

PRESCHOOLERS' SELF-DISTRACTION: ROLE OF MATERNAL REGULATION AND
CHILD CHARACTERISTICS

by

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(Under the Direction of Hui-Chin Hsu)

ABSTRACT

Self-regulation is the ability of a child to control emotion, cognition, and social behavior. This study examined self-distraction as a form of self-regulation. Eighty-five 4-year-olds and their mothers participated in this study. The purpose of the study was to explore preschoolers' self-distraction, including attentional and behavioral, in two waiting contexts (mother absent vs. mother present). This study also explored the association of different maternal regulation strategies with preschoolers' self-distraction and investigated individual child characteristics such as sex, age, temperament, and language ability in relation to preschoolers' use of self-distraction. Results revealed that male and female preschoolers differed in the duration of their use of regulatory strategies. Preschoolers' use of self-distraction was context-dependent; they performed attentional distraction more frequently, longer, and quicker in their mother's absence and performed behavioral distraction more frequently, longer, and quicker in their mother's presence. Maternal insufficient regulation and ignore was the strongest predictor of reduced duration of child attentional distraction. Children's characteristics, in general, were not related to their use of self-distraction. Implications and directions for future studies are discussed.

INDEX WORDS: self-regulation, self-distraction, maternal regulation

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CHAPTER 1

INTRODUCTION

To wait or not to wait? That is the question. Imagine a 4-year old child is watching his favorite TV show, when all of a sudden, the power goes out and cannot be restored immediately. Feelings of frustration, anxiety, desperation, and hopelessness can quickly fill up his mind. Yet, because he really wants to know how the show ends, he decides to wait. Waiting is a natural human behavior; however, the experience of waiting can vary greatly from one person to the other and from one context to the other. Self-regulatory behavior one engages in during waiting can make a difference to the waiting experience. While waiting, the 4-year-old may start playing with his favorite toy, practice counting numbers, or simply watch the falling leaves outside. He may also ask his parent to tell him a story to pass the time. Indeed, behaviors such as these are examples of self-distraction, a specific type of self-regulatory strategy commonly used by children.

Self-distraction becomes more complex as children age. As early as the newborn period, infants begin to manage stressful encounters through self-regulation behaviors, including self-distraction (e.g., thumb-sucking). In toddlerhood, the repertoire of regulatory behaviors drastically widens to include sustained attention on objects, more complex body-related behaviors (e.g., playing with hands and feet) and manipulation of objects. During the preschool ages, children are already equipped with a wide variety of distracting behaviors such as counting numbers, engaging in dramatic play, distant exploration (i.e., removing oneself from the distressing situation) and active engagement with objects.

Research shows that failure to self-regulate is linked to the inability to resolve conflict among thoughts, feelings and responses, which, in turn, is linked to the increased risk of later development of psychopathology, such as violence and aggression (Calkins & Dedmon, 2000; Calkins & Fox, 2002; Cicchetti, Ackerman, & Izard, 1995; Keenan, 2000; Calkins & Leerkes, 2011) and maladjustment, such as social delinquency and poor academic outcomes (Eisenberg, Spinrad, & Eggum, 2010). Knowledge of effective regulatory strategies may provide insights on how to prevent later emotional and behavioral problems.

Very few studies, however, have specifically explored children's distraction as a self-regulatory strategy in waiting contexts. Thus, the present study examined two types of self-distraction, including attentional (e.g., focused gaze or sustained attention on objects, scanning the environment) and behavioral (e.g., manipulation of objects, tapping chair) distraction and their correlates, including child characteristics and maternal regulation.

Parental socialization and attachment are two guiding theoretical frameworks for this study. Attachment theory posits that early parent-child relationships form the foundation for later socioemotional development (Bowlby, 1969). In human relationships, when an infant experiences distress, the attachment figure becomes critical for comfort and contact (Diamond & Fagundes, 2008). Attachment security becomes crucial during the early years when the child is developing self-regulation. According to the socialization perspective, self-regulation skills are largely socially constructed and influenced by early familial socialization processes (Thompson & Meyer, 2007). Parents' socialization practices help children understand culturally appropriate behavioral and emotional behaviors, which in turn help them become successful in self-regulation (Sroufe, 1996). By teaching children to redirect their attention and distract themselves

from emotionally eliciting stimuli, parents ultimately contribute to the development of children's self-regulation (Perry, Calkins, Nelson, Leerkes, & Marcovitch, 2012).

The first goal of this study was to examine the extent to which children engage in self-distraction in two waiting contexts (mother present vs. absent) relative to another self-regulation strategy, focus on desired object. Moreover, there was also a paucity of research in the role of individual child characteristics such as preschoolers' sex, age, temperament and language development in their ability to differentially engage in behavioral and attentional distraction. The second goal of the study, thus, was to examine the role of individual child characteristics such as sex, age, temperament and language ability in children's use of attentional and behavioral self-distraction. While researchers have explored a wide variety of maternal regulation strategies and their effects on preschoolers' self-regulatory strategies, the role of specific maternal regulation behaviors in preschoolers' ability to perform behavioral and attentional self-distraction was largely understudied. Therefore, the final goal of the current study was to explore the relationship between maternal regulatory behaviors and children's use of self-distraction in two waiting contexts.

CHAPTER 2: REVIEW OF THE LITERATURE

Social psychologists, neuroscientists, and behavioral researchers have studied many aspects of self-regulation. In early childhood, three types of self-regulation are frequently examined: emotion, cognitive, and attention regulation. Emotion regulation refers to the ability to down-regulate (i.e., suppress) negative emotions (e.g., anger and frustration) and up-regulate (i.e., stimulate) positive emotions (e.g., interest and joy). The failure to regulate negative emotions has been linked to the later development of psychopathology, maladjustment, and poor academic outcomes. Cognitive regulation, the ability to focus on the task and ignore other irrelevant information, also contributes to the performance of cognitively demanding tasks, such as those found in academic settings. Success in attention regulation has been linked to favorable academic outcomes and ability to delay gratification and wait successfully (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Calkins & Hill, 2007). Finally, employing attention regulation strategies such as attention shifting or stimulus avoidance have also been found to help children regulate their affective states (Rothbart, 1991; Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993). Attentional control has been linked to the ability to resolve conflict among thoughts, feelings, and responses (Rueda, Posner, & Rothbart, 2005). Similar to success in cognitive regulation, success in attention regulation can also contribute to effective ability to delay gratification (Mischel & Ayduk, 2002; Willoughby, Kupersmidt, Voegler-Lee, & Bryant, 2011), which is critical for the development of self-control and more complex human behavior (Mischel & Ebbesen, 1970).

Because forms of self-regulation are evident very early in life, the literature on self-regulation, and specifically, on self-distraction as a form of self-regulation, is best reviewed through a developmental lens, beginning in infancy, then toddlerhood, and ending in preschool age. First, I discuss the development of self-distraction as a form of self-regulation. Then, I discuss the effect of different social contexts on self-distraction as children age. Third, I review maternal regulation strategies in relation to the development self-distraction. Lastly, I review individual child characteristics that have an effect on self-distraction and maternal regulation.

Distraction as Self-Regulation

Infancy. Self-regulation begins very early in the human life. As early as the newborn period, infants already engage in body-related behaviors such as finger sucking and body rocking to reduce distress (Kopp, 1989). Researchers have also documented other forms of regulation strategies such as gaze aversion, looking at mother, scanning the environment and focused gaze on objects (Braungart-Rieker, Garwood, Powers, & Wang, 2001; Calkins, Dedmon, Gill, Lomax, & Johnson, 2002; Stifter & Braungart, 1995). These attention-related behaviors can be early signs of infants' attentional distraction capabilities. Moreover, between 5 and 10 months, infants' repertoire of regulation strategies expands to include clasping and pulling on hands, feet and hair (Stifter & Braungart, 1995). Indeed, the researchers found that with age, infants' use of self-comforting behaviors becomes a preferred self-regulatory strategy over avoidance or communicative behaviors (i.e., crying to mother) to reduce negativity or distress. This suggests that for infants, self-comforting behaviors may serve as early behavioral distractors that regulate distress and frustration. Older infants can reduce the display of negative emotions by further engaging in active engagement (i.e., play or exploratory activities using toys and/or prolonged visual examination of objects) (Bridges, Grolnick, & Connell, 1997). Active engagement

encompasses both behavioral and attentional forms of distraction, which may indicate that with age not only do infants' behaviors become more complex, but infants also become more adept at using both types of distractions simultaneously. Although these infancy studies did not specifically define these behaviors as self-distraction, it is evident that researchers have documented the performance of regulatory strategies similar to distraction as early as infancy.

Toddlerhood. As researchers move along the developmental spectrum, it becomes easier to capture and categorize toddlers' regulatory behaviors. There are a number of studies that suggest toddlers' use of attentional and behavioral distraction. For example, one study examining anger regulation defined distraction as focusing attention on an object other than the desired object if the attention was sustained and intense, or manipulating/playing with another object in the room (Diener & Mangelsdorf, 1999). At 18 months, toddlers used distraction along with other regulation strategies directed toward the mother such as 'help seeking' and 'engaging mother' (Diener & Mangelsdorf, 1999). Distraction, however, maintained toddlers' anger levels rather than reduce them. Since the researchers' definition of distraction captures both attentional and behavioral aspects, the role of each in maintaining or regulating anger remains unclear. At 24 months, toddlers have the ability to behaviorally self-distract by active engagement with a substitute toy and to reorient their attention to a different object when a more desirable object is present (Grolnick, Bridges, & Connell, 1996).

