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Meta-Analysis of Family Support Programs' Impacts on Emotion Regulation in Early Childhood

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A dissertation submitted in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

University of Washington

2023

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Program Authorized to Offer Degree:

Learning Sciences and Human Development

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Abstract

Meta-Analysis of Family Support Programs' Impacts on Emotion Regulation in Early Childhood

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This study examined evaluations of family support programs in early childhood that measured emotion regulation (ER). Family support programs attend to the development of ER in children under the age of 5 by offering services to improve parenting practices, knowledge, or attitudes. The foundations of ER are formed in early childhood, and identifying the ways that programs attend to ER development is important. In order to understand the effective components of family support programs, a meta-analysis of program evaluations that attended to the ER of children under the age of 5 was conducted, with 16 studies (N = 16) and 82 effect sizes (N=82) included in this analysis. Results of this study show that these programs are, on average, improving children's ER (ES = 0.21). Results from the joint model suggest that programs using services such as child social skills training, center-based early childhood care, child play groups, information on child development or didactic materials had lower effect sizes on average (ES = -0.24) than those not providing these services, as did studies that measured children's ER through the use of the Emotion Regulation Checklist (ES = -0.29) relative to other measures used to

measure ER. These findings provide guidance for the field's next steps in designing family support programs to improve ER in early childhood and planning program evaluations. The practice and policy implications and future directions for family support programs to improve ER in early childhood are discussed.

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ACKNOWLEDGEMENTS

This dissertation would not be possible without the support of so many people in my life. The guidance and feedback I've received from my committee members over the past 3 years has deeply influenced the quality of this study. Holly, thank you again for being a model advisor. Your encouragement and insight have made my time at the University of Washington possible. Coming to UW because of the trust I had in you and your commitment to building my independent research agenda continues to pay off. To Liz, your students are so fortunate to have a statistics instructor like you that provides high-quality, individualized learning experiences. Your deep knowledge and enthusiasm are unparalleled and the tools you provide to all of your students are resources we can draw on for years to come. I am so grateful for your guidance over my 6 years at UW.

I would also like to thank my family, with special thanks to my parents. Thank you for encouraging me to do and be too much. I am a dogged, curious person, and life-long learner thanks to you two and both of these traits helped sustain me through this long process. To my dear friends across the country (Lindsay, Laura, Stephanie, and Vanessa), you all have always been there to support me, and I am looking forward to celebrating with each of you. To my UW cohort, especially Erin and Rae, thank you for being a sounding board and being my local support system through not only graduate school, but a global pandemic. These words do not capture how important you are to me, and I am so lucky to have found friends and colleagues like you. Thank you to the College of Education for providing me with opportunities to teach, lead and learn. I am also appreciative of the Doi Dissertation funding and allowing me to use it in a new way.

Finally, to my love, Michael Parker. You never doubted that this was possible and have always picked up the slack when I needed you most. Thank you for being my family and building a life with me. Thank you for always being one extra set of eyes for my writing and listening to me think through a conceptual problem aloud. I'm looking forward to enjoying more downtime with you in the near future.

Chapter 1. INTRODUCTION

The foundations for social-emotional development begin in early childhood (Cooper et al., 2009) and can have a profound impact on children's well-being (Eisenberg, 2006; Guerra & Bradshaw, 2008). Young children's social-emotional development is in part supported by their parents and caregivers. Many facets of parenting practices, behaviors, and beliefs contribute to children's social-emotional learning (SEL) (Center on the Developing Child at Harvard University, 2009; Kvalevaag et al., 2015; Vallotton et al., 2016; Van Der Voort et al., 2014). SEL was initially defined by Elias and colleagues (1997) and has since been taken up by Collaborative to Advance Social and Emotional Learning (CASEL) as a set of competencies for students that attend to non-academic behaviors and skills that may lead to more positive life outcomes. Changes in SEL have been tied to how parent-child relationships unfold as children develop more social ways of knowing and being through these relationships with their caregivers (Bronfenbrenner, 1978; Sameroff, 2010). This confluence of parental interactions and beliefs with children's concurrent social development is foundational for SEL. A particularly opportune time for social-emotional development is in early childhood as early social-emotional competencies have an impact on school readiness (Harrington et al., 2020), cognitive outcomes (Baker, 2013) and mental health (Center on the Developing Child at Harvard University, 2009). This suggests that there is a cascading effect on social-emotional development that begins in a child's earliest years.

Emotion regulation (ER) is one component of social-emotional learning that may be influenced by parents' behaviors, practices, and beliefs (Davies & Forman, 2002; Halberstadt & Eaton, 2002; Hooven et al., 1995; Jusiene et al., 2015). As defined by Gross and Thompson

(2007), emotion regulation is “one's ability to modulate one's response to an emotion to limit the effect emotion has on either their behavior or mood.” Children's competency in ER has been associated with social competencies later in life, including academic achievement and fewer conduct problems in school (Morris & Age, 2009; Saarni, 1999). In particular, children who exhibit lower ER capabilities have a higher risk of later externalizing and internalizing issues and disorders (Casey, 1996; Emotion Regulation and Externalizing Disorders in Children and Adolescents., 2007). These connections between ER in early childhood and future outcomes have encouraged researchers to design programs that aim to improve ER during this time period. Our theoretical models of child development predict that these ER constructs are tied to parents' behaviors, knowledge, and practices.

There has been an abundance of evidence that parents may serve as one fulcrum in improving social-emotional learning in children. With this evidence, a growing number of early childhood interventions and family support programs that aim to improve children’s ER and related skills have been designed, delivered, and evaluated. This growing number of program evaluations has created an opportunity to learn *across* evaluations. In this paper, I used meta-analysis, which allowed me to empirically synthesize the average treatment effects and identify mechanisms associated with those effects. Through this synthesis, I aimed to further understand which programmatic characteristics were associated with improvements to ER. Identifying active ingredients of programs and how active ingredients are delivered can inform new ways of addressing the needs of children and families more effectively and efficiently. More specifically, this meta-analytic study included experimental evaluations of programs serving parents and children ages 0-5 to address the following research questions:

1. In this sample of family support programs, what techniques are provided and what is the duration of these programs?
2. What is the average treatment effect of family support programs on children's emotion regulation?
3. Does the effect on emotion regulation vary based on the intended program population?
4. Does the effect of family support programs on emotion regulation vary based on services offered, or the instructional grouping of parents?
5. Does the effect of a family support program on emotion regulation vary by the program's type of measure? Specifically, are there differences between the effect sizes of studies using the Emotion Regulation Checklist (Shields & Cicchetti, 1997) versus other measures of ER?

Findings from this dissertation will contribute to our understanding of family support programs and their impact on children's ER. Specifically, this meta-analysis of experimental family support evaluations will help elucidate which strategies show the most promise. This differentiation is essential for guiding future policy and programming that intends to improve children's emotion regulation.

Chapter 2. THEORETICAL FRAMEWORK

2.1 SOCIAL ECOLOGICAL THEORY

A foundational theoretical framework in human development is Bronfenbrenner's social ecology model. The social ecology model, also known as the ecological theory, demarcated the importance the family context has on children (Bronfenbrenner, 1978, 1979). This model is a widely accepted framework articulating the nested nature of the influences that any child is

either exposed to directly or indirectly. Bronfenbrenner contends that development is socially situated. His claim relies on the fact that people are not making choices and developing in a vacuum; rather, the interactions they have with others wield influence on their decisions and outcomes. The use of this framework holds particular importance in the case of social and language skills (such as emotion regulation), as these skills are often transferred through dialogue, conversations, and modeling specific behaviors.

This model also spurred discussions about the immediate or proximal influences (e.g., parents, peers, and schools) and more distal influences (e.g., communities and governments) that interact with the self, thus allowing for further study of complex contexts and interactions. Influences that lie further from the self (distal) may have impacted a person differently than proximal influences. Since the interactions children are exposed to have developmental implications, it is necessary to look at the nested and interdependent relationship parents have on their children's development broadly and how contexts may influence these relationships. For example, interactions that children have with their parents or caregivers may be sustained over time, thus leading to a shared knowledge within the family unit. An example of shared knowledge could be how to respond to conflict or appropriately display emotions. Families do not necessarily have control over more distal influences, such as government policies, that have shaped their circumstances, but the family's interactions with one another may contribute to a child's understanding of these circumstances. These components, developed through social interactions and proximal influences, apply to the questions presented in this dissertation.

2.2 Unified Theory of Development

Influenced by Bronfenbrenner's ecological model, Sameroff further expanded Bronfenbrenner's theoretical model in the Unified Theory of Development. Sameroff's theory

consisted of the addition of four other models of development: the personal model, the regulation model, the transactional model, and the representational model (Sameroff, 2010). This Unifying Theory of Development recognizes that development does not have to be linear and is influenced by myriad contexts and conditions (Sameroff, 2010). While Bronfenbrenner's Ecological Model focuses on social aspects of development and how the contexts' influences can pervade from distal to proximal relationships, Sameroff's Unified Theory of Development explores how the addition of children's and families' neurobiology, and other trait-based attributes can contribute to development. The Unified Theory of Development is intended to bridge the divide between theorists on both sides of the nature versus nurture debate as it emphasized that these models do not have to be at odds with one another and are, in fact, interconnected. Importantly for later discussions, Sameroff pivots from the traditional views of the regulation model. Instead of understanding regulation as something inherent to an individual, Sameroff shifts to a theoretical model suggesting that these regulatory behaviors exhibited by children are not stagnant but are continuously shaped by the experiences that a child has within specific contexts across development. This model considers both relational elements that Bronfenbrenner identified, while also considering the biological aspects. The Unified Theory shifted the field to consider both relational and biological aspects of development and how they are intertwined.

One thing both Sameroff and Bronfenbrenner's multifaceted models share is that both center around the child (or self), with the parents as the first sphere of influence. Through centering the child, both theories emphasize the importance these proximal relationships hold in child development. These relationships are of particular importance concerning two subcategories of the regulatory model and the transactional model when considering how

parents contribute to SEL constructs (Bornstein, 2002; Sameroff, 1983). The regulation model purports that individuals develop an ability to first attend to their biological needs (sleeping, eating, etc.). As they develop, they can then attend to their psychological needs (attention, emotional states, etc.) and can later extend this regulation to their social needs (building relationships, prosocial behavior, etc.). The transactional model (Sameroff & Chandler, 1975) explains the bidirectional relationship between a child and their social surroundings. This model has been compared to Vygotsky's zone of proximal development (Vygotsky, 1978), where children build on many social interactions to create behavioral and social heuristics (Sameroff, 2010).

The other models that are folded into the Unified Theory are the personal change and representational models of development. While the personal change model contributes to our understanding of social-emotional learning and development, it is focused more on the development within each person (Sameroff, 2010). This model is apt to examine development and growth alongside contextual factors. The final component of the Unified Theory is the representational model. This model contributes by including how individuals have interpreted interactions and situations and how this understanding is then applied in other contexts. Parents' interpretations of their children's behavior and skills have been informed by the representational model, as parents may interpret their child's behavior based on their understanding of the world, which then informs the child's understanding of later interactions (MacKenzie & McDonough, 2009).

Taken together, Social Ecological Theory and the Unified Theory of Development provide a theoretical rational for examining the questions proposed, which consider the development of emotion regulation processes in early childhood that are influenced by way of

parents. Specifically, these theories provide a framework for questions proposed in this dissertation, given that: (a) the relationships between parents and children are hypothesized to be interdependent, (b) parents' behaviors, practices and beliefs directly influence children's emotion regulation, and (c) there is a bidirectional influence between parents and children's behaviors that contribute to development.

Chapter 3. LITERATURE REVIEW

3.1 SOCIAL-EMOTIONAL LEARNING IN EARLY CHILDHOOD

The terms social-emotional learning (SEL) and social-emotional development are often used interchangeably. Social-emotional development refers to how a person can identify and understand their own emotions and the emotions of others, regulate their own behaviors, and maintain healthy relationships (National Scientific Council on the Developing Child, 2004). On the other hand, (SEL) could be likened to more explicit or formal learning settings that target social-emotional skills (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2016). SEL competencies can be strengthened through practice or explicit coaching, where social-emotional development may be considered more trait-based. Strengthening SEL competencies is important as children's social-emotional competence has been associated with increased academic performance and positive youth development as children age (Eisenberg, 2006; Guerra & Bradshaw, 2008). Importantly, parents can be a key driver in building SEL in their children.

3.2 PARENTS' CONTRIBUTION TO SOCIAL-EMOTIONAL LEARNING

Parents can provide a great deal of support to their children. Some of this support may come from the choices parents make (interactions they have with their children, routines, etc.). Other influences could be from more pervasive factors as suggested by Bronfenbrenner (e.g., political climate, laws, or community level effects) where parents are not in control. Nevertheless, the whole family unit is impacted. Even when considering these outside factors, there is a persistent bidirectional relationship between parent and child (Belsky, 1984; Grusec, 2011). Parents have long been regarded as the main socializer for children (Eisenberg et al., 1998). This socialization means that many of the SEL skills imparted to children are by way of parents (Ayoub et al., 2014; Behrendt et al., 2019).

