The Impact of Early Life Adversity and Parenting Skills on Emotion Regulation in a Child Welfare-Involved Sample

by

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A thesis accepted and approved in partial fulfillment of the

requirements for the degree of

Master of Science

in Psychology

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Spring 2024

Thesis Abstract

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Master of Science in Psychology

Title: The Impact of Early Life Adversity and Parenting Skills on Emotion Regulation in a Child Welfare-Involved Sample

Child Welfare (CW) involved children are vulnerable to developmental problems, including deficits in emotion regulation. Emotion regulation is crucial for understanding and responding to situations appropriately. The capacity of emotion regulation skills is sensitive and can be affected by early life adversity, family climate, and quality of parenting. This study investigates the emotion regulation skills of 189 CW-involved children and their associations with observed parenting behaviors and early life adversity. Children aged 3-7 (M = 4.86 years) completed an Emotional Go/No-Go Task to assess emotion regulation abilities and a series of DPICS-IV coded interaction tasks with their caregiver. CW-involved parents showed low rates of positive parenting skills (M = 2.5) and 9x higher rates of negative parenting skills (M = 23.6). Additionally, there was a significant amount of controlling parenting behavior, with almost half of the verbalizations children received being commands that were impossible to comply with. These controlling parenting behaviors were associated with higher false alarm rates and quicker reaction times. Exposure to early life adversity was unrelated to performance on the Emotional Go/No-Go Task. As predicted, older children showed faster, more accurate responses and fewer mistakes in correctly identifying facial emotions. Gender differences also emerged, with girls resisting error more efficiently than boys to both happy and angry distractor emotions and boys being quicker in accurately identifying angry faces in the presence of happy and neutral distractor emotions. These findings provide new insights into CW children's emotion regulation, aiding clinicians in understanding the challenges CW-involved children and caregivers face.

Keywords: child emotion regulation, early childhood adversity, go/no-go task, child welfare, parenting

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INTRODUCTION

Emotion Regulation

Emotion regulation refers to managing one's emotions by controlling their duration, intensity, and occurrence (Morris et al., 2017). A child's ability to regulate their emotions is crucial for development as it affects their capacity to understand and respond to situations appropriately. Emotion regulation is also essential for children's social competence and skills, academic achievement, school readiness, and mental health (Graziano et al., 2007; Housman, 2017). Research has shown that children with strong emotion regulation skills tend to have better home and peer relationships. These children are better equipped to handle challenging situations and are less likely to experience emotional outbursts or engage in impulsive behaviors (Graziano et al., 2007). They are also more likely to succeed academically as they are better able to focus, manage stress, and engage in productive problem-solving (Eisenberg et al., 2010). In addition, children with well-developed emotion regulation skills are more resilient and can tolerate frustration when faced with adversity or trauma (Prout et al., 2019). These positive skills carry on with children into adulthood, leading to better outcomes in life, including greater job satisfaction and mental health (Côté & Morgan, 2002). Developing strong emotion regulation skills is an important aspect of a child's overall development and can positively impact multiple areas of their life.

Difficulties with emotion regulation can significantly impact everyday life, leading to increased distress and vulnerability to poor health outcomes. In preschool-aged children, poor emotion regulation skills may manifest as tantrums, aggression, withdrawal from peers and

family, and a lack of social skills (Herndon et al., 2013). If left unaddressed, these difficulties with emotion regulation can become more severe in adolescence and adulthood. The negative consequences of poor emotion regulation skills include an increased risk of dropping out of school, substance abuse, mental health difficulties, behavior problems, and criminality (Cicchetti & Toth, 2016; Parker & Asher, 1987).

Emotion regulation is a critical aspect of mental health, and research suggests that it is closely linked to psychopathology. Children who struggle with regulating their emotions are at a higher risk of developing mental health problems and experiencing psychopathology in the future (Buckholdt et al., 2013). Emotion regulation difficulties are often associated with clinical disorders, including conduct disorders, depression, and anxiety in children, which can have significant negative impacts on a child's development and well-being (Berking & Wupperman, 2012; Miu et al., 2022). These findings suggest that developing effective emotion regulation skills in childhood may be a critical factor in preventing future psychopathology.

The development of emotion regulation is highly sensitive and can be influenced by various factors, including early life adversity and trauma, parenting behaviors, parent-child relationship and attachment, and a child's environment (Eisenberg et al., 2010). While it has been well documented that older children have better emotion regulation abilities (Sanchis-Sanchis et al., 2020; Zimmermann & Iwanski, 2014), few studies have examined the associations between gender and age and emotion regulation in high-risk populations. Furthermore, there is a lack of knowledge about the quality of parenting that child welfare-involved children receive, as well as its associations with their ability to regulate emotions. This paper aimed to explore the relationships between childhood adversity, the quality of observed parenting behavior, and

children's emotion regulation performance in a high-risk sample of child welfare-involved children, as well as the effects of gender and age on emotion regulation in this population.

Parent-Child Relationship and Emotion Regulation

Evidence strongly suggests that a child's emotion regulation development is largely shaped by their family, primarily their parents or primary caregivers (Rutherford et al., 2015; Thompson, 1994). Children observe their parents' actions and internalize and imitate their behaviors. The ability of parents to practice self-regulation is among the first ways children learn about regulating their emotions (Zeman et al., 2006). Children may directly model the responses and reactions of their caregivers (Silk et al., 2006). Child modeling of their caregivers' emotion regulation skills has significant implications for developing their own regulatory abilities (Rutherford et al., 2015). It can be challenging for parents who struggle with emotion regulation to appropriately respond to their children's emotions and help them develop relevant skills. For example, a study by Eisenberg and Morris (2002) found that mothers who consistently display negative emotional responses have children who struggle with emotion regulation, as the children tend to model their parent's behavior. As a result, children who do not experience and observe effective emotion regulation may struggle to regulate their emotions. Parents who regulate their emotions are more likely to display positive parenting behaviors and respond sensitively to their children's emotions (Eisenberg et al., 1998; Gross, 2014). This, in turn, encourages positive emotion regulation in the child.

A parent's ability to regulate their emotions influences the parenting practices and behaviors used (Gottman et al., 1996; Morris et al., 2017; Rutherford et al., 2015). For instance, parents who face challenges in managing their emotions often show less warmth and more hostility towards their children, as noted by Rutherford et al. (2015). Conversely, research by

Crandall et al. (2015) and Zimmer-Gembeck et al. (2022) suggests that parents with stronger emotion regulation abilities are more likely to display warm and positive parenting behaviors. Research examining parenting behaviors often classifies them according to their positive attributes, such as warmth and support, or their negative characteristics, like hostility, coercion, and rejection, and assesses how these behaviors influence a child's ability to regulate their emotions. Positive parenting skills involve being warm, attentive, nurturing, predictable, and responsive to a child's needs (Eyberg & Funderburk, 2011). Parents can show attention and interest in their child by reflecting on their comments, actively listening, and describing their play activities. Additionally, positive parenting includes using praise to encourage specific prosocial behaviors in the child and improve their self-esteem (Eyberg & Funderburk, 2011). Praise entails providing the child with specific and positive feedback for good behavior. Parents can create a warm and secure parent-child relationship by providing attention to the child through reflection and description and praising desirable behaviors (Eyberg & Funderburk, 2011; Zimmer-Gembeck et al., 2022). The findings described above contribute to a growing understanding of parent emotion regulation, parenting practices, and how they influence child emotion regulation. It is well-evidenced that warm, positive parenting is associated with more effective emotion regulation skills in children (Boldt et al., 2020; Houltberg et al., 2012; Koblinsky et al., 2006; Morris et al., 2007, 2017; Rutherford et al., 2015).

In addition to warmth and support, positive parenting involves parents effectively managing their child's behavior and utilizing safe, positive discipline skills. This is a crucial component of successful parenting. Effective commands are one way to give positive discipline and influence a child's behavior and compliance (Morris et al., 2017). Effective commands are clear, direct, positively stated, and developmentally appropriate for the child, making them easy

to comply with (Eyberg & Funderburk, 2011). While giving these commands, parents need to be calm and neutral. After the child complies with the command, parents need to follow up with praise to encourage this behavior response. Parents need to be consistent and follow through with discipline approaches, as it helps the child understand that the parent's response is predictable and increases the child's willingness to follow the parent's directions (Eyberg & Funderburk, 2011; Morris et al., 2013, 2017). Additionally, positive parenting involves setting clear rules and boundaries to guide children in expressing their emotions. This promotes socially acceptable behavior for emotional expression and enhances emotional security by providing children with a sense of predictability (Houltberg et al., 2016). By knowing what to expect, children can better regulate their emotions and respond appropriately to different situations. In sum, effective parenting involves using positive parenting skills paired with safe, effective discipline strategies. These parenting skills enhance the parent-child relationship and encourage positive emotion regulation in children (Bornstein et al., 2018; Koblinsky et al., 2006; Morris et al., 2013, 2017; Rutherford et al., 2015).

In contrast to positive parenting skills, which encourage positive emotion regulation development in children, negative parenting behaviors, such as those that are harsh and controlling, have been evidenced to lead to difficulties in children's emotion regulation (Morelen et al., 2016; Morris et al., 2013, 2017; Zimmer-Gembeck et al., 2022). Negative parenting behaviors include parental rejection, coercion, unpredictability, and harshness. Parental rejection refers to negative behaviors and interactions from a parent toward their child, including aversion, hostility, harsh interactions, and irritability (Skinner et al., 2005). This lack of interest and affection from the parent for their child results in an insecure parent-child relationship that can lead to child behavior and emotional problems (Gottman et al., 1996; Morris et al., 2013, 2017).