Preschool Age. Self-distraction has been shown to help preschoolers in anger regulation (Gilliom et al., 2002; Morris et al., 2010; Morris et al., 2011). One study examining self-distraction, defined as purposeful behaviors in which the focus of attention is not on the delay object or the task, and anger regulation of boys found that self-distraction predicted low frequencies of increasing anger (Gilliom et al., 2002). Specifically, after boys employed

behavioral self-distraction (e.g., fantasy play, exploration of the room, turning lights on and off), their anger displays increased in intensity less often than expected. Two additional regulatory strategies, passive waiting (i.e., standing or sitting quietly but not looking at the desired cookie) and attention shifting (i.e., shifting gaze to different objects in the room, continuously scanning the environment), were also associated with decreased anger. These results suggest that engaging in behavioral and attentional distraction can be helpful in decreasing anger expressions. Furthermore, Hill and colleagues (Hill, Degnan, Calkins, & Keane, 2006) examined distraction, defined as being focused for at least two seconds on an object other than the object of distress, and found that effectiveness of attentional distraction (whether the child's distress decreased when distraction was used) was correlated with decreased negative affect. Altogether, these studies suggest that self-distraction can be an effective regulatory strategy in reducing preschoolers' high levels of anger or negative affect.

In summary, distraction as self-regulation begins as early as the newborn period as infants use body-related movements or attention-related behaviors to reduce distress. During toddlerhood, both attentional and behavioral distraction widens to include physical manipulation of other toys and reorientation of attention to other objects. When children reach the preschool age, they perform more complex distraction such as continuous attention shifting (i.e., shifting gaze to multiple objects in the room), engaging in dramatic play, and removing oneself from the frustrating situation by distant exploration. However, there are multiple gaps in current research about behavioral and attentional self-distraction. The nature and role of behavioral and attentional self-distraction in the waiting contexts (mother-absent and mother-present) and the role of specific maternal regulation behaviors in preschoolers' ability to self-distract are still unknown. The roles of preschooler's temperament, age, language, and sex in their ability to

engage in behavioral and attentional distraction have never been empirically examined. Therefore, the current study aims to fill current research gaps by exploring the extent to which children engage in self-distraction in two waiting contexts, the relation between maternal regulatory behaviors and children's self-distraction, and how children's individual characteristics such as age, sex, temperament and language ability relate to their use of self-distraction.

Social Contexts and Distraction

Infancy. It is evident that infants' use of distraction might differ according to the contextual demands. For example, when young infants are in a frustrating context, they employ more body-related self-comforting behaviors such as thumb sucking, clasp and pulling on hands and feet to regulate negative reactivity (Stifter & Braungart, 1995). Moreover, infants can also employ attentional distraction in distressing contexts. The still-face paradigm is a commonly used stressful context during which parents show no emotional expression to their infants. Researchers have found that young infants engage in more object orientation (i.e., gaze focused at window or door) than parent-focused or self-soothing behaviors in a still-face context with mothers and fathers (Braungart-Rieker, Garwood, Powers, & Notaro, 1998). This form of gaze aversion may be an earlier form of attentional distraction. Additionally, one study specifically included distraction, defined as attending to or manipulating an object other than the task object, as a specific strategy that infants commonly employ in multiple frustrating contexts (Calkins et al., 2002). This study investigated the different emotion regulation strategies infants displayed while engaged in frustrating laboratory tasks (i.e., plastic barrier task where a toy is placed behind a barrier and arm restraint where mother constrains infant arm movement) and found differences in frequency of distraction used among infants with different temperaments (Calkins et al., 2002). Hence, the effect of context remains an important influence on infants'

self-regulation, but it is also possible that individual differences play a role in infants' use of behavioral and attentional strategies. More details on the contribution of child temperament to self-distraction are discussed in a separate section below.

It is known that young infants can employ a wide variety of behavioral regulatory strategies in the presence of their mother. Among 12 to 14 month-old infants in a parent-passive context (parent simply observing the infant without engaging him/her in interaction), attentional and behavioral strategies such as focus on desired object, focus on the parent, self-soothing and solitary active engagement were most frequently used (Bridges et al., 1997). The parent-passive context and use of strategies were altogether associated with increased negative emotions. On the other hand, when situated in a parent-active context (parent is responsive to infant's cues), infants most frequently engaged in behavioral strategies such as exploratory activities and play and displayed less negative emotions (Bridges et al., 1997). Therefore, as early as infancy, context may have an effect on the differential use of attentional and behavioral distraction.

Toddlerhood. Toddlers' regulatory strategy use also differs based on the nature of the situation. For example, one study found that toddlers displayed more distraction (behavioral and attentional combined) during frustration episodes (i.e., toy removal, waiting for snacks) compared to fear episodes (i.e., placing a toy octopus that made sounds in the middle of the room) (Diener & Mangelsdorf, 1999). Although it is unclear whether toddlers performed more behavioral or attentional distraction, the effect of context is evinced by toddlers' performance of distractive behavior when they were frustrated rather than when they were afraid. Thus, variation in contexts can elicit differential use of both attentional and behavioral strategies.

For toddlers, their use of behavioral regulatory strategies such as maternal proximity (i.e., sitting next to mother) and contact seeking (i.e., asking for mother's attention) differed

contingent on maternal absence or presence. Researchers have found that girls engaged in more contact seeking than boys in distressing situations when the mother is present but not actively engaged (Buss, Brooker, & Leuty, 2008). However, boys displayed more contact seeking and distress in both situations where mother is present and absent (e.g., toy removal). Other researchers have shown that the mother's absence influences self-distraction usage. One study examined emotion regulation in two-year olds in both contexts where the parent is absent (experimenter-present) and present (passively or actively participating) and found that when an adult was present (i.e., either parent or experimenter), active engagement with a substitute toy (i.e., behavioral distraction) was the most commonly used strategy and most negatively associated with child distress (Grolnick et al., 1996). Additionally, the researchers found that physical self-soothing (e.g., thumb-sucking) was positively associated with distress in situations where the parent is absent and when the parent is present but passively participating (i.e., unresponsive, uninvolved). Therefore, it is possible that the substitute toy acted as a distractor and helped the child shift attention away from the desired object. However in this case, even though behavioral distraction usage was frequent in the parent-absent context, it had differential effects on child distress. Still, the role of behavioral distraction when mothers are absent remains unclear.

Preschool age. Focusing on early childhood, related research has examined self-distraction or behavioral distraction strategies in a wide variety of contexts such as disappointing, stressful, and frustrating laboratory situations such as removing a favored toy from view, exchanging the most favored prize for the least favored one, and asking the child to wait to eat snacks (Spinrad, Stifter, Donelan-McCall, & Turner, 2004; Diener & Mangelsdorf, 1999; Calkins & Johnson, 1998). Self-distraction use differs depending on the presence of the mother

or a stranger. In a delay of gratification task where the mother is present but passively engaged and in a male stranger-approach situation where the mother is absent, distraction (i.e., when the child focused attention elsewhere either verbally or behaviorally) was the most frequently used regulatory strategy (Zimmerman & Stansbury, 2003). Children are more likely to use behavioral distraction than attentional distraction or focusing on desired object in a waiting context (Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009). Interestingly, preschoolers engaged in distraction the most when in a busy-caregiver situation where a female stranger pretends to be passively engaged (i.e., present but not attending to child). Altogether, these results confirm that use of self-distraction differs depending on the nature of the task, but the distinct role of behavioral and attentional distraction in different type of situations remains unclear. In this study, it is expected that maternal strategies (e.g., maternal attention shifting, see Appendix B) are integral in the child's performance of self-distraction (see Appendix A); hence, children are expected to perform more behavioral and attentional self-distraction in the mother-present context compared to the mother-absent context. Children's preference for use of behavioral and attentional self-distraction within each situation is further examined.

As reviewed earlier, different types of tasks (stranger approach, delay of gratification, and busy-caregiver) elicited differential use of self-distraction (Zimmerman & Stansbury, 2003). Additionally, these researchers found that bolder children were more likely to use distraction whereas shy children employed more instrumental strategies (i.e., comfort-seeking) in a busy-caregiver paradigm. Interactions between context and child individual differences may play a role in preschoolers' ability to employ behavioral and attentional distraction, which is further discussed in a separate section below.

Maternal Regulation and Distraction

Infancy. Few studies have investigated the role of maternal regulation in infants' ability to employ self-regulation; however, the few suggest that mothers do influence their infants' behaviors. For example, maternal sensitivity has been shown to relate to infants' use of behavioral self-regulation strategies. Examined longitudinally, researchers found that infants, who were later classified with secure attachments at 12 months, used the same number of behavioral self-regulation strategies such as thumb-sucking and rubbing hair as when their mothers were highly sensitive at 4 months (Braungart-Rieker et al., 2001). From both socialization and attachment perspectives, this study suggests that maternal sensitivity may promote the use of behavioral strategies among very young infants. By contrast, when parents are emotionally unavailable, distressed infants increase displays of negative emotions, which in turn, lead to the reduced ability to perform attentional distraction as evidenced by more frequent focus on the desired object (Bridges et al., 1997). Additionally, highly negative infants (i.e., temperamental trait of negative affect) were less self-regulated when they were in unresponsive relationships but more self-regulated when in responsive relationships (Kim & Kochanska, 2012). Therefore, the influence of parental socialization practices (e.g., responding to child's bids to suggest strategies for waiting) and the quality of attachment to parents on self-regulation begins very early in life.

