PI population as the early omission population has a unique strength, as well as drawback. PI children present a unique demographic for studying early deprivation, and a notable strength of research models that include this

population of children is that the period of omission, as well as the type and extent of omission, is measurable and is often more clearly defined in PI samples than in samples of neglected child populations in the United States. Domestic samples, often recruited through the child welfare system, may represent a greater diversity of experiences with regard to caregiver acts of omission. Yet, this is also a slight drawback of the PI sample, as institutions and orphanages in other countries may present with unique situational factors that are not present in a more traditional neglectful caregiver environment, making them potentially less representative of the neglected population in the United States. As such, future research using both populations—PI children and children recruited from a naturalistic domestic pool—may together contribute to further clarity surrounding immediate impacts of neglect on EF in early childhood.

### *2.1.2. Long-Term Impacts on Executive Function in Adulthood*

If the deficits in EF observed during early childhood are persistent, long-term repercussions of early omissions on EF may be observed in adults. Few studies distinguish between specific subtypes of prior maltreatment in adult populations such that downstream EF development may be analyzed specifically in those adults that experienced early acts of omission. Yet, from existing data, I present available evidence regarding whether, and how, EF performance in adulthood is impacted by early omissions.

Preliminary evidence in adult populations indicates persistence of global deficits in EF into adulthood following exposure to early omissions. A pertinent study by Gould and colleagues evaluated the EF of a sample of adults who had endured early life stress, as measured by the Childhood Trauma Questionnaire (CTQ). Among this sample, neglect was strongly associated with two dimensions—the first including performance on visual memory, executive functioning,

and spatial working memory tasks, and the second relating to emotional processing and inhibition, as measured through the Affective Go-No-Go (AGNG) task (Gould et al., 2012). In both of these dimensions, early neglect predicted deficits in performance on measures of EF. Nikulina and Widom (2013) also found long-term EF deficits in adults who had experienced early omissions. Approximately 22 years after their initial study, for which they recruited children between the ages of 0 and 11, the researchers began conducting a comprehensive follow-up analysis with participants from their maltreated group—made up of individuals who had substantiated cases of child neglect or abuse at the time they were recruited—and their control group—made up of individuals who were matched on several demographic factors during the initial study, such as age, sex, race and ethnicity, and social class—when those participants reached middle adulthood. This study found that childhood neglect was predictive of non-verbal reasoning and poorer EF, specifically cognitive flexibility, at age 41 and that a history of PTSD did not moderate or mediate those effects.

Pluck and colleagues provide some support for these lingering effects of neglect as well, although several factors limit the conclusions that can be drawn from their research. In this study, emotional and physical neglect and emotional abuse during participants' upbringing were positively associated with their FrSBe composite score, which measured executive dysfunction, disinhibition and apathy (Pluck et al., 2011). This study provides some evidence for measurable EF deficits lasting into adulthood as a result of early omissions. However, several confounding factors limit reliance on these findings, such as the potential presence of commission experiences in the emotionally abused individuals, a high prevalence of substance abuse and head injury, the fact that the study focused on the homeless population, and the lower than average IQ in the study sample. As an example of the confounding nature of this last factor, the physical neglect

association was no longer significant when controlling for IQ. Another study provides evidence for EF deficits, specifically in the process of working memory, in adults who experienced neglect during childhood. Majer and colleagues found spatial working memory and pattern recognition memory deficits in adults that had been previously neglected, and those deficits were found to increase with the severity of the neglect experience (Majer, Nater, Lin, Capuron, & Reeves, 2010). In their overall EF measure, no deficits were linked to neglect. Yet, this study suffers from methodological flaws that distinctly limit the applicability of these data. The small sample size is chief among these flaws, as the study included only 47 participants, of which only 25.5% were exposed to moderate to severe childhood trauma. Only two participants experienced physical neglect, and two participants experienced emotional neglect.

A study by Viola and colleagues provides further evidence for downstream repercussions of early omissions on adult EF (Viola et al., 2013). Interestingly, their participant population was entirely comprised of women with crack cocaine dependence. While several studies have compared the EF of adult drug users and non-drug users, this study focused on two groups of crack cocaine-dependent women, of whom 37 had a history of childhood physical neglect and 48 had no such history. For almost all measures of EF, including measures of verbal fluency, inhibition, working memory, cognitive flexibility, and selective attention, the women who had a history of childhood physical neglect performed significantly worse than their non-neglected counterparts. There was no significant difference between the groups on performance on the Iowa Gambling Task (IGT)—a decision making task.

There are a few key points that may be taken from this downstream research on outcomes in EF during adulthood in individuals who were exposed to early acts of omission. First, preliminary evidence suggests that deficits in EF persist into adulthood following early

omissions. While multiple studies indicate that these deficits may be global, some of this evidence also provides windows into specific processes—working memory, cognitive flexibility, and inhibition—that may be individually impacted in different ways by early omission. As such, further multidimensional study is required in order for those deficits to be clearly identified and in order to discern whether certain processes within EF are at particular risk for long-term deficits as a result of acts of omission experienced during early childhood. The increased ability to thoroughly measure EF processes later in development may provide the opportunity for future research to conduct these more nuanced, multidimensional analyses. It is also possible, in accordance with a developmental cascades model, that these early acts of omission would result in a series of ramifications over the course of development, continuing to affect older children, adolescents, and adults in ways that result in complex downstream impacts on EF (Masten & Cicchetti, 2010; Lansford, Malone, Dodge, Pettit, & Bates, 2010). More research of a multidimensional nature is needed to determine the nature of these deficits.

One other factor that is important to consider is that the exposures to omissions across these adult studies were not confined to early childhood, and rather occurred over the course of more expansive periods of development, including by age 11, before adolescence, and before adulthood. In taking a developmental approach, my aim is to isolate early childhood as a period of interest for the time at which omission exposure occurred. Yet, in naturalistic domestic samples of adults, exposure to acts of omission during early childhood is likely to be indicative of a recurring trend of caregiver behavior, thereby limiting the ability to isolate early childhood as the only period in which exposure to acts of omission occurred. This represents a promising area for future research and an opportunity to utilize the strengths of PI studies. Conducting follow up analyses of PI child populations when they reach adulthood would provide a clearer

isolation of early childhood omissions, in contrast to many existing studies, which generalize to a broader period of childhood neglect. Further, since the ranges of ages at which individuals may have been exposed to omissions are broad, it is not entirely clear in all of the samples of adults in the cited studies that omissions did occur during early childhood, which is a notable limitation. Thus, the conclusions that I have drawn from existing research necessarily include a caveat of imprecision. For domestic adult samples, gaining a more detailed understanding of participants' timing of omission exposure, such that individuals who did and did not experience acts of omission during early childhood can be evaluated as distinct groups, would be a promising approach for future developmental research in order to draw more specific conclusions.

## *2.2 A Gap: Hot Executive Function and Early Childhood Maltreatment*

Preliminary evidence on deficits in EF that emerge as a result of early neglect, though sparse, provides certain insights into the developmental impacts of acts of omission. This analysis provides evidence suggesting that global behavioral deficits in EF are observable as young as preschool-age in children who experience early omissions and that those deficits are persistent, with early evidence indicating the presence of behavioral deficits in EF in adulthood associated with early exposure to acts of omission. In both of these areas of research, more multidimensional research is needed in order to determine the precise nature of these deficits.

Yet, the presented research on outcomes in adulthood also raises an interesting conflict. In Gould and colleagues' research, early neglect showed associations with performance on the AGNG task—an emotional processing and inhibition task, which is often associated with hot EF (Gould et al., 2012). In Viola and colleagues' research, the only task on which the population of women who experienced early neglect showed no difference from their non-neglected peers was

the Iowa Gambling Task—a decision-making task also commonly associated with hot EF (Viola et al., 2013). Certainly, several differences exist between the two studies. Notably, the Gould study excluded those potential participants who met criteria for a substance abuse disorder within the last 6 months, according to the Diagnostic and Statistical Manual for Mental Disorder 4th Edition (DSM-IV), while the entire participant population of the Viola study had a formal DSM-IV diagnosis of substance use disorder. The two hot EF tasks employed were also different from one another. Yet, both of these studies raise the question of whether and how hot EF may be impacted by early omissions and how that might be distinct from the impacts on cool EF.

Research has begun to explore a broader conception of EF and to capture the ways in which the presence of affect may adjust an expected EF response. This theoretical and empirical expansion, seen in some developmental psychopathology research, has been slower to carry over into early maltreatment analyses—where the limited empirical findings that exist on the topic of EF development in abused and neglected populations seem to center around data gathered from measures of EF that predominantly focus on cool EF. But the observed findings in adult populations expose a wide gap in the literature involving early maltreatment and its impacts on hot EF and the development of affect regulation. Are impacts of early omission on hot EF dissociable from the impacts on cool EF? Further, is this distinction in deficits observed only in adulthood, only during early childhood, or during both developmental stages? With the developmental importance of EF for effective self-regulation in affect-laden and motivational circumstances, pursuing the question of impacts of early maltreatment on hot versus cool outcomes in EF development, both within the period of early childhood and also into later stages of development, is one that would provide critical insights.

There are reasons to expect such deficits in hot EF, even during early childhood, and why pursuing a distinction between outcomes in hot and cool EF is a helpful avenue for future early maltreatment research. Early maltreatment has been linked to notable socioemotional deficits, even during preschool years (Maughan & Cicchetti, 2002; Hoffman-Plotkin & Twentyman, 1984; Font & Berger, 2015; Erickson, Egeland, & Pianta, 1989; Naughton et al., 2013)—a pattern that may implicate deficits in hot EF. In research aiming to differentiate between hot and cool EF during early childhood, cool EF showed a strong association with general intellectual functioning, but hot EF did not (Hongwanishkul, Happaney, Lee, & Zelazo, 2005). Based on available evidence, these researchers posited that hot EF was likely specifically associated with social and emotional intelligence. Given the early emergence of socioemotional deficits in maltreated children, this research indicates that immediate difficulties may be expected to emerge in hot EF as a result of early maltreatment exposure. Further, based on behavioral evidence gathered by Egeland and colleagues, both neglected and abused preschool-age children presented with greater negative affect than the control group (Egeland, Sroufe, & Erickson, 1983). This may indicate the presence of affect dysregulation in maltreated young children, a finding further substantiated by other early childhood research (Cicchetti & Toth, 1995). This, too, would implicate deficits in hot EF in young children exposed to early maltreatment.