By the age of five, children begin to have fewer interactions with their parents, and their social networks with peers expand, necessitating social-emotional skills (Bornstein, 2002). This shift in social interactions highlights a window of opportunity parents have to support and build these skills with their children. These SEL competencies are particularly essential for children entering formal schooling. This is in part because teachers' perceptions of children's social-emotional behaviors are linked to behavioral and academic outcomes (Morrison & Connor, 2009). If these skills are not strengthened or present when children enter formal schooling, they may have more strained relationships with peers and adults in the classroom. One aspect of SEL that parents shape during early childhood is emotion regulation.

3.3 EMOTION REGULATION IN EARLY CHILDHOOD

Emotion regulation has recently garnered more attention in the SEL literature. Children begin to develop emotion regulation at an early age as a component of self-regulation. Signs of

self-regulation begin to appear around 30 months, as evidenced by effortful control tasks and executive control attention tasks (Kochanska et al., 2001). As children's self-regulation develops, they can then attend to regulating their emotions and continue to strengthen their executive functioning (Ursache et al., 2013). Further, there is evidence that between ages 3 to 5, children's emotion recognition and emotion knowledge improves (Denham et al., 2015; Pons et al., 2004). This suggests that this may be an ideal time to work on these skills with young children.

Children's competency in emotion regulation has been associated with social competencies later in life, including academic achievement, fewer conduct problems in school, developing and maintaining relationships with peers and overall health (Amanda Sheffield Morris & Age, 2009; C Saarni, 1999; Sullivan & Lewis, 2003). In particular, children who exhibit lower emotion regulation capabilities have a higher risk of later externalizing and internalizing issues and disorders (Casey, 1996; Emotion Regulation and Externalizing Disorders in Children and Adolescents., 2007). Existing research on emotion regulation competencies later in life has shown that an inability to regulate emotions is associated with mental disorders like borderline personality disorder, depression, bipolar disorder, anxiety, eating disorders, and substance use disorders (Berenbaum et al., 2003; Greenberg, 2015; Kring & Bachorowski, 1999; Mennin & Farach, 2007). These outcomes highlight the importance of emotion regulation development to children's lifelong well-being and the importance of early intervention.

Even though emotion regulation has been studied for almost three decades, there is still debate in distinguishing emotion regulation from self-regulation (Gross, 2015). In some respects, ER could be considered a construct nested under the broader self-regulation construct.

Self-regulation is more broadly defined as the ability to manage your thoughts, attention, emotions, and behaviors intentionally to your current circumstances (Galarce & Kawacji, 2013; Raver, 2004). This discrepancy between the two terms has clouded what emotion regulation measures are actually measuring, which could be a combination of effortful control, executive function, and emotion-related self-regulation (Gross, 2015). This lack of specification in the research leaves much of what we know about the development of emotion regulation in young children unclear. A 2016 review of social emotional measures confirmed that ER, in particular, is often theorized as a subcategory of self-regulation or other emotional competencies (Halle & Darling-Churchill, 2016). Due to the theoretical models presented, I expect that these constructs are tied to parents' behaviors, knowledge, and practices.

3.4 Parents' Influence on Emotion Regulation

The caregiving a child receives in early childhood is linked with social-emotional competence, including self-regulation and social skills with peers (Rodrigues et al., 2021; Russell et al., 2016). This is in part because parents drive and model many of these interactions for their young children. For example, a recent study of families of preschoolers found that children of parents who modeled adaptive emotion regulation strategies exhibited more emergent emotion regulation behaviors (Kao et al., 2020). Through these social interactions, we can see the bidirectional relationship between parent and child and the resources they have to draw on. More precisely, bidirectionality in the context of parents and children refers to the transactions (or interactions) between the individuals. For example, in a conversation, parents are often viewed as a party that is dispensing information or norms; however, the child’s response to this conversation may color not just the current interaction but future interactions. We can think of this relationship as one that has cycles and is an iterative process, which isn’t

dissimilar to the transactional model used in the Unified Theory of Development (Sameroff, 2010). This bidirectional relationship assumes that children are equal and active participants in SEL and emotion regulation development (Kuczynski, 2003).

As emotion regulation is social by nature, a central component to the development of emotion regulation is theorized to be influenced by parents' interactions with their children. Emotion regulation aligns with Sameroff's Unified Model and Bronfenbrenner's Ecological Model, where the child and their familial interactions are centered and thus are most closely aligned with children's development. A touchstone meta-analysis on emotion regulation in the family context introduced the Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment (referred to more commonly as the Tripartite Model) (Morris et al., 2007). The Tripartite Model recognizes the relationship among parents, their children, and children's emotion regulation and adjustment (e.g., internalizing, and externalizing behaviors). This model is a compilation based on the family systems model and additional components of the functional model. The addition of the functional model assumes that behaviors and emotions serve as a way to cue others to children's needs. For example, crying is both an emotional expression and it allows the child to receive attention from a caregiver to soothe them or solve a problem the child is having.

Building from this model, and their meta-analysis, Morris et al. (2007) highlight a few crucial concepts. They suggest that the parent-child relationship allows for parents to first regulate their child's emotions through responding to infants' behavioral cues like crying and then soothing the distressed child. As the child ages and develops, they can gradually self-regulate as they learn skills that have either been modeled through behaviors or explained

through explicit instruction. Therefore, this self-regulation of children's own emotions is predicated on their parents' emotion regulation and parents' enacted practices and beliefs.

There is ample evidence in the literature to suggest that parents contribute to children's emotion regulation. A latent class analysis study of preschoolers' regulation reported on by mothers found supportive responses were higher, but not significantly predictive, when children showed decreasing (versus increasing) ER problems (Jusiene et al., 2015). This suggests that these responsive behaviors may buffer further negative outcomes for young children. Additionally, much of this evidence is predicated on the fact that emotion regulation is socially learned like most SEL constructs. Therefore, children may adopt and adapt their parents’ emotion regulation strategies and behaviors and incorporate these beliefs and practices into their own. Earlier research has theorized and identified that children’s environments, especially when exposed to negative emotions or coping mechanisms, influence children’s general emotional development (Hyson, 1994). This incorporation of beliefs and familial practices may be why influences such as family climate are influential in the development of emotion regulation. Examples of these types of socialization within the family include exposure to marital conflict, parents' emotion expression, and parents' beliefs toward their own emotions, which can all influence a child's emotion regulation (Davies & Forman, 2002; Halberstadt & Eaton, 2002; Hooven et al., 1995).

Chapter 4. EMPIRICAL RESEARCH OF FAMILY SUPPORT PROGRAMS

There has been great promise in addressing children's emotion regulation and general development through changing parenting behaviors, practices, and beliefs, as evidenced by

evaluations of family support programs. In spite of this promise, there is still much to learn about how best to implement programs to support ER, including what works (or doesn't work), for whom, and in what contexts. There are aspects of program characteristics like program population, services provided, techniques used, program delivery, and length of the program, that may contribute to the program's efficacy. As additional evaluations are conducted, we can learn more about the best ways to deliver programs to families and young children. Below, I review the literature in each of these areas to help inform the current study.

4.1 Program Population

One program characteristic that may be associated with program effectiveness is the program population. I categorize these populations as universal, selective, or indicated programs (Hawkins, 2006). Starting with the programs defined more narrowly, indicated programs are for children or families that currently exhibit detrimental behavior (e.g., substance abuse, aggression). In contrast, selective programs are considered for those that may be at an elevated risk of engaging in problematic behaviors or adverse outcomes, like poverty. A recent summary of parenting programs that have been used with selective populations concluded that parenting programs that focus on building responsive caregiving had positive impacts on child development in populations where children had been exposed to violence or were part of a military family (Morris et al., 2017).

Finally, universal programs are for any child or family, regardless of the risk factors (Jenson & Bender, 2014). As an example, until recently, home visiting programs were primarily categorized as selective programs as they aimed to address the needs of families that may be at an elevated risk of later adverse child outcomes (Olds et al., 1998). Although some programs like Family Connections (previously known as Durham Connects) have been

expanded to serve a universal population, other home visiting programs, like the Nurse Family Partnership have been traditionally been offered as selective programs (Dodge et al., 2014; Olds, 2006; Sweet & Appelbaum, 2004). These home-visiting programs have largely been shown to positively impact families and children that receive these services.

Other systematic reviews and meta-analyses focused on anxiety and depression with other age groups have focused on the outcomes of these population categorizations and found that universal programs typically have smaller effect sizes than indicated programs (Calear & Christensen, 2010; Hugh-Jones et al., 2021; Leijten et al., 2019; Teubert & Pinquart, 2011; Werner-Seidler et al., 2017). Although the focus of these programs differ from the ones used for this study, there are similarities, as these studies all are concerned with disruptive behaviors, anxiety, and depression outcomes in children. While there is currently not a direct tie between ER in early childhood and later anxiety or depression, there are other investigations into the relationship among these constructs and behaviors, suggesting that program population may contribute to overall effect sizes in this meta-analysis. (Dryman & Heimberg, 2018; Esbjørn et al., 2011). Many of the studies included in these reviews focused on both school and home programs, so there was infrastructure that was sometimes in place for program delivery. For example, Christensen, et al., noted that universal programs may be more appealing for school administrators, as they reduce administrative burdens (2010). This may be less relevant for family support in early childhood, as many of the programs are in home or community settings or include an out-of-school family component, versus in schools. Still, given the existing evidence regarding program populations, I expect that programs for indicated populations will have larger effect sizes than selective and universal programs.

4.2 Services Delivered

Differences in efficacy may also be related to the type of services delivered. A recent paper on parent education found that allowing parents to practice skills during programs was successful (Morris et al., 2020). Other reviews concerned with parent training programs have come to similar conclusions. We can look to the evidence collected from the Center on the Developing Child across 5 decades that suggests that a core principle for effective programs is to build caregivers' skills through services that engage parents (2016). They found that programs that used active learning with parents had higher impacts on child development (Center on the Developing Child at Harvard University, 2016). These services are similar to offering parent and child activities, which may be more effective than providing didactic materials or child development information.

Additional services that may influence ER include increasing parents' access to social support and counseling. Both of these services may benefit parents' mental health. Parents' mental health has connections to social-emotional competencies. This is illustrated by a meta-analysis that examined emotion regulation strategies and psychopathology where avoidance and suppression were positively related to psychopathology, but problem solving and reappraisal were negatively related to psychopathology (Aldao et al., 2010). Support for attending to parents that might have mental health issues was also noted by the Center on the Developing Child (2016) as a way to tailor services to parents. Providing counseling or therapy to families may have a positive impact on families as this is one service that may improve parents' mental health.

Other calls to move policy and the field forward have suggested that we should focus on empirically supported programs and services for families and children. In these calls, a diverse

range of experts were surveyed about these best practices and next steps (Morris, et al., 2020). Their responses suggest services that elicit more active engagement produce larger effects in children's emotion regulation. The strategies proposed across children's development and specific recommendations in early childhood align with implementing active programs, with parents often as the locus of change (Luthar & Eisenberg, 2017). Through active services provided to parents (e.g., parent/child activities, parent social support, and parent counseling) we may see higher effects on emotion regulation than through those that may engage parents less (e.g., center-based care, child playgroups, didactic materials, providing child development information via handouts).

4.3 Techniques Provided

In addition to the broader conceptualization of service types, it is important to explore the specific techniques provided within programs. Whereas service types are broader categories, techniques are more closely tied to the specific skills taught. As parenting and family support programs may address specific issues families may be facing, they are often building from Social Learning Theory to impart new skills or knowledge to parents (Bandura & Walters, 1963). These techniques could relate to parenting behaviors or could be techniques that improve some facet of parents' well-being that then results in improved child outcomes. There are many programs that promote emotion socialization, minimization of harsh parenting, use of consistent discipline, responsive parent-child relationships and strengthened family relationships (Morris et al., 2020).

A recent meta-analytic study of techniques used in parenting programs for disruptive child behaviors tested both the program effects and longevity of these effects for specific techniques (Leijten et al., 2019). They found that teaching positive reinforcement, praise, and

logical consequences had the strongest program effects of those tested. Other techniques that approached significance included proactive parenting, time outs and monitoring techniques. This study focused on a wider child age range (average study age 2 to 9 years old) and disruptive child behaviors, so these techniques are not necessarily relevant or developmentally appropriate for a universal early childhood population. In reviewing family support programs in early childhood that attend specifically to emotion regulation, some of the techniques are unlikely to garner much attention and do not have a conceptual tie to emotion regulation development (e.g., disciplining techniques).