Additionally, unpredictable parenting can interfere with a child's ability to regulate emotions effectively. They may struggle to understand and express their feelings, leading to emotional outbursts or difficulty coping with stress (Morris et al., 2007). Research suggests that coercive parenting can be especially harmful to a child's emotion regulation as it often involves over-controlling, manipulative, and highly punitive behavior toward the child (Bornstein et al., 2018; Leerkes & Augustine, 2019; Morris et al., 2007, 2013). This type of parenting can lead to emotional difficulties for children, causing them to experience heightened levels of anxiety, fear, and emotionality due to the authoritarian and punitive nature of coercive parenting techniques (Morris et al., 2002, 2017). It is crucial that parents avoid negative parenting practices that are harsh, controlling, and unpredictable, as they can significantly impact child emotion regulation development.

The existing research indicates a strong association between parent emotion regulation, parenting styles and behaviors, and children's emotion regulation abilities. Child welfare-involved parents often lack positive parenting skills and engage in more hostile and controlling behavior, less affection, and less positive engagement with their children compared to non-welfare-involved parents (Borrego et al., 2004; Mulder et al., 2018; Stith et al., 2009; Wilson et al., 2008). Ample evidence supports the influence of parenting behaviors and the parent-child relationship on child emotion regulation. However, fewer studies combine observational measures of parenting behaviors with experimental measures of child emotion regulation to understand children's emotion regulation abilities from high-risk child welfare backgrounds and how they relate to the kinds of parenting they receive. As such, this study aimed to investigate parenting behaviors and skills that are clinically observed and coded and their association with

children's ability to regulate emotions, as measured via a well-established measure of emotion regulation, the Emotional Go/No-Go Task.

Early Life Adversity

Early life adversity refers to experiences that deviate from the expected environment, such as child abuse and neglect, exposure to violence, and family hardship (McLaughin, 2016). This definition incorporates a wide range of childhood experiences within the category of early life adversity. In the United States, just under 50% of children will experience at least one form of adversity or traumatic event (Kesler et al., 2010; McLaughlin et al., 2012), and 10% of children will experience three or more forms of adversity (Sacks & Murphey, 2018). Much evidence suggests that early life adversity strongly impacts the development of emotion regulation in children (Callaghan & Tottenham, 2016; Krugers et al., 2016; Milojevich et al., 2020). Meta-analyses have reported that early life adversity is associated with difficulties in emotion regulation, including increased habitual rumination, emotional suppression, and higher emotional reactivity (Milojevich et al., 2020; Miu et al., 2022). Additionally, research has shown that children who have experienced adversity often use ineffective emotion regulation strategies, such as avoidance, suppression of emotions, and withdrawal (Boyes et al., 2016; Milojevich et al., 2020; Robinson et al., 2009). Exposure to early life adversity has also been shown to decrease child resilience, a vital trait in emotion regulation (MacPhee et al., 2015). Lack of resilience is associated with increased anxiety, depression, and stress, which in turn leads to an increased risk of emotion regulation difficulties (Davydov et al., 2010). Additionally, children who have experienced adversity display greater emotional instability and reduced ability to adapt their emotional response when compared to non-maltreated children (Shields & Cicchetti, 1998). As evidenced by these findings, childhood adversity exposure negatively impacts the

development of emotion regulation, which can result in emotional dysregulation and a range of mental health issues later in life.

Emotion regulation is linked to prefrontal brain regions involved in cognitive control and executive functioning (Martin & Ochsner, 2016). Executive functions involve top-down mental processes such as reasoning, problem-solving, and planning (Collins & Koechlin, 2012; Lunt et al., 2012). The amygdala is the most widely accepted region involved with executive functioning and emotion regulation (Ahmed et al., 2015; Ochsner et al., 2002). The amygdala is susceptible to lifelong structural and functional changes due to early life adversity (Krugers et al., 2016; McCrory et al., 2011), which may lead to lasting consequences in emotion regulation. Children who have experienced early life adversity exhibit increased amygdala reactivity when processing emotional faces, particularly fear and anger (Van Harmelen et al., 2013). Heightened amygdala reactivity in response to early life adversity may impact accuracy, response inhibition, and reaction time on emotional tasks by influencing emotional processing, impulse control, and the speed of cognitive responses to emotional stimuli (Tottenham et al., 2011). These effects are likely to contribute to differences in how individuals with early life adversity perform on tasks involving emotion processing and regulation. Another study showed early life adversity hampers prefrontal cortex activity, decreasing executive functioning (Hanson et al., 2015). Decreased executive functioning can negatively impact accuracy, response inhibition, and reaction time on emotion tasks by disrupting the cognitive processes involved in attending to, interpreting, and regulating emotional responses (Diamond, 2013). These findings indicate that early life adversity profoundly influences brain regions involved in emotion regulation, leading to emotion regulation difficulties.

Children who have been involved in the child welfare system are particularly vulnerable to developing emotion regulation difficulties due to the multiple forms of adversity they have experienced (Callaghan & Tottenham, 2016; Krugers et al., 2016; Milojevich et al., 2020). These adversities can include physical, emotional, or sexual abuse, neglect, parental substance abuse, or exposure to violence. Such experiences can significantly impact a child's emotional development, leading to lasting difficulties in regulating emotions. This study aimed to examine the associations between early life adversity and emotion regulation in a high-risk sample of welfare-involved children.

Age and Child Emotion Regulation

Developing emotion regulation begins in early childhood at birth and continues to develop into adulthood (Eisenberg et al., 2010; Gross, 2013). Children from infancy to 24 months utilize some self-soothing strategies but otherwise primarily rely on their caregivers for emotion regulation support, using vocalizations, attention-gaze to caregivers, and seeking comfort from caregivers to manage their emotions through co-regulation (Illinois Early Learning Project, 2012; Rosanbalm & Murray, 2018). By age 3, children begin to understand and express their emotions, but they have little control over them (Olson et al., 2009). Hence, this age is characterized by impulsive behavior, including hitting, biting, yelling, and pushing to express emotions and resolve conflicts, with little understanding of the difference between appropriate and inappropriate responses (Rosanbalm & Murray, 2018). At age 4, children start comprehending the consequences of their actions, though they continue to display emotional outbursts. They also understand that these outbursts may result in punishment or other caregiver limit-setting approaches, including loss of privileges and timeouts from positive reinforcement (Dadds & Tully, 2019). By age 5, children are becoming better equipped to recognize emotions,

manage their impulses, and express their feelings using words (Eisenberg et al., 2010). After age 5, children with well-developing emotion regulation skills can increasingly express their emotions in prosocial ways, follow instructions, share, wait, communicate, and solve problems (Denham, 2006). In summary, children's ability to recognize, express, and regulate their emotions improves significantly with age.

Although the research consistently highlights that children's emotion regulation skills and capabilities improve significantly across early childhood, the extent of age differences in emotion regulation abilities has been relatively under-explored among children in the child welfare system. Studies consistently show that children exposed to adversity have poorer emotion regulation than non-exposed children, regardless of age (Bick & Nelson, 2016; Milojevich et al., 2020; Smith & Pollak, 2020). This study explored associations between age and emotion regulation abilities among child welfare-involved children.

Gender and Child Emotion Regulation

Research on gender differences in emotion regulation among young children is still limited. However, recent studies have shown that girls perform better than boys on error monitoring and inhibition tasks. This finding is consistent with anecdotal evidence indicating that girls have better regulatory skills than boys. For example, studies conducted by Grammar et al. (2014), Kim et al. (2018), and Matthews et al. (2009) have all reported that girls outperform boys in tasks related to error processing and regulation. Moreover, studies conducted by Cole (1986) and Davis (1995) have highlighted notable differences in emotional expression between genders within the age range of 3 to 8 years old. They found that girls display more positive emotions during emotion regulation tasks, whereas boys often exhibit higher frustration levels. This discrepancy implies that girls may possess more adept emotional management skills and

cope better with frustration during early childhood. Furthermore, research by Sanchis-Sanchis et al. (2020) has provided additional insights into gender differences in behavioral tendencies during the toddler and preschool years. Their findings indicate that boys are more likely to display externalizing behaviors than girls in this developmental stage.

Taken together, the studies indicate that there might be differences in emotion regulation skills between boys and girls from an early age. Typically, girls demonstrate better error detection and processing, as well as emotion regulation. However, these gender differences are not yet fully comprehended, and further research is necessary to explore these distinctions in emotion regulation. It is even less clear how gender is associated with emotion regulation in children from high-risk, welfare-involved backgrounds. This paper aimed to explore the association between gender and emotion regulation performance in young children who are involved in child welfare and have experienced forms of early life adversity.

Current Study

The current study aimed to observe the relationship between early life adversity, parenting behaviors, and children's emotion regulation in a high-risk sample of child welfare-involved children. There is currently limited knowledge about the relationship between the quality of parenting that child welfare-involved children receive and their ability to regulate emotions. Furthermore, while research has documented better emotion regulation skills in older children (Cole et al., 2013; Eisenberg et al., 2010; Gross, 2013), few studies have examined the effects of age and gender on emotion regulation within high-risk samples. Children who have been involved in the child welfare system face heightened risks of developing emotion regulation difficulties due to enduring various early life adversities (Callaghan & Tottenham, 2016; Krugers et al., 2016; Milojevich et al., 2020). This study explored the associations between early life

adversity and emotion regulation in a sample of children involved in the welfare system. In addition, exploratory analyses were performed to investigate differences in emotion recognition on an Emotional Go/No-Go Task in this high-risk sample.