Moreover, deficits in hot EF may be especially related to early neglect due to the importance of caregivers for regulating affect early in life, and thus the unique consequences that may arise as a result of acts of omission. Prior to development of internal regulatory mechanisms, caregivers play a central role in regulating affect (Hofer, 1994; Cicchetti & Toth, 1995; Gee et al., 2014). The consequences to affect regulation in the absence of caregiving input, and the resulting omission of external regulation, may therefore be particularly damaging. In

Egeland and colleagues' study, some unique evidence of affect dysregulation was observed in neglected young children, who presented with less positive affect than controls, in addition to the greater negative affect also observed in abused children (Egeland et al., 1983).

Research that distinguishes between hot and cool outcomes in EF development in maltreated children during the period of early childhood is plausible, and it is broadly applicable. Measures have been found that distinguish hot and cool EF performance in children as young as preschool-age, and research indicates that hot and cool EF are differentiable constructs, even during the period of early childhood (Hongwanishkul et al., 2005; Lagattuta et al., 2010; Kerr & Zelazo, 2004). Even outside the context of EF-impaired populations, systematic and thorough investigation into the impact of emotional stimuli on EF processes has been repeatedly identified as a promising route of inquiry. Delving into more thorough exploration of affect regulation through expansion of current empirical research in early EF and maltreatment has the potential to provide critical insight into the developmental underpinnings of important affective outcomes in maltreated children, such as future behavioral deficits and psychopathological symptomatology, and how those, too, may differ between those who have suffered acts of omission and those who have been subject to acts of commission. This research would provide a more nuanced perspective on the developmental stages at which interpersonal traumas have a particularly severe impact and on which outcomes, which could also contribute to future developmental maltreatment research that seeks to use maltreatment as a window into understanding normative development. Should future research confirm the presence of distinguishable hot EF deficits in maltreated young children generally, and in young children exposed to early omissions in particular, it would provide a major substantiation of hot and cool EF theory, in addition to an important gain in information for future research, clinical, and policy use.

### *2.3 Distinguishing the Impacts of Neglect and Abuse on Executive Function*

Research to date has only scratched the surface in identifying whether the observed impacts of early omissions on EF may be distinct from those of early commissions. While insufficient data exists to make a concrete determination, there is empirical and theoretical evidence to support a distinction between the impacts of those experiences. The following analysis highlights available empirical evidence that identifies immediate and long-term differences in outcomes between individuals exposed to early omissions and early commissions and presents additional theoretical support for distinguishing between the immediate impacts of omissions and commissions during early childhood. Further, it calls attention to the need for future research to closely examine the omission and commission comparison in order to provide empirical and theoretical clarity about the distinction between neglect and abuse in immediate and long-term outcomes in EF development.

#### *2.3.1 Immediate Differences between Early Omission and Commission*

Scant empirical research has sought to answer the question of how outcomes in EF development during the period of early childhood differ between children who are subject to acts of omission versus commission, although some have investigated this neglect and abuse comparison during later childhood and adolescence. The adverse immediate impacts of early omission on EF having been already identified, the question remains: do these EF deficits in early childhood differ from deficits observed in children who have suffered commissions?

There are several potential reasons why omission- and commission-based differences in EF may be observed during early childhood and why omissions may result in poorer outcomes. A great deal of theoretical and empirical research has been devoted to factors that increase EF

during development, and such research has predominantly shown that EF development is aided by caregiver behaviors and the child-caregiver relationship. Parental relationships have been shown to play a key role in normative development of self-regulatory capacities, namely EF, during the period of early childhood (Bernier, Carlson, & Whipple, 2010). Greater EF capacity is observed in young children who receive positive stimulation from caregivers in the form of responsive caregiving and a predictable environment in which expectations may be formed about individuals' behavior and event occurrences (Carlson, 2003). Other caregiving tactics have also been shown to be beneficial to early EF development, including scaffolding, autonomy support, and language input (Bernier et al., 2010). Further, early psychosocial deprivation, explored mainly through the lens of international institutional care, has been repeatedly associated with lasting deficits in EF, and poorer performance on various attention, memory and inhibitory control-related tasks, although those outcomes are typically measured later on during childhood (Pollak et al., 2010; Bos, Fox, Zeanah, & Nelson, 2009; Colvert et al., 2008; McDermott, Westerlund, Zeanah, Nelson, & Fox, 2012; De Bellis, Hooper, Spratt, & Woolley, 2009; Merz, Harlé, Noble, & McCall, 2016). The nature of neglect may therefore make it uniquely threatening to the beginning stages of EF development. Acts of commission—abuse—involve the presence of stimulation that is harmful or threatening, while acts of omission—neglect—are characterized by a total lack of stimulation that is necessary for development (Koss & Gunnar, 2017). With EF development showing such a reliance on caregiver stimulation, it may be the case that children who experience acts of commission may still receive stimulation that, despite its negative nature, would provide the basis for a more normative course of EF development than children who receive little to no stimulation from a caregiver. Accordingly, acts of omission on the part of caregivers, through which a child is deprived of even normative levels of stimulation,

would seem poised to have a particularly detrimental outcome on EF during development—even more so than acts of commission.

A particular theoretical approach further substantiates this hypothesis. Highlighting the role of experience in development, Cicchetti and Lynch differentiate between inductive, maintenance, and facilitative functions of experience (Cicchetti & Lynch, 1995). In this model, the inductive function of experience occurs when a particular developmental change requires a certain experience, without which it would fail to occur. While neglect at any point in development has the potential to impede the developmental trajectory by failing to provide the requisite experience to fulfill the maintenance and facilitative functions, this structure highlights the way that early omissions may uniquely impede cognitive development, as well as why that might differ from early commissions. In an atypical caregiving environment in which caregiver omissions result in the lack of experience that fulfills the inductive function, this may result in unique deficits, as compared to an atypical caregiving environment in which experiences occur that are entirely or partially negative commissions. That is to say, where there is the expectation of a particular experiential input from a caregiver—food, attention, emotional support, even medicine or education—and such an input is not just altered, but missing entirely, even the most basic function of experience, the inductive function, fails to be accomplished. This theoretical approach provides a useful basis for understanding the unique potential of omission to thwart development of constructs such as EF, which are experience-based. It also highlights the need to identify those deficits and intervene early on in order to rectify the course of development and move to the maintenance and facilitative functions of experience.

Investigating empirical approaches to this question revealed a lack of comprehensive data from which to draw a clear distinction between the immediate impacts on EF development in

young children who experienced acts of omission and those who experienced acts of commission. However, there are two studies that seem to imply that EF deficits may be marginally more severe among children who have suffered acts of omission than their differently maltreated counterparts, supporting the need for further empirical research into that possibility. Pears and Fisher, in their sample of three- to six-year-olds, distinguished between a group of generally maltreated foster children and a group that was comprised of children who had experienced “neglect and emotional abuse” in particular, though they did not separate a group that had experienced abuse (Pears & Fisher, 2005). Although they found that the foster care sample overall did not significantly differ from community samples in EF, they did find associations between being removed primarily because of neglect or emotional abuse and poorer EF, visuospatial processing, and memory, among other cognitive outcomes. Further, they found significant associations between number of maltreatment types and better visuospatial processing, language, and EF. This comparison group is not a clear isolation of children who have experienced only omission, given that some of the emotionally abused children may have also suffered emotional acts of commission. And yet, this comparison, particularly when taken together with the superior performance of children who experienced multiple forms of maltreatment, still presents enough evidence of uniquely poor outcomes in EF in children who experienced neglect, as compared to other forms of maltreatment, to support the notion that differential immediate outcomes in EF development in early omission and early commission populations ought to be explored further.

EF-related observational data from Egeland and colleagues also supports the need for future research into the possibility that neglect may result in poorer outcomes in EF than abuse during early childhood. The researchers found that neglected preschool-age children, as

compared to physically abused children, verbally abused children, children of psychologically unavailable mothers, and children in the control group, demonstrated the most difficulty “pulling themselves together to deal with tasks” (Egeland et al., 1983). They showed the least flexibility, ego control, and agency, were highly distractible and impulsive, and were the most dependent of all other groups of children. A notable limitation of this study is that the central findings are made up of observational data, rather than a more standardized EF task battery. Yet, these in-context observations appear to be strongly linked to EF processes, and inhibitory control in particular. This study also presents a uniquely detailed comparison between maltreatment subtypes, pointing to notable inhibition- and attention-related deficits that distinguish neglected children, whose mothers failed to properly care for their children’s health, physical care, and safety, from all comparisons—including those children who had been exposed to psychological unresponsiveness or passive rejection in the maternal relationship. While it is not possible to make a decisive determination from these findings that immediate outcomes in EF development are poorer in neglected children than in other maltreated children, the study certainly supports the need for additional research into that possibility. Further, the results raise the possibility of taking a more multidimensional approach in future research, with the goal of testing a unique impact of early omission on inhibitory control in early childhood.

These current empirical findings demonstrate the difficulty posed by comorbidity in comparative research, once again highlighting the inherent strength of study designs involving PI populations. It is challenging to find a naturalistic sample of children exposed to only one type of maltreatment such that the impacts of acts of omission and acts of commission may be clearly contrasted. Ultimately, however, this theoretical and empirical evidence suggests that future research may find distinct EF deficits in omission and commission populations that emerge in

early childhood, potentially in the form of poorer composite EF scores. Although less clearly delineated by current research, the potential that unique deficits exist in inhibitory control in particular during this period as a result of early omissions warrants further inquiry.