Despite these differences, there is conceptual overlap between the early childhood family support programs in my study and the programs considered in their study. Specifically, because many of the programs included in their review are addressing various aspects of parents' behavior management skills, there are connections to emotion regulation, and we might expect similar study results. For example, Leijten and colleagues (2019) specifically named that parents are building both their own and their children's emotion regulation and improving other self-management behaviors to address children's disruptive behaviors. Given that these techniques overlap, I expect that programs teaching techniques of child skills and parent-child relationship enhancement might be offered with services that have higher effects.

4.4 Delivery Method

Another feature that may have an impact on program effectiveness is whether programs are delivered individually or in a group setting. Studies of parent education and parenting program settings are inconclusive. One cost analysis study compared group-based Incredible Years and individual parent-specialist delivery. They found that the Incredible Years group

delivery was more expensive than the individual program, with minimal differences in children's outcomes (Daley, 2016). This finding is surprising as we typically believe group delivery to reduce the staffing costs and thereby incentivize those delivering programs to preference group delivery over individual delivery. Group programs are useful when attempting to increase parent's social support (e.g., Circle of Parents or Program for Early Parent Support) and they enable parents to practice new skills in a group setting (e.g., Strengthening Families Program). One review of retention and engagement in family mental health programs found that families who are "harder to reach" for preventative services were more likely to enroll in group services but there wasn't evidence that their participation in the programs was sustained (Cunningham et al., 1995). Similarly, group sessions can be challenging for families to accommodate into their schedules or lives and may limit participation (Finigan-Carr et al., 2014; Frank et al., 2015; Spoth & Redmond, 2000).

Further, studies that have investigated parents' preference on delivery have often found that parents would prefer individual training (Cunningham et al., 2008; Tully et al., 2017; Wymbs et al., 2015). Although preferences are not tied to children's outcomes, individual programs may help retention. If retention is higher, parents may be more likely to complete or receive more services in an individual setting than those in group settings. I expect that programs delivered to individual parents or families will demonstrate stronger effects on children's emotion regulation than group delivery.

4.5 Program Duration or Length

One other component that can contribute to a program's efficacy is the dosage (length and frequency) of a program. These components can also be thought of as part of the implementation strategy. Contention in the research regarding the length of parenting and

family programs exists. Some have found that parents "at-risk" may have higher drop-out rates, may not seek out parenting programs, or may have worse attendance, which may suggest that shorter programs may be more accessible and encourage participation (Assemany & McIntosh, 2002; Havighurst & Kehoe, 2017). This logic is similar to that used by Durham Connects, where Dodge et al., found that a short intervention would work best for the population they were serving (2014). Other implementation researchers have suggested that interventions are more effective if delivered over a longer time (Jenson & Bender, 2014). At this time, there does not seem to be a number of sessions or contact hours that are exclusively associated with positive child outcomes (Jenson & Bender, 2014). There is some evidence that interventions for a child who has already shown problem behaviors may need to be longer than a program targeted towards a universal population (Manning et al., 2010). In short, there is no clear consensus on how many sessions a program should have or the optimal length it should be. I expect that program length and hours spent in the program may not have a clear relationship to program effects on emotion regulation.

Despite inconclusive evidence, there is continued interest in parents' roles in developing emotion regulation. Specifically, the Tripartite Model (Morris, et al., 2007) has continued to be used and tested across childhood. In a review of the evidence gathered in the decade since their model was first published, Morris and colleagues (2017) discuss approaches commonly used in both providing training to parents and in the evaluations of these studies. More specifically, they found that parents of young children were often given strategies to build children's emotional socialization through refocusing, versus parents coaching their children to reframe or comforting their child (Morris et al., 2017; Morris et al., 2011). They also found that parents

and children learning together might be a strength of parenting programs that are focused on emotion regulation. However, this hypothesis has not been empirically tested.

Evaluations of socialization practices led the field of emotion regulation to coach parents to recognize but not dismiss negative emotions. Emotion coaching in parents has been shown to have mixed results, yet this is still considered a promising place to intervene (Gottman & Katz, 1997; Thompson & Meyer, 2007). For example, parents talking about and validating negative emotions their children have has led to more open conversations about how to manage difficult emotions (Waters et al., 2010). The inconsistencies in findings may partly be because other contributions to emotion regulation (e.g., child temperament) have been seen as more fixed elements, so the measurement of emotion regulation in these studies has not considered children's potential trajectories (Bargh, 1994).

A narrative systematic review of emotion socialization programs for parents of young children examined a dozen programs (England-Mason & Gonzalez, 2020). Through this review, they focused on how parent emotion socialization is used as a mechanism for improving children's emotion regulation. They built from the Tripartite Model and included both US- and non-US-based programs. Their review of the literature suggested that programs were more likely to be offered to parents of preschoolers than to those with children younger than 3-years-old. Additionally, while many programs were developed for parents, broadly defined, mothers were the predominant participants (England-Mason & Gonzalez, 2020). Finally, they suggest that the programs offered and reviewed do not attend to the sociocultural context of families. This further crystalizes the need to investigate what works for whom and under what conditions.

4.6 Measurement of Emotion Regulation

A review of emotion regulation assessment noted that there are four ways ER has typically been measured in children: child self-reports, teacher or parent reports, observational reports or biological indicators (Adrian et al., 2011). In early childhood, there is not an expectation that children are able to self-report on their ER, as they likely do not have the language to communicate their emotions and responses (Zeman et al., 2007). Additionally, the biological/physiological markers used in ER measurement are not of interest in this study. These markers are often examinations of neurobiological functions of the prefrontal cortex (PFC) or related to biological stress, like cortisol levels. The research in this area is dominated by what it means to have dysregulation, at both individual and dyadic levels. In this paper, I am interested in the contributions to children's emotion regulation based on parents' knowledge, attitudes, and practices. In addition to these parent-reported measures, ER has also been measured with behaviors related to children's emotion regulation, like the child behavior checklist, CBCL. The CBCL has been used in many settings and is related to multiple domains of ER such as children's emotional problems and ability to modulate their behaviors.

Another frequently used measure with this population is the Emotion Regulation Checklist (ERC) (Shields & Cicchetti, 1997). While originally developed for middle childhood, it has also been used in early childhood populations, with parents and teachers reporting on children's emotion regulation and lability/negativity. The lability/negativity subscale measures a lack of flexibility, mood lability, and dysregulated negative affect, whereas the emotion regulation subscale measures situationally appropriate affective displays, empathy, and emotional self-awareness (Shields & Cicchetti, 1997). This is an example of another informant providing information about the child's ER. As with all latent variables,

there is some concern about measurement error. More specifically, there may be error dependent on who is the informant. There is evidence that both parents and teachers as informants have biases that may contribute to their ratings of children's ER. For example, parents' mental health may influence their ratings of their children (Fergusson et al., 1993) and bias from teacher ratings have measurement issues as well (Hoyt, 2000).

Further, observational measures may also differ from informant ratings. While these observational measures capture the embodied responses of ER (facial expressions, perceived affect, response to particular stimuli), they do not capture any internal processes of ER or may not be generalizable to children's daily experiences (Saarni, 1984). In their review, Adrian and colleagues (2011) investigated the prevalence of measures used. They found that in the infant and toddler/preschool age groups, there were more observational measures used than measures relying on other informants. They also noted that there has been an uptick in ER studies and that there is still some uncertainty in ER measurement and constructs. I anticipate the ERC may not represent the internal capacities of early childhood very well and will be associated with smaller effect sizes than other measures that represent children's behaviors.

4.7 Limitations of Current Literature

While it is well established that parents can have an influence on children's social-emotional learning and emotion regulation in early childhood, a comprehensive review of the programs and strategies has yet to be completed. Further, we do not have conclusive evidence on how to best provide these supports and how they may be connected with improved emotion regulation. With so many disparate aims and practices, a synthesis of commonalities among efficacious programs would help the field identify the most promising programs and features.

To date, parenting programs and supports in early childhood have attended more closely to externalizing behaviors that may be disruptive, and less attention has focused on internalizing behaviors or emotion regulation (Jenson & Bender, 2014). Although there are recent meta-analyses of programs attending to emotion regulation in older youth (middle childhood and adolescence), a similar study of early childhood program evaluations has yet to be conducted. As the foundations of emotion regulation are developed in early childhood, it would be meaningful to examine these evaluations to better support this initial development. A systematic meta-analysis of evaluations of family support programs would provide guidance for the field's next steps in improving emotion regulation in early childhood through family support programs. Examining these features may provide insight when developing new family and parent programs during early childhood. While it is improbable that a one-size-fits-all program exists for families, some commonalities may drive future research and practice.

4.8 Present Study

This study provides additional evidence for family support programs that intend to improve young children's emotion regulation by addressing the following questions:

1. In this sample of family support programs, what techniques are provided and what is the duration of these programs?
2. What is the average treatment effect of family support programs on children's emotion regulation?
3. Does the effect on emotion regulation vary based on the intended program population? I expect programs with an indicated population to have larger effects than those designed and delivered to selected and universal populations.

4. Does the effect of family support programs on emotion regulation vary based on services offered, or the instructional grouping of parents?
    a. I expect that programs offering services that directly engage parents (e.g., parent/child activities, parent social support, and parent counseling) may have higher effects on emotion regulation than those that may engage parents less (e.g., center-based care, child playgroups, didactic materials, providing child development information).
    b. I expect that programs delivered to individual parents or families will demonstrate stronger effects on children's emotion regulation than group delivery.
5. Does the effect of a family support program on emotion regulation vary by the program's measure type? Specifically, are there differences between the effect sizes of studies using the ERC or other measures of ER? I expect that the ERC may have weaker effects on emotion regulation than other measures of ER.

Chapter 5. METHODOLOGY

To answer my research questions, I compiled a set of relevant, high-quality evaluations of family support programs that focused on emotion regulation in children ages birth to 5. Details of the meta-analytic methods, including search strategy, criteria for inclusion and exclusion, coding protocol, reliability, and final sample, are described below.

5.1 SEARCH STRATEGY

To find studies that provided data for my research questions, I began by using the same search terms as the National Forum on Early Childhood Policy and Programs meta-analytic

database. Those terms are listed below (Figure 1) and were adapted from Abt Associates and the National Institute for Early Education Research (NIEER) (Camilli et al., 2010; Jacob et al., 2004; Layzer et al., 2001). This original search focused on evaluations of policies and programs for children ages birth to 5 in the United States published between 1960-2007 that had a rigorous methodology.

Using the same terms and procedures, I aimed to find studies of programs in the same age group but expand the pool of potential studies to more recently published ones. The search for relevant articles from databases was completed in January 2022. The ERIC, PsychInfo, and EconLit databases were used to search for relevant studies to mimic the National Forum's search. As the original search terms were used to capture a wide array of programs and studies with myriad children's outcomes as the focal effect sizes, I further narrowed this search by including the addition of "AND emotion regulation" to my search (Appendix A). This search resulted in 1,336 reports for possible inclusion. This broad conceptualization of the potentially relevant studies casts a wide net that may include more false positives, to reduce the chances of excluding a potentially relevant study (Cooper et al., 2019). As the search continued, I also reference-chased articles that had been screened in to further ensure that all relevant studies and publications were included in the study. In only a few cases did I feel the need to reference chase, and in these efforts, no additional studies were added to the pool of included studies.

Figure 1.

Initial search terms

evaluation or curriculum or intervention or services or program or impact or "home visit*" or prevention or treatment or training

and

child or children or childhood or infant* or baby or babies or toddler* or prenatal

and

(parent* and training) or (“home visit*” or home-based) or (parent* and income) or (parent* and “mental health”) or “parent* education” or ((parent* or mother*) and interaction*) or (parent* and skills) or “family literacy” or “family resources” or “family functioning” or “family support” or “parent support” or “social support”

5.2 Literature Search

5.2.1 *Inclusion and Exclusion Criteria*

The following criteria were designed to identify high-quality studies that evaluated programs serving families of children from birth to 5 and were adapted from the Forum's original criteria (Schindler et al., 2015). These included programs comparing treatment and control groups and treatment-by-treatment designs. I screened in treatment-by-treatment designs and programs that may compare the additive benefit of a parent program to a classroom program. There were a few treatment-by-treatment designs in the sample that provided information about potential additive benefits of family supports, dosage, and incentives.

To be included, a study had to meet the following criteria:

- Children's ages during the intervention are prenatal – 5 years old
    - If the age range extends past 5 years old, the mean age must be less than 6
- Intervention provided services for a parent, caregiver, or child
- Program was focused on emotion regulation (ER)

  - Study intended to improve ER and/or measured ER
- Study was conducted in the United States
- Randomized and quasi-randomized control studies, with at least 10 participants in each condition
- Attrition of less than 50% in each condition
- The intervention was not for children with medical conditions or learning disabilities

Studies were excluded from this synthesis when there was:

- No comparison group
- A special population (e.g., autism spectrum disorder, medical condition)
- Medical or pharmacological interventions

Another consideration for inclusion was regarding program delivery year or study publication date. While the search of the databases noted that there was a study from the 1930s to review, this study didn't include a program or a comparison group. This left a more recent set of publications, beginning in the 1990s, as potential data points. This aligns with other extant research and meta-analytic reviews of the emotion regulation domain, as our current conceptualization of emotion regulation wasn't commonly understood until the mid-1980s (Aldao et al., 2010). While considering publication date was an important theoretical note, it was a moot point, as the oldest published study included in the review is from 2007. To further detail the search process, see the PRISMA study flowchart in Figure 2.