In sum, this thesis research sought to comprehensively examine the following hypotheses in a child welfare-involved sample of young children:

1) It was hypothesized that older children and girls would display greater emotion regulation in this sample than younger children and boys, respectively.
2) It was hypothesized that greater adversity exposure would be associated with poorer emotion regulation skills.
3) It was hypothesized that in this sample, children of parents with lower levels of positive parenting and higher levels of negative parenting would display poorer emotion regulation.
4) Regarding predictions about within-task differences in emotion regulation skills in these child welfare-involved children, it was hypothesized that children would show greater accuracy and speed in identifying angry faces than happy ones. It was also hypothesized that these children would display greater false alarms to happy emotion distractors than angry ones.

METHOD

Participants

Participants included 189 child welfare-involved children and their caregivers recruited from the Oregon Department of Human Services (DHS). Children with a history of sexual abuse were excluded from this study. Parents had to be 18 years of age or older, be the biological or custodial caregiver of the child, and live in the same household as the child. Participating

children were 3-7 years of age (*M* = 4.8, *SD* = 1.40*)*, and 55% were boys. Children had an average ACE score of 3.5 (*SD* = 1.9). Children in the study were identified as European American/White (*n* = 117), Hispanic (*n* = 6), African American/Black (*n* = 3), Asian/Pacific Islander (*n* = 0), Native American/Alaskan Aleut (*n* = 2), and Multiracial/Multiethnic (*n* = 74). Parents in the study were identified as European American/White (*n* = 144), Hispanic American/Latina (*n* = 5), African American/Black (*n* = 4), Asian/Pacific Islander (*n* = 3), Native American/Alaskan Aleut (*n* = 3), and Multiracial/Multiethnic (*n* = 42). If a parent or child identified themselves as multi-racial, parents were instructed to select all races that applied, resulting in more responses than the number of participants in the study. Of the total sample, 78.5% of parent-child dyads lived in households below the poverty line, and 53.7% of children had caregivers who were unemployed at the time of the study.

Procedures

The study's sample included individuals referred by the State of Oregon's Department of Human Services (DHS) between April 2016 and June 2019. These individuals met the inclusion criteria and agreed to participate in the study. The eligibility criteria included: (a) the participating parent was at least 18 years old at the time of study entry, (b) the participating child's biological or custodial parent, (c) the participating child was between 3 and 7 years old at study entry, (d) no parent or caregiver in the home was a documented child sexual abuse perpetrator according to child welfare records, (e) the parent could speak sufficient English to engage in an assessment, and (f) the parent provided written consent to participate. Participating parent-child dyads completed the same assessments before and after treatment, which included parent-child interaction tasks, individual parent and child tasks, and surveys. Additional

information regarding recruitment and assessment procedures is available in Nekkanti et al. (2020).

Parent-Child Interaction Tasks

Parent-child dyads underwent a standard Parent-Child Interaction Therapy Dyadic Assessment Protocol. This protocol included a standard set and arrangement of toys in a playroom for parent and child to engage with. There were three 5-minute parent-child interactions: a 5-minute Child-Led Play, a 5-minute Parent-Led Play, and a 5-minute Clean-Up Task. Parents were provided with an earpiece at the beginning of a session that allowed researchers to communicate task instructions through a one-way mirror to the parent alone in the playroom with their child completing the tasks. Parents were instructed to follow their child's lead during Child-Led Play, decide what to play with during Parent-Led Play, and direct their child to clean up the toys during the Clean-Up Task. Parent behaviors were observationally coded using the Dyadic Parent-Child Interaction Coding System-IV (DPICS) described below.

Observed Parenting Behaviors

Parent behaviors during the Dyadic Assessment Protocol's Child-Led Play and Clean-Up Task were recorded, transcribed, and coded using the Dyadic Parent-Child Interaction Coding System-IV (Eyberg et al., 2013). Parenting behaviors that were coded included labeled praises, unlabeled praises, behavior descriptions and reflections, negative talk/criticisms, compliable direct and indirect commands, no opportunity to comply commands, questions, and neutral talks. A Positive Parenting score was calculated as the frequency of parent behaviors during Child-Led Play that were coded and labeled *Praises* (e.g., “You did a great job sharing your toys with me”), *Reflections* (e.g., child states, “I love this game,” parent states “you love this game”), and behavior *Descriptions* (e.g., the child places a toy cow in the barn, parent states “you are putting

a cow in the barn"). Also drawn from Child-Led Play, a Negative Parenting score was calculated by summing the frequency of all *Negative Talk* (e.g., "your coloring is bad"), *Questions*, and *Commands* (e.g., "put that block here"). Next, during the Clean-Up Task, two parenting variables assessed a parent's ability to give effective commands to their child to guide them in cleaning up the playroom toys: (1) Compliable, direct commands: the frequency of all commands given to the child during the Clean-Up Task that were both direct and compliable; and (2) No opportunity for compliance commands during Clean-Up: the frequency of all commands given to the child during the Clean-Up Task that were impossible to comply with. Compliable, direct commands are clearly stated orders, demands, or directions a child can comply with (e.g., "Put the blocks back in the bin"). No opportunity for compliance commands are those that a child is not given an adequate chance to comply with (e.g., "You need to clean your room when we get home").

Child Emotion Regulation

Emotional Go/No-Go Task

To assess emotion regulation, all children performed a child-friendly Emotional Go/No-Go Task adapted from Pollak et al. (2001). In this task, children respond to either happy, angry, or neutral face stimuli by pressing a response key when a target emotion is presented (Go trials) and inhibiting a response when a distractor emotion is presented (No-Go trials). Children completed a practice block of four trials: two go trials (happy is go) and two no-go trials (angry is no-go). The children then completed four blocks of trials for 76 trials. In Block 1(18 trials), children were instructed to respond to happy faces (Go stimuli) and inhibit responses to angry faces (No-Go or distractor stimuli). In Block 2 (18 trials), the task was reversed, with happy faces as the distractor (No-Go) stimuli and angry faces as the Go stimuli. In Blocks 1 and 2, 50% of the trials contained positive emotion stimuli, and 50% contained negative emotion stimuli. In

Blocks 3 and 4 (each 20 trials), neutral faces were presented along with angry and happy faces. In Block 3, go trials were to angry faces (40% of trials), and no-go trials were to both happy (20% of trials) and neutral faces (40% of trials). In Block 4, go trials were to happy faces (40% of trials), and no-go trials contained angry (20% of trials) and neutral faces (20% of trials). In trial Block 1 and trial Block 3, children were responding to positive emotion stimuli. In trial Block 2 and trial Block 3, children were responding to negative emotion stimuli. The emotion faces stimuli were presented for 1500 ms, and fixation was set to 1000 ms. Responses could be made while the stimulus was on the screen and during a 250 ms ISI.

The behavioral scores of interest on the Emotional Go/No-Go Task were calculated for each of the four trial blocks. They consisted of (a) Go Accuracy scores, defined as the percentage of correct responses on Go trials; (b) False Alarm Rate, defined as the percentage of incorrect responses on No-Go trials; and (c) Average Reaction Time in milliseconds; defined as average response time on all correct go trials. Go Accuracy was calculated by dividing the number of go trials with a correct response by the total number of go trials in the given block. False Alarm Rate was calculated by dividing the total number of no-go trials with an incorrect response by the total number of no-go trials. Average Reaction Time was calculated as the average response time for all correct go trials in a block. Participants without responses to any trials in a block, as well as any trials with reaction times between 0-100 ms, were omitted. If a child had fewer than 20 trials, they were removed. Following these exclusions, 189 children had usable data after the four blocks.

Survey Measures

Adverse Childhood Experiences

Parents completed the Adverse Childhood Experiences (ACEs) questionnaire to assess their child's exposure to early life adversity. The CDC and Kaiser Permanente developed this widely used and validated ACEs questionnaire in the 1990s (Felitti et al., 1998). The ACEs questionnaire produces a score out of 10, with items including physical, emotional, and sexual abuse; physical and emotional neglect; parent drug or alcohol abuse; parent mental illness; divorce of parents; incarceration of parent; and childhood domestic violence. One point is given for each type of adversity experienced.

Data Analytic Plan

Means [*M*] and standard deviations [*SD*] of child Emotional Go/No-Go Task scores were calculated. The means, standard deviations, minimums, and maximums of the observationally coded parenting behaviors were also calculated. Differences in emotion recognition between trial blocks were compared using paired-sample t-tests for the outcome measures, Go Accuracy, Average Reaction Time, and False Alarm Rate. The relationships between emotion regulation performance and child age, gender, and ACE score were analyzed through correlational and multiple regression analyses. The relationships between observed parenting behaviors during Child-Led Play and Clean-Up Tasks and children's emotion regulation performance were analyzed through linear regression analyses.