### *2.3.2 Long-Term Differences between Early Omission and Commission*

Preliminary evidence from studies using adult populations also supports the possibility that early omissions may have distinct long-term effects on EF, as compared to early commissions. Nikulina and Widom (2013) found stark evidence of long-term differences in impacts of early omissions and early commissions on EF development. Whereas child maltreatment overall and child neglect in particular predicted deficits in EF and verbal reasoning at age 41 in their participant population, no such deficits were found in those adults who had been exposed to early physical and sexual abuse. In Gould and colleagues' comparison between adults who had experienced early abuse and adults who had experienced early neglect, one specific differential impact was found. The researchers' first dimension, which seemed to gather information on cool EF, was found to be strongly associated with both abuse and neglect, though abuse exerted a slightly stronger effect. The second dimension, which included the AGNG, was found to be most strongly associated with neglect (Gould et al., 2012). This is a particularly intriguing preliminary finding, as it distinguishes early omission from early commission populations through unique associations with deficits in task performance attributed to hot EF. Within this analysis, both neglect and abuse appear to be strongly related to deficits on more traditional measures of cool EF, with abuse slightly more so. However, there seems to be a unique, lasting impact of neglect on performance on the AGNG task, an emotionally salient inhibitory control task. This again implicates hot EF as a promising construct of interest for

further inquiry, raising the possibility that omissions and commissions may differently impact the development of hot EF. Is it possible that early acts of omission may pose unique threats to the long-term development of hot EF? Particularly given the contrasting findings of Viola and colleagues, more research is certainly required to uncover whether acts of omission during early childhood uniquely impact hot EF in adulthood in a way that is distinct from acts of commission (Viola et al, 2013). Certainly these findings are not conclusive. Yet, there is empirical and theoretical reason to pursue further empirical understanding regarding the differential immediate and long-term impacts of early omissions and early commissions on development of EF.

#### *2.4 Looking Forward*

For new projects seeking to expand empirical understanding of the impacts of early neglect on EF development, several factors from this developmental and dimensional approach ought to be considered. Clear delineations between subtypes of maltreatment according to a dimensional understanding of the construct (McLaughlin & Sheridan, 2016)—whether the experience was one of omission or commission or whether no measurable interpersonal trauma occurred—as well as more organized developmental timing—recording the specific timing of early maltreatment experiences and differentiating early childhood as a period of interest in subsequent data analysis—will add needed structured evidence to the current pool of findings. This would be important progress, though certainly not exhaustive. For EF and for maltreatment—and at the intersection of these literatures—substantial work lies ahead in constructing theoretical models and empirical measures of sufficient nuance and complexity to capture outcomes of interest at each stage of development. Yet, the potential benefits are significant. In addition to the welcomed contribution such research would make to this area of

academic study, early indications of unique deficits that may emerge when neglected children are faced with an emotionally salient, or a decontextualized, EF challenge, will be an essential step toward crafting maximally nuanced and successful early interventions.

### 3. EARLY INTERVENTION: PROPOSALS FOR PUBLIC POLICY ADVANCEMENT

In order for research on the developmental repercussions of child neglect on EF to be maximally worthwhile, it must be utilized. Thoughtful, careful attempts at implementation of evidence-based interventions that reflect current knowledge are critical in order to immediately help at-risk young children (Shonkoff, 2010). Waiting for additional research to take place before crafting public policy interventions is not an option. Every day, children are subjected to early experiences that have the potential to undermine their self-regulation capacity and mental health for many years to come. Specifically for deficits in EF, preemptive support for young children before they reach school age may help reduce the struggles they face later in life (Jacobs et al., 2010). Even with a limited basis of information on which evidence-based policies may be crafted, it is clear that neglect in early childhood can result in immediate EF deficits in young children, and interventions ought to be implemented that focus on diminishing those deficits.

Within current research, age-appropriate interventions have already demonstrated positive outcomes for EF development in early childhood. If widely implemented among this population, such interventions may help young children who have suffered neglect to achieve a more normative trajectory of EF development. For young children exposed to early omission, early childhood education (ECE) curricular interventions seem particularly promising.

### *3.1 Evidence for Early Childhood Education Intervention*

Multiple studies have demonstrated improvements in children's EF through implementation of ECE-based interventions, confirming that EF is modifiable during the preschool period and that curricula with a developmental focus can result in positive EF and self-regulatory modification (Raver et al., 2011). Of the curricular interventions that have been tested in preschool children, there are examples of curricula that directly target EF and the development of EF skills, curricula that target EF-related skills and goals, and curricula that target other skills and cognitive development more generally, rather than EF directly. For each of these types of curricula, positive outcomes have been reported for children's EF development over the course of the intervention period.

In a curricular intervention that deliberately targeted EF, Diamond and colleagues sought to differentiate between the benefits of the Tools of Mind (Tools) curriculum—comprised of a series of 40 EF-promoting activities—and the district's version of balanced literacy curriculum (dBL)—a literacy curriculum not focused on EF—to children's EF development (Diamond, Barnett, Thomas, & Munro, 2007). The researchers found that children involved in the Tools curriculum significantly outperformed children involved in the dBL curriculum on demanding EF tasks. Diamond and colleagues interpreted their findings as promising support for the idea that EF skills can be improved in preschool children in the context of the classroom.

In a different intervention approach, Bierman and colleagues targeted a mixture of skills, both cognitive and social-emotional, which were EF-related (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008). The researchers randomly assigned 44 HeadStart classrooms either to usual practice or to an enriched intervention (Research-Based, Developmentally Informed, or REDI) and tracked 356 preschool children across those classrooms over the course of a full preschool

year. Part of this REDI program targeted language and emergent literacy through development of such cognitive skills as vocabulary and syntax. This component of the intervention contained an interactive reading program in which teachers were taught to foster children's use of EF-related skills, including memory and planning. The PATHS curriculum (promoting alternative thinking strategies), also included in the REDI intervention, targeted social-emotional skills associated with school readiness. These social-emotional skills are also closely related to EF and include self-control and social problem solving, among others. The greatest benefits in EF as a result of this program were observed in children who had lower pre-intervention EF skills. Those children who began with lower EF skills demonstrated higher levels of social competence and reduced aggression, among other outcomes, if they were in the REDI intervention classroom, as compared to a usual practice classroom. Children with higher initial EF behavioral skills did equally well in the intervention and usual practice classrooms. These findings highlight the potential for curricular interventions to be particularly impactful for those preschool children who come into the classroom with deficits in EF.

Weiland and Yoshikawa (2013) did not deliberately target EF or EF-related skills in their intervention, but rather targeted other cognitive skills that have shown promise for improving EF when incorporated into school curricula. In their sample of Boston Public Schools prekindergarten students, Weiland and Yoshikawa implemented two curricula—Opening the World of Learning (OWL) and Building Blocks—that together targeted language, literacy, mathematics, and socioemotional skills. The researchers saw small but significant benefits to EF skills in all three areas (working memory, inhibitory control, and attention shifting) in their sample population. These effects, though relatively small, are promising. Even when EF skills

are not expressly targeted, these findings indicate that other curricula deliberately designed to improve cognitive and socioemotional outcomes may also aid the development of EF skills.

Overall, evidence points to the potential for ECE interventions to improve the prospects of young children exposed to early omission. ECE curricula that cultivate EF skills may help those young children that have suffered this exposure, and who may have resulting deficits in EF, to improve their EF skills and achieve a more normative trajectory of EF development. It is beyond the scope of this analysis to put forward a comprehensive plan for the optimal ECE curriculum. Yet, future efforts to craft ECE curricula that would maximally aid EF development in all children, and especially in those exposed to early omission, ought to draw from multiple examples of beneficial practices, as cited above. These efforts should explore novel approaches that include a combination of activities, some of which specifically promote EF skills, some of which promote cognitive growth in areas such as literacy and mathematics, and some of which promote socioemotional development in areas such as social problem solving and self-control. Based on this curricular intervention research, it seems a particularly promising avenue for pursuit in public policy is establishing a framework to identify children in circumstances of caregiver omission and provide them with access to ECE in which such curricula are utilized.

### *3.2 Policy Context for Evidence-Based Recommendations*

There are certain existing resources that provide services to children at risk of, or experiencing, acts of omission by a caregiver, and these resources are critical components of my recommendations. Chief among these is the child welfare system—a group of services involved in the promotion of children’s wellbeing and the prevention of child abuse and neglect (Child Welfare Information Gateway, 2013). The child welfare system is not so much a singular entity

as a large network of community, local, and state resources involved in carrying out the mission of ensuring child safety, achieving permanency, and strengthening families. States hold the primary responsibility for delivering these services and receive support from the Federal Government to do so. As evidenced by the several hundred thousand children in 2016 classified as neglected by the U.S. Department of Health and Human Services (2018), the population of children involved in the child welfare system makes the system a critical resource to utilize in the process of identifying young neglected children and connecting them with resources that will promote their EF development. Further, the child welfare system still has shortcomings that must be addressed in its provision of resources to neglected children. It has been demonstrated that initial cases of neglect obtain fewer family services and less support within the child welfare system than other forms of maltreatment, and child protective workers ascribe less risk in response to allegations of neglect, as compared to physical or sexual abuse (Jones & Logan-Greene, 2016). My recommendations demonstrate a way in which the child welfare system may address this inadequacy and increase its support for neglected young children and their families.