Toddlerhood. A variety of maternal regulatory strategies in toddlerhood have been investigated previously, including maternal unresponsivity, comforting and support, and negative control. Previous studies show that maternal unresponsivity or lack of involvement influence toddlers' employment of emotion regulation strategies. For example, Rodriguez and colleagues (2005) examined how maternal unresponsivity influenced toddlers' display of negative affect in

stressful situations and found that both maternal unresponsivity (i.e., when the mother ignores the child) and high toddler negative affect predicted ineffective attentional strategies (i.e., looking at reward or desired object) in a high stress situation, as opposed to a low stress situation. This suggests that maternal unresponsivity and toddler temperament can predict toddlers' employment of regulatory strategies. Additionally, maternal disengagement (i.e., mother turns away from the child or leaves the child) was linked to the toddlers' feelings of temptation (i.e., frequent attention to the desired object) in a delay of gratification task and to ineffective regulatory strategies (i.e., touching the desired object). Overall, this study suggests that maternal engagement, not lack of involvement, might be related to toddlers' use of distraction strategies. Further, another study found that mothers who scored as more involved had toddlers who were more distressed and used more mother-orienting behaviors (Buss et al., 2008). This may suggest that a high degree of maternal involvement might become detrimental to toddlers' effective use of distraction. Another study further suggests that when mothers were unresponsive, mother-focused strategies (i.e., support seeking) were followed by displays of negativity, whereas toy-focused strategies reduced displays of negative affect (Ekas, Braungart-Rieker, Lickenbrock, Zentall, & Maxwell, 2011). When mothers are unresponsive, toddlers may rely on available distractors (e.g., attractive toy), hence, behavioral and attentional distraction might be effective emotion regulatory strategies for reducing distress. Despite the different directions of the relationship, toddlers' behavioral strategies for emotion regulation differed as a function of maternal involvement (Diener & Mangelsdorf, 1999).

With respect to maternal comforting and support, positive guidance (i.e., positive verbal expressions, physical affection, positive feedback) was related to toddlers' use of distraction (i.e., attending to or manipulation of another object other than the desired one) and support seeking

decreased distress in frustrating events, whereas interference increased toddlers' display of distress (Calkins & Johnson, 1998). In terms of maternal negative control, it was found that toddlers who showed high levels of distress had mothers who were low on negative control (Calkins & Johnson, 1998). It is still unknown, however, whether maternal negative control is related to high levels of distress or vice versa.

Most of the studies reviewed here suggest that as proposed by the socialization perspective, specific types of mothers' regulation strategies have differential associations to toddlers' use of self-regulatory strategies. However, in a longitudinal study, researchers found that mothers' use of regulation strategies (i.e., maternal attention shifting) when her child was a toddler did not predict self-regulatory strategies at age 5 (Spinrad et al., 2004). Still, mothers' use of distraction as a regulation strategy at 18 months was related to children's reduced use of distraction at preschool age.

Preschool Age. Perry and colleagues (2012) found that mothers' non-supportive actions (e.g., minimizing and punitive) to children's negative emotions predicted lower child-reported emotion regulation behaviors and lower observed distraction (defined as the extent to which the child distracts themselves away from the frustrating event and includes verbal and physical distractions like standing up, walking away, or playing with unrelated objects in the room). Moreover, non-supportive maternal actions may be insufficient in helping regulate preschoolers' negative emotions. Another study reported that children whose parents used more unexplained compliance demands (a form of insufficient regulation) used fewer cognitive and behavioral distraction strategies (Stansbury & Zimmerman, 1999).

A study by Cole and colleagues (Cole, Dennis, Smith-Simon, & Cohen, 2009) demonstrated that maternal support is related to children's understanding and generation of

emotion regulation strategies, which is consistent with the socialization perspective. When mothers employed attention refocusing (i.e., shift child attention away from the emotion-eliciting stimulus), children displayed less anger and showed lower externalizing behaviors (Morris et al., 2010). Interestingly, maternal comforting strategies were not related to decreases in anger displays. In a more recent study, Morris and colleagues (2011) found that in addition to mother's attention refocusing, joint cognitive reframing (i.e., reframing the situation so it is no longer perceived as negative) also leads to lower intensity of expressed anger and sadness. These two studies suggest that maternal attention-related regulation strategy may play an important role in facilitating children's ability to self-regulate. As in their earlier study, maternal comforting was found to be ineffective in decreasing anger or sadness. It appears that physical comforting might be an insufficient regulator for this age group. Based on the available evidence, in the current study, it is hypothesized that maternal comforting will not be related to children's self-distraction; however, maternal attention shifting (i.e., refocusing child's attention to a different object) and reasoning/explaining are expected to be associated with longer duration and greater frequency of children's self-distraction. No specific hypotheses are generated for other maternal regulatory behaviors (i.e., attention focusing, ignore, insufficient regulation) included in this study due to the paucity of research about these maternal behaviors.

Individual Differences in Distraction and Maternal Regulation

One of the major goals of this project is to examine whether there are individual differences in children's use of self-distraction, including child sex, age, temperament and language development. Each will be discussed below.

Child Sex. Previous studies have found specific sex differences in boys and girls in terms of self-regulation. As early as 6 months, Calkins and colleagues (2002) found that even though

male and female infants were equally likely to be classified as frustrated or less easily frustrated, male infants were less able to regulate physiologically. In addition, male and female infants differ in their strategy use with parents; for example, boys display more solitary active engagement with fathers and more self-soothing and active engagement with mothers than their female counterparts (Bridges et al., 1997). In another study examining infants in a still-face situation, young male infants exhibit more positive affect and less attention to objects than their female counterparts (Braungart-Rieker et al., 1998). It appears that as early as infancy child sex may influence the differences in behaviors of male and female infants in response to challenging situations.

Research has also shown sex differences in toddlers' waiting behaviors in delay of gratification tasks. One study examining emotion regulation at age 3 found that girls display more comforting strategies than boys (Zimmerman & Stansbury, 2003). Comforting strategies, similar to behavioral distraction, included behaviors such as thumb sucking or seeking a parent for comfort. Despite some evidence for sex differences, other researchers have found no effect of sex differences in toddlers' use of regulatory strategies. For example, Diener and Mangelsdorf (1999) found no sex differences in toddlers' use of regulatory strategies. Grolnick and colleagues (1996) also found no effect of child sex on strategy use and emotion expression. Similarly, Spinrad and colleagues (2004) did not find any sex differences in toddlers' use of emotion regulation strategies. Additionally, they found no differences on how mothers respond to their sons or daughters.

In early childhood some studies also suggest that there are no differences between boys' and girls' emotion regulation. For example, one study that examined the influence of mother-child emotion regulation strategies on children's expression of anger and sadness found no sex

differences on strategy use or effectiveness (Morris et al., 2011). Another study by Morris and colleagues (2010) examined children's externalizing behavior in school and observed anger regulation in the mother-child dyad and found that emotional regulation and adjustment were the same for boys and for girls. However, since these two studies used the same data set, their identical finding regarding sex differences may be due to the characteristics of their sample.

Some evidence suggests the existence of sex differences in self-regulation among preschoolers. One study examined the role of emotion regulation and inattention in externalizing behavior problems for boys and girls and found sex differences in emotion regulation strategy use. Poor emotion regulation and inattention were important predictors of membership in the chronic-clinical profile (i.e., high externalizing behaviors) for girls but emotion regulation did not predict membership in the chronic-clinical profile for boys (Hill et al., 2006). In terms of differences in regulatory strategy use, girls tend to focus their attention more on the reward than boys (Rodriguez et al., 2005). Even though focusing their attention on the reward does not constitute a distraction strategy, it is possible that girls are able to sustain their attention more on objects than boys. Indeed, researchers have found that boys display more behavioral distraction than girls (Dennis et al., 2009). Hence, in the present study, it is hypothesized that boys are going to use more behavioral self-distraction than girls in waiting contexts with and without the mother's presence.

Age. Little is known about the differential use of distraction-like strategies among younger and older infants. Among toddlers, researchers have found that slight differences in age do not predict use of self-regulatory strategies (Diener & Mangelsdorf, 1999). However, across developmental periods, it appears that older children employ different regulatory strategies than younger children. For example, 4-year-olds tend to use more self-distraction than 3-year-olds

(Spinrad et al., 2004). Moreover, compared to 3-year-olds, 4-year-olds use more attentional distraction (Dennis et al., 2009) and have a better grasp of anger regulation strategies (Cole et al., 2009). This suggests that in early childhood children who are older may be more efficient at employing different regulatory strategies.

Child age may also influence the mother's employment of regulation and socialization strategies. For example, while some studies suggest that for toddlers, maternal comforting is an efficient regulator of distress and anger, this strategy becomes insufficient for regulating sadness and anger among older children (Morris et al., 2011). Indeed, as children age, some maternal strategies might lose their value. Child increased age was associated with decreased maternal use of both positive (i.e., distraction and understanding) and negative (i.e., physical obstruction) regulatory strategies in a waiting task, which suggests that the age of the child can also influence maternal regulation strategies (van Zeijl et al., 2007). Therefore, a focus on the examination of preschool-aged children in this study might shed more light on the effect of child age on self-distraction.