RESULTS

Descriptive Statistics

Child Behavioral Measures

Children's Go Accuracy, False Alarm Rate, and Reaction Time on the Emotional Go/No-Go Task can be seen in Table 1. Children were the most accurate in identifying positive emotion faces in Block 1 (*M* = 85%, *SD* = 23) and the least accurate in identifying negative emotion faces in the presence of positive and neutral distractors in Block 3 (*M* = 75%, *SD* = 26). Children had the highest rate of false alarms to positive and neutral distractors in Block 3 (*M* = 40%, *SD* = 28) and the lowest rate of false alarms to negative emotion distractors in Block 1 (*M* = 17%, *SD* = 24). Children were the quickest in correctly identifying negative emotions in the presence of positive and neutral distractor emotions in Block 3 (*M* = 857.25 ms, *SD* = 227.55) and the slowest in correctly identifying positive emotions in the presence of negative emotion distractors in Block 1 (*M* = 890.23 ms, *SD* = 199.33).

Parent Behavioral Measures

Observationally coded parenting skills displayed during the Child-Led Play and Clean-Up Task can be seen in Table 2. Overall, this child welfare-involved sample of parents showed low rates of positive parenting skills (*M* = 2.5, *SD* = 2.58) and 9X higher rates of negative parenting behaviors (*M* = 23.6, *SD* = 11.62) during the 5-minute Child-Led Play Task. During the Clean-Up Task, an average of 6.23 (*SD* = 4.44) parent verbalizations were compliable, direct commands, while 14.17 (*SD* = 12.81) verbalizations comprised 'no opportunity to comply' commands.

Emotional Go/No-Go Performance Differences by Block

Paired-sample t-tests were used to assess if there were performance differences on each of the outcome measures: Go Accuracy, Average Reaction Time, and False Alarm Rate. In Blocks 1 and 2, children identified positive and negative emotion faces in the presence of positive and negative distractor emotions. In Blocks 3 and 4, children identified positive and negative emotion faces in the presence of positive, negative, and neutral distractor emotions.

Go Accuracy

Emotion Distractors vs. Neutral and Emotion Distractors. There was no significant difference in children's Go Accuracy when identifying positive emotion faces in Block 1 (happy was go, angry was no-go) and Block 4 (happy was go, angry and neutral were no-go), $t(168) = 1.13$, $p = 0.27$. Children were equally accurate in identifying positive facial emotions regardless of whether the distractors were negative emotions only or a mix of negative and neutral emotions. However, ceiling effects were observed in both trial blocks. Children demonstrated near-perfect accuracy when responding to positive emotion faces, regardless of whether distractor faces displayed angry or neutral expressions. There was a significant difference in children's Go Accuracy to negative emotion between Block 2 (angry was go, happy was no-go) and Block 3 (angry was go, happy and neutral were no-go), $t(181) = 2.32$, $p < 0.05$. In other words, results indicate that children were more accurate when identifying negative emotion faces in the context of positive emotion distractors alone than when distractors included both happy and neutral faces.

Positive vs. Negative Emotion Faces. There were no significant differences in Go Accuracy between Block 1 (happy was go, angry was no-go) and Block 2 (angry was go, happy was no-go), $t(175) = 1.52$, $p = 0.13$. Children were equally skilled in correctly identifying

positive and negative emotions. However, a ceiling effect was observed in both trial blocks. Whether the stimulus was happy faces or angry faces, children reached near-perfect accuracy.

Positive vs. Negative Emotion Faces with Neutral Distractors. When accurately identifying positive vs. negative emotions in the presence of neutral distractors, there was a significant difference in Go Accuracy, $t(177) = -2.44$, $p < 0.05$, between Block 3 (angry was go, happy and neutral were no-go) and Block 4 (happy was go, angry and neutral were no-go). Children were significantly more accurate in correctly identifying happy faces when neutral and angry distractors were present and less accurate in correctly identifying angry faces when neutral and happy distractors were present.

Average Reaction Time

Emotion Distractors vs. Neutral and Emotion Distractors. There was a significant difference in children's Average Reaction Time, $t(166) = 2.05$, $p < 0.05$, between Block 1 (happy was go, angry was no-go) and Block 4 (happy was go, angry and neutral were no-go). Children were significantly slower in correctly identifying happy faces when angry distractors were presented than when identifying happy faces in the context of both angry and neutral distractors. There was no significant difference in children's Average Reaction Times to anger, whether presented with happy distractors only (Block 2) or together with neutral distractors as well (Block 3), $t(175) = 1.43$, $p = 0.15$. In other words, the speed with which children correctly identified negative emotions did not change in the presence of happy distractors vs. happy and neutral distractors.

Positive vs. Negative Emotion Faces. There was no significant difference in children's Average Reaction Times during Block 1 (happy was go) and Block 2 (angry was go), $t(173) =$

0.84, $p = 0.40$. The speed with which children correctly identified the "Go" stimulus did not significantly differ between positive and negative emotions.

Positive vs. Negative Emotion Faces with Neutral Distractors. When accurately identifying positive vs. negative emotions in the presence of neutral distractors, there was no significant difference in Average Reaction Time between Block 3 (angry was go, happy and neutral were no-go) and Block 4 (happy was go, angry and neutral were no-go), t (173) = 0.66, $p = 0.51$. Children's speed when correctly identifying the go emotion stimulus did not significantly differ between happy faces with angry and neutral distractors or angry faces with happy and neutral distractors.

False Alarm Rate

Emotion Distractors vs. Neutral and Emotion Distractors. There was a significant difference in False Alarm Rate to negative emotion distractors, $t(167) = -10.38$, $p < 0.001$, between Block 1 (angry distractors only) and Block 4 (angry and neutral distractors). Children had significantly higher false alarms to angry and neutral distractors (Block 4) than to angry distractors alone (Block 1). However, there was an observed floor effect in Block 1 when angry served as the only distractor. Children were nearly perfect in resisting error when anger alone was the distractor stimulus, but in the presence of the additional, neutral stimulus, children displayed higher rates of false alarms. There also was a significant difference in False Alarm Rates to positive emotion distractors, $t(181) = -7.14$, $p < 0.001$, between Block 2 (happy distractors only) and Block 3 (happy and neutral distractors). In the presence of the additional, neutral stimulus, children had higher rates of false alarms to positive emotion distractors than when the positive emotion distractor was presented alone.

Positive vs. Negative Emotion Faces. There was a significant difference in False Alarm Rate, $t(175) = -5.04$, $p < 0.001$, between Block 1 (angry distractors) and Block 2 (happy distractors). Children had significantly higher false alarms to positive emotion distractors, and a floor effect was observed when negative emotion distractors were presented. Children were nearly perfect in resisting error when anger was the distractor emotion.

Positive vs. Negative Emotion Faces with Neutral Distractors. There was no significant difference in False Alarm Rate between Block 3 (happy and neutral distractors) and Block 4 (angry and neutral distractors), $t(176) = 0.45$, $p = 0.65$. Children were equally accurate in resisting error to positive and negative distractors when neutral distractors were also presented.

Relationship between Child Characteristics and Emotion Regulation Performance

Multiple regression analyses were used to examine associations between emotion regulation performance and demographic characteristics of children. For each outcome measure of the Emotional Go/No-Go Task (i.e., Go Accuracy, Average Reaction Time, and False Alarm Rate), the predictors were child age, gender, and ACE scores.

Testing Child Gender Effects

Go Accuracy. As Table 3 shows, there was no significant effect of Gender on Go Accuracy in any of the trial blocks. In other words, children's accuracy in correctly identifying the target emotion did not change as a function of gender.

Average Reaction Time. As Table 4 shows, there was no significant effect of Gender in the response speed for correctly identifying emotion faces in Blocks 1, 2, or 4. However, a significant effect for gender emerged in Block 3, such that boys displayed faster reaction times than girls when correctly identifying angry faces in the context of both happy and neutral

distractors (boys *M* = 815.89 ms, girls *M* = 904.03 ms). See Figure 1 for a box plot of gender differences in reaction speed in Block 3.

False Alarm Rate. As Table 5 shows, there was a significant effect of gender on the False Alarm Rate in Block 1 (angry distractors) and in Block 2 (happy distractors). Gender significantly contributed to children's error resistance, with girls committing fewer errors than boys in Block 1 to negative emotion distractors (boys *M* = 21.5%, girls *M* = 10.7%) and in Block 2 to positive emotion distractors (boys *M* = 30.2%, girls *M* = 21.1%). See Figure 2 and Figure 3 for box plots of gender differences in false alarms in Block 1 and Block 2. There was no significant effect of Gender on False Alarm Rate in Block 3 (happy and neutral distractors) or Block 4 (angry and neutral distractors). In the presence of emotion distractors with neutral distractors, children had no differences in performance in regard to gender.

Testing Child Age Effects

Go Accuracy. As Table 3 shows, regression analyses revealed a significant effect of age on Go Accuracy in all blocks. Older children were more accurate than younger children at identifying the target emotion.

Average Reaction Time. As Table 4 shows, there was a significant effect of age on Average Reaction Time in Block 1 (happy was go) in Block 3 (angry was go, happy and neutral were no-go). Older children were quicker in correctly identifying positive emotion faces in Block 1 and negative emotion faces in the context of happy and neutral distractors in Block 3. Age had no significant effect on Average Reaction Time in Block 2 (angry was go, happy was no-go) or in Block 4 (happy was go, angry and neutral were no-go).

False Alarm Rate. As seen in Table 5, analyses revealed that age had a significant effect on False Alarm Rates to positive and negative emotion distractors. Older children had greater

error resistance to distractor emotions in Block 1 (angry distractors), Block 2 (happy distractors), and Block 4 (angry and neutral distractors). In Block 3, when angry was go and happy and neutral were the distractors, age had no significant effect on False Alarm Rate.