Two factors make this a particularly critical time to employ the child welfare system in efforts to aid young children exposed to early acts of omission. First, the opioid crisis that continues to face the United States has contributed to a growing number of children becoming involved in the child welfare system and being placed in out-of-home care. Even before the opioid crisis, children with parents who abused drugs or alcohol were found to be four times more likely to experience neglect than those with parents who did not abuse substances (Kelleher, Chaffin, Hollenberg & Fischer, 1994). Between 2005 and 2015, the number of children removed from their homes due to parental drug abuse increased from 22% to 32%, and neglect—a closely linked indicator—rose simultaneously (Williams & Devooght, 2017; Young,

2016). As such, the child welfare system currently manages a growing number of neglect cases linked to the opioid crisis and an expanding population of young children facing early omission by caregivers, including as a result of parental drug abuse. Given the child welfare system's role in the opioid crisis, the system is uniquely positioned right now to contribute meaningfully to an evidence-based intervention designed to identify young children who may have been exposed to early acts of omission and connect them with EF-promoting ECE resources.

The second factor is the recent passage of the Family First Prevention Services Act (FFPSA)—a sweeping piece of child welfare legislation, passed as part of the recent Bipartisan Budget Act, which is poised to restructure the distribution of financial resources within the child welfare system (Bipartisan Budget Act of 2018). Among the notable adjustments to child welfare funding streams ushered in by the FFPSA are the establishment of federal reimbursement for preventive services—such as substance use treatment and parenting skills training—for families with children who are at risk of entering the foster care system, and the creation of incentives for states to reduce placement into congregate or group care, where more than six children are placed in the same care setting (Children's Defense Fund, 2018). My recommendations specifically reference the first portion of this reform, which establishes federal funding streams for preventive services—in particular, the preventive services funding that may be allocated for children placed with parents in residential substance abuse treatment programs. Recognizing the high-risk population served by the system, the FFPSA also brings notable updated language to federal child welfare guidelines, specifically allocating funding for those preventive services that meet a *trauma-informed* standard of care (Bipartisan Budget Act of 2018). This legal requirement for services to incorporate a trauma-informed approach creates opportunity for scientific understanding of the impact of traumatic experiences during childhood to be used in

determining which child welfare policies are most promising and which programs receive financial resources from the federal government.

Within the FFPSA, in articulating the criteria for federal funding for preventive services, the law states that these programs and services must be “provided under an organizational structure and treatment framework that involves understanding, recognizing, and responding to the effects of all types of trauma and in accordance with recognized principles of a trauma-informed approach...to address trauma’s consequences and facilitate healing” (Bipartisan Budget Act of 2018). The term trauma-informed is somewhat vague, but according to the Substance Abuse and Mental Health Services Administration (SAMHSA), which elaborates on those principles, “a program, organization, or system that is trauma-informed: (1) realizes the widespread impact of trauma and understands potential paths for recovery; (2) recognizes the signs and symptoms of trauma in clients, families, staff, and others involved with the system; (3) responds by fully integrating knowledge about trauma into policies, procedures, and practices; and (4) seeks to actively resist re-traumatization” (2015). These principles reflect the Federal Government’s acknowledgement of the clear need to construct evidence-based systems and services that appropriately recognize, and respond to, traumatic experiences, and the incorporation of these principles into the recent federal budget demonstrates the Federal Government’s fiscal support for those efforts. Crafting public policy that incorporates research on the impacts of early neglect, and on intervention approaches that may diminish those impacts, is therefore a particularly timely venture, reflective of current federal funding priorities.

Based on my exploration of the empirical and theoretical scientific research on a particularly widespread trauma—early childhood neglect, or acts of omission—and its impact on a critical factor in development—EF—I offer ideas on a framework that may increase states’

capacity to reach and assist neglected young children in a trauma-informed manner. As evidenced above, curricular intervention in ECE programs is an important component of this approach. However, it is only one of several measures that, taken together, have the potential to successfully identify young children at risk of experiencing neglect and connect them with developmentally appropriate and beneficial state resources. Within my proposed framework, there are four top priorities: (1) coalition-building between disparate state systems and programs that are poised to identify children at risk of neglect and connect them with ECE placement; (2) state ECE curricular improvements that reflect practices shown to aid EF development; (3) targeted increases in access to ECE to provide spaces for those identified as at-risk for early omission; and (4) collaboration between state ECE and residential substance use treatment facilities that contain beds for children of patients. This proposed integrated framework is intended to be a generalizable template for targeting necessary resources toward this population of young neglected children, applicable to multiple programming approaches and suitable for future exploration and adjustment by policymakers in states nationwide.

### *3.3 Minnesota and the Potential of an Early Omission Coalition*

In a dissenting opinion in 1932, Supreme Court Justice Louis Brandeis popularized the concept of the state as a laboratory for democracy, stating that “it is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country” (New State Ice Co. v. Liebmann, 1932). In the policy domains most relevant to this discussion—including child welfare and ECE, among other statewide programs and initiatives—each laboratory has crafted a slightly different experiment. Operation and delivery of child

welfare and other services and availability and quality of, and enrollment in, state-funded preschool options vary substantially from state to state (Child Welfare Information Gateway, 2018; Sanchez & Nadworny, 2017). As such, the inspiration and foundation for this framework is garnered from programs currently operating in one specific state: Minnesota. Rather than critiquing the layers of Minnesota's public policy approach in particular, I use Minnesota's programs as a laboratory and an example for exploring how successfully identifying, and responding to, the specific developmental needs of, victims of neglect during their early childhood years may be achieved through taking an integrated approach to service provision and forming a coordinated Early Omission Coalition (EOC). For each of the four priorities of the intervention framework, the general goals of the recommendation are addressed, followed by use of Minnesota's programs as an example for the framework's implementation.

**(1) Building an EOC.** The top priority of these recommendations is the formation of a coalition across disparate facets of state resources whose services position them to interact with, and identify, children who may have been exposed to early acts of omission. The universal purpose of this EOC, although the coalition itself would necessarily look slightly different in every state, would be to open a channel of communication between these various systems and programs—including the child welfare system, state ECE, family drug courts, and other state-specific initiatives. This integrated approach to service delivery would better address the needs of children identified as being at-risk of exposure to early omissions. It would enable service providers to easily and swiftly refer those children's parents to developmentally beneficial resources within the EOC and, importantly, it would establish a pathway for children's streamlined enrollment in state ECE. How best to implement this recommendation will vary by state, but on a general scale, a promising preliminary step is to offer joint trainings and meetings

to case managers and social workers from across the coalition. These gatherings would provide service providers with information about utilizing the coalition network and would serve as opportunities to both develop and learn the coalition protocol for directing at-risk young children to the appropriate resources—in particular, to the state ECE system—and for providing services to those children in a trauma-informed manner. Regular in-person gatherings, as well as collaborative online platforms, could provide coalition members with an outlet for collecting and sharing helpful resources and best practices and maintaining inter-coalition communication.

Minnesota is home to a unique array of resources that are poised to identify children who may be at risk for deficits in EF due to early acts of omission. These resources would likely form a strong and effective coalition that would be of notable assistance to neglected young children across the state. Among the potential coalition members is the Minnesota child welfare system, which sees thousands of cases involving neglect each year. In the state of Minnesota, over 24,000 allegations of child neglect were reported in 2016 (Minnesota Department of Human Services, 2017). The largest group of children involved with the state's child welfare system is alleged victims of neglect. In 2016, approximately 60% of maltreated children in Minnesota experienced neglect, and in 2017, nonmedical neglect accounted for 54% of all child maltreatment reports (Minnesota Department of Human Services, 2017; Minnesota Department of Human Services, 2018). This number is on the rise, as since 2009, there has been a nearly 80% increase in both reports and alleged victims of maltreatment. Further, in 2017, roughly 40% of 39,414 children who were subjects of maltreatment reports were age 5 or younger (Minnesota Department of Human Services, 2018). This volume of cases of early neglect positions social workers and case managers at Minnesota's Department of Children and Families to be central contributors to an EOC, and further, the EOC would help these child welfare professionals to

more effectively serve neglected children in the state. Every year, the Minnesota child welfare system, as part of an EOC, would be able connect thousands of children who have been exposed to early omissions with coalition-based resources that would promote their development of EF.

Outside of the child welfare system, Minnesota's unique statewide initiatives also show immense promise with regard to their capacity to contribute to an EOC. Particularly promising is the Crisis Nursery program. Through this program, parents in the state of Minnesota, in a period of intense family stress, are able to obtain temporary 24-hour care for children, as well as comprehensive parental services, such as crisis counseling, in-home family counseling, and referrals to community resources and support groups—all provided cost-free (Families First of Minnesota, 2018; Greater Minneapolis Crisis Nursery). Specifically designed to prevent abuse and neglect, this program would be an instrumental component of a Minnesota EOC. The Crisis Nursery has a unique ability to locate children who are currently, or who are at risk of becoming, victims of neglect—specifically those whose parents are seeking help—making the program well positioned to identify at-risk children and connect their parents to resources. The EOC would also augment, and increase the effectiveness of, the Crisis Nursery parental case management services, as the EOC's streamlined process for handling cases of early caregiver omissions would better enable struggling Crisis Nursery parents to swiftly access those services that will aid their child's development, such as ECE placement for their child and other coalition resources.

In addition to their Crisis Nursery program, Minnesota also has an interagency initiative between the state Department of Education, Department of Health, and Department of Human Services called Help Me Grow—a collection of resources on child development, ranging from developmental milestone and caregiver strategy information for parents and professionals to free developmental screening and evaluation services for referred children (Help Me Grow). This

collaboration would be of great use as part of an EOC. In addition to the free developmental screenings, which may be able to identify children at particular risk of missing developmental milestones following parental acts of omission, the developmental resources would provide an essential tool for teaching parents identified through the coalition about more developmentally beneficial caregiving strategies. The EOC is also compatible with, and a useful addition to, the Help Me Grow initiative's current frameworks for referral to resources, which focus on Infant and Toddler Intervention and Preschool Special Education. The EOC would build upon the Help Me Grow initiative's existing connections to state preschools, and it would expand the initiative's network of resources for referral to include resources targeted for children who come to their attention who have been subject to acts of omission by a caregiver.