Temperament. Temperament refers to “constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention” (Rothbart & Bates, 2006). Temperament is biologically based and influenced over time by heredity, maturation, and experience. Because temperament is a reactive system, it has been suggested to contain self-regulatory aspects (Rothbart & Sheese, 2007). A temperamental systems approach to emotional reactivity suggests that there are two systems that incorporate temperament and self-regulation (Rothbart & Sheese, 2007). The Defense System is characterized by either fear or anger and has the goal of avoiding harm and prepares the individual to organize his/her

responses to both immediate and long-term threats. The Approach System, on the other hand, is characterized by surgency and extraversion and has the goal of resource acquisition.

Another perspective on child individual characteristics is the temperamental systems approach to effortful control and executive attention. As mentioned earlier, attention regulation helps monitor and resolve conflict situations. Effortful control refers to the ability of the child to inhibit a dominant response to perform a subdominant response (Rothbart & Rueda, 2005). To elaborate on this construct, consider a child who is placed in a negative and stressful situation (e.g., separation from the mother). With adequate effortful control, the child will successfully control or regulate his/her negative emotions and might even show positive affect despite the stressful situation. On the other hand, a child who has poor effortful control will not be successful in regulating his/her negative emotions and will display negative reactivity in a stressful situation. Indeed, researchers have shown that individuals who have high effortful control are better at self-regulating affective responses (Rothbart & Rueda, 2005).

Differences in temperament and self-regulation exist as early as in early infancy. At 4 months, infants with negative temperaments already show less behavioral (i.e., self-comforting) and attentional (i.e., object orientation) strategies in a mother-infant still-face situation (Braungart-Rieker et al., 1998). At 6 months, infants who are easily frustrated engage in less distraction and are less able to regulate physiologically than infants who are less easily frustrated (Calkins et al., 2002). Additionally, easily frustrated infants employed more scanning behavior and orienting to mother than less easily frustrated infants. These results suggest that early in infancy, temperamentally difficult children may already differentially engage in attentional and behavioral distraction compared to their less difficult counterparts.

In formulating a developmental model for toddler distraction, Wiggins (2005) indicated that the effect of the mother results from an interaction with toddler temperament factors; specifically, anger-prone toddlers are only socialized by mothers to self-distract if they are low in attentional focus. Indeed, differences in toddlers' temperament interact with use of regulatory strategies. For example, Ekas and colleagues (2011) found that negative affect predicted toddlers' increased use of self-distraction (i.e., vocalizing to self, attending to/focusing on another object, self-soothing). These results suggest that toddler temperament may play a role in the performance of both behavioral and attentional self-distraction.

As also mentioned earlier, Rodriguez and colleagues (2005) found that maternal unresponsivity interacted with temperament factors, which in turn predicted the toddlers' regulatory strategy. Another study found that in a waiting context, mothers used less positive regulatory strategies (i.e., distraction and understanding) in response to children who had more externalizing behavior problems. In toddlerhood, maternal and child regulatory strategies may be dependent on specific individual differences in temperament.

For preschoolers, indirect associations between differences in temperament and self-regulation have also been found. For example, specifically targeting boys, Gilliom and colleagues (2002) examined how different temperament related to their and their mothers' use of regulatory strategies. The researchers' reason for the sole inclusion of boys was due to the known sex difference in higher levels of conduct problems in boys beginning in the preschool period (Gilliom et al., 2002). They found that when mothers used negative control, higher levels of negative emotionality, lower rates of passive waiting and higher rates of focus on object/task were observed among boys. Furthermore, the researchers found that negative emotionality (e.g., high negative affect) had no significant association with these strategies when mothers used

positive control. These results suggest that for children high in negative emotionality, the child's regulation strategy may critically depend on the mother's regulatory strategy. Indeed, one study found that maternal attention refocusing is more helpful for reducing anger and externalizing problems among highly reactive children (Morris et al., 2010). Based on the available evidence with preschoolers, in the present study, it is hypothesized that children with easier temperament are going to perform more self-distraction; specifically, children who maintain attentional focus, suppress inappropriate responses, and exhibit less frustration are expected to have longer duration, greater frequency, and shorter latency of self-distraction.

Language Ability. Children's language skills begin to excel in early childhood. According to researchers who have examined language development and self-regulation, children's language ability is related to their understanding of emotion regulation strategies (Cole et al., 2009), which could, in turn, influence their generation and usage of self-regulatory strategies. Children who possess more language skills may be more knowledgeable of emotions and thus be more efficient at employing different regulatory strategies. Even though only few researchers have examined the influence of children's language development on self-regulation, the few studies that have examined this relationship have suggested that language plays a role in children's generation of self-regulatory strategies.

For example, Roben and colleagues (Roben, Cole, & Armstrong, 2013) found that children's language ability is directly related to their use of self-distraction. Specifically, greater language development (e.g., high expressive language scores derived by mean length of utterance) is related to less use of self-distraction and decreased anger displays in response to challenges. However, another study found the inverse relationship between language ability and

use of self-distraction in that children in the high language group used more distraction compared to children in the low language group (Stansbury & Zimmerman, 1999).

When maternal strategies, child distraction, and child language skills are examined altogether, researchers have found that parents of children with low verbal comprehension tend to use more unexplained compliance demands, which in turn, as previously mentioned, predict fewer distraction strategies (Stansbury & Zimmerman, 1999). Hence, the type of maternal strategy used on children with different language skills is related to their use of self-distraction. More specifically, children either low on both or high on both verbal comprehension and expressive language had mothers who used fewer distraction strategies to help children regulate their emotion, whereas mothers of children with low verbal expressive skill but high verbal comprehension used more emotion regulation strategies (Stansbury & Zimmerman, 1999).

Altogether, these mixed results suggest that the role of children's language ability in self-distraction exists but is still unclear, a gap that this study hopes to fill. Also, little is known about how child language affects mothers' use of regulatory strategies. Therefore, in this study, children with more advanced language development are expected to contribute to longer duration, greater frequency and shorter latency of children's self-distraction.

CHAPTER 3

RESEARCH QUESTIONS

To summarize, this study asked the following research questions:

- (1) To what extent do children engage in self-distraction, behavioral and attentional distraction combined, in the two waiting contexts (mother-absent and mother-present) relative to focus on desired object? Due to lack of previous research, there were no specific hypotheses for this research question.
- (2) Do children engage in more self-distraction at their mother's absence or presence? It was expected that children would engage in longer duration, greater frequency and shorter latency of self-distraction in their mother's presence than absence.
- (3) Are maternal regulatory behaviors related to children's use of self-distraction in the two waiting contexts? It was hypothesized that maternal attention shifting, comforting/support and reasoning/explaining would be associated with longer duration, greater frequency and shorter latency of children's self-distraction. No hypothesis were generated for maternal attention focusing, ignore, and insufficient regulation.
- (4) Are children's individual characteristics related to their use of self-distraction? It was expected that older children, girls, children with easier temperament (i.e., maintenance of attentional focus, suppression of inappropriate response, and frustration) and children with more advanced language development would show longer duration, greater frequency, and shorter latency of self-distraction.

CHAPTER 4

METHODS

Participants

As a part of a larger longitudinal project, 85 four-year olds (46 boys; children's mean age = 220.02 weeks) and their mothers participated in this study. Mothers were predominantly married (93%), White (84%), middle-class, and have a college education ($M=16.4$ years). The children included in this study were healthy and developing normally.

Procedure

A graduate research assistant greeted the mother-child dyad in the parking lot near the laboratory. Then, the mother-child dyad was introduced to a playroom where the mother and her child engaged in a variety of activities mimicking everyday situations, including free play, toy clean up, book reading, separation-reunion, snack time, teaching puzzle and etch-a-sketch, and gift-waiting. There were also contexts where the child was alone, such as candy delay or separation from mother, or with a researcher, such as toys on a tray and mean/good puppet game for assessing children's effortful control. This study will focus on observing the two challenging waiting tasks: candy delay and gift waiting.

Candy delay task. In this task, the mother is absent and the child is given two cups of candy, with one cup containing significantly more pieces than the other. The child is also given a bell to ring. The researcher asks the child to wait until she comes back and if the child waits, he/she will get the cup with more candy. If, however, the child cannot wait for the researcher to come back, he/she can ring the bell but will only be rewarded the cup with fewer candy. The

task is terminated when the child rings the bell, the child eats the candy, or when the child waits for up to five minutes (i.e., the cup with more candy is given to the child).

Gift-waiting task. In this task, the mother is present and the child is asked to wait to open a gift bag until the mother is finished with some questionnaires for about 5 minutes. The researcher states that the child cannot open, touch, or look inside the gift bag until the mother is done. The mother is instructed not to initiate interaction with the child, but can respond to the child's initiation for interaction. The child is not provided any toy or given any specific instructions during the wait.

Measures

Second-by-second real-time coding (i.e., a behavioral code was applied every time the behavior occurred) was used to assess the different types of behaviors the child displayed while waiting. The waiting tasks were similar in nature and previous researchers have used them to elicit the same behavior (Adrian, Zeman, & Veits, 2011).