Testing ACEs Exposure Effects

Contrary to my hypotheses, children's exposure to adversity as measured by their ACE scores was not correlated with emotion regulation scores on the Emotional Go/No-Go Task. As shown in Tables 3, 4, and 5, respectively, children's ACE scores did not account for significant variability in the accuracy of children's positive or negative emotion recognition, speed of emotion recognition, or regulation in the context of emotional distractors.

Relationship between Observed Parenting Behaviors and Child Emotion Regulation

Using simple linear regression models, with parenting behaviors as the predictor(s) and child Emotional Go/No-Go Task scores as the outcomes, I tested the relationships between DPICS-coded (a) positive parenting (PRIDE) skills and (b) negative parenting behaviors during Child-Led Play, and children's performance on the Emotional Go/No-Go Task. A simple linear regression model was also employed to test the relationship between parents' use of (c) compliable, direct commands and (d) no opportunity to comply with commands during the Clean-Up Task and children's Emotional Go/No-Go Task scores.

No significant relationships were observed between positive or negative parenting behaviors during Child-Led Play and children's Emotional Go/No-Go Task performance. However, significant associations were observed during the Clean-Up Task between the frequency of parent commands and children's Emotional Go/No-Go Task performance.

Go Accuracy

As seen in the regression results reported in Table 6, neither the rates of direct commands nor 'no opportunity to comply' commands given during the Clean-Up Task were associated with children's Go Accuracy for positive or negative emotion recognition on the Emotional Go/No-Go Task.

Average Reaction Time

As seen in the regression results reported in Table 7, analyses revealed that children who received a higher frequency of **'**no opportunity to comply' commands displayed significantly faster reaction times to angry facial emotions in Block 2 and Block 3. Children who received more 'no opportunity to comply' parent commands were also quicker to correctly identify positive emotion faces when distractor stimuli included both angry and neutral faces (Block 4). Next, the frequency of compliable, direct commands children received during the Clean-Up Task was also correlated with reaction time scores. Similarly to 'no opportunity to comply' commands, a higher frequency of compliable, direct commands received was associated with faster identification of angry faces in Block 2 and Block 3 and quicker identification of happy emotion faces in Block 4. Finally, greater parent use of commands, both direct, compliable, and not compliable, was associated with quicker reaction times in Blocks 2, 3, and 4.

False Alarm Rate

Significant associations emerged between the frequency of parent commands during Clean-Up and children's false alarms to distractor emotions. As seen in the regression results reported in Table 8, children who received more direct commands and more 'no opportunity to comply' commands displayed more false alarms to angry distractors in Block 1 and Block 4.

More ‘no opportunity to comply’ commands also significantly predicted greater false alarms to happy emotion distractors in Block 2 and Block 3.

DISCUSSION

This study examined the emotion regulation skills of a sample of child welfare-involved children using a rigorous, experimental Emotional Go/No-Go Task. The results described above contribute to a growing understanding of factors associated with emotion regulation skills in high-risk children. These results provide insight into parenting skills in high-risk child welfare families and predictors of these children’s emotion regulation abilities that can help clinicians better understand the challenges welfare-involved children experience. Furthermore, this study highlights differences in emotion recognition among welfare-involved children.

Welfare-Involved Children’s Emotion Recognition and Emotion Regulation Performance

The impact of childhood adversity on emotion recognition has been studied in children, but the findings vary significantly depending on the type and severity of the adversity exposure. For example, Pollak et al. (2000) discovered that children who were neglected had a more challenging time distinguishing emotional expressions compared to children who were not neglected or those who were physically abused. However, physically abused children demonstrated a tendency towards recognizing angry facial expressions (Pollak et al., 2000). In the current study, child welfare-involved children were proficient at discriminating between positive and negative emotional expressions, as evidenced by their near-perfect accuracy in identifying both happy and angry facial emotions, regardless of the valence of the emotion distractors. However, when distractors included both positive (happy) and neutral emotions, children’s accuracy in identifying negative (angry) emotions decreased. These children were less accurate in recognizing angry faces when seeing happy and neutral distractors than when they

only had to distinguish angry faces from happy ones. This finding suggests that the contrast between angry and happy faces might be clearer and easier for children to discern when neutral expressions are not present as distractors. This may be due to the added nuance with the neutral distractors, making it more challenging for children to identify emotional expressions correctly.

In addition, it was found that reaction times to identify the target emotion stimuli correctly were influenced by the type of distractors present. Children exhibited faster reaction times when identifying happy faces with angry distractors than happy faces with angry and neutral distractors. In simpler terms, when angry faces were the only distractors, children were quicker to recognize the happy faces than when neutral faces were also distractors. Angry expressions are typically more emotionally salient or attention-grabbing than neutral expressions (Fox et al., 2000). When angry faces are the only distractors, children may quickly focus on and identify the contrasting happy expressions amidst the more noticeable angry cues. However, when neutral faces are also present, the contrast between happy and neutral expressions may be less pronounced, requiring more time for children to discern the happy faces amidst the distracting emotional and neutral stimuli. This study found no significant difference in reaction times when identifying positive or negative emotions. This suggests children may use similar cognitive processing mechanisms for positive and negative emotions. They may allocate equal attention and mental effort when processing emotional stimuli without inherently prioritizing one type of emotion over the other in terms of speed.

Differences in children's false alarm rates also emerged in this sample. When neutral faces and emotional distractors were present, false alarm rates were significantly higher than when emotional distractors were presented alone. This suggests that neutral distractors increased the likelihood of errors in emotion recognition regardless of which emotional stimuli (angry or

happy) were the target. One possible explanation for this finding is that the presence of neutral faces might have created ambiguity or uncertainty for the children when distinguishing between emotional expressions and neutral expressions. The contrast between emotional and neutral expressions could have made it more challenging for children to accurately differentiate between them, leading to a higher rate of false alarms. Additionally, the presence of neutral faces alongside emotional distractors may have influenced children's decision-making processes, potentially increasing the likelihood of errors in emotion recognition.

In summary, significant findings emerged in children's emotion recognition accuracy, speed of recognition, and error resistance to distractor emotions in this high-risk sample. Firstly, neutral distractors have an impact on emotion recognition. The presence of neutral distractors alongside emotional expressions affected children's ability to accurately identify emotions. This suggests that the contrast between emotional expressions (e.g., angry and happy) becomes less clear and more challenging for children when neutral expressions are introduced as distractors. Understanding how the context of neutral expressions influences emotion recognition helps reveal the complex cognitive processes involved in emotion recognition. Secondly, the findings highlight that the emotional salience of the distractor type influences reaction times. When angry faces serve as distractors, children tend to have faster reaction times than when neutral faces are also present. This suggests that emotionally salient cues, such as angry expressions, may capture children's attention more quickly and facilitate the recognition of contrasting emotional expressions. However, when neutral distractors are present, it reduces the salience of emotional expressions, leading to longer reaction times. This may be because children need more time to discern the emotional faces amidst the distracting neutral stimuli. This finding highlights the importance of emotional salience in cognitive processing and its impact on children's ability to

recognize emotions. Together, these findings provide valuable insights into the emotion recognition and regulation skills of a sample of children in the child welfare system who have faced adversity.

The role of gender and age

When considering children's Emotional Go/No-Go performance as a function of age and gender, there were a few significant associations. First, older children performed better on all Emotional Go/No-Go Task components. This is consistent with other studies that have documented positive relationships between age and emotion regulation: As children get older, they become increasingly better at regulating their emotions. (Cole et al., 2013; Eisenberg et al., 2010; Gross, 2013; Sanchis-Sanchis et al., 2020; Zimmerman & Iwanski, 2014). This happens because of various factors, including maturation of their neurobiology, cognitive development, learning to deal with emotions through social interactions and experiences, influence from parents and the environment, and increasing self-awareness and autonomy over time (Eisenberg et al., 2010; Martin & Ochsner, 2016). All these factors work together to help children improve their ability to manage their emotions as they move through different stages of development, from childhood to adolescence.

Child gender differences were also observed, with girls being better at resisting error to angry distractors, regardless of age. Others have also documented gender differences in error processing and resistance (Grammar et al., 2014; Kim et al., 2018; Matthews et al., 2009). A possible explanation for girls having greater error resistance than boys may be developmental differences in brain structure and function. Studies have shown that the prefrontal cortex, a region crucial for inhibitory control and error monitoring, undergoes distinct maturation patterns in boys and girls (Lenroot et al., 2007). Girls tend to exhibit earlier and more pronounced

development in areas associated with executive functions than boys, which may confer an advantage in tasks requiring error resistance (Grissom & Reyes, 2019). Additionally, socialization processes, through which individuals learn and internalize societal norms, values, and behaviors, often based on gender, may contribute to gender differences in emotion regulation (Chaplin et al., 2010; Liben & Bigler, 2002). From a young age, boys and girls may be socialized differently regarding expectations, roles, and behaviors. These gendered socialization processes could impact the development of inhibitory control and error resistance skills. For instance, boys may be encouraged to engage in more risk-taking behaviors, which could influence their tolerance for errors or impulsivity compared to girls, who may be socialized to be more cautious and risk averse. Further research is needed to explore the underlying mechanisms driving gender differences in inhibitory control and error resistance, including the potential role of biological factors and socialization processes.