Another member of the Minnesota coalition would be the Family Drug Courts—known in Minnesota as Family Dependency Treatment Courts. Over 50 treatment court programs, including 19 adult drug courts and two family dependency treatment courts, are operational in Minnesota (Minnesota Judicial Branch, 2018). Through an EOC, the courts would be presented with further opportunity to improve the prospects of the children in those families that pass through their courtroom, in addition to providing addiction-specific resources that primarily target parents. As part of an EOC, these courts may be able to identify children at risk of deficits in EF due to early acts of omission prompted by parental drug abuse and, through their case management, connect the children and parents to resources within the coalition, such as Help Me Grow or Crisis Nursery, and provide the children with access to ECE.

Minnesota provides an interesting template for analysis, with a wide mix of state resources for inclusion. Some are Minnesota-specific, others similar to programs in neighboring states. Some rely on parental self-identification, others on outside referrals. Many are two-

generational programs, designed to service both parents and children (Chase-Lansdale & Brooks-Gunn, 2014). Overall, Minnesota serves as an apt example with which to highlight the usefulness of coalition building. Were this network of resources within the state to become a well-coordinated EOC—with social workers and case managers who are practiced at providing referrals to developmentally appropriate resources and who maintain systems of communication with one another—parents and children in families where caregiver acts of omission have taken place would be able to better access the assistance they need to improve their child’s prospects for EF development.

**(2) ECE Curricular Improvement.** Another priority of this recommended intervention framework is the incorporation of curricular improvements into state ECE curricula that are reflective of EF-promoting strategies (Diamond et al., 2007; Bierman et al., 2008; Weiland & Yoshikawa, 2013). Prior research on ECE-based interventions that aid the development of EF, as highlighted previously, ought to be used in state ECE providers’ faculty development processes and should inform teachers’ curricula as well as state learning standards. Example curricula that incorporate such strategies as EF-promoting activities and EF-related skill building should be accessible through the state Department of Education.

These improvements are in keeping with Minnesota’s curricular quality standards. Minnesota meets high quality standards for state ECE. According to the National Institute for Early Education Research, Minnesota meets all but one of 10 quality benchmarks, including two curricular quality measures (Barnett et al., 2017). Curricula are informed by Minnesota’s early learning standards, the Early Childhood Indicators of Progress (ECIPs)—a set of expectations about children’s learning benchmarks from birth to kindergarten, based on child development (Minnesota Department of Education, 2017a). A comprehensive analysis of the quality indicators

in the state of Minnesota strays from the purpose of this discussion, yet, it is evident their curricula are already held to high standards based on principles of child development.

For instance, the social and emotional domain of the ECIPs already includes such components as social conflict management and self-direction, and three ECIPs domains are focused on such cognitive skills as mathematics, language and literacy, and scientific thought (Minnesota Department of Education, 2017a; Minnesota Department of Education, 2017b). Intentional incorporation of activities that have been found to promote EF into state ECE curricula would be in keeping with, and would augment, Minnesota's ECIPs development-based standards. As a model for state innovation, Minnesota serves as an example of the way in which strategies to promote EF, and benchmarks for the development of EF, may be incorporated and adapted as part of existing curricula and learning standards within state ECE systems.

**(3) Provision of ECE placement.** The next priority in this framework is targeted increases in access to ECE for young children identified as having been exposed to early acts of omission by a caregiver—a guarantee that children referred to the state ECE system through the EOC are able to enroll in a state ECE program. This recommendation is consistent with current research, which recognizes the importance of—and nationwide shortcomings in—increasing access to ECE more generally for child welfare-involved children (Klein, Mihalec-Adkins, Benson, & Lee, 2018). Implementing this targeted access recommendation may pose unique challenges in every state. For states without universal voluntary ECE options in particular, this would require allocation of additional state funds. In many states, then, implementing this recommendation would involve coordination between the state legislature and the ECE system in order to budget the requisite resources such that each child referred to the state ECE system through the EOC successfully obtains ECE placement. Yet, this framework requires that these

challenges be addressed and those resources be allocated, as identifying children in greatest need of a resource is futile if provision of that resource does not follow.

For the state of Minnesota, this recommendation may require substantive effort, given their difficulties with access in their state ECE program. Ranked nearly last among the states in access for four-year-olds and roughly halfway down the list in access for three-year-olds, Minnesota does not show the same achievements in access as in quality (Barnett et al., 2017). Yet, the recent mobility on the part of their state government to provide substantial increases in funding is a positive indication that this recommendation for targeted access could be implemented as part of future ECE budgeting. Minnesota has, in recent years, looked for ways to increase access to ECE opportunities for all children. As part of this effort, the state sought to expand their programs with a \$25 million allocation for the 2016-17 school year, and, in spite of some disagreement between the state governor and legislature, that funding increased to \$50 million for the 2017-18 school year, enabling over 6,000 additional children to access free pre-K programs (Loewenberg, 2016; Van Berkel, 2017; Office of Governor Mark Dayton, 2017). These targeted increases in access would be a natural continuation of Minnesota's demonstrated commitment to expanding access to ECE. Further, the accomplishment of this step in Minnesota would serve as an example for how resources may be allocated for this purpose in states that face challenges with ECE access.

**(4) Coordination With Substance Abuse Treatment Centers.** In this time of a national opioid crisis, there is a particular need to provide EF-promoting services to those children who may have been exposed to severe acts of omission as a result of caregiver substance abuse. Residential treatment programs with beds for children—where parents and children live together during a parent's treatment period—should certainly be included in the EOC, but they also

present a unique opportunity for further innovation. Specifically in those counties in which such programs exist, these recommendations include the priority of establishing partnerships between residential treatment programs and state ECE programs. Following intake of a family with a preschool-age child into the treatment facility, this partnership would allow for an expedited process of enrollment into a state ECE program, as well as arranged transportation for the child to and from the school building. This population of children residing in treatment centers is a topic of new political discourse, particularly with the recent implementation of federal financial support for these children through the FFPSA's child welfare reforms. These recommendations reflect the need to seize on this moment of discourse and take additional action, creating a framework for children to receive services that are beneficial to their own development while their parents work to overcome their addiction.

These residential programs exist throughout the country, and several exist in Minnesota, such as Women's Wellbriety Center, Wellcome Manor Family Services, and Saint Cloud Hospital (Recovery Plus) (Drug Rehab Headquarters, 2018). Spread out across several counties in the state, these programs are designed for substance-dependent parents, and particularly mothers, to remain with their children during treatment. In its establishment of collaborations between these centers and nearby state ECE programs, this recommended framework is a particularly useful and timely tool for assisting families in Minnesota who are struggling during the opioid crisis and easing the developmental impacts young children in the state may face as a result of parental drug abuse-induced exposure to early acts of omission.

## CONCLUSION

Early acts of omission pose a significant, persistent threat to the development of EF. Disruption of early experiences through caregiver omission during early childhood can result in measurable adverse impacts on EF, both immediately during early childhood and also later during adulthood, which may have lasting consequences for such critical abilities as problem solving, engaging in goal-oriented behaviors, and self-regulation. While extensive further research is required to understand the precise nature of these deficits, it is evident that such immediate and long-term deficits exist. Further, current research does not address the potential unique impacts of early omission on hot EF, as compared to cool EF, despite the unique importance of hot EF to critical areas of development that may be undermined by acts of omission, such as socioemotional skills and affect regulation. Essential insights may be gained from future research that explores this distinction, as well as from future research that explores the distinction between EF outcomes in early omission and early commission populations. It seems that neglect—though often neglected across areas of scientific inquiry—may be found to predict poorer EF outcomes than early acts of commission. This hypothesis, grounded in initial empirical findings as well theoretical analysis, flies in the face of a scientific literature that focuses more intently on abuse and on the general construct of maltreatment than on neglect.

This evidence brings with it the weight of responsibility in a society that bears witness to hundreds of thousands of cases of child neglect each year. It is of utmost importance to craft suitable early interventions that promote gains in EF skills during early childhood and aim to set children exposed to early omission on a more normative trajectory of EF development. A promising area for early intervention investment is in ECE, as a strong basis of research connects ECE curricula deliberately designed to promote growth in EF, cognition, and socioemotional

development with significant gains in behavioral performance on EF tasks. An optimal approach to intervention includes more than curricular advancement in state ECE. Children in greatest need of these resources must be identified and connected with ECE programs that employ developmentally beneficial curricula. A recommended framework for states to consider involves, in addition to curricular advancement, coalition-building across state systems and programs in order to identify young children facing caregiver omission and connect them with ECE resources, providing targeted increases in access to ECE for those children by deliberately allocating ECE resources to children identified through the coalition, and establishing partnerships between state ECE providers and residential substance abuse treatment programs. This comprehensive framework has the potential to incorporate insights from the existing literature on early acts of omission and their impacts on EF into direct policy implementation. It presents a timely and trauma-informed means of providing aid to neglected young children.