PRISMA Study Flowchart.

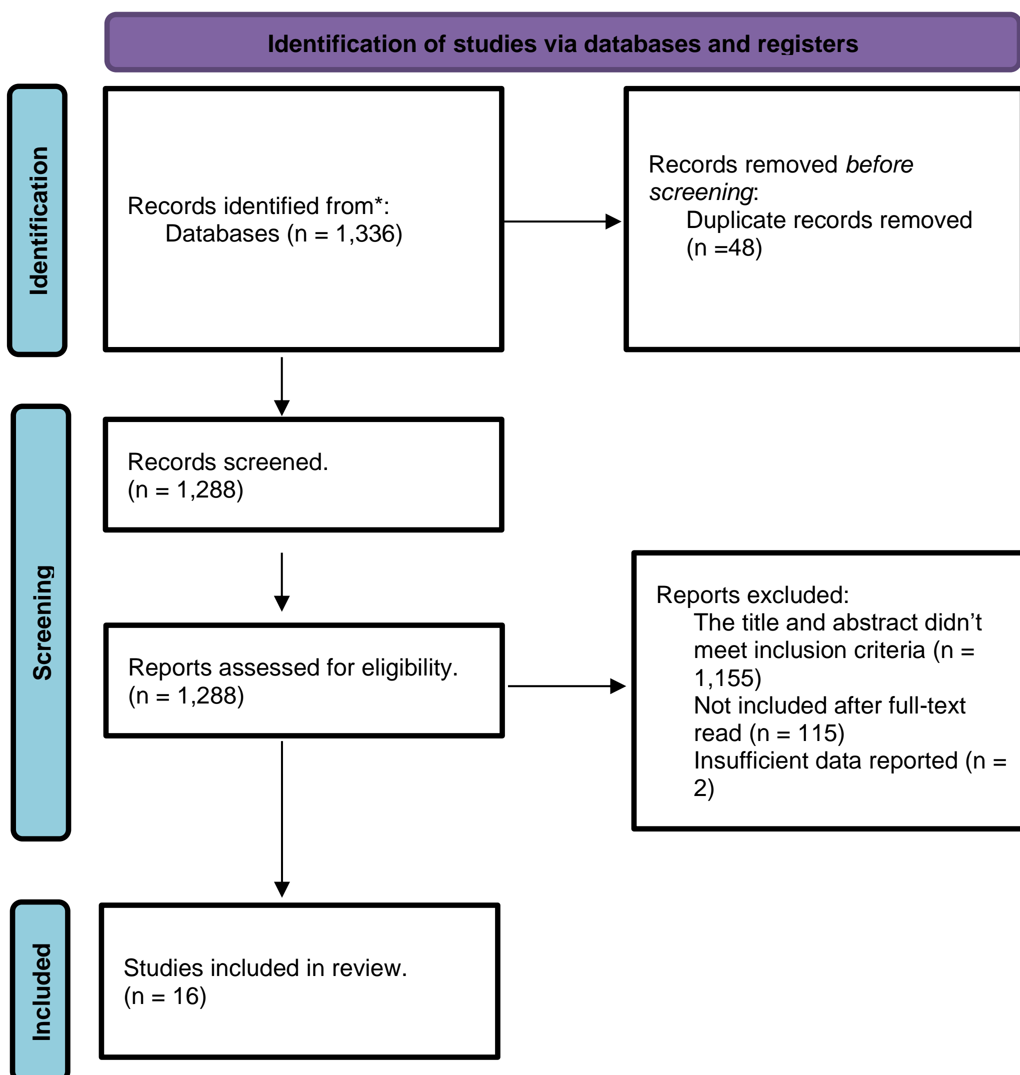
5.2.2 *Screening Procedure*

Once the search terms, inclusion and exclusion criteria were finalized, I screened the titles and abstracts for relevant studies. During this process, I gave a generous reading to the studies and only excluded it if it clearly met an exclusion criterion. If the title and abstract suggested that the study may be screened in, I referred to the study's full text to ensure that it met all inclusion and exclusion criteria.

An initial screening of both abstracts and titles and subsequent full texts resulted in 20 potential studies. Funding for a second screener was secured and used. The second screener was used to increase the reliability of the data (Cooper et al., 2019). Funding allowed for a random sample of 50% of the included studies (N=10) to be reviewed by a second screener to ensure they met the inclusion/exclusion criteria. One of the studies reviewed by the second screener was excluded as it was an international sample and there were two duplicate studies with no additional measures or data to include (Herbert, 2014; Herbert, et al., 2013; Luby, et al., 2018; Luby, et al. 2014), for a total sample of 18 studies. Two final studies were removed during the coding procedure (described later), as there was insufficient data reported to calculate an effect size for children’s ER.

Figure 2.

PRISMA Study Flowchart



5.3 Coding Study Characteristics

5.3.1 *Coding Protocol*

Once studies were deemed eligible for inclusion in the analytic database, the studies were coded for all relevant data. The codebook used is a subset of that used in the Forum's analyses. I removed variables that didn't inform the research questions of this study, and additional variables regarding techniques used were added to the codebook. Information regarding the

relevant dependent and independent variables were collected through close readings of all included studies. Specifics on the variables relevant to the current study are provided in the next section.

5.3.2 *Coding Reliability*

To improve reliability of the data extracted, 50 % of the studies included in the final sample (N = 8) were double coded by another graduate student who was trained on the codebook and relevant variables. We met and discussed the codebook before coding began to clarify meanings and definitions of some of the codebook terms. In order to assess reliability, an initial percent agreement was calculated between myself and the other coder, resulting in 75.42% agreement across 254 variables and 31 effect sizes. The area with the most initial disagreements were under the categories of intended population served and intended program dosage. To resolve any disagreements, we met and discussed the coding until agreement was achieved and before the analyses began. For example, the intended population as originally defined was unclear, so we shifted to coding to the intended program population (versus the study population). To ensure that these variables were consistently coded across the sample, the second half of the studies coded by only myself were completed after these discussions.

5.3.3 *Data Structure*

The meta-analytic database was hierarchical in structure, with effect sizes nested within contrasts, which were nested within studies. I classified studies as comparisons among a treatment group and at least one comparison group. Each study could include data from multiple reports. The next level of data under the study level was the contrast level. A contrast was a specific comparison at the group level of the studies. These comparisons are the

treatment group compared to each comparison group within the study. For example, in Hart, et al., (2019), there are three contrasts: one comparing the Summer Treatment Program (STP) 8-week program to the STP 4-week program; one comparing the STP 8-week program to families receiving a school consultation; and one comparing the STP 4-week program to the school consultation condition. The next level of the data was the effect size level. Effect sizes were calculated from the reported information, specifically the number of subjects in each group and reported outcomes at each time point. To calculate Hedge's *g*, *d* was adjusted with a correction factor ($g = d * J$). Where $J = 1 - (3 / (4 * \text{df} - 1))$ and $d = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{(sd_1{}^2 + sd_2{}^2)/2}}$.

Time of measurement was also coded, but instead of using it as an additional level, it was entered as a predictor. Additional information about the treatment of time in the analyses is discussed in the analytic approach.

5.3.4 *Dependent Variable*

The dependent variable for this study was the effect size calculated for children's emotion regulation. Additional information about how these effect sizes were calculated is detailed in the analytic approach. Borenstein et al. (2009) noted three considerations when choosing an effect size index: 1) comparable studies, 2) the effect size is computable from the information given, and 3) metrics such as sampling distributions and variances should be known for the effect sizes. To address the first point, I considered whether the outcomes measured should be compared to one another. My intention was that all of the dependent variables of this study would be the effect sizes that measure the impact of the family support program on children's behaviors related to emotion regulation. Essentially, it only makes sense to compare effect sizes if they measure a similar construct. As discussed earlier, the domain of emotion

regulation in early childhood is typically measured via parent or teacher reported measures or observational measures. Once the complete set of studies was defined, I evaluated whether these outcome variables were similar enough to consolidate into this conceptualization of emotion regulation. A subset of the studies included used the Child Behavior Checklist (CBCL), which in part measures children's internalizing and externalizing behaviors. Although this isn't a direct measure of ER, it overlaps with ER as a subset of related behaviors that are represented on the internalizing and externalizing subscales.

Of the 82 effect sizes, 43 of these effect sizes were measured using ERC or a subscale of the ERC. Other measures used were related to other observational measures of children's emotion regulation behaviors (N = 15), like adaptive regulation, comfort seeking, positive/negative emotions expressed during a stressful task, 2 effect sizes from a self-report task, and parent/teacher reported behaviors from measures like the CBCL (N = 16), and 5 other effect sizes from teachers/parents. For the purposes of the analyses, comparisons of both ERC subscales and other observed outcomes were effect coded. The use of ERC and its subscales was coded as 1 and use of other measures and subscales were coded as -1. This coding helped answer research question 5.

Concerning Borenstein's second and third points, the calculation of effect sizes followed similar procedures to the Forum's procedures, including using the Comprehensive Meta-Analysis (CMA) software, version 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2013). As mentioned in the screening procedure, there were two studies that didn't provide enough statistical information to calculate an effect size and these studies were excluded (Shelleby et al., 2012). Choosing how to calculate an effect size was dependent on what statistics were published or available. While the study outcomes were ideally reported on a scale with reliable psychometric properties (e.g.,

ERC), the studies used different scales and measures (see independent variables for more on this point). When possible, use of independent group means and standard deviations were used to calculate Hedge's *g*, but there were a few cases where other reported statistical information on group differences were used to calculate Hedge's *g*.

In addition to the three considerations provided by Borenstein and colleagues, I used a standardized mean. An unstandardized mean is often used when the scale has an interpretable meaning to those in the field (i.e., heart rate or IQ). Therefore, using an unstandardized mean would not be advisable for the reports included in the database. Instead, comparing the standardized differences between groups, specifically Hedge's *g*, would better represent the data (Borenstein et al., 2009). One reason to use *g* is to account for bias when sample sizes of studies were small. Using *g*, in this case, is essential because *d* has a bias to be overestimated when there is a large sample size, so a correction term is used to arrive at *g* instead (Hedges, 1981). Hedges' *g* is calculated by using Cohen's *d* and is then adjusted using a correction term that relies on the degrees of freedom. Cohen's *d* is the number of standard deviations between two groups. In this case, the difference is between the programs of interest and the comparison groups. Again, this was used to ensure that studies with small samples were not overestimated (Borenstein et al., 2009). Additionally, effect sizes were calculated using the pooled standard deviation and variances in order to account for potential group differences. Finally, a weight was applied to all the calculated effect sizes. I used the inverse variance weighting in the analysis of effect sizes. Each calculated Hedge's *g* was weighted by multiplying the inverse variance by $1/N$, where N is the number of effect sizes within a contrast (Cooper et al., 2009; Joo et al., 2019). This weighting is meant to prevent the over- influence of studies that reported multiple ER outcomes across multiple comparison groups.

The last consideration was how to address time in this analysis. There is ample research that shows that program effects are strongest at the end of the program, with diminishing effects as time goes on. In this study, there were 11 effect sizes measured during the program, 48 effect sizes measured at the end of the programs, and 23 effect sizes measured at a later follow-up. I used all these effect sizes to look at program effectiveness, but effect coded this variable, where follow-up measurements were coded as 1, and end or during the program measurements were coded as -1.

5.3.5 *Independent Variables*

The independent measures are intended population, program services offered, techniques taught, the instructional grouping of parents (individual program delivery compared to group or mixed), program duration and dependent variable characteristics. These independent variables were used as covariates in the model and for descriptive purposes. Given the small study sample, I limited the number of predictors at Level 2 to maintain statistical power. Although the contrast level was coded, there were only an additional 5 contrasts (N = 20), so analyses at the Study Level were prioritized and conducted. Due to the small sample size, not all identified independent variables were used in the multilevel models. I chose independent variables that would maintain power to draw conclusion about variables with normal distributions and those with stronger theoretical rationales. For example, I chose to retain independent variables regarding services offered (over techniques used) as the distribution of services had more variability and there have been more empirical studies on services offered than techniques used, allowing for stronger future claims.

5.3.5.1 Level 2 Independent Variables

To answer RQ1, 7 dummy-coded variables were used to capture what techniques each study provided to families. Each study was coded as either having provided skills parents could impart to their children (child skills in subsequent tables), relationship enhancement, positive reinforcement, nonviolent discipline, proactive parenting, active listening, and skills for parents' well-being (parent skills in subsequent tables). In addition to the technique variables, program length was also coded. Program length was measured in months.