Minimal research has examined gender-based differences in reaction time on emotion regulation tasks. This study found that boys reacted faster than girls to correctly identify angry facial emotions in the presence of happy and neutral distractors. This gender difference in reaction times suggests that boys had quicker processing speed when recognizing angry expressions amidst distracting emotional cues like happy and neutral faces. One possible interpretation of this finding is that boys and girls may have different attentional or cognitive processing strategies when processing and interpreting emotional stimuli. Boys may exhibit a greater ability to focus on and rapidly identify angry expressions, even in the presence of distracting emotional cues. However, when interpreting the gender-based emotion regulation differences together, boys in this sample showed quicker reaction times and greater errors. Together, these findings suggest greater reactivity and impulsiveness in boys than in girls. This is

consistent with findings that have examined gender differences in emotional reactivity and found that boys exhibited higher levels of emotional reactivity than girls (Calkins & Dedmon, 2000; Else-Quest et al., 2006; Zahn-Waxler et al., 2008). These findings add to our understanding of potential gender differences in emotion recognition processes and highlight the importance of considering individual and gender-related factors in emotional processing. It also underscores the complexity of how gender may interact with other factors, such as biological and socialization processes, to influence cognitive and emotional abilities (Chaplin et al., 2010; Liben & Bigler, 2002).

Early Life Adversity and Emotion Regulation

The present study's findings show no significant associations between early life adversity exposure and children's emotion regulation skills, which conflicts with conventional understandings of the impact of early life adversity on children's emotion regulation abilities. In this study, early life adversity exposure, measured by an ACE score, was not associated with child emotion regulation abilities on any measure of the Emotional Go-No/Go Task (i.e., Go Accuracy, Average Reaction Time, False Alarm Rate). Early life adversity refers to a range of adverse experiences, including abuse, neglect, household dysfunction, and exposure to violence, all of which can have profound and lasting effects on various aspects of a child's development and outcomes (Callaghan & Tottenham, 2016; Krugers et al., 2017; Milojevich et al., 2020). The lack of significant findings may be due to the limitations of using only one measure of adversity exposure. The ACEs questionnaire used in this study primarily focuses on a specific set of experiences that might not encompass all the adversities experienced by the children in this high-risk sample. As a result, it is possible that some of the negative, adverse experiences that these children have faced might not be captured in the assessment, such as housing instability,

bullying, and discrimination, potentially explaining the null association observed. Furthermore, the ACEs measure cannot capture additional information about adversity exposure, such as the timing, severity, and duration. Without information about these factors, the complexity of children's adversity experiences and how they relate to emotion regulation outcomes cannot be fully understood, and associations may not be found.

The ACEs questionnaire assesses exposure to various forms of adversity, such as abuse, neglect, and household dysfunction. However, if the majority of children in the sample have experienced a high number or similar types of ACEs, there may be limited variability in the scores on this measure. As a result, it becomes challenging to identify meaningful correlations between ACEs and emotion regulation skills because the sample lacks variability in terms of adversity exposure. Future research may consider surveying a larger and more diverse population of children with a broader range of adversity exposure. By including children with varying levels and types of adversity exposure, the variability in the sample can be increased. This greater variability increases the likelihood of observing the hypothesized associations between adversity exposure and emotion regulation skills.

Parenting Skills and Child Emotion Regulation

Contrary to expectations, positive parenting skills, as observationally coded using DPICS-IV, did not predict better child emotion regulation performance. However, there was a notable discrepancy in the quality of parenting the children in this high-risk sample received. In this child welfare-involved sample, parents demonstrated markedly low rates of positive parenting skills and very high rates of negative parenting skills. Negative parenting skills were presented nine times as frequently as positive parenting skills in a 5-minute Child-Led Play session. The sheer number of negative, aversive parenting skills found in this study is consistent

with existing literature that has examined the types of parenting often observed in child welfare families (Borrego et al., 2004; Wilson et al., 2008; Stith et al., 2009; Mulder et al., 2018). The low prevalence of positive parenting skills within the sample population may have hindered the ability to detect significant associations between positive parenting skills and child emotion regulation.

Moreover, an essential aspect of effective, positive parenting is giving clear, direct, and effective commands that a child can comply with (Eyberg & Funderburk, 2011). In this study, parents were instructed to give compliable, direct commands rather than commands that were impossible to comply with. In this sample, there were very high volumes of controlling parenting behaviors. On average, half of all parent verbalizations children received were commands that were impossible to comply with. These high levels of controlling parenting behaviors correlate with child emotion regulation, specifically higher false alarm rates for both happy and angry emotion distractors and quicker reaction times when correctly identifying angry and happy emotions. Interestingly, the more commands that parents employed during the Clean-Up Task, regardless of whether they were considered effective or impossible to comply with, correlated with greater false alarm rates to anger and quicker speed when accurately identifying positive or negative emotions. These findings indicate that children who receive high levels of controlling parenting have weaker emotion regulation skills in the context of distractor emotions but faster reaction times when correctly identifying the target emotional stimuli. One possible explanation for these findings is that because these children receive high levels of non-compliable commands, the good commands are indistinguishable from the bad. The constant barrage of commands, particularly non-compliable ones, coupled with overcontrolling parenting practices, can disrupt a child's emotion regulation abilities. They may experience heightened stress,

frustration, or confusion, which can impede their ability to regulate their emotions effectively. Another possible explanation for these findings is that parents' tendency to be overcontrolling and exhibit large numbers of commands may lead to heightened reactivity and emotional arousal. This heightened reactivity and emotional arousal may influence response times and inhibition on emotion regulation tasks. Children with heightened reactivity may find it more challenging to inhibit impulsive responses triggered by emotional cues, leading to difficulty exerting control over their reactions (Tottenham et al., 2011). However, it is also possible that children with heightened reactivity may exhibit faster reaction times to emotional stimuli due to their heightened sensitivity to such cues. Further research is needed to explore the associations between heightened reactivity and emotion regulation performance.

The association between high levels of parent commands and children's emotion regulation task performance suggests that parenting behaviors play a significant role in shaping children's ability to process and regulate emotions. Understanding the dynamics of parent-child interactions and the impact of parenting styles on children's emotion regulation can inform interventions and support strategies to promote healthy emotional development in children.

Limitations and Future Directions

Despite this study's valuable findings, there are some limitations to consider. First, the study's cross-sectional design does not allow for causal inferences. While this design provides valuable insights into associations between early life adversity, parenting behaviors, and child emotion regulation, it cannot determine whether there are direct causes and effects. In other words, the study cannot conclude whether early life adversity and parenting behaviors directly cause differences in emotion regulation abilities among children involved in child welfare services. Longitudinal studies that follow children over time may provide a better understanding

of how early life adversity and parenting behaviors may be directly associated with emotion regulation abilities.

Moreover, the study sample consisted of children aged 3-7, with a mean age of 4.86 years. While this age range is critical for understanding early childhood development, the findings cannot be generalized to older children. Emotion regulation is a complex process that continues to evolve across childhood and adolescence (Eisenberg et al., 2010; Gross, 2013). By restricting the sample to young children, the study may not capture the full spectrum of emotion regulation abilities and experiences, particularly those that emerge or change as children grow older. For example, as children enter school age and interact more with peers and teachers, they may encounter new social and emotional challenges that require different emotion regulation skills. Additionally, the impact of early life adversity on emotion regulation may vary across different developmental stages. Young children may primarily rely on external regulatory strategies (e.g., seeking comfort from caregivers) (Rosanbalm & Murray, 2018). In contrast, older children may develop more complex regulatory processes of emotion regulation (e.g., cognitive reappraisal) (McRae et al., 2012). Therefore, future research may consider studying children across a broader age range to better understand how emotion regulation may change and develop over time, especially concerning early life adversity exposure.

In addition, future research should explore the role of culture and race in shaping emotion regulation abilities in children who are involved in child welfare services. Cultural beliefs, values, and socialization practices can influence how emotions are expressed, regulated, and understood within a child's household and community (Markus & Kitayama, 1991; Morris et al., 2007). Children from different cultural backgrounds may use emotion regulation strategies based on their cultural norms and expectations. Examining cultural influences can allow researchers to

understand how these norms shape children's emotion regulation abilities. In addition, race can impact children's emotion regulation through various pathways, including social, economic, and systemic factors (Brody et al., 2006; Priest et al., 2013). Racial minorities may experience additional stressors and face systemic barriers that affect their emotion regulation abilities. By exploring race-related experiences and influences, researchers can understand the impact of these factors on children's emotion regulation. Future research should consider race and culture to gain a comprehensive understanding of the complexities surrounding emotion regulation in vulnerable populations.

Finally, the study relied on a single measure of adversity exposure, which may not capture the full extent of children's adversity experiences in this high-risk sample of welfare-involved children. Additionally, the timing, duration, severity, and chronicity of adversities can all influence their effects on children's emotion regulation (Pollak et al., 2000). Adversity experienced during sensitive periods of development, such as early childhood, may have more profound and lasting impacts. Similarly, chronic or severe adversity may be detrimental to children's emotional regulation abilities. Therefore, it is essential to consider these factors when assessing adversity exposure and its relationship to emotion regulation. Future studies may consider using additional measures of adversity exposure to fully capture the extent of adversity exposure in this high-risk sample.

By addressing this study's limitations and exploring future directions, we can further advance our understanding of the relationship between parenting behaviors, early life adversity, and emotion regulation in high-risk welfare-involved children.