I would be amiss not to mention some of the limitations of this analysis, of which several are posed by the constraints of the available literature. For instance, this discussion does not specifically address the possibility for sensitive periods within the developmental stage of early childhood that may increase the impact of early omission on EF, though some evidence indicates that 0-2 years is a critical time within the trajectory of EF development, and further evidence highlights a complex relationship between outcomes of infant and toddlerhood neglect versus neglect during the preschool years (Jurado & Rosselli, 2007; Manly et al., 2001). As previously mentioned, the issues of severity and chronicity, while important factors to address in considering the impacts of early omission on EF, were not considered in this analysis. Further, this analysis, despite taking a dimensional approach to maltreatment, cannot guarantee utmost consistency in categorizations of types of maltreatment due to inconsistencies in definitions of

neglect and abuse across cited studies. Given the scarcity of research, these were not possible to address, although future research ought to consider and address these issues. Although comorbidity is prevalent among maltreated children, this analysis also did not address the implications for EF of co-occurrence of multiple types of maltreatment (De Bellis, 2005; Richardson, Henry, Black-Pond, & Sloane, 2008). This was done deliberately in order to focus on the particular impacts of omission, which may also inform future research on comorbidity. Further, this analysis does not address observed impacts of early omission on EF during the stages of middle and late childhood and adolescence, although research exists examining impacts during those periods. While future research would benefit from comprehensive analysis of this research, such a discussion was not in keeping with the focus of this analysis. In examining only the immediate impacts in early childhood and long-term impacts in adulthood, I aim to highlight those developmental stages that, in addition to being useful areas of inquiry within EF and maltreatment research, are also most informative as part of a broader discussion about implementing scientific research in public policy. Given the multifaceted focus of this analysis and the effort made to use current data to inform political action, it was a deliberate choice and was of specific use to highlight both the rapid emergence of deficits and the lasting impacts when those children are grown.

The findings within these bodies of literature, of immediate deficits in EF that persist into adulthood, in particular call attention to the urgency of early intervention. This analysis, and the results of taking a developmental and dimensional approach to the study of early acts of omission and their impacts on EF, serves as a dual reminder in the context of a crisis of child neglect: while the perils of inaction are significant, great promise lies in informed response.

### Author Contributions

Aviva Abusch conducted the literature search, guided by Dr. Dylan Gee and with assistance from doctoral students Emily Cohodes and Camila Caballero. Topic and approach were crafted in collaboration with Dr. Gee and Emily Cohodes, with input provided by Dr. Gee throughout the literature analysis process. Aviva Abusch conducted the policy research, with assistance from Stefanie Sprow, Deputy Director of Child Welfare and Mental Health at the Children's Defense Fund, and Emily Cohodes. Suggestions for policy interventions compiled by Aviva Abusch, with insights incorporated from professors Jessica Sager and Janna Wagner.

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## WORKS CITED

- Aber, J.L., Allen, J.P., Carlson, V., & Cicchetti, D. (1989). The effects of maltreatment on development during early childhood: recent studies and their theoretical, clinical, and policy implications. In D. Cicchetti & V. Carlson (Eds.), *Child Maltreatment: Theory and research on the causes and consequences of child abuse and neglect* (pp. 579-619). Cambridge, England: Cambridge University Press.
- Anderson, V. (2002). Executive Function in Children: Introduction. *Child Neuropsychology*, 8(2), 69-70.
- Barkley, R.A. (2001). The Executive Functions and Self-Regulation: An Evolutionary Neuropsychological Perspective. *Neuropsychology Review*, 11(1), 1-29.
- Barnett, D., Manly, J. T., & Cicchetti, D. (1993). Defining child maltreatment: The interface between policy and research. In D. Cicchetti & S. L. Toth (Eds.), *Child abuse, child development, and social policy* (pp. 7-73). Norwood, NJ: Ablex.
- Barnett, W.S. (1995). Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes. *The Future of Children*, 5(3), 25-50.
- Barnett, W. S., Friedman-Krauss, A. H., Weisenfeld, G. G., Horowitz, M., Kasmin, R., & Squires, J. H. (2017). The State of Preschool 2016. *The National Institute for Early Education Research*. Retrieved April 10, 2018, from [http://nieer.org/wp-content/uploads/2017/09/Full\\_State\\_of\\_Preschool\\_2016\\_9.15.17\\_compressed.pdf](http://nieer.org/wp-content/uploads/2017/09/Full_State_of_Preschool_2016_9.15.17_compressed.pdf)
- Beers, S.R., & De Bellis, M.D. (2002). Neuropsychological Function in Children With Maltreatment-Related Posttraumatic Stress Disorder. *The American Journal of Psychiatry*, 159(3), 483-486.

- 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.
- Best, J.R., & Miller, P.H. (2010). A Developmental Perspective on Executive Function. *Child Development, 81*(6), 1641-1660.
- Bierman, K.L., Nix, R.L., Greenberg, M.T., Blair, C., & Domitrovich, C.E. (2008). Executive functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI program. *Developmental Psychopathology, 20*(3), 821-843.
- Bipartisan Budget Act of 2018, 4 U.S.C. § 50701-50782.
- Bos, K.J., Fox, N., Zeanah, C.H., & Nelson III, C.A. (2009). Effects of early psychosocial deprivation on the development of memory and executive function. *Frontiers in Behavioral Neuroscience, 3*(16), 1-7.
- Burger, K. (2010). How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Childhood Research Quarterly, 25*(2), 140-165.
- Burkeman, O. (2014, January 05). Jerry Seinfeld on how to be funny without sex and swearing. *The Guardian*. Retrieved March 19, 2018, from <https://www.theguardian.com/culture/2014/jan/05/jerry-seinfeld-funny-sex-swearing-sitcom-comedy>
- Cameron, J.L. (2001). Critical periods for social attachment: deprivation and neural systems in rhesus monkeys. *Social Research in Child Development, Abstr 2-054*.

- Carlson, S.M. (2003). Executive Function in Context: Development, Measurement, Theory, and Experience. *Monographs of the Society for Research in Child Development*, 68(3), 138-151.
- Carlson, S.M. (2005). Developmentally Sensitive Measures of Executive Function in Preschool Children. *Developmental Neuropsychology*, 28(2), 595-616.
- Chase-Lansdale, P.L., & Brooks-Gunn, J. (2014). Two-Generation Programs in the Twenty-First Century. *Future of Children*, 24(1), 13-39.
- Child Trends DataBank. (2016). Child Maltreatment. Retrieved April 12, 2018, from <https://www.childtrends.org/?indicators=child-maltreatment>
- Child Welfare Information Gateway. (2013). *How the child welfare system works*. Washington, DC: U.S. Department of Health and Human Services, Children's Bureau.
- Child Welfare Information Gateway. (2018). *State vs. county administration of child welfare services*. Washington, DC: U.S. Department of Health and Human Services, Children's Bureau.
- Children's Defense Fund. (2018, February). The Family First Prevention Services Act: Historic Reforms to the Child Welfare System will Improve Outcomes for Vulnerable Children. Retrieved March 10, 2018, from <http://www.childrensdefense.org/library/data/family-first-detailed-summary.pdf>
- Cicchetti, D. (2016). Socioemotional, Personality, and Biological Development: Illustrations from a Multilevel Developmental Psychopathology Perspective on Child Maltreatment. *Annual Review of Psychology*, 67, 187-211.
- Cicchetti, D., & Lynch, M. (1995). Failures in the expectable environment and their impact on individual development: The case of child maltreatment. In D. Cicchetti & D. J. Cohen

- (Eds.), *Wiley series on personality processes. Developmental psychopathology, Vol. 2. Risk, disorder, and adaptation* (pp. 32-71). Oxford, England: John Wiley & Sons.
- Cicchetti, D., & Toth, S.L. (1995). A Developmental Psychopathology Perspective on Child Abuse and Neglect. *Journal of the American Academy of Child & Adolescent Psychiatry*, 34(5), 541-565.
- Cicchetti, D., & Valentino, K. (2006). An ecological-transactional perspective on child maltreatment: Failure of the average expectable environment and its influence on child development. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (pp. 129-201). Hoboken, NJ, US: John Wiley & Sons Inc.
- Colvert, E., Rutter, M., Kreppner, J., Beckett, C., Castle, J., Groothues, C.,...Sonuga-Barke, E.J. (2008). Do theory of mind and executive function deficits underlie the adverse outcomes associated with profound early deprivation?: findings from the English and Romanian adoptees study. *Journal of Abnormal Child Psychology*, 36(7), 1057-1068.
- Crouch, J.L., & Milner, J.S. (1993). Effects of Child Neglect on Children. *Criminal Justice and Behavior*, 20(1), 49-65.
- De Bellis, M. D. (2005). The psychobiology of neglect. *Child Maltreatment*, 10, 150–172.
- De Bellis, M.D., Hooper, S.R., Spratt, E.G., & Woolley, D.P. (2009). Neuropsychological findings in childhood neglect and their relationships to pediatric PTSD. *Journal of the International Neuropsychological Society*, 15(6), 868-878.
- DePrince, A.P., Weinzierl, K.M., & Combs, M.D. (2009). Executive function performance and trauma exposure in a community sample of children. *Child Abuse & Neglect*, 33(6), 353-361.

- Diamond, A. (2006). The early development of executive functions. In E. Bialystock & F. I. M. Craik (Eds.), *Lifespan cognition: Mechanisms of change* (pp. 70-95). Oxford, UK: Oxford University Press.
- Diamond, A. (2013). Executive Functions. *Annual Review of Psychology*, 64, 135-168.
- Diamond, A., Barnett, W. S., Thomas, J., & Munro, S. (2007). Preschool program improves cognitive control. *Science*, 318, 1387-1388.
- Drug Rehab Headquarters. (2018). Addiction Treatment Search. Retrieved April 12, 2018, from <https://www.drug-rehab-headquarters.com/>
- Egeland, B., Sroufe, L.A., & Erickson, M. (1983). The Developmental Consequence Of Different Patterns Of Maltreatment. *Child Abuse & Neglect*, 7(4), 459-469.
- English, D.J., Upadhyaya, M.P., Litrownik, A.J., Marshall, J.M., Runyan, D.K., Graham, J.C., & Dubowitz, H. (2005). Maltreatment's wake: The relationship of maltreatment dimensions to child outcomes. *Child Abuse & Neglect*, 29(5), 597-619.
- Erickson, M.F., & Egeland, B. (2002). Child Neglect. In J.E.B. Meyers et al. (Eds.), *The APSAC Handbook on Child Maltreatment: Second Edition* (pp. 3-20). Thousand Oaks, California: Sage Publications, Inc.
- Erickson, M.F., Egeland, B., & Pianta, R. (1989). The effects of maltreatment on the development of young children. In D. Cicchetti & V. Carlson (Eds.), *Child Maltreatment: Theory and research on the causes and consequences of child abuse and neglect* (pp. 579-619). Cambridge, England: Cambridge University Press.
- Families First of Minnesota. (2018). Crisis Nursery. Retrieved April 10, 2018, from <http://www.familiesfirstmn.org/pages/complete-services/crisis-nursery.php>