Whom the program intended to offer the program to is a variable of interest. This variable was coded categorically, using the definitions from Hawkins (2006) as either universal, selective, or indicated programs. This allows for an impact on the effect size to be examined across intervention population subgroups. Using this coding provides further evidence of how broadly programs that attend to children's ER should be designed or implemented. This categorical variable was effect coded as either an indicated population (1) or those with selected and universal populations (-1). These categorizations helped answer RQ3.

To answer the many parts of RQ4, I used two variables related to services offered, and one variable related to the instructional grouping of parents. Similar to the variables used to answer RQ3, services that directly engaged parents (parent/child activities, parent social support) were effect coded against programs that didn't offer these services. Additionally, services that were either more passive or child-focused (e.g., center-based care, child playgroups, didactic materials, providing child development information or child social skills training) were also effect coded as either offered (1) or not offered (-1).

To assess the effects of individual versus group delivery, I again used effect coding to compare the effects of programs delivered to individual parents (1) or families versus those using a mixed or group delivery (-1).

5.3.5.2 Level 1 Independent Variable

Additional information on the measure used and how data was collected by the original study authors was also coded and included in this study. More specifically, the use of the ERC compared to effect sizes from other measures was effect coded, where an effect size was coded as having used the ERC (1) or another measure (-1). This may be used to examine the original study's measurement quality, as that may impact the effect size of the dependent variable (Rosenshine, 2010; Shager et al., 2013). This information helped answer RQ5.

5.4 Final Database and Sample Description

The search and screening procedure resulted in a total of 16 studies (N = 16). At the next level of data, the contrast level, there were 20 comparison groups (*N* = 20). At the final level of the data, there were 82 effect sizes (*N* = 82). Hedges' *g* was computed for each effect size in this study using Comprehensive Meta Analysis 3.0 (Borenstein et al., 2013). A more detailed description of the studies included in the analytic sample are described in Table 1.

Table 1.
Sample Description

Citation	Study	Sample	Intended Population	Services	Techniques
Barry, C. M., Robinson, L. R., Kaminski, J. W., Danielson, M. L., Jones, C. L., & Lang, D. L. (2022). Behavioral and socioemotional outcomes of the Legacy for ChildrenTM randomized control trial to promote healthy development of children living in poverty, 4 to 6 years postintervention. *Journal of Developmental and Behavioral Pediatrics*, *43*(1), e39–e47. https://doi.org/10.1097/DBP.0000000000000962	Legacy of Children – Miami	N = 179	Selective Family	Parenting education, Parent social support, & Parent/child activities	Relationship enhancement & Parent skills
	Legacy of Children – Los Angeles	N = 172	Selective Family	Parenting education, Parent social support, Information on child development, & Parent/child activities	Relationship enhancement & Parent skills
Graziano, P. A., & Hart, K. (2016). Beyond behavior modification: Benefits of social–emotional/self-regulation training for preschoolers with behavior problems. *Journal of School Psychology*, *58,* 91–111. https://doi.org/10.1016/j.jsp.2016.07.004	School Readiness Parenting Program	N = 82	Selective Child	Parenting education	Relationship enhancement, Positive reinforcement, & Nonviolent discipline
Hart, K. C., Maharaj, A. V, & Graziano, P. A. (2019). Does dose of early intervention matter for preschoolers with externalizing behavior problems? A pilot randomized trial comparing intensive summer programming to school consultation. *Journal of School Psychology*, *72,* 112–133. https://doi.org/10.1016/j.jsp.2018.12.007	School Readiness Parenting Program	N = 30	Selective Child	Parenting education	Relationship enhancement, Positive reinforcement, & Nonviolent discipline
Hepworth, A. D., Berlin, L. J., Martoccio, T. L., Cannon, E. N., Berger, R. H., & Harden, B. J. (2020). Supporting infant emotion regulation through attachment-based intervention: A randomized controlled trial. *Prevention Science*. https://doi.org/10.1007/s11121-020-01127-1	Attachment Behavioral Catch-Up	N = 208	Selective Family	Parenting education, Information on child development & Parent/child activities,	Relationship enhancement, Positive reinforcement, & Active listening

Citation	Study	Sample	Intended Population	Services	Techniques
Herbert, S. D., Harvey, E. A., Roberts, J. L., Wichowski, K., & Lugo-Candelas, C. I. (2013). A Randomized Controlled Trial of a Parent Training and Emotion Socialization Program for Families of Hyperactive Preschool-Aged Children. *Behavior Therapy*, *44*(2), 302–316. https://doi.org/10.1016/j.beth.2012.10.004	Parenting Your Hyperactive Preschooler	N = 31	Selective Child	Parenting education & Parent social support	Relationship enhancement, Child skills, Positive reinforcement, Nonviolent discipline, Proactive parenting, & Parent skills
Hooper, E. G. (2018). Maternal emotion socialization and children's emotional development: Mechanisms in the intergenerational transmission of depression [ProQuest Information & Learning]. In *Dissertation Abstracts International Section A: Humanities and Social Sciences* (Vol. 79, Issues 7-A).	Mother-Child Therapy for Depressed Mothers	N = 55	Selective Family	Parent/child activities, Parent counseling, & Child counseling	Relationship enhancement, Child skills, & Parent skills
Kennedy, D. E., & Kramer, L. (2008). Improving emotion regulation and sibling relationship quality: The More Fun With Sisters and Brothers Program. *Family Relations: An Interdisciplinary Journal of Applied Family Studies*, *57*(5), 567–578. https://doi.org/10.1111/j.1741-3729.2008.00523.x	More Fun with Brothers and Sisters Study	N = 95	Universal	Parenting education, Parent/child activities, Child play groups, Didactic materials, & Child social skills training	Child skills
Labella, M. H., Lind, T., Sellers, T., Roben, C. K. P., & Dozier, M. (2020). Emotion regulation among children in foster care versus birth parent care: Differential effects of an early home-visiting intervention. *Journal of Abnormal Child Psychology*, *48*(8), 995–1006. https://doi.org/10.1007/s10802-020-00653-4	Attachment Behavioral Catch-Up	N = 211	Universal	Parenting education, & Parent/child activities	Relationship enhancement, Positive reinforcement, Proactive parenting, & Active listening
Lieneman, C. C., Girard, E. I., Quetsch, L. B., & McNeil, C. B. (2019). Emotion regulation and attrition in parent–child interaction therapy. *Journal of Child and Family Studies*. https://doi.org/10.1007/s10826-019-01674-4	Parent–Child Interaction Therapy	N = 66	Indicated Child	Parenting education	Nonviolent discipline, Proactive Parenting, & Parent skills

Citation	Study	Sample	Intended Population	Services	Techniques
Lind, T. (2018). Intervening to enhance emotion regulation: Early childhood adversity, parent-child mutual positive affect, and later child regulation capabilities [ProQuest Information & Learning]. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 79, Issues I(E)).	Attachment Behavioral Catch-Up	N = 107	Indicated Family	Parenting education	Relationship enhancement, Positive reinforcement, Nonviolent discipline, & Active listening
Longo, F. (2018). Two-generation approach to improving emotional and behavioral regulation [ProQuest Information & Learning]. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 78, Issues I9-B(E)).	Mind Matters	N = 205	Indicated Family	Parenting education, Information on child development, & Center-based early childhood education	Relationship enhancement
Luby, J. L., Barch, D. M., Whalen, D., Tillman, R., & Freedland, K. E. (2018). A randomized controlled trial of parent-child psychotherapy targeting emotion development for early childhood depression. *The American Journal of Psychiatry*, *175*(11), 1102–1110. https://doi.org/10.1176/appi.ajp.2018.18030321	Parent–Child Interaction Therapy	N = 204	Indicated Child	Parenting education	Relationship enhancement, Nonviolent discipline, Proactive Parenting, & Parent skills
Mersky, J. P., Topitzes, J., Janczewski, C. E., Lee, C.-T. P., McGaughey, G., & McNeil, C. B. (2020). Translating and implementing evidence-based mental health services in child welfare. *Administration and Policy in Mental Health and Mental Health Services Research*, *47*(5), 693–704. https://doi.org/10.1007/s10488-020-01011-8	Parent–Child Interaction Therapy	N = 129	Indicated Family	Parenting education, & Parent/child activities	Relationship enhancement, Nonviolent discipline, & Proactive parenting
Reid, M. J., Webster-Stratton, C., & Hammond, M. (2007). Enhancing a Classroom Social Competence and Problem-Solving Curriculum by Offering Parent Training to Families of Moderate- to High-Risk Elementary School Children. *Journal of Clinical Child and Adolescent Psychology*, *36*(4), 605–620. https://doi.org/10.1080/15374410701662741	Incredible Years	N = 171	Indicated Child	Parenting education, Parent social support, Center-based early childhood education, & Child social skills training	Child skills, Nonviolent discipline, & Proactive parenting
Speidel, R., Wang, L., Cummings, E. M., & Valentino, K. (2020). Longitudinal pathways of family influence on child self-regulation: The roles of parenting, family expressiveness, and maternal sensitive guidance in the context of child maltreatment. *Developmental Psychology*, *56*(3), 608–622. https://doi.org/10.1037/dev0000782	Reminiscing and Emotion Training	N = 160	Indicated Family	Parenting education, & Parent/child activities	Relationship enhancement & Active listening

5.5 ANALYTIC APPROACH

To address my research questions, I examined both study and effect size level statistics. I used multilevel modeling (MLM) to answer my questions about the average treatment effect of family support programs on ER. The meta-analytic data has an inherent hierarchical structure, where there is nesting within the data. The data included in these analyses has studies with nested contrasts of conditions and effect sizes nested in these contrasts. This data structure allowed for the assumption of independence to be addressed. Without attending to the nested structure of the data, the residuals are not independent. Therefore if these data had not been modeled without accounting for the nesting, the Type I error would be inflated and could result in rejecting the null hypothesis, when in fact, it is true (Aarts et al., 2014; Collins & Seitz, 1994).

The data were modeled using a multilevel framework (Raudenbush & Bryk, 2002), where the level-1 model, the effect size level, represents effect size i in study j is modeled as a function of the intercept (π_0), which represents the average effect size for all studies; a set of estimated effects of k independent variables measured at the effect size level ($\pi_1 x_{1ij} + \ldots + \pi_{k} x_{kij}$); and a within-study error term (e_{ij}). The level-2 model, or the study level, represents the intercept as a function of the grand mean effect size (β_{00}), p independent variables measured at the study level ($\beta_{01} x_{1j} + \ldots + \beta_{0\mathrm{p}} x_{pj}$) and a between-study random error term (u_{0j}).

Level - 1, Effect Size: $ES_{ij} = \pi_{0\mathrm{j}} + \pi_1 x_{1ij} + \ldots + \pi_{k} x_{kij} + e_{ij}$

Level $-$ 2, Study Level: $\pi_{0j} = \beta_{00} + \beta_{01} x_{1j} + \ldots + \beta_{0\mathrm{p}} x_{pj} + u_{0j}$

Taken together, these two models of the data are a mixed model that can examine discrete parts of studies that are related to their effect sizes (Konstantopoulos, 2011). Finally, Model R^2 and sr^2 were used to assess the practical value of the results. The squared semi-partial correlations (sr^2) were computed as the effect size for each coefficient using the parameter estimate t-test statistic, degrees of freedom, and model total R^2 (e.g., Aloe & Thompson, 2013) as follows. These squared semi-partial correlations are the unique variance explained by each coefficient, or the variance shared by the outcome that is not explained by any other predictor in the model. On the other hand, R^2, is the total variance explained by the set of coefficients combined.

$$sr^2 = ((t^2/(\ t^2 + df))*(1 - R^2))/(1 - (t^2/(\ t^2 + df)))$$

To answer research question 2, I used an intercept-only multilevel regression model of treatment versus control. To answer the additional questions regarding intended population (RQ3), program services (RQ4), delivery (RQ4), and measure information (RQ5), I added the relevant independent variables to the model independently. A final model with controls for control group activity and effect sizes from follow-ups, was entered with intended population, services, program delivery, and measurement information entered together was also used. An additional model that included study start year was also analyzed, but not presented with the other results.

After the substantive analysis, sensitivity and publication bias analyses were conducted to check the robustness of the results. To examine publication bias, a funnel plot for program versus control groups was created. This funnel plot is the visual representation of the data where effect size is plotted against the standard error as a stand in for the sample size (Sterne & Egger, 2001). To assess the sensitivity of the analysis, both Q (the sum of squared deviations

on a standardized scale) and I^2 (the proportion of the observed variance in relationship to the true variance) were calculated in CMA v.4 (Borenstein et al., 2009; Borenstein, 2022). Both of these results tell us about how the mean effect sizes of these programs are distributed.