Conclusion

Children involved in the Child Welfare system face heightened risks for developmental challenges, including deficits in emotion regulation. The findings reveal that child welfare-involved parents exhibit low rates of positive parenting skills and significantly higher rates of negative parenting behaviors. Moreover, controlling parenting behaviors in this sample are prevalent, with nearly half of the verbalizations children received during the study task being commands. These controlling behaviors correlate with children's emotion regulation abilities. Interestingly, this study found no associations between early life adversity exposure and children's performance on emotion regulation tasks. However, within-sample differences in emotion regulation emerged. Older children exhibited faster and more accurate responses in identifying facial emotions. In this sample, gender differences are also apparent, with girls demonstrating greater resistance to errors in the presence of distracting emotions, while boys display faster recognition of angry faces amidst happy and neutral distractors. These findings offer valuable insights into the emotion regulation capacities of child welfare-involved children.

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Table 1

Means and Standard Deviations of Scores on Child Emotional Go/No-Go Task

Emotion Regulation Task	*M*	*SD*
Go Accuracy Block 1	0.85	0.23
Go Accuracy Block 2	0.80	0.25
Go Accuracy Block 3	0.75	0.26
Go Accuracy Block 4	0.82	0.23
False Alarm Rate Block 1	0.17	0.24
False Alarm Rate Block 2	0.26	0.28
False Alarm Rate Block 3	0.40	0.28
False Alarm Rate Block 3	0.38	0.29
Avg. Reaction Time Block 1	890.23	199.33
Avg. Reaction Time Block 2	879.01	200.81
Avg. Reaction Time Block 3	857.25	227.55
Avg. Reaction Time Block 4	862.48	183.98

Note. In trial Block 1, happy was go, and angry was no-go. In trial Block 2, angry was go, and happy was no-go. In trial Block 3, angry was go, and happy and neutral were no-go. In trial Block 4, happy was go, and angry and neutral were no-go. Average Reaction Time was measured in milliseconds.

Table 2

Descriptive Statistics of Parenting Behaviors

Parenting Behaviors	*M*	*SD*	Median	Min	Max
Positive Parenting Skills	2.5	2.6	2.0	0.0	14.0
Negative Parenting Skills	23.6	11.6	22.0	1.0	69.0
Compliable, Direct Commands	6.2	4.4	5.0	0.0	22.0
No-Opp Commands	14.2	12.8	11.0	0.0	78.0

Note. Positive Parenting Skills and Negative Parenting Skills were drawn from the 5-minute Child-Led Play. Compliable, Direct Commands and No Opportunity to Comply Commands were drawn from the 5-minute Clean-Up Task.

Table 3

Regression Coefficients of Child Demographics on Go Accuracy Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(intercept)	.40***	.060	6.7	.34***	.062	5.5	.44***	.070	6.3	.45***	.064	7.0
Age	.09***	.011	7.9	.10***	.011	8.7	.068***	.013	5.2	.075***	.012	6.3
ACE	.004	.008	.61	-.01	.008	-1.2	-.01	.001	-1.1	.0024	.032	.009
Gender	-.012	.030	-.41	-.003	.032	-.12	.73	.036	.73	.0005	-.077	.032

*$p < .05$. **$p < .01$. ***$p < 0.001$.

Table 4

Regression Coefficients of Child Demographics on Average Reaction Time Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(intercept)	1078.8***	58.5	18.43	865.10***	59.3	14.56	667.82***	65.8	10.14	849.56***	55.8	15.24
Age	-32.4**	10.8	-2.93	9.80	10.9	.89	-33.41**	12.2	2.74	-2.62	10.4	-.25
ACE	-10.0	8.01	-1.25	-8.21	8.21	-1.00	-4.18	9.19	-.46	4.27	7.79	.55
Gender	15.6	29.8	.52	-12.70	30.2	-.42	82.22*	33.5	2.45	23.96	28.3	.85

*$p < .05$. **$p < .01$. ***$p < 0.001$.

Table 5

Regression Coefficients of Child Demographics on False Alarm Rate Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(intercept)	.55***	.069	8.1	.76***	.073	10.4	.48***	.083	5.8	.78***	.082	9.5
Age	-.06***	.013	-4.9	-.085***	.013	-6.3	-.004	.015	-.25	-.065***	.015	-4.3
ACE	-.01	.009	-.88	-.012	.010	-1.2	-.021	.012	-1.8	-.012	.011	-1.1
Gender	-.08*	.035	-2.5	-.087*	.037	-2.3	.016	.043	.38	-.061	.041	-1.5

*$p < .05$. **$p < .01$. ***$p < 0.001$.

Table 6

Regression Coefficients of Parenting Behaviors on Child Go Accuracy Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(Intercept)	.860***	.029	28.8	.794***	.032	24.8	.733***	.032	22.5	.823***	.031	26.8
Compliable	-.0025	.004	-.659	.0001	.004	.034	.00325	.004	.758	-.0010	.004	-.266
(Intercept)	.857***	.026	33.5	.805***	.028	29.0	.762***	.028	26.9	.827***	.026	31.5
No-Opp	-.001	.001	-.757	-.0001	.001	-.475	-.0006	.001	-.410	-.0007	.001	-.539

Note. Compliable represents the Direct, Compliable Commands parents were instructed to give during the 5-minute Clean-Up Task. No-Opp represents the No Opportunity to Comply Commands, which parents were instructed to avoid using during the 5-minute Clean-Up Task.
*$p < .05$. **$p < .01$. ***$p < 0.001$.

Table 7

Regression Coefficients of Parenting Behaviors on Child Average Reaction Time Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(Intercept)	912.15***	25.7	35.4	920.80***	25.2	36.5	915.53***	28.8	31.9	915.91***	23.7	38.6
Compliable	-3.49	3.34	-1.05	-6.71*	3.30	-2.04	-9.44*	3.79	-2.49	-8.50**	3.09	-2.75
(Intercept)	906.17***	22.1	41.0	911.37***	21.9	41.6	902.15***	24.8	36.4	910.10***	20.1	45.2
No-Opp	-1.12	1.14	-.983	-2.28*	1.14	-1.99	-3.17*	1.29	-2.46	-3.35**	1.04	-3.20

Note. Compliable represents the Direct, Compliable Commands parents were instructed to give during the 5-minute Clean-Up Task. No-Opp represents the No Opportunity to Comply Commands, which parents were instructed to avoid using during the 5-minute Clean-Up Task.
*$p < .05$. **$p < .01$. ***$p < 0.001$.

Table 8

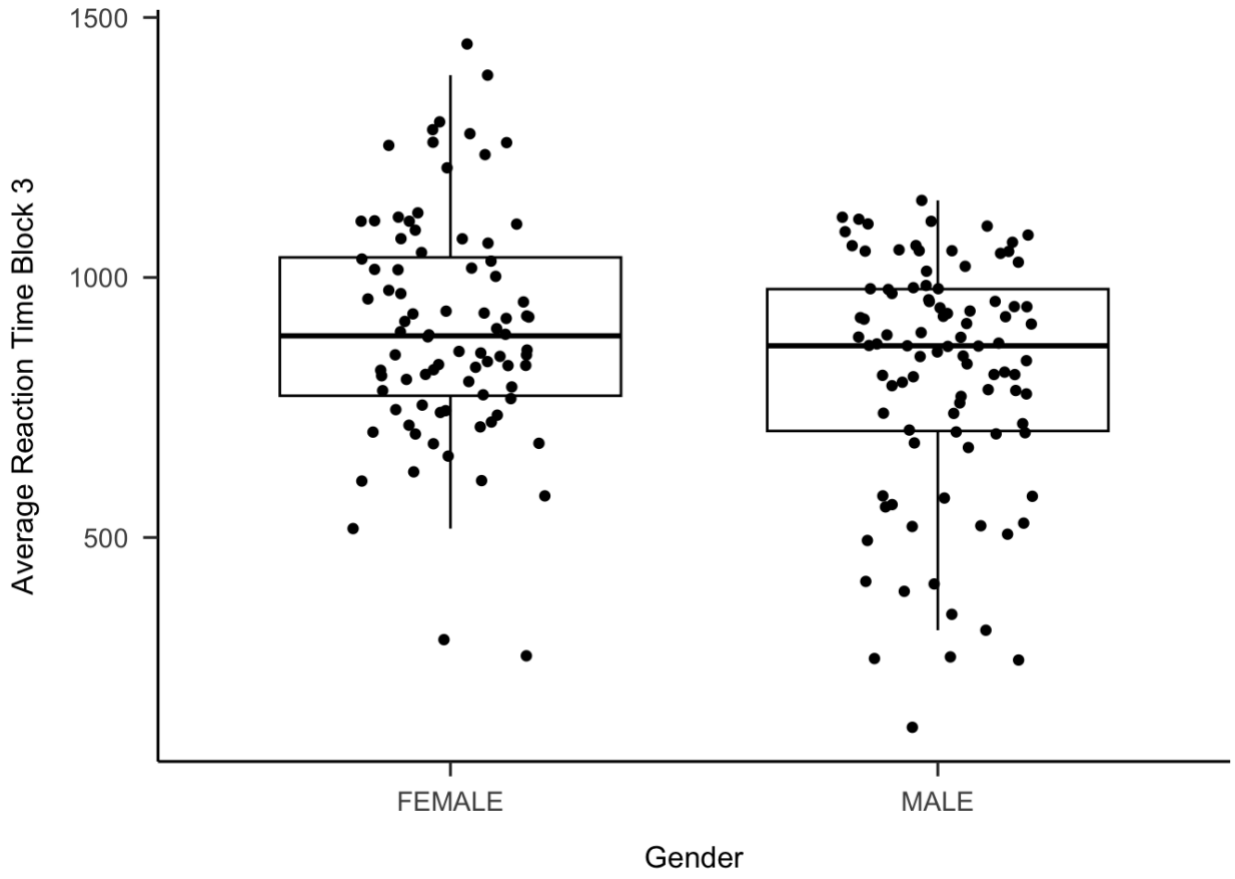
Regression Coefficients of Parenting Behaviors on Child False Alarm Rate Performance