Candy delay procedure. Three child waiting behaviors were observed: (1) *focus on desired object*, when the child looks at, touches, or plays with the desired object (e.g., candy, bell, or gift bag), (2) *behavioral distraction*, when the child engages in behaviors directed toward self and/or other objects in the room to keep self occupied such as tapping on the table, singing and making funny faces and (3) *attentional distraction*, when the child is simply looking at the toys or other objects in the room, shifting gaze and sitting on the chair but not looking at, touching or playing with the desired objects. Coding reliability was checked by a second coder who independently coded 20% of randomly selected dyads (percentage of agreement=94% and kappa = .90). The frequency (as indexed by rate per minute), duration (as indexed by proportion

of the total length of observation) and latency (as indexed by the number of seconds since the onset of observation) of these three child regulatory behaviors are used in subsequent analyses.

Gift-waiting procedure. The same three child behaviors were coded from videos. In addition, *support seeking*, when the child talks to the mother regardless of topic, was coded in the gift-waiting procedure. Coding reliability was also done by a second coder who coded 20% randomly selected dyads (percentage of agreement= 87% and kappa = .84).

To capture maternal regulatory behaviors, a 10-s time sampling coding strategy (i.e., a behavioral code was applied for every 10-second segment) was employed. Nine different maternal behaviors were coded: (a) *No regulation*, no interaction between the child or the mother or the mother responds but does not attempt to change child's behavior, (b) *Attention shifting*, an attempt to shift attention away from the desired object is made in order to refocus attention on something non-distressing; (c) *Attention focusing*, the action or behavior directs the child's attention to the desired object; (d) *Comforting/Support*, use of physical behaviors, such as hugging or holding, or verbalizations is performed to comfort the child without attempting to change the situation; (e) *Insufficient regulation*, a simple answer is given without explanation or reasoning and response was not useful from the child's perspective (f) *Ignore*, ignoring the child's bids without responding; (g) *Reasoning/Explaining*, age-appropriate explanations and reasoning are provided to the child's questions; (h) *Negative control*, includes scolding, negative remarks and expressions; and (i) *Break*, mother and child were out of the room. See Table 1 for descriptive statistics. For reliability, 25% of the sample was coded independently by another trained graduate student and the agreement with the master coder was $\kappa = .65$.

Table 1

Descriptive Statistics for the Duration of Maternal Regulation Strategies (N=80)

Maternal regulation strategy (proportion)	Gift-waiting		
	<i>M</i>	<i>SD</i>	Range
Attention shifting	.08	.11	.00-.56
Attention focusing	.03	.05	.00-.26
Comforting/support	.04	.05	.00-.26
Insufficient regulation	.20	.11	.00-.50
Ignore	.06	.08	.00-.31
Reasoning/explaining	.03	.05	.00-.29
Negative control	.02	.04	.00-.35
No regulation	.51	.20	.10-.93

Because there were several maternal regulatory strategies, a factor analysis was performed to reduce their number. Seven maternal regulatory behaviors (excluding ‘no regulation’ and ‘break’) were subjected to a principal components analysis with a Varimax rotation. The rotated solution yielded three interpretable maternal regulation patterns with Eigenvalues that were greater than 1 (see Table 2): (1) *Insufficient Regulation and Ignore*, which included two maternal regulatory behaviors, namely, insufficient regulation and ignore; (2) *Comforting and Attention Guiding*, which included two maternal regulatory behaviors, namely, comforting/support and attention focusing and shifting; and (3) *Reasoning and Negative Control*, which included two maternal regulatory behaviors, namely, reasoning/explaining and negative control.

Further, based on the results of factor analysis, three composite scores of maternal regulation patterns were computed. Specifically, the composite score of maternal regulation pattern of *Insufficient Regulation and Ignore* was the sum of the z-scores for insufficient regulation and ignore. The pattern of maternal *Comforting and Attention Guiding* was the sum of

the z-scores for attention shifting, attention focusing and comforting. Finally, the pattern of *Reasoning and Negative Control* was created by subtracting the z-score of negative control from the z-score of reasoning/explaining. Only these three maternal regulation patterns were included in further analyses.

Table 2

Factor Loadings for Maternal Regulation Strategies

Maternal Regulation Strategy	Factor 1 <i>Insufficient Regulation and Ignore</i>	Factor 2 <i>Comforting and Attention Guiding</i>	Factor 3 <i>Reasoning and Negative Control</i>
Attention shifting	-.29	.65	-.18
Attention focusing	.25	.65	.33
Comforting/support	-.13	.55	-.06
Insufficient regulation	.83	-.01	-.08
Ignore	.68	-.42	-.04
Reasoning/explaining	.12	.06	.76
Negative control	.32	.18	-.64
Eigenvalue	1.44	1.36	1.15
Variance Explained (%)	20.57	19.45	16.41

Child Temperament. Mothers filled out the Childhood Behavior Questionnaire (Rothbart, Ahadi, Hershey, & Fisher, 2001) to assess temperament. Three subscales, including attentional focus (i.e., tendency to maintain attentional focus upon task-related channels; $\alpha = .67$), inhibitory control (i.e., the capacity to plan and suppress inappropriate approach responses under instructions or in novel or uncertain situations; $\alpha = .76$), and frustration (i.e., amount of negative affect related to interruption of ongoing tasks or goal blocking; $\alpha = .80$), are selected as the target dimensions of child temperament in the current study (Rothbart et al., 2001).

Child Expressive Language. Children's expressive language ability was measured by computing the mean length of utterance (MLU) derived from verbatim transcripts of child

speech during play with their mothers (i.e., puzzle and etch-a-sketch). Researchers have previously used MLU as an indicator of preschoolers' syntactic complexity and expressiveness (Brown, 1973; Crain-Thoreson & Dale, 1992; Hughes, 1998). MLU is calculated using a program called CLAN (Computerized Language ANalysis; see MacWhinney, 2000) in which the average number of morphemes in a child's utterances is calculated.

CHAPTER 5

RESULTS

Descriptive Statistics

Means, standard deviations, and ranges for child characteristics, child regulation strategies in the two waiting contexts, and maternal regulation strategy patterns in the gift-waiting context were computed.

Child characteristics. See Table 3 for descriptive statistics. In general, there were a few more male children ($n=46$) in the study than female children ($n=39$). On average, children were 4 years and 3 months old when they participated in the study. The means for temperamental scores suggested that children in the study generally fell within normal ranges for anger/frustration, attentional focusing, and inhibitory control (Rothbart et al., 2001). Children's MLU (mean length of utterance) scores suggested that they were relatively lower than average scores (4.6+) of language development for their age based on Brown's Stages of Language Development (Brown, 1973; Miller, 1981; Paul & Alford, 1993). The standard deviation of MLU also suggested that there were marked individual differences among children.

Child regulatory strategies. The duration, frequency and latency of behavioral distraction, attentional distraction and focus on desired object in two waiting contexts of candy delay and gift waiting are shown in Table 4. Children's waiting time ranged from 11 seconds to 300 seconds in candy delay whereas their waiting time ranged from 122 seconds to 501 seconds in gift waiting.

Maternal regulation strategies. Three maternal regulatory patterns were included in the analyses: (a) Comforting and attention guiding, (b) Insufficient regulation and ignore and (c) Reasoning and negative control. Descriptive statistics for the composite z-scores are shown in Table 5.

Table 3

Descriptive Statistics for Child Characteristics

Variable	<i>N</i>	Frequency (%)	<i>M</i>	<i>SD</i>	Range
Sex					
Male	46	54.10	---	---	---
Female	39	45.90	---	---	---
Age (weeks)	85	---	220.02	12.14	207-259
Temperament					
Anger/frustration	84	---	4.43	.74	2.69-6.00
Attentional focusing	84	---	4.70	.75	2.57-6.64
Inhibitory control	84	---	4.65	.71	2.08-6.64
Language (MLU)	85	---	3.23	12.16	.50-5.62

Note. MLU = mean length of utterance

Table 4

Descriptive Statistics for Child Regulation Strategies in Two Waiting Contexts

Child regulation strategy	Waiting contexts							
	Candy delay				Gift-waiting			
	<i>N</i>	<i>M</i>	<i>SD</i>	Range	<i>N</i>	<i>M</i>	<i>SD</i>	Range
Total wait time (seconds)	84	254.08	94.03	11-300	80	271.82	64.76	122-501
Duration								
Behavioral distraction	84	.34	.20	.00-.84	80	.41	.19	.01-.92
Attentional distraction	84	.36	.21	.00-.88	80	.19	.18	.00-.85
Focus on desired object	84	.29	.15	.07-.73	80	.19	.13	.02-.77
Support seeking	---	---	---	---	80	.19	.13	.02-.57
Frequency								
Behavioral distraction	84	1.64	.91	.00-4.80	80	1.97	.67	.24-3.43
Attentional distraction	84	2.12	1.55	.00-10.91	80	1.36	.79	.00-3.63
Focus on desired object	84	2.26	1.30	1.00-9.60	80	1.76	.72	.26-3.24
Support seeking	---	---	---	---	80	1.53	.88	.21-3.67
Latency								
Behavioral distraction	84	44.82	58.22	0-300	80	27.10	39.00	0-248
Attentional distraction	84	17.56	44.97	0-300	80	41.28	65.78	0-290
Focus on desired object	84	10.10	22.31	0-166	80	22.70	44.94	0-218
Support seeking	---	---	---	---	80	36.28	45.29	0-197

Note. Frequency was measured as rate per minute, duration as proportion of total length of observation, and latency as number of seconds since the onset of observation.