Chapter 6. RESULTS

6.1 Descriptive Statistics

The data extracted from these studies are described by study, contrast, and effect size level (Table 2, Table 3, and Table 4, respectively). The categories of intended program population, services offered, techniques, instructional grouping, and measurement type used were individually coded as binary variables. The services and techniques were intended to capture the breadth of the programs surveyed so that multiple services and techniques could be coded as offered to families. In contrast, the intended population and instructional grouping were confined to one categorization per study. The measurement type was coded at the effect size level. While this study is interested in the difference between the Emotion Regulation Checklist and other measures, one study used both ERC and additional measures, as noted in Table 2 and Table 3.

Due to the small sample size and the distribution of techniques used, the technique variables were not entered into the multilevel models. Instead, they are presented as descriptives of the studies included (RQ1). The mean effect sizes of providing relationship enhancement (building positive parent-child relationships through empathetic interactions and parent-child play) are offered consistently across these family support programs and have positive small effects (M = 0.23, SD = 0.28). Proactive parenting (disrupting children's inappropriate behaviors and affirmative instructions) was offered less frequently, but had a

higher, medium average effect (M = 0.41, SD = 0.20). These results were not examined for statistically significant differences; rather, they are descriptive of the sample.

Correlational analyses of the services and techniques offered at the study level were conducted to inspect what services were offered together (Table 5). Of the services offered, only child social skills training and child play groups/didactic materials had a significant relationship, where they were offered together 68 % of the time ($p < 0.05$). The technique of relationship enhancement was offered significantly with two services, child play groups/didactic materials (54%, $p < 0.05$) and child social skills trainings (79%, $p < 0.001$). The technique of nonviolent discipline was offered with the service of parent/child activities (72%, p< 0.05) and the technique of proactive parenting (52%, $p < 0.05$). No other overlaps among techniques and services were significant.

Program length was also not entered into the model, as it had a very skewed distribution. This distribution would have likely resulted in nonsignificant results, as program length has yet to have a clear effect on program outcomes. Therefore, other variables were prioritized. Programs offered to families ranged in length from 1 to 59 months, with an average of 9.48 months (SD = 16.58). These results are presented as descriptive of the sample but are not predictive of children's ER. A majority of the studies sampled (N = 13) were programs offered for fewer than 5 months (range 0.75 - 4.5 months), with a small number of studies (N = 3) that had multiyear programs (range 2 - 5 years long). The median length of the programs offered was 2.63 months. Sixty two and a half percent of the programs were offered in a group or mixed format, and 43.8% of programs measured emotion regulation using the Emotion Regulation Checklist.

Table 2.
Descriptives by Study

	% offered or M(SD)	*M Effect Size*	*SD of the Effect Size*
Intended Program Population			
Indicated by Family or Child Characteristics	37.50%	0.06	0.24
Selective or Universal Programs	62.50%	0.12	0.25
Services Offered			
Parent Social Support	25.00%	0.09	0.23
Information on Child Development	18.75%	-0.01	0.25
Parent/Child Activities	47.50%	0.08	0.25
Center-based Early Childhood Education	12.50%	0.19	0.21
Child Play Groups & Didactic Materials	6.25%	0.18	0.36
Parent and Child Counseling/Therapy	6.25%	0.24	0.38
Child Social Skills Training	12.50%	0.13	0.29
Techniques			
Child Skills	25.00%	0.02	0.34
Relationship Enhancement	81.25%	0.08	0.23
Positive Reinforcement	37.50%	0.00	0.26
Nonviolent Discipline	50.00%	0.04	0.25
Proactive Parenting	37.50%	0.02	0.26
Active Listening	25.00%	0.02	0.25
Parent Skills	37.50%	0.18	0.26
Instructional Grouping of Parents			
Individual	37.5%	0.18	0.29
Whole, Small or Mixed Grouping	62.5%	0.05	0.22
Length in Months	9.48 (16.58)	--	--
Measurement Type			
Emotion Regulation Checklist	43.80%	0.11	0.21
Other Measure	56.30%	0.08	0.28

N= 16 studies. Unadjusted Hedge's g used. One study used both the ERC and other measures, as more other measures were used, this study included in this group.

Table 3.
Descriptives by Contrast

	% offered or M(SD)	*M Effect Size*	*SD of the Effect Size*
Intended Program Population			
Indicated by Family or Child Characteristics	65.00%	0.35	0.20
Selective or Universal Programs	35.00%	0.07	0.25
Services Offered			
Parent Social Support	25.00%	0.15	0.20
Information on Child Development	20.00%	-0.04	0.15
Parent/Child Activities	40.00%	0.33	0.19
Center-based Early Childhood Education	20.00%	-0.01	0.15
Child Play Groups & Didactic Materials	5.00%	0.29	0.19
Parent and Child Counseling/Therapy	5.00%	0.15	0.30
Child Social Skills Training	15.00%	0.22	0.17
Techniques			
Child Skills	25.00%	0.20	0.23
Relationship Enhancement	80.00%	0.19	0.24
Positive Reinforcement	40.00%	0.10	0.30
Nonviolent Discipline	55.00%	0.23	0.28
Proactive Parenting	35.00%	0.41	0.21
Active Listening	20.00%	0.19	0.17
Parent Skills	30.00%	0.19	0.23
Instructional Grouping of Parents			
Individual	30.0%	0.23	0.20
Whole, Small or Mixed Grouping	70.0%	0.14	0.25
Length in Months	9.11 (15.37)	--	--
Measurement Type			
Emotion Regulation Checklist	55.00%	0.10	0.27
Other Measure	45.00%	0.25	0.18

N= 20 contrasts. Unadjusted Hedge's g used. One study used both the ERC and other measures, as more other measures were used, this study included in this group.

Table 4.
Descriptives by Effect Size

	% offered or M(SD)	*M Effect Size*	*SD of the Effect Size*
Intended Program Population			
Indicated by Family or Child Characteristics	37.80%	0.37	0.19
Selective or Universal Programs	62.20%	0.11	0.29
Services Offered			
Parent Social Support	29.00%	0.16	0.18
Information on Child Development	10.00%	0.04	0.15
Parent/Child Activities	37.00%	0.36	0.21
Center-based Early Childhood Education	22.00%	0.14	0.16
Child Play Groups & Didactic Materials	6.00%	0.29	0.19
Parent and Child Counseling/Therapy	9.00%	0.15	0.30
Child Social Skills Training	26.00%	0.21	0.17
Techniques			
Child Skills	26.00%	0.20	0.21
Relationship Enhancement	71.95%	0.23	0.28
Positive Reinforcement	40.24%	0.10	0.33
Nonviolent Discipline	64.63%	0.24	0.28
Proactive Parenting	35.37%	0.41	0.20
Active Listening	13.41%	0.18	0.17
Parent Skills	23.20%	0.17	0.24
Instructional Grouping of Parents			
Individual	21.95%	0.20	0.23
Whole, Small or Mixed Grouping	88.05%	0.21	0.26
Length in Months	9.72 (14.25)	--	--
Measurement Type			
Emotion Regulation Checklist	52.44%	0.11	0.30
Other Measure	47.66%	0.31	0.20

N= 82 effect sizes. Unadjusted Hedge's *g* used. One study used a child self-report measure and was excluded from the last category.

Table 5.

Zero-Order Correlations of Services Offered and Techniques Provided

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Parent Social Support	--													
2. Information on Child Development	.09	--												
3. Parent/Child Activities	.03	.19	--											
4. Center-based early childhood care	.22	.30	-.37	--										
5 . Child Play Groups & Didactic Materials	-.15	-.12	.07	-.10	--									
6. Parent and Child Therapy or Counseling	-.15	-.12	.28	-.10	-.07	--								
7. Child Social Skills Training	.22	-.18	-.14	.43	**.68**	-.10	--							
8. Child Skills	.33	-.28	-.09	.22	.45	.45	**.66**	--						
9. Relationship Enhancement	-.09	.23	.27	-.30	**-.54**	.12	***-.79***	-.46	--					
10. Positive Reinforcement	-.15	-.04	-.23	-.29	-.20	-.20	-.29	-.15	.37	--				
11. Nonviolent Discipline	.00	-.48	**-.72**	.00	-.26	-.26	.00	.00	-.16	.26	--			
12. Proactive Parenting	.15	-.37	-.23	.10	-.20	-.20	.10	.15	-.29	-.07	**.52**	--		
13. Active Listening	-.33	.09	.33	-.22	-.15	-.15	-.22	-.33	.28	.45	-.29	-.15	--	
14. Parent Skills	.45	-.04	.04	-.29	-.20	.33	-.29	.15	.04	-.33	.00	.20	-.45	--

Note. N =16.

Bolded if $p < 0.05$.

6.2 Average treatment effect on Emotion Regulation (RQ2)

The intercept-only model was specified to evaluate the intraclass correlations (ICCs) and predicted value of the effect size. The weighted grand mean effect size of 0.21 (SE = 0.10) for emotion regulation was significantly different from zero ($p < 0.05$). The ICC for effect size within studies was 0.63. This suggests that, on average, those receiving family support programs did better on measures of children's emotion regulation than those in the control or alternate treatment groups (Table 6.). These effect sizes are also presented as a bubble plot (Figure 3), where each bubble represents an effect size. The size of the bubble is determined by the square root of the sample size, and they are shaded if it is a statistically significant finding.

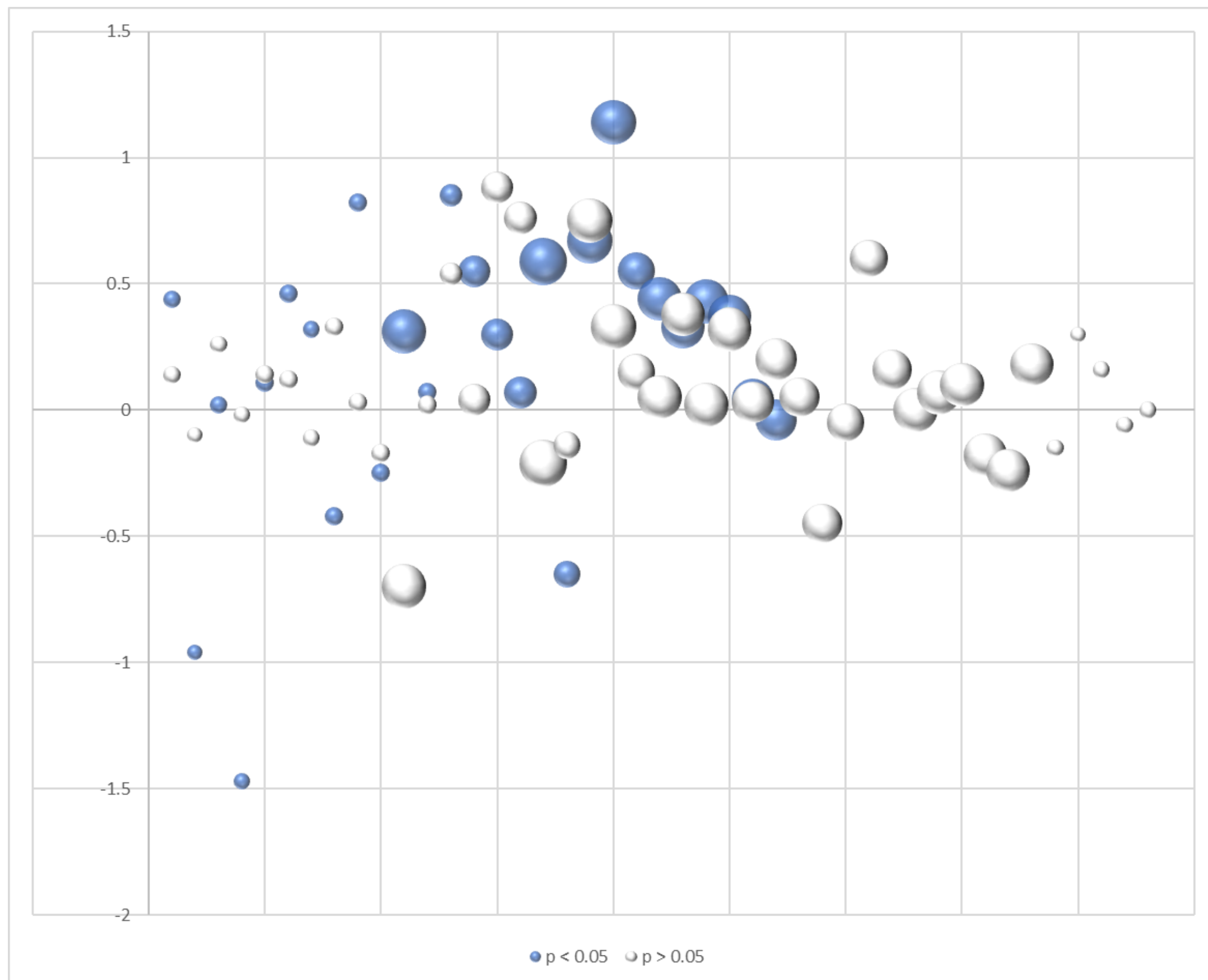
Two control predictors were added to the model to understand the difference between (1) evaluations that had a comparison group that was an alternative treatment versus passive or business-as-usual, and (2) effect sizes collected at a follow-up time point versus during or at end of treatment. Both of these variables were effect coded and introduced into the model. Both had non-significant results. Programs using a passive control group, on average, had effect sizes 0.05 higher than the mean effect size across all studies (M = 0.19, $p > 0.05$), and those using an active control group are expected to have effect sizes 0.05 less than the average effect size across all studies. This is expected as smaller differences in ER between those receiving the programs of interest and those receiving an alternative treatment compared to those not receiving any services between measurements. To interpret this finding, a study using a passive control would have a mean effect size of 0.24, whereas one using an active control would have a mean effect size of 0.14 (SE = 0.04). Similarly, the effect size was calculated from a follow-up (versus at post-program or during the program), and it was also not significant. But there was a negative relationship, where the effect sizes from follow-up

measurements are smaller by 0.03 (SE = 0.04, $p > 0.05$). An effect size from a follow-up measurement has an average effect size of 0.16, compared to an effect size drawn from during the program or at the end of the program have an average effect size of 0.22 (SE = 0.04). A final standardized variable, representing the year of the study was also entered individually to assess if there was a significant effect due to recency. The sample's approximate start years were either provided in the text, or the published date minus three years was used as an approximation. The range of the study's approximate start years was between 2001 and 2017. When entered into the model individually both coefficients were not significant, with the predicted ES intercept was 0.21, with the ES coefficient for standardized start year was 0.01. This means that for each standard deviation increase for approximate start year, the effect size would only increase by 0.01. Due to the small range of start years and the minimal effect, it was not entered into the final model.