- Fishbein, D., Warner, T., Krebs, C., Trevarthen, N., Flannery, B., & Hammond, J. (2009). Differential Relationships Between Personal and Community Stressors and Children's Neurocognitive Functioning. *Child Maltreatment, 14*(4), 299-315.
- Font, S.A., & Berger, L.M. (2015). Child Maltreatment and Children's Developmental Trajectories in Early to Middle Childhood. *Child Development, 86*(2), 536-556.
- Friedman, N.P., Miyake, A., Corley, R.P., Young, S.E., DeFries, J.C., & Hewitt, J.K. (2006). Not all executive functions are related to intelligence. *Psychological Science, 17*(2), 172-179.
- Garon, N., Bryson, S. E., & Smith, I. M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin, 134*(1), 31-60.
- Gee, D.G., & Casey, B.J. (2015). The impact of developmental timing for stress and recovery. *Neurobiology of Stress, 1*, 184-194.
- Gee, D.G., Gabard-Durnam, L., Telzer, E.H., Humphreys, K.L, Goff, B., Shapiro, M.,...Tottenham, N. (2014). Maternal Buffering of Human Amygdala-Prefrontal Circuitry During Childhood but Not During Adolescence. *Psychological Science, 25*(11), 2067–2078.
- Giovannoni, J. (1989). Definitional issues in child maltreatment. In D. Cicchetti & V. Carlson (Eds.), *Child Maltreatment: Theory and research on the causes and consequences of child abuse and neglect* (pp. 579-619). Cambridge, England: Cambridge University Press.
- Glaser, D. (2000). Child Abuse and Neglect and the Brain—A Review. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41*(1), 97-116.
- Gould, F., Clarke, J., Heim, C., Harvey, P.D., Majer, M., & Nemeroff, C.B. (2012). The effects of child abuse and neglect on cognitive functioning in adulthood. *Journal of Psychiatric Research, 46*(4), 500-506.

Greater Minneapolis Crisis Nursery. (n.d.). How We Help. Retrieved April 10, 2018, from <https://www.crisisnursery.org/how-we-help/>

Hein, T.C., & Monk, C.S. (2016). Research Review: Neural response to threat in children, adolescents, and adults after child maltreatment – a quantitative meta-analysis. *The Journal of Child Psychology and Psychiatry*, 58(3), 222-230.

Help Me Grow. (n.d.). About Help Me Grow. Retrieved April 10, 2018, from <http://helpmegrowmn.org/HMG/AboutHMG/index.html>

Hildyard, K.L. & Wolfe, D.A. (2002). Child neglect: developmental issues and outcomes. *Child Abuse & Neglect*, 26(6-7), 679-695.

Hofer, M.A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatrica*, 83(s397), 9-18.

Hoffman-Plotkin, D., & Twentyman, C.T. (1984). A Multimodal Assessment of Behavioral and Cognitive Deficits in Abused and Neglected Preschoolers. *Child Development*, 55(3), 794-802.

Hofmann, W., Schmeichel, B.J., & Baddeley, A.D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, 16(3), 174-180.

Hongwanishkul, D., Happaney, K.R., Lee, W.S., & Zelazo, P.D. (2005). Assessment of hot and cool executive function in young children: age-related changes and individual differences. *Developmental Neuropsychology*, 28(2), 617-644.

Hostinar, C.E., Stellern, S.A., Schaefer, C., S.M., & Gunnar, M.R. (2012). Associations between early life adversity and executive function in children adopted internationally from orphanages. *PNAS*, 109(2), 17208-17212.

- Hughes, C. (2011). Changes and challenges in 20 years of research into the development of executive functions. *Infant and Child Development, 20*(3), 251-271.
- Jacobs, E., Miller, L.C., & Tirella, L.G. (2010). Developmental and behavioral performance of internationally adopted preschoolers: a pilot study. *Child Psychiatry & Human Development, 41*(1), 15-29.
- Jones, A.S., & Logan-Greene, P. (2016). Understanding and responding to chronic neglect: A mixed methods case record examination. *Children and Youth Services Review, 67*, 212-219.
- Jurado, M.B., & Rosselli, M. (2007). The Elusive Nature of Executive Functions: A Review of our Current Understanding. *Neuropsychology Review, 17*(3), 213-233.
- Kelleher, K., Chaffin, M., Hollenberg, J., & Fischer, E. (1994). Alcohol and drug disorders among physically abusive and neglectful parents in a community-based sample. *American Journal of Public Health, 84*(10), 1586-1590.
- Kerr, A., & Zelazo, P. D. (2004). Development of “hot” executive function: The children's gambling task. *Brain and Cognition, 55*(1), 148-157.
- Klein, S., Mihalec-Adkins, B., Benson, S., & Lee, S.Y. (2018). The benefits of early care and education for child welfare-involved children: Perspectives from the field. *Child Abuse & Neglect, 79*, 454-464.
- Koss, K.J., & Gunnar, M.R. (2017). Annual Research Review: Early adversity, the hypothalamic–pituitary–adrenocortical axis, and child psychopathology. *The Journal of Child Psychology and Psychiatry, 59*(4), 327-346.

- Kotch, J.B., Lewis, T., Hussey, J.M., English, D., Thompson, R., Litrownik, A.J.,...Dubowitz, H. (2008). Importance of Early Neglect for Childhood Aggression. *Pediatrics*, *121*(4), 725-731.
- Lagattuta, K.H., Sayfan, L., & Monsour, M. (2010). A new measure for assessing executive function across a wide age range: children and adults find *happy-sad* more difficult than *day-night*. *Developmental Science*, *14*(3), 481-489.
- Lansford, J.E., Malone, P.S., Dodge, K.A., Pettit, G.S., & Bates, J.E. (2010). Developmental cascades of peer rejection, social information processing biases, and aggression during middle childhood. *Development and Psychopathology*, *22*(3), 593-602.
- Lee, V., & Hoaken, P.N.S. (2007). Cognition, Emotion, and Neurobiological Development: Mediating the Relation Between Maltreatment and Aggression. *Child Maltreatment*, *12*(3), 281-298.
- Lerner, M.D., & Lonigan, C.J. (2014). Executive Function Among Preschool Children: Unitary Versus Distinct Abilities. *Journal of Psychopathology and Behavioral Assessment*, *36*(4), 626-639.
- Loewenberg, D. (2016, September 12). Hope and Caution with Minnesota's "Universal" Pre-K Rollout. *New America*. Retrieved April 18, 2018, from <https://www.newamerica.org/education-policy/edcentral/hope-and-caution-minnesota-universal-pre-k-rollout/>
- Maguire, S.A., Williams, B., Naughton, A.M., Cowley, L.E., Tempest, V., Mann, M.K.,...Kemp, A.M. (2015). A systematic review of the emotional, behavioural and cognitive features exhibited by school-aged children experiencing neglect or emotional abuse. *Child: care, health and development*, *41*(5), 641-653.

- Majer, M., Nater, U.M., Lin, J.M.S., Capuron, L., & Reeves, W.C. (2010). Association of childhood trauma with cognitive function in healthy adults: a pilot study. *BMC Neurology, 10*, 61.
- Manly, J.T. (2005). Advances in research definitions of child maltreatment. *Child Abuse & Neglect, 29*, 425-439.
- Manly, J.T., Kim, J.E., Rogosch, F.A., & Cicchetti, D. (2001). Dimensions of child maltreatment and children's adjustment: contributions of developmental timing and subtype. *Developmental Psychopathology, 13*(4), 759-782.
- Masten, A.S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology, 22*(3), 491-495.
- Maughan, A., & Cicchetti, D. (2002). Impact of child maltreatment and interadult violence on children's emotion regulation abilities and socioemotional adjustment. *Child Development, 73*(5), 1525-1542.
- McClelland, M.M., Cameron, C.E., Wanless, S.B., & Murray, A. (2007). Executive Function, Behavioral Self-Regulation, and Social Emotional Competence: Links to School Readiness. In O.N. Saracho & B. Spodek (Eds.), *Contemporary Perspectives on Social Learning in Early Childhood Education* (pp. 83-107). Charlotte, North Carolina: Information Age Publishing.
- McDermott, J.M., Westerlund, A., Zeanah, C.H., Nelson, C.A., & Fox, N.A. (2012). Early adversity and neural correlates of executive function: Implications for academic adjustment. *Developmental Cognitive Neuroscience, 2*(1), S59-S66.
- McLaughlin, K.A., & Sheridan, M.A. (2016). Beyond Cumulative Risk: A Dimensional Approach to Childhood Adversity. *Current Directions in Psychological Science, 25*(4), 239-245.