Table 5

Descriptive Statistics for Composite Z-Scores of Maternal Regulation Patterns

Maternal Regulation Patterns	<i>M</i>	<i>SD</i>	Range
Comforting and attention guiding	.00	1.94	-1.96-5.13
Insufficient regulation and ignore	.00	1.68	-2.63-4.91
Reasoning and negative control	.00	1.33	-.97-6.80

Comparison of Child Regulation Strategies in Two Waiting Contexts

To answer the first research question, to what extent do children engage in self-distraction (behavioral and attentional combined) relative to focus on desired object, three separate 2 (Context: candy delay vs. gift-waiting) x 2 (Child Regulation Strategy: distraction vs. focus on desired object) x 2 (Child Sex: male vs. female) mixed-design analysis of variances (ANOVAs) were conducted, with the frequency, duration, and latency of child regulation strategy as the respective dependent variable. Summaries of F-values are shown in Table 6.

Frequency. The main effect for Context, Wilks' $\Lambda = .92$, $F = 6.43$, $p < .01$, $\eta^2 = .08$, and Child Regulation Strategy, Wilks' $\Lambda = .19$, $F = 320.72$, $p < .01$, $\eta^2 = .81$, were significant as shown in Figure 1A and 1B. The results indicate that preschoolers engaged in regulatory strategies more frequently while waiting in the candy delay task (mother-absent) compared to the gift-waiting task (mother-present). Additionally, when a comparison was made between the two regulatory strategies, the results indicate that preschoolers performed distraction more frequently compared to focus on desired object during waiting.

Duration. Similar to the results with frequency, the main effects for Context, Wilks' $\Lambda = .30$, $F = 180.53$, $p < .01$, $\eta^2 = .70$, and Child Regulation Strategy, Wilks' $\Lambda = .20$, $F = 307.90$, $p < .01$, $\eta^2 = .80$, were also significant as shown in Figure 1A and 1B. The results indicate that preschoolers engaged in regulatory strategies for longer durations while waiting in the candy delay task compared to the gift-waiting task. Additionally, when a comparison was made

between the two regulatory strategies, the results demonstrate that preschoolers performed distraction for longer durations compared to focus on desired object during waiting.

In addition, Child Regulation Strategy x Child Sex interaction effect was also significant, Wilks' $\Lambda = .94$, $F = 4.73$, $p < .05$, $\eta^2 = .06$ (see Figure 2). Two separate follow-up independent samples t-test were conducted to compare the differences between boys and girls. Overall, children performed more distraction than focusing. Specifically, sex differences in the mean duration (proportion) of focusing on desired object were significant, $t = -2.08$, $p = .04$. Boys performed significantly more focusing on the desired object than girls during waiting. Sex differences in the mean duration (proportion) of child distraction approached significance, $t = 1.77$, $p = .08$. Specifically, girls tended to use more distraction than boys when waiting. The results indicate that boys and girls might have different preferences for using regulatory strategies during waiting.

Latency. The main effects for Context, Wilks' $\Lambda = .89$, $F = 9.10$, $p < .01$, $\eta^2 = .11$, and Child Regulation Strategy, Wilks' $\Lambda = .87$, $F = 11.93$, $p < .01$, $\eta^2 = .13$, were significant as shown in Figure 1A and 1B. The results indicate that preschoolers were quicker to engage in regulatory strategies while waiting in the candy delay task compared to the gift-waiting task. When a comparison was made between the two regulatory strategies, the results indicate that preschoolers were quicker to perform distraction compared to focus on desired object in the two waiting contexts.

In sum, the results indicate that preschoolers significantly differed in the performance of regulatory strategies in the two waiting contexts; they performed more regulatory strategies in the candy delay context compared to the gift-waiting context. Specifically, preschoolers performed distraction more frequently, for longer durations, and shorter latencies compared to

focus on desired object. More importantly, results showed that male and female preschoolers differed in the duration of their use of regulatory strategies; males performed longer durations of focus on desired object compared to their female counterparts and females tended to perform longer durations of distraction compared to their male counterparts.

Table 6

Summary of F-values for Mixed-Design Analysis of Variance for Context (candy delay vs. gift waiting) by Child Regulation Strategy (distraction vs. focus on desired object) by Child Sex

Behavioral measure	Context	Child Regulation Strategy	Context*Child Regulation Strategy	Child Regulation Strategy*Sex	Context*Sex	Context*Child Regulation Strategy*Sex
Frequency	6.43**	320.72**	0.00	0.75	1.06	0.22
Duration	180.53**	307.90**	0.10	4.73*	0.97	2.48
Latency	9.10**	11.93**	1.09	0.00	0.29	0.04

Note. Frequency = rate per minute, duration = proportion of total length of observation, and latency = number of seconds since the onset of observation.

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

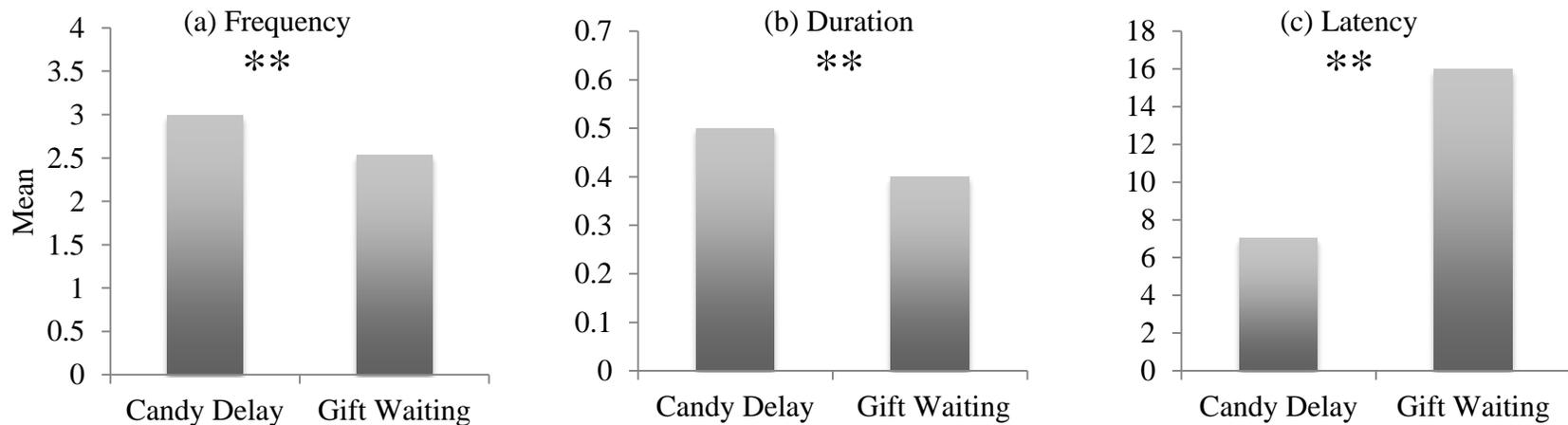


Figure 1.A Main effects of waiting contexts: Comparing child regulation strategy as measured by (a) frequency (rate per minute), (b) duration (proportion of total length of observation) and (c) latency (number of seconds since the onset of observation).

** $p < .01$.

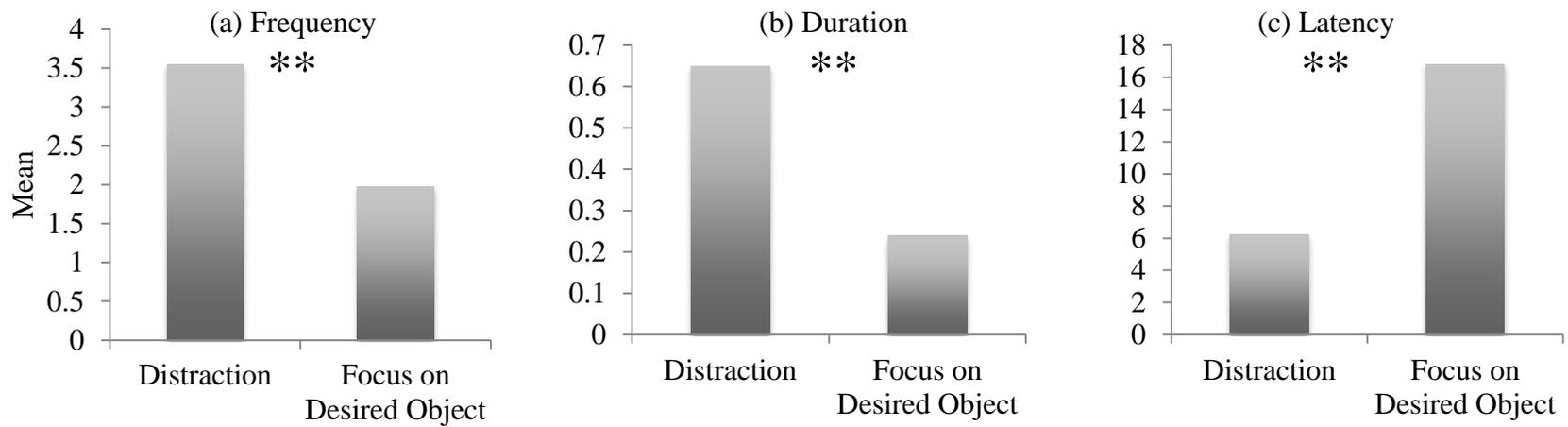


Figure 1.B Main effects for comparing two regulation strategies in both contexts as measured by (a) frequency (rate per minute), (b) duration (proportion of total length of observation) and (c) latency (number of seconds since the onset of observation).