Variable	Block 1			Block 2			Block 3			Block 4		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
(Intercept)	.116***	.032	3.65	.240***	.036	6.75	.347***	.036	9.68	.321***	.037	8.58
Compliable	.008*	.004	2.13	.003	.005	.693	.008	.005	1.60	.009*	.005	2.01
(Intercept)	.096***	3.62	.027	.197***	.030	6.52	.336***	.031	10.9	.310***	.031	9.85
No-Opp	.005***	3.88	.001	.004**	.002	2.80	.004*	.002	2.53	.005**	.002	3.10

Note. Compliable represents the Direct, Compliable Commands parents were instructed to give during the 5-minute Clean-Up Task. No-Opp represents the No Opportunity to Comply commands, which parents were instructed to avoid using during the 5-minute Clean-Up Task.
*$p < .05$. **$p < .01$. ***$p < 0.001$.

Figure 1

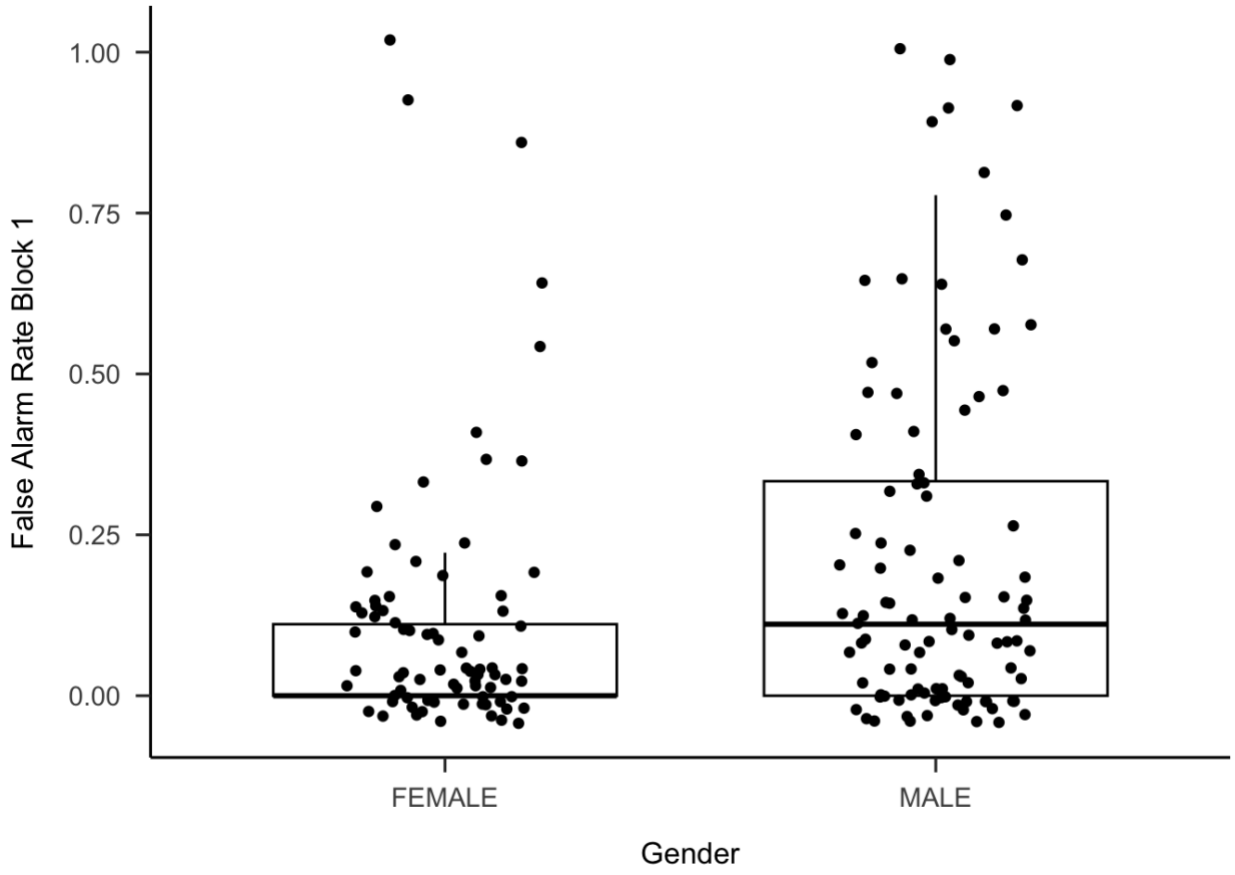
Gender Differences in Average Reaction Time in Block 3



Note. Each dot represents an individual participant. Boys displayed faster reaction times than girls when correctly identifying angry faces in the context of both happy and neutral distractors (boys M = 815.89 ms, girls M = 904.03 ms).

Figure 2

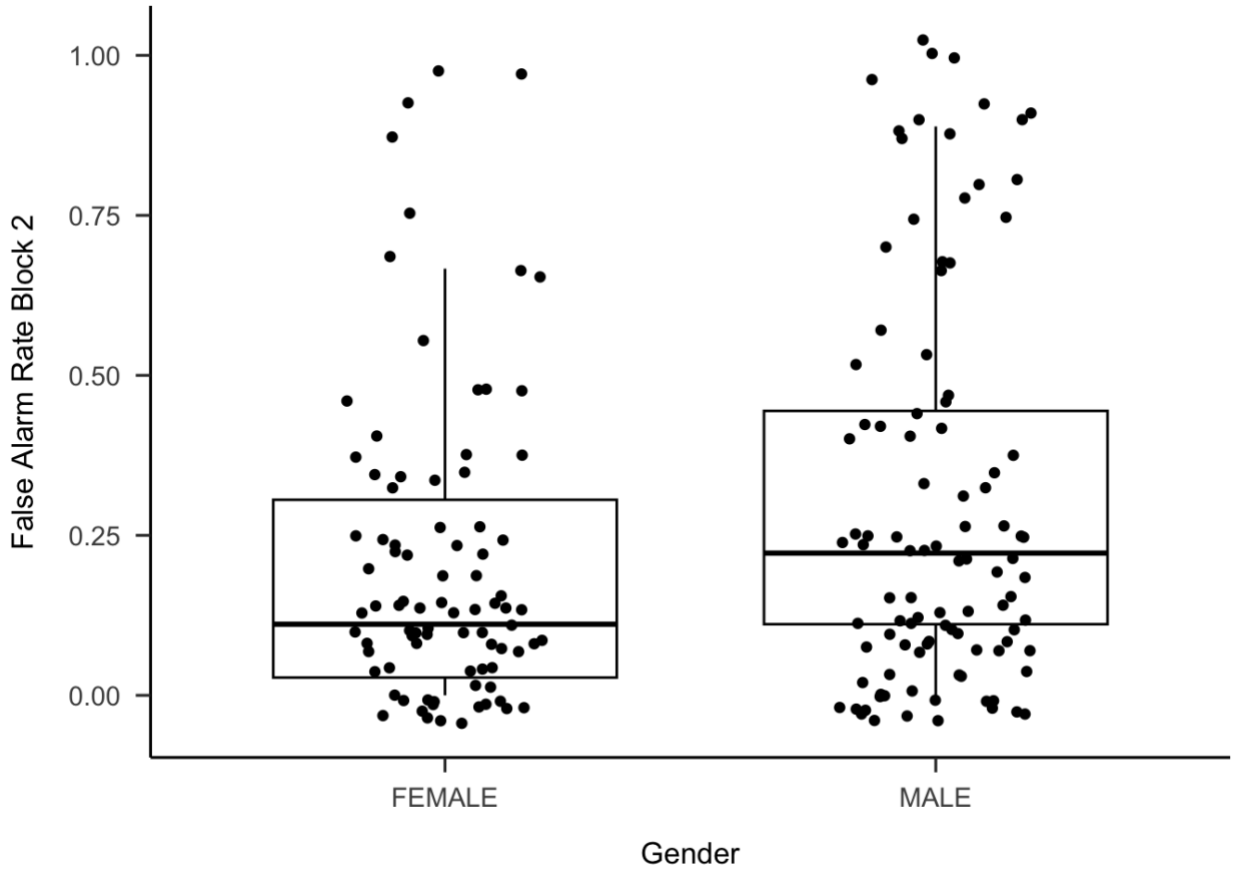
Gender Differences in False Alarm Rate in Block 1



Note. Each dot represents an individual participant. Gender significantly contributed to children's error resistance to negative emotion distractors. Girls had significantly lower false alarm rates than boys to angry distractors (boys $M = 0.215$, girls $M = 0.107$).

Figure 3

Gender Differences in False Alarm Rate in Block 2



Note. Each dot represents an individual participant. Gender significantly contributed to children's error resistance to positive emotion distractors. Girls had significantly lower false alarm rates than boys to happy distractors (boys $M = 0.302$, girls $M = 0.211$).