Table 6.
Multilevel Models

	Model 1 (Intercept Only)					Model 2 (Individual Predictors)						Model 3 (Joint Predictors)					
Fixed Effects	*Coeff*	*SE*	*t*	*df*	*p*	*Intercept*	*Coeff*	*SE*	*t*	*df*	*p*	*Coeff*	*SE*	*t*	*df*	*p*	*sr2*
Intercept (Mean)	0.21	(0.10)	2.17	(16)	.045	--	--	--	--	--	--	0.12	(0.10)	1.23	(16)	.237	--
Indicated Population						0.24	0.12	(0.09)	1.33	(16)	.201	0.14	(0.08)	1.66	(12)	.123	.14
Parent/Child Activities or Parent Social Support						0.19	0.07	(0.07)	1.05	(56)	.297	0.02	(0.07)	0.37	(66)	.713	.00
Child Services Provided						0.18	-0.08	(0.10)	-0.75	(16)	.463	-0.24	(0.10)	-2.40	(15)	.030	.24
Individually Delivered Services						0.21	0.01	(0.10)	0.12	(17)	.904	-0.11	(0.09)	-1.20	(15)	.248	.06
ERC Measure Used						0.24	-0.21	(0.08)	-2.58	(30)	.015	-0.29	(0.08)	-3.42	(33)	.002	.21
Controls																	
Passive Control						0.19	0.05	(0.06)	0.84	(80)	.404	0.04	(0.05)	0.65	(81)	.515	.00
Follow-up Effect Size						0.19	-0.03	(0.04)	-0.78	(19)	.440	-0.04	(0.04)	-0.93	(79)	.353	.01
Random Effects	*Var*						*Var*					*Var*					
Level 2: Studies	0.12						--					0.09					
Level 1: Effect Sizes within Studies	0.07						--					0.06					
Model Fit Indices																	
Approximate R^2	0.00						--					0.37					
BIC	64.40						--					79.70					
Deviance (-2LL)	51.20						--					35.60					

Figure 3.
Emotion regulation effect sizes from all programs sampled.



Note: Dots represent individual effect sizes, and their size represents the square root of the sample size. Shaded dots are those that were statistically significant.

6.3 AVERAGE TREATMENT EFFECT BASED ON POPULATION (RQ3)

To determine if the intended population predicted ER effect sizes, I used an effect coded variable indicating if the intended population was an indicated population or not. The intercept coefficient was significant (ES= 0.24, $p < 0.05$), but the population coefficient was non-significant (ES = .12, SE = .09, $p > 0.05$), with evaluations with an intended indicated

population having slightly higher effect sizes compared to selective/universal populations. These differences between groups were non-significant, but the average effect size for indicated programs is higher than those of selective or universal programs. More specifically, we can interpret the model as the mean effect across populations is 0.24, and for programs designed for indicated programs, the average effect would be 0.36 (the sum of the intercept and indicated coefficient), whereas the effect sizes from programs designed for selective or universal populations would be, on average, 0.12.

6.4 Average Treatment Effect based on services, and Instructional Grouping (RQ4)

To determine if ER outcomes varied based on the services offered, I entered the services into the model. Due to the small sample size, I used the correlations and theory to reorganize these from the ten types of services offered into two categories. Specifically, two effect coded variables were created. One variable was for programs offering parent/child activities or parent social support services, and the second variable was effect coded when the program offered child social skills training, didactic materials, child play groups, center-based care, or information on child development. Neither of these grouped services had a significant effect on children’s ER. Programs that offered parent/child activities and parent social support had a positive coefficient, (ES = 0.07, SE = 0.07). The intercept of this model was 0.19. To interpret this finding, a program offering parent/child activity services would on average have an effect size of 0.26. However, the variable representing more child-focused services had a negative coefficient (ES = -0.08 SE = 0.10) and an intercept of 0.18. This means on average a program offering didactic materials (or any other child services) would on average have an effect size of 0.10.

To evaluate if individual delivery was associated with greater improvements to children's ER, I effect coded if the program was exclusively delivered individually as 1 and programs using a mixed delivery or group delivery as -1. The results (**Error! Reference source not found.**) were non-significant, with only the intercept (ES = 0.21) having a significant value. Those families that received the program individually had, on average, effect sizes 0.01 higher compared to the average. To interpret this result, programs that were delivered individually would have an ES of 0.22, on average.

6.5 AVERAGE TREATMENT EFFECTS BASED ON MEASUREMENT (RQ5)

To answer my final question regarding measurement used, I used Level 1, effect size data with an effect coded predictor variable, where if the measurement tool was the ERC, it was coded as 1, and other measures were coded as -1. The coefficients were significant, with effects sizes measured by the ERC lower than average (ES= -0.21, SE =0.08) than other measures. To interpret this finding, if an effect size was measured with the ERC, the effect size will be, on average, 0.02 whereas effect sizes using other measures of ER would be 0.45, on average.

6.6 FINAL MODEL OF THE AVERAGE TREATMENT EFFECTS

A final model of relevant predictors was entered (Model 3 in Table 6.). In this model, measure used was significant ($p < 0.01$) and child services provided was also significant ($p < 0.05$), with both having a negative relationship with the overall effect size. The other predictors were not significant, with the average effect size across all studies being 0.12. To interpret this finding, we would expect an effect size from a program that was measured using the ERC (ES = -0.29, SE = 0.08), and delivered child play groups (one type of child services), to be -0.41,

on average. However, if a program was intended to be from an indicated population and offered parent social support, we would expect the effect size to be 0.28, on average. Both control variables had non-significant results, where passive control groups are predicted to have effect sizes 0.04 higher than average (SE = 0.05), and where follow-up effect sizes are predicted to have effect sizes 0.04 lower than average (SE = 0.04). Finally, R^2, or the total variance explained by the coefficients, is 0.37. This means that 37% of the variance is explained by the seven variables in the model. Presented in Table 6 are the squared semi-partial coefficients (sr^2), or the unique variance explained by each coefficient. The variables with the highest unique variances are that of child services provided ($sr^2 = 0.24$) and ERC measure used ($sr^2 = 0.21$).

6.7 Publication Bias

A funnel plot comparing the difference between groups' effect sizes is presented in

Figure 4. The funnel plot is reasonably symmetrical. However, Egger's regression test (t (14) = 0.60, p= 0.56), suggested there is asymmetry in the plot. Duval and Tweedie's trim and fill, calculated in CMA v.4, is presented in Figure 5, with 5 studies suggested to be added to the right of the mean. As an additional measure of publication bias, a fail-safe N was computed. Computations were carried out using Comprehensive Meta-Analysis Version 4 (Borenstein et. al., 2022). In order to nullify the results of this study, an additional 56 studies with non-significant effects (Hedge's $g = 0$, $p < 0.05$) would have to be added to the data set. Rosenthal's rule of thumb for whether this poses a significant threat to the study's conclusions is if the number of null studies is less than 5 times the number of studies plus 10, meaning for this study, a suitable fail-safe N would be 105 additional studies. There was significant heterogeneity in these effect sizes (Q = 88.48, p < .001) and the I^2 statistic indicated that 83%

of the variance in the observed effect sizes reflect the variance in the true effect, rather than sampling error.

Figure 4.
Funnel plot of mean effect sizes between groups

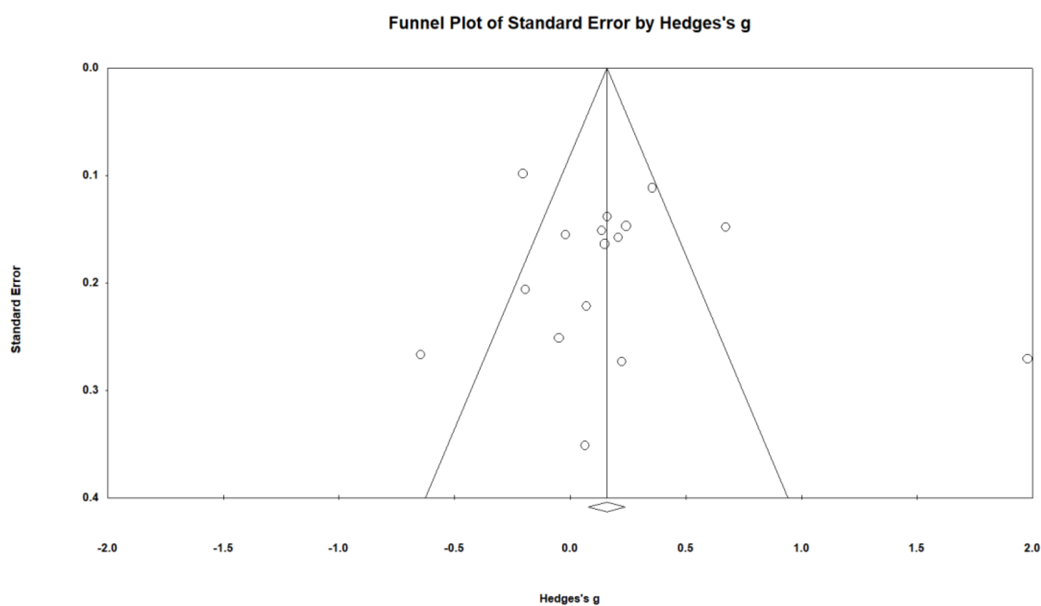
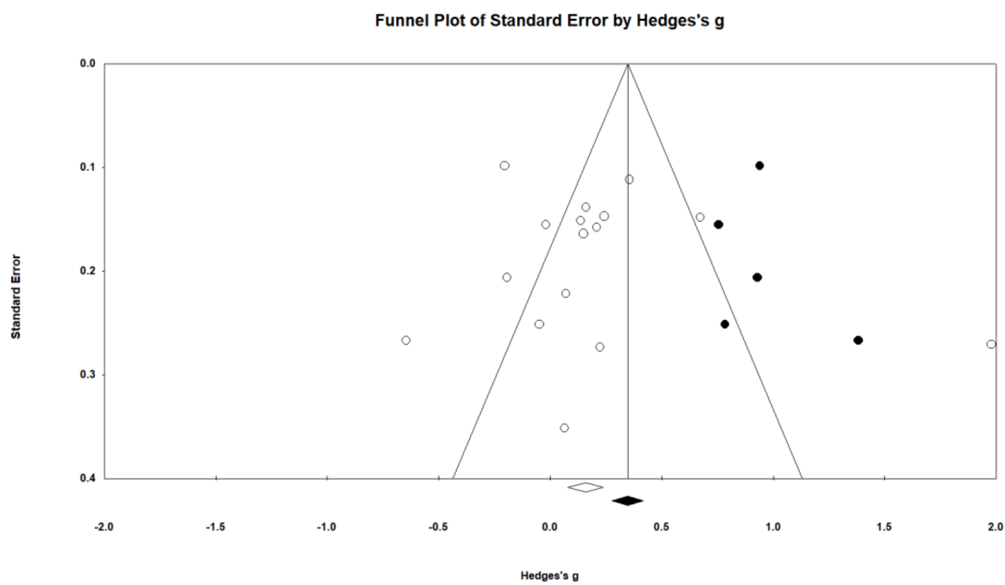


Figure 5.
Trim and Fill funnel plot



Chapter 7. DISCUSSION

The goal of this dissertation was to examine the extent to which family support programs that intended to improve children's emotion regulation in early childhood were successful in that pursuit. Further, I was interested in how variations in program characteristics, offerings and methods may have influenced the differences between programs' outcomes regarding children's ER. In the conceptualization of this study, I was interested in including both randomized and quasi-randomized studies. However, the final sample of studies only included randomized designs. This allows for causal claims to be made regarding the studies' effect sizes. Additionally, as these programs all have specific aims of improving ER, we would anticipate that there would be a positive, main effect on ER in this critical time period of child development. The significant intercept only model suggests that these programs do indeed have a positive effect on children's ER. Given that this effect is a representation of the change in children's ER after being randomized to a family support program, there is causal evidence that family support programs have a positive impact on ER in early childhood.