- Merz, E.C., Harlé, K.M., Noble, K.G., & McCall, R.B. (2016). Executive Function in Previously Institutionalized Children. *Child Development Perspectives, 10*(2), 105-110.
- Merz, E.C., & McCall, R.B. (2011). Parent ratings of executive functioning in children adopted from psychosocially depriving institutions. *Journal of Child Psychology and Psychiatry, 58*(5), 537-546.
- Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3-19.
- Minnesota Department of Education. (2017a). Early Childhood Indicators of Progress: Minnesota's Early Learning Standards: Birth to Kindergarten. Retrieved April 9, 2018, from <https://education.mn.gov/MDE/dse/early/ind/>
- Minnesota Department of Education. (2017b). Early Childhood Indicators of Progress: Minnesota's Early Learning Standards - Introduction to Social and Emotional Domain. Retrieved April 9, 2018, from <https://education.mn.gov/MDE/dse/early/ind/>
- Minnesota Department of Human Services. (2018). Child protection in Minnesota: Keeping children safe. Retrieved April 13, 2018, from <https://edocs.dhs.state.mn.us/lfsrserver/Public/DHS-4735-ENG>
- Minnesota Department of Human Services. (2017, October). Minnesota's Child Maltreatment Report, 2016. Retrieved April 11, 2018, from <https://edocs.dhs.state.mn.us/lfsrserver/Public/DHS-5408I-ENG>
- Minnesota Judicial Branch. (2018). Treatment Courts. Retrieved April 12, 2018, from <http://www.mncourts.gov/Help-Topics/Treatment-Courts.aspx>
- Mulder, T. M., Kuiper, K. C., van der Put, C. E., Stams, G. J. J. M., & Assink, M. (2018). Risk factors for child neglect: A meta-analytic review. *Child Abuse & Neglect, 77*(C), 198-210.

- National Scientific Council on the Developing Child. (2012). The Science of Neglect: The Persistent Absence of Responsive Care Disrupts the Developing Brain. *Center on the Developing Child: Harvard University*. Retrieved April 11, 2018, from <http://developingchild.harvard.edu/wp-content/uploads/2012/05/The-Science-of-Neglect-The-Persistent-Absence-of-Responsive-Care-Disrupts-the-Developing-Brain.pdf>
- Naughton, A.M., Maguire, S.A., Mann, M.K., Lumb, R.C., Tempest, V., Gracias, S., & Kemp, A.M. (2013). Emotional, Behavioral, and Developmental Features Indicative of Neglect or Emotional Abuse in Preschool Children. *JAMA Pediatrics, 167*(8), 769-775.
- New State Ice Co. v. Liebmann, 285 U.S. 262 (1932)
- Nikulina, V., & Widom, C.S. (2013). Child Maltreatment and Executive Functioning in Middle Adulthood: A Prospective Examination. *Neuropsychology, 27*(4).
- Office of Governor Mark Dayton. (2017, August 4). 22,500 Kids Heading to Preschool This Fall with State Funding Secured by Governor Mark Dayton. Retrieved April 18, 2018, from <https://mn.gov/governor/newsroom/?id=1055-305604>
- O'Hara, M., Legano, L., Homel, P., Walker-Descartes, I., Rojas, M., & Laraque, D. (2015). Children neglected: Where cumulative risk theory fails. *Child Abuse & Neglect, 45*, 1-8.
- Pears, K., & Fisher, P.A. (2005). Developmental, Cognitive, and Neuropsychological Functioning in Preschool-aged Foster Children: Associations with Prior Maltreatment and Placement History. *Journal of Developmental & Behavioral Pediatrics, 26*(2), 112-122.
- Perez, C.M., & Widom, C.S. (1994). Childhood victimization and long-term intellectual and academic outcomes. *Child Abuse & Neglect, 18*(8), 617-633.
- Piaget, J. (1962). The relation of affectivity to intelligence in the mental development of the child. *Bulletin of the Menninger Clinic, 26*(3), 129-137.

- Pluck, G., Lee, K.H., David, R., Macleod, D.C., Spence, S.A., & Parks, R.W. (2011). Neurobehavioural and cognitive function is linked to childhood trauma in homeless adults. *British Journal of Clinical Psychology, 50*, 33-45.
- Pollak, S.D., Nelson, C.A., Schlaak, M.F., Roeber, B.J., Wewerka, S.S., Wiik, K.L.,...Gunnar, M.R. (2010). Neurodevelopmental Effects of Early Deprivation in Postinstitutionalized Children. *Child Development, 81*(1), 224-236.
- Raver, C.C., Jones, S.M., Li-Grining, C., Zhai, F., Bub, K., & Pressler, E. (2011). CSRP's Impact on Low-Income Preschoolers' Preacademic Skills: Self-Regulation as a Mediating Mechanism. *Child Development, 82*(1), 362-378.
- Richardson, M., Henry, J., Black-Pond, C., & Sloane, M. (2008). Multiple Types of Maltreatment: Behavioral and Developmental Impact on Children in the Child Welfare System. *Journal of Child & Adolescent Trauma, 1*, 1-14.
- Sabatini, M.J., Ebert, P., Lewis, D.A., Levitt, P., Cameron, J.L., & Mirnics, K. (2007). Amygdala gene expression correlates of social behavior in monkeys experiencing maternal separation. *The Journal of Neuroscience, 27*(12), 3295-3304.
- Sanchez, C., & Nadworny, E. (2017, May 24). Preschool, A State-By-State Update. NPR. Retrieved April 14, 2018, from <https://www.npr.org/sections/ed/2017/05/24/529558627/preschool-a-state-by-state-update>
- Schumacher, J.A., Smith Slep, A.M., & Heyman, R.E. (2001). Risk factors for child neglect. *Aggression and Violent Behavior, 6*(2-3), 231-254.
- Shea, A., Walsh, C., MacMillan, H., & Steiner, M. (2005). Child maltreatment and HPA axis dysregulation: relationship to major depressive disorder and post traumatic stress disorder in females. *Psychoneuroendocrinology, 30*(2), 162-178.

- Shipman, K., Edwards, A., Brown, A., Swisher, L., & Jennings, E. (2005). Managing emotion in a maltreating context: A pilot study examining child neglect. *Child Abuse & Neglect*, 29(9), 1015-1029.
- Shonkoff, J.P. (2010). Building a New Biodevelopmental Framework to Guide the Future of Early Childhood Policy. *Child Development*, 81(1), 357-367.
- Shonkoff, J. P., & Phillips, D. A. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, D.C.: National Academies Press.
- Snyder, H.R., Miyake, A., & Hankin, B.L. (2015). Advancing understanding of executive function impairments and psychopathology: bridging the gap between clinical and cognitive approaches. *Frontiers in Psychology*, 6, 328
- Spratt, E.G., Friedenber, S.L., Swenson, C.C., LaRosa, A., De Bellis, M.D., Macias, M.M.,...Brady, K.T. (2012). The Effects of Early Neglect on Cognitive, Language, and Behavioral Functioning in Childhood. *Psychology (Irvine)*, 3(2), 175-182.
- Stoltenborgh, M., Bakermans-Kranenburg, M.J., & van Ijzendoorn, M.H. (2012). The neglect of child neglect: a meta-analytic review of the prevalence of neglect. *Social Psychiatry and Psychiatric Epidemiology*, 48(3), 345-55.
- Substance Abuse and Mental Health Services Administration. (2015). Trauma-Informed Approach and Trauma-Specific Interventions. Retrieved April 1, 2018, from <https://www.samhsa.gov/nctic/trauma-interventions>
- Teicher, M.H., Andersen, S.L., Polcari, A., Anderson, C.M., Navalta, C.P., & Kim, D.M. (2003). The neurobiological consequences of early stress and childhood maltreatment. *Neuroscience & Biobehavioral Reviews*, 27(1-2), 33-44.

- Trickett, P.K., & McBride-Chang, C. (1995). The Developmental Impact of Different Forms of Child Abuse and Neglect. *Developmental Review, 15*, 311-337.
- U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2017). Preliminary FY2016 Estimates as of Oct 20, 2017. *The AFCARS Report, 24*, 1-6.
- U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2018). Child maltreatment 2016. Retrieved March 12, 2018, from <https://www.acf.hhs.gov/cb/research-data-technology/statistics-research/child-maltreatment>.
- Van Berkel, J. (2017, August 4). More children headed to pre-K this fall after state adds \$50 million for early learning. *Star Tribune*. Retrieved April 9, 2018, from <http://www.startribune.com/more-children-headed-to-pre-k-this-fall-after-state-adds-50-million-for-early-learning/438580813/>
- Viola, T.W., Tractenberg, S.G., Pezzi, J.C., Kristensen, C.H., & Grassi-Oliveira, R. (2013). Childhood physical neglect associated with executive functions impairments in crack cocaine-dependent women. *Drug and Alcohol Dependence, 132*(1-2), 271-276.
- Weiland, C., & Yoshikawa, H. (2013). Impacts of a Prekindergarten Program on Children's Mathematics, Language, Literacy, Executive Function, and Emotional Skills. *Child Development, 84*(6), 2112-2130.
- Williams, S.C., & Devooght, K. (2017, June 2). 5 things to know about the opioid epidemic and its effect on children. *Child Trends*. Retrieved April 12, 2018, from <https://www.childtrends.org/child-trends-5/5-things-know-opioid-epidemic-effect-children/>

- Wolock, I., & Horowitz, B. (1984). Child Maltreatment As a Social Problem: The Neglect of Neglect. *American Journal of Orthopsychiatry*, 54(4), 530-543.
- Young, N.K. (2016). Examining the Opioid Epidemic: Challenges and Opportunities. Written Testimony of Nancy K. Young, Ph.D. Director, Children and Family Futures, Inc. Before the United States Senate Committee on Finance. Retrieved April 1, 2018, from <https://www.finance.senate.gov/imo/media/doc/23feb2016Young.pdf>
- Zelazo, P.D., & Carlson, S.M. (2012). Hot and Cool Executive Function in Childhood and Adolescence: Development and Plasticity. *Child Development Perspectives*, 6(4), 354-360.
- Zelazo, P. D., & Müller, U. (2002). Executive function in typical and atypical development. In U. Goswami (Ed.), *Handbook of childhood cognitive development* (pp. 445–469). Oxford: Blackwell.
- Zelazo, P.D., Müller, U., Frye, D., & Marcovitch, S. (2003). The development of executive function in early childhood. *Monographs of the Society for Research in Child Development*, 68(3), vii-137.
- Zhou, Q., Chen, S.H., & Main, A. (2012). Commonalities and Differences in the Research on Children's Effortful Control and Executive Function: A Call for an Integrated Model of Self-Regulation. *Child Development Perspectives*, 6(2), 112-121.