** $p < .01$.

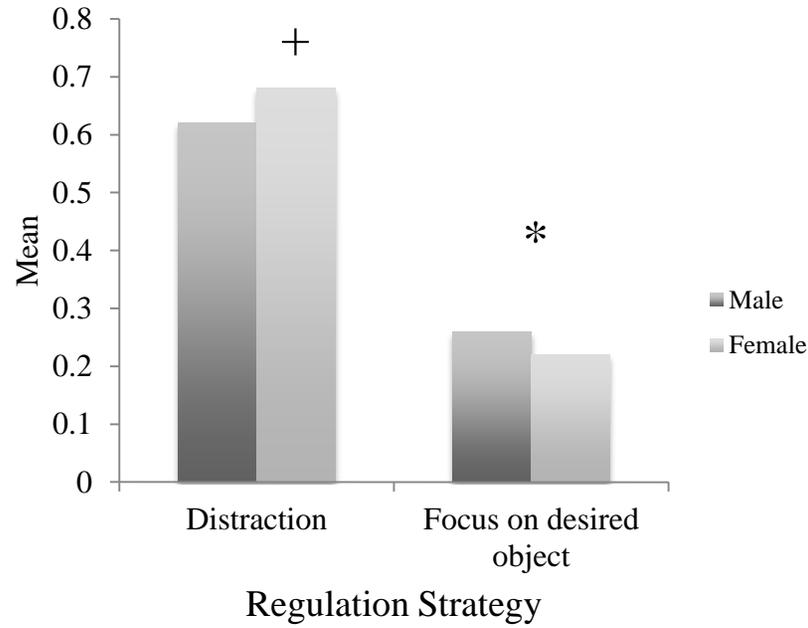


Figure 2. Two-way interaction effect between child regulation strategy and child sex as measured by duration (proportion of total length of observation).

* $p < .05$. + $p < .10$.

Comparison of Child Distraction Strategies in Two Waiting Contexts

To answer the second research question, whether children engage in more self-distraction at their mother's absence (candy delay) or presence (gift-waiting), three separate 2 (Context: candy delay vs. gift-waiting) x 2 (Child Distraction Strategy: behavioral distraction vs. attentional distraction) x 2 (Child Sex: male vs. female) mixed-design analysis of variances (ANOVAs) were conducted with the frequency, duration, and latency of child distraction as the respective dependent variable. Summaries of F-values are shown in Table 7.

Frequency. The main effect for Context, Wilks' $\Lambda = .95$, $F = 4.25$, $p < .05$, $\eta^2 = .05$, was significant as shown in Figure 3A. The results indicate that preschoolers engaged in distraction more frequently while waiting in the candy delay task (mother-absent) compared to the gift-waiting task (mother-present). However, when a comparison was made between the two distraction strategies, the results were not significant indicating that the mean frequency of distraction (both behavioral and attentional) in both contexts was not significantly different (see Figure 3B).

Additionally, the Context x Child Distraction Strategy interaction effect was significant, Wilks' $\Lambda = .76$, $F = 24.88$, $p < .01$, $\eta^2 = .24$ (see Figure 4). Follow-up paired samples t-tests were conducted. These results suggest that children performed attentional distraction more frequently in the candy delay task, $t = -3.10$, $p < .01$, whereas they engaged in behavioral distraction more frequently in the gift-waiting task, $t = 4.14$, $p < .01$.

Duration. The main effect for Context, Wilks' $\Lambda = .79$, $F = 20.09$, $p < .01$, $\eta^2 = .21$, and Child Distraction Strategy, Wilks' $\Lambda = .92$, $F = 6.93$, $p < .01$, $\eta^2 = .08$ (see Table 7) were also significant as shown in Figure 3A and 3B. The results indicate that preschoolers engaged in distraction strategies for longer durations while waiting in the candy delay task compared to the

gift-waiting task. Additionally, when a comparison was made between the two distraction strategies, the results indicate that preschoolers performed behavioral distraction for longer durations compared to attentional distraction in the two waiting contexts.

Moreover, the interaction effect of Context x Child Distraction Strategy was also significant, Wilks' $\Lambda = .72$, $F = 30.16$, $p < .01$, $\eta^2 = .28$ (see Figure 4). Two separate follow-up paired samples t-tests were performed, which indicated that children performed attentional distraction for longer durations in the candy delay task, $t = 7.15$, $p < .01$, whereas they engaged in behavioral distraction for longer durations in the gift-waiting task, $t = -2.89$, $p < .01$.

Latency. Both the main effects for Context and Child Distraction Strategy were not significant, which indicate that there was no difference in the onset of distraction (both behavioral and attentional) in the two waiting contexts. However, the Context x Child Distraction Strategy interaction effect was significant, Wilks' $\Lambda = .80$, $F = 19.54$, $p < .01$, $\eta^2 = .20$ (see Figure 4). Two separate follow-up paired samples t-tests indicated that children were quicker to perform attentional distraction in candy delay compared to gift-waiting, $t = -3.66$, $p < .01$, and quicker to perform behavioral distraction in gift waiting compared to candy delay, $t = 2.89$, $p < .01$.

Altogether, these results suggested that children's use of both behavioral and attentional distraction depends on the type of waiting context. Specifically, although children perform attentional distraction more frequently, longer, and quicker in their mother's absence (candy delay), they engaged in behavioral distraction more frequently, longer, and quicker in their mother's presence (gift-waiting).

Table 7

Summary of *F*-values for Mixed-Design Analysis of Variance for Child Distraction Strategy (behavioral vs. attentional) by Context (candy delay vs. gift-waiting) by Child Sex

Behavioral measure	Context <i>F</i>	Child Distraction Strategy <i>F</i>	Context*Child Distraction Strategy <i>F</i>	Child Distraction Strategy*Sex <i>F</i>	Sex*Context <i>F</i>	Context*Child Distraction Strategy*Sex <i>F</i>
Frequency	4.25*	0.05	24.88**	0.05	0.43	1.10
Duration	20.09**	6.93**	30.16**	0.02	1.23	0.68
Latency	1.21	1.56	19.54**	0.19	0.27	1.19

Note. Frequency is measured as rate per minute, duration as the proportion of total length of observation, and latency as number of seconds since the onset of observation.

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

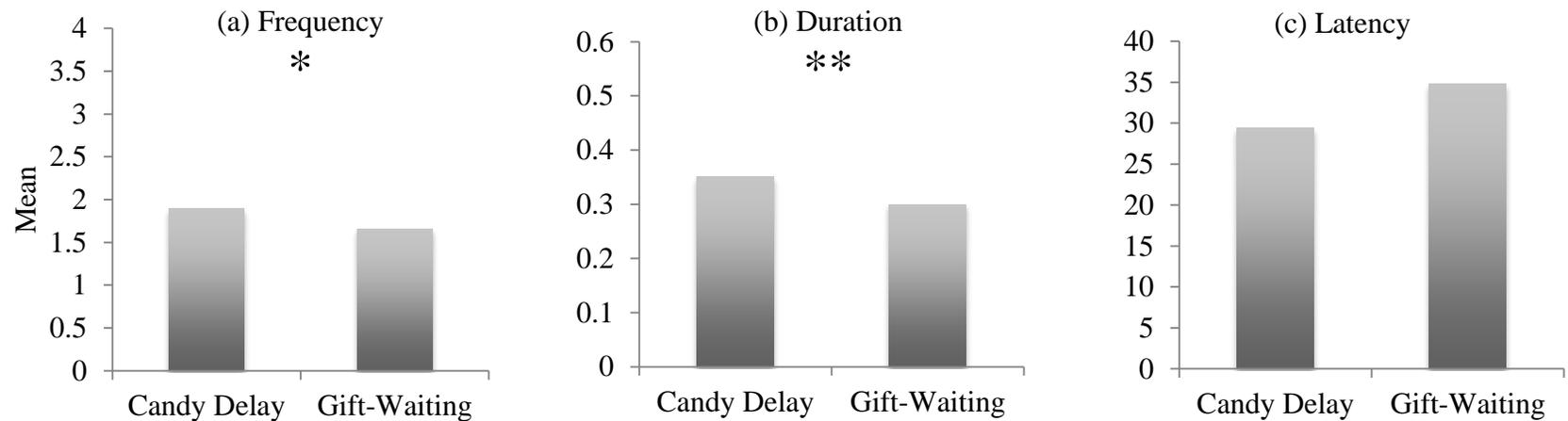


Figure 3.A. Main effects of waiting contexts: Comparing child distraction strategy as measured by (a) frequency (rate per minute), (b) duration (proportion of total length of observation), and (c) latency (number of seconds since the onset of observation).