This small average effect size represents the difference between those that received the program being evaluated and those that did not received the program, suggesting that family support programs that intend to improve children's ER are in fact improving children's ER. This average effect size is in line with other family support services and early childhood programs. For example, a meta-analysis of home visiting programs had a mean effect size for social-emotional outcomes of 0.096, and adding parent education to early childhood education had a mean effect of 0.30 on cognitive outcomes for children (Grindal et al., 2016; Sweet & Appelbaum, 2004). Although these effect sizes are small by statistical heuristics, these

represent positive changes for children's ER outcomes through the use of family support programs. Therefore, we should interpret this outcome as one that may have cascading effects from early childhood into later development.

A key component of this study was to investigate the effect of variations in programs services, delivery, and population to inform our understanding of how ER is developed in these family systems and how best to support families in building these critical regulation systems in early childhood. Although the small sample size of studies prevented a litany of characteristics from being compared in a single model and limited the power to detect statistical differences, there are still suggestive findings that may contribute to future program development. For example, programs that were designed for an indicated population had, on average, higher, but not statistically significant, effect sizes than those drawn from selective or universal populations. This aligns with past research suggesting that universal programs typically have smaller effect sizes than indicated programs (Calear & Christensen, 2010; Hugh-Jones et al., 2021; Leijten et al., 2019; Teubert & Pinquart, 2011; Werner-Seidler et al., 2017). We may assume that indicated populations begin programs with elevated risk, and therefore have more opportunity for growth over the course of a program. The intended populations may have also been influenced by the sample of studies included. Currently, many of the programs designed and offered to families are those that are intended to address or prevent some problematic behavior (indicated or selective programs). This tendency makes it difficult to identify if there are existing confounding variables, such as poverty, that may explain more variation in the effect sizes or if the overlaps between programs evaluated and their intended population are obscuring potential significance.

As there are many factors that may contribute to children's ER, another key component of this dissertation was to elucidate evidence to support specific program features that are associated with larger improvement to ER. Parent-child activities/parent social support had a non-significant but positive effect when entered individually and in the joint model. This positive association aligns with past research suggesting that actively engaging parents has positive effects on child development (Center on the Developing Child at Harvard University, 2016). These active service strategies are also weakly evidenced to be contributing to children's ER, as suggested by the Unified Theory of Development, where parents play a role in the development of their children's regulation systems in an interdependent way (Sameroff, 2010).

On the other hand, more child focused, or passive service delivery methods had a significant negative impact on effect size. This significant result should not be misconstrued and does not imply that offering information on child development, center-based early childhood care, child play groups or didactic materials are not beneficial to families. This may instead be connected to what is not offered in these conditions to improve ER. For example, none of these services actively engaged parents and may not have produced any changes to the parent-child dynamic. Therefore, the social interactions theorized to have an effect on children's ER are not encouraged in these service models, resulting in limited effects on ER. Without altering the transactional model used in the Unified Theory of Development (Sameroff, 2010) between parents and children, we might expect not to see positive effects to children's ER. Additionally, these services may not directly contribute to this bidirectional relationship between parents and children in an equal or active way, resulting in the negative direction of the relationship (Kuczynski, 2003). This result may also be informative to future

program developers that are interested in improving children's ER, as it may be beneficial to focus on active strategies that engage parents, versus passive services or focusing on delivering child-focused services.

Although the data collected was not robust enough to introduce more variables to the model, I have presented descriptives of the techniques used in these programs. These techniques are more specific than the services as they are the skillsets programs hope to provide to families. This suggests that these techniques may be effective skills to impart to parents in this context. As these parent skills are less concerned about how or what parents teach their children, but more about improving parents' own well-being, we may want to continue to develop programs that deal with parents more holistically (e.g., not only as parents, but as individuals). Examining the correlations between services offered and techniques used, there is a significant negative relationship between relationship enhancement and child play groups/didactic materials and child skills. Although this study does not provide evidence for techniques' direct effect on effect sizes, the relationship enhancement technique being negatively correlated with services coded as child services is not in opposition results presented by Leijten and colleagues (2019), which suggest that techniques that build both parent and child skills are associated with higher effects. An unexpected significant correlation between nonviolent discipline and positive reinforcement was also observed. This correlation in techniques offered was not explored in the final model, but we may assume that programs that are encouraging parents to use non-violent discipline may be concurrently encouraging them to use proactive parenting techniques as a replacement behavior.

Another facet of program delivery examined was if programs were delivered individually to families, or not. These results were not significant and differed in direction between the

individual predictor model and the joint model. Specifically, the coefficient individually was small, but positive, and in the joint model it was a larger negative coefficient. This suggests that those in group deliveries had higher effect sizes than those who received the program individually. If we consider the joint model, studies using individual delivery would have an average effect size of 0.01, holding all else constant, whereas those in a group or mixed delivery would have an average effect size of 0.23. Given that this result is not significant, there may be additional studies on implementation that should be considered. As these delivery components have yet to demonstrate conclusive evidence, we may instead want to offer these programs based on parents' preferences, which is often for individually delivered programs (Cunningham et al., 2008; Tully et al., 2017; Wymbs et al., 2015).

The final result presented is based on the measurement of children's ER. Given that SEL and ER are a more recent focus in early childhood, it is not surprising that there is a significant difference in effect size between those measured by the ERC and those measured in other ways. ER has been measured through a range of child self-reports, teacher or parent reports, observational reports or biological indicators (Adrian et al., 2011), so we might expect there to be some variation in what is actually being measured. The ERC is a measure of both lability/negativity and positive emotion regulation in which a teacher or parent reports on a child's behavior. ERC was also validated and designed for use in middle childhood, so it may be less precise when used in an early childhood population (Shields & Cicchetti, 1997). This differs from other measures used. For example, the CBCL is also a measure reported on by parents and teachers, but is based on observed behaviors, versus internal processes. The CBCL was the measure used for a fifth of the effect sizes, and of the five largest effect sizes, the CBCL was the measurement for four of those effect sizes. None of the CBCL effect sizes had

negative effects. These positive and large effects on the CBCL may have impacted this result. Including the CBCL as a measure of ER may be controversial, as it is typically used to assess behavior problems for clinical decisions and is primarily focused on identifying internalizing and externalizing behavior problems (Achenbach & Ruffle, 2000). With this in mind, the CBCL may be capturing more overt behavior effects than the more specific emotion regulation behaviors in young children. The CBCL is also not equipped to measure positive, or adaptive ER strategies. We may consider these differences in measurement as a place to grapple with identifying the difference between a large effect and an accurate effect.

One consideration of measuring ER in early childhood is that these informant ratings may not be capturing any of the internal processes experienced by a child. Therefore, ERC may be more likely to produce small and varied effects than other measures of ER as these processes may not be evident to parents or teachers. Further, the comparison group to the ERC was almost evenly split between observational and parent/teacher-reported measures of children's behaviors; this negative relationship between ERC and effect size seems reasonable. For the early childhood population, there may be a need to instead prefer to measure ER as an observational measure of behaviors as young children may not be able to articulate their emotional states clearly or consistently. Further consideration should be given to whether these behavioral measures are appropriate proxies for ER. One measure, the Social Competence and Behavior Evaluation scale, was used for 8 of the effect sizes. This measure has been validated for children 30- 78 months and relies on parent or teacher observations. Measures that rely on developmentally appropriate behaviors in early childhood may be more representative of these effects. These internal processes may be difficult for parents and teachers to identify, so the measurement of ER during this phase of development may be difficult to capture.

It is also important to note that there were three predictors that were entered as controls (follow-up effect size, passive control, and start year). All were all non-significant when entered individually and both follow-up effect sizes and passive control group were entered into the joint model and were also not significant. Their relationship to children's ER aligns with extant research when entered individually. For example, past studies have noted that positive changes we see at the end of programs often diminish as time progresses (Lundahl, et al., 2006). This non-significant result persisted in the joint model. This means that more recent studies have smaller effect sizes than older studies. This is similar to other studies of parent training programs and parent-child reading programs (Bus et al., 1995; Piquero et al., 2009). This trend is often noted in other meta-analyses, but a theoretical reason has not been proposed. As other programs are evaluated, it would be interesting to see if these trends persist.

As this study included comparison groups that received active alternative comparisons, it was also important to examine the difference between active and passive comparison groups. We would assume that those in passive control groups would show fewer improvements than those in active groups, resulting in larger effect sizes for those programs with passive control comparisons. This result was not significant but did follow the expected trend when entered individually and in the joint model.

7.1 Limitations

The most impactful limitation in this study is the small sample size. Given the nested data, there were limitations on how many variables could be entered into the final model while maintaining power to differentiate significant differences between effect sizes. All of the program level variables of interest were at the study level, so statistical analysis was

challenging. Until there are additional studies family support programs that hope to improve ER in early childhood, the focus of this study had to be broader than hoped.

7.2 Future Directions

There are a few pressing questions that have been left unanswered and would contribute to our knowledge of emotion regulation development in early childhood. Regarding intended study population, the results presented are consistent with existing research, however it may be of interest to further disentangle if these populations are indicated based on children's, families' or parents' characteristics. This may elucidate a more nuanced understanding of how families are identified for services that benefit them. Similarly, being able to disaggregate the data based on "risk" factors may identify what populations are oversampled or identified for these programs. One way that may help us understand these contributing factors is considering baseline information. By examining differential impacts by families' and children's baseline circumstances, we may be able to further identify what is working for whom.

Additionally, as so few programs used child/parent therapy to address improvements in ER, this may be a promising area of future investigation or program development. These services had the highest unadjusted mean effect sizes at the study level, but there were very few programs that studied the effects of these service offerings in this context. This support service also seems promising based on the connection between parents' mental health and children's ER.

Finally, seeing as the measure type had a significant effect, there may be the need to validate an ER measure for early childhood. Development of this tool could take into consideration, as presented earlier, the interdependence of ER in children and parents. This

could be a measure that therefore accounts for parents' ER behaviors, as we may be able to differentiate children's ER when interacting with parents versus others.

7.3 CONCLUSIONS: PRACTICE AND POLICY IMPLICATIONS

Through the use of meta-analysis, I was able to examine data from the previous 15 years to draw conclusions from the patterns across multiple studies and programs. This has the potential to guide future program development and evaluations of ER in family contexts. As suggested by the intercept only model, family support programs that intend to improve children's ER are able to do so. This suggests that these programs are, on average, having a positive effect on children's ER. Considering this result with the joint model suggests that services that are delivered to children only or passively to parents may have a negative association with children's ER. Programs wishing to improve children's ER should instead prioritize delivering active services to both parents and children in an effort to drive positive social interactions.

Further study of delivery of programs and intended populations should be considered, as neither of these factors significantly predicted children's ER. Given the non-significant and small effects, these may not be the aspects of delivery to focus on. There may not be one approach that is best for families, and we may instead choose to focus on the services provided.

The strongest relationship in the model was how the effect size was measured. Given the inconsistent history of defining ER, this result is not surprising. Furthermore, as this study focused on ER in early childhood, there is an additional challenge of measuring this more interior construct. Observational measures of ER may allow for higher ratings in early childhood from embodied responses when children may not be capable of articulating their

internal processes. If we are interested in measuring change in ER during this time period, we may need more sensitive measurement tools than the commonly used ERC.

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APPENDIX A

Search Terms

evaluation or curriculum or intervention or services or program or impact or "home visit*" or prevention or treatment or training

and

child or children or childhood or infant* or baby or babies or toddler* or prenatal

and

(parent* and training) or (“home visit*” or home-based) or (parent* and income) or (parent* and “mental health”) or “parent* education” or ((parent* or mother*) and interaction*) or (parent* and skills) or “family literacy” or “family resources” or “family functioning” or “family support” or “parent support” or “social support”

and

emotion regulation

VITA

Cory J. Campbell's research interests are primarily on supporting positive relationships among caregivers and children across multiple contexts and social-emotional learning. She has a B.S. in Decision Science from Carnegie Mellon University. Cory spent many years developing and evaluating programs and working on a longitudinal study of parents and children. Additionally, she was a Community Partner Fellow at the University of Washington, working with the Boys and Girls Clubs of King County, and has been an instructor for undergraduate courses in the College of Education at the University of Washington in both Early Childhood and Family Studies and Education Studies. Cory is looking forward to working in policy and practice evaluations with communities that have been historically marginalized.