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

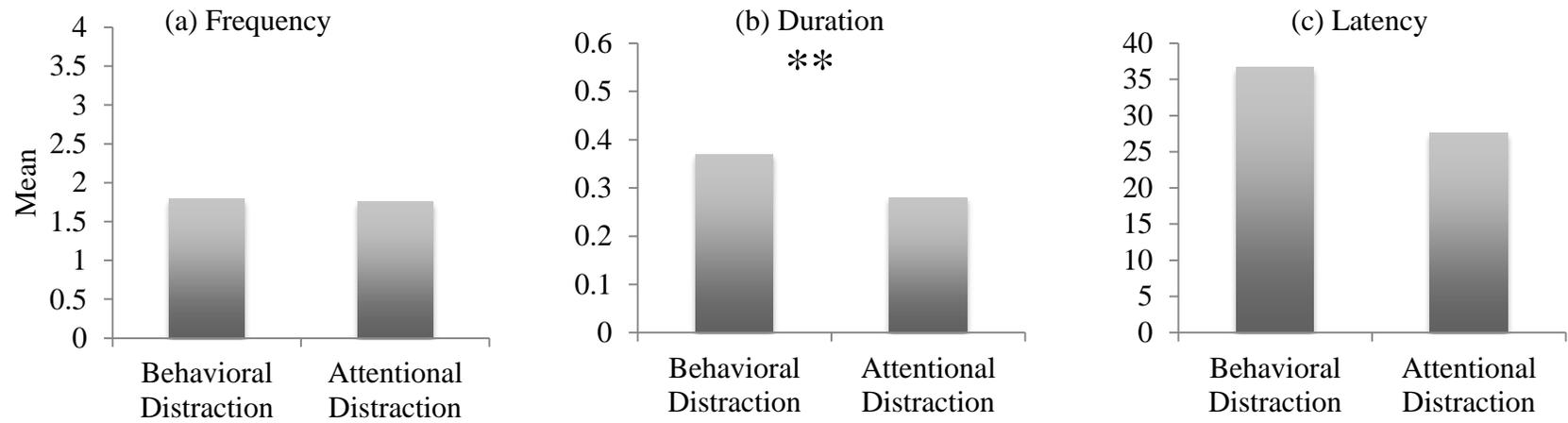


Figure 3.B. Main effects for comparing child distraction strategies in both contexts as measured by (a) frequency (rate per minute), (b) duration (proportion of total length of observation) and (c) latency (number of seconds since the onset of observation).

** $p < .01$.

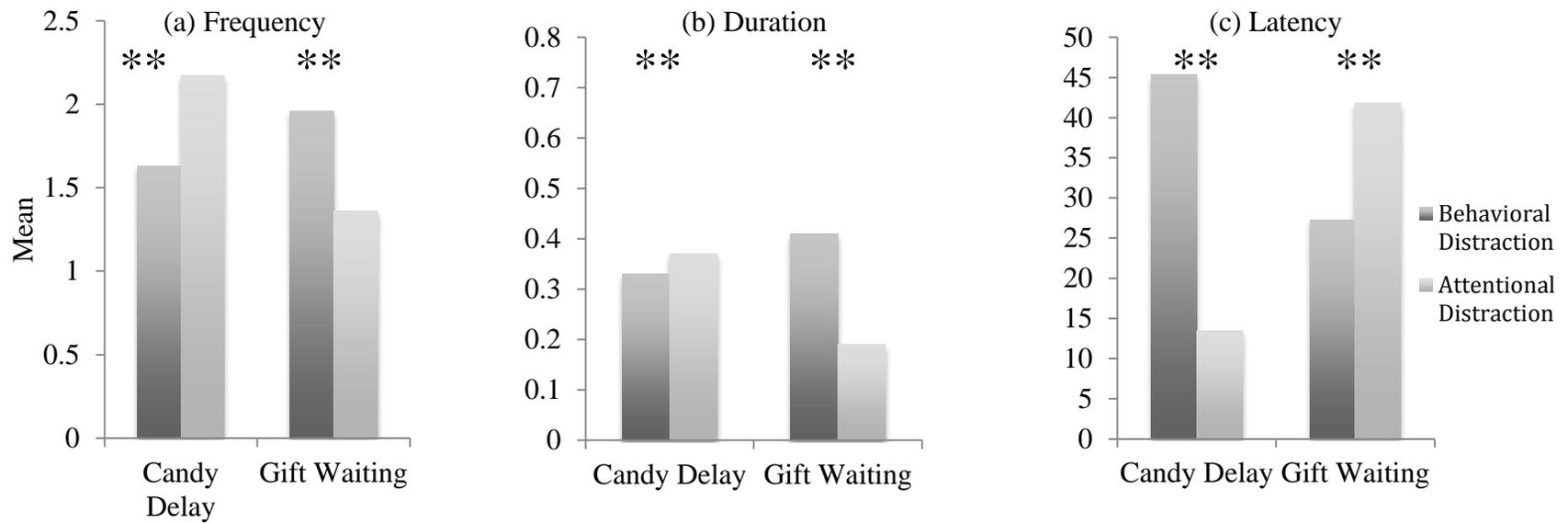


Figure 4. Two-way interaction effect between context and child distraction strategy as measured by (a) frequency (rate per minute), (b) duration (proportion of total length of observation) and (c) latency (number of seconds since the onset of observation). ** $p < .01$.

Maternal Regulation Patterns and Children's Use of Distraction

To answer the third research question, whether maternal regulatory behaviors were related to children's use of self-distraction in the two waiting contexts, bivariate correlations of child behavioral and attentional self-distraction with three maternal regulation patterns were first computed (see Table 8). Results revealed significant negative correlations between the duration of child attentional distraction in both waiting contexts and maternal regulation pattern of Insufficient Regulation and Ignore. During both waiting contexts, when mothers engaged in longer insufficient regulation and ignore, children were less likely to engage in longer attentional distraction during waiting. Additionally, the correlation between maternal regulation pattern of Insufficient Regulation and Ignore and the frequency of child behavioral distraction in gift waiting was positive and statistically significant. In gift-waiting, when mothers performed longer durations of insufficient regulation and ignore, children engaged in more frequent behavioral distraction.

Next, twelve different sets of regression analyses were further conducted using three maternal regulatory patterns to predict child self-distraction in the two waiting contexts (see Table 9). Only results with proportion of child behavioral and attentional distraction as the outcome variables are displayed in Table 9. Results showed that only the duration of maternal Insufficient Regulation and Ignore ($\beta = -.26$) was a significant predictor of child attentional distraction in gift waiting, $R^2 = .10$, $F = 2.84$, $p < .05$ (Model 4).

Table 8

Correlations Between Composite Z-Scores of Maternal Regulation Patterns and Child Distraction

Maternal regulation pattern	Waiting contexts											
	Candy delay (N=79)						Gift-waiting (N=80)					
	Child behavioral distraction			Child attentional distraction			Child behavioral distraction			Child attentional distraction		
	F	D	L	F	D	L	F	D	L	F	D	L
Comforting and attention guiding	.01	-.15	-.03	.08	.20	-.07	.11	-.01	.09	-.10	-.12	-.02
Insufficient regulation and ignore	.20	.14	-.02	.01	-.26*	-.15	.34**	-.20	-.10	.05	-.23*	-.08
Reasoning and negative control	-.03	-.09	-.02	.04	-.09	-.09	.14	-.03	.03	-.05	-.15	-.11

Note. F = Frequency indexed by rate per minute, D = duration indexed by proportion of total length of observation, and L = Latency indexed by number of seconds since the onset of observation.

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

Table 9

Predicting the Duration (Proportion of Session) of Child Distraction from Three Maternal Regulation Patterns

Maternal regulation pattern	Waiting contexts			
	Candy delay (N=79)		Gift-waiting (N=80)	
	Model 1	Model 2	Model 3	Model 4
	Child behavioral distraction	Child attentional distraction	Child behavioral distraction	Child attentional distraction
	β	β	β	β
Comforting and attention guiding	-0.12	0.15	-0.07	-0.19
Insufficient regulation and ignore	0.12	-0.21	-0.22	-0.26*
Reasoning and negative control	-0.10	-0.07	-0.01	-0.13
R^2	.04	.09	.05	0.10
F	1.15	2.52	1.19	2.84*

* $p < .05$

Children's Characteristics and Use of Distraction

To answer the fourth research question, whether children's age, sex, temperament, and language ability were related to their use of self-distraction, bivariate correlations of child behavioral and attentional self-distraction and children's individual characteristics were conducted (see Table 10).

Age. Child age in weeks did not have any significant correlations with child self-distraction measures. This indicates that child age might not be related to their use of distraction at age 4.

Sex. The effect of child sex was previously found to be nonsignificant in relation to child distraction (behavioral and attentional) in the mixed-design ANOVA (see Table 6). However, as mentioned previously, the effect of child sex was found to be significant in relation to performance of child regulatory strategies (distraction and focus on desired object). Specifically, males performed longer durations of focus on desired object compared to their female counterparts.

Temperament. Bivariate correlations revealed only one significant positive correlation between child anger/frustration dimension of temperament and the frequency of child attentional distraction in the candy delay context. Children who scored higher on the anger/frustration dimension of temperament were more likely to engage in attentional distraction frequently in candy delay.

Language. Children's expressive language ability as measured by mean length of utterance (MLU) did not have any significant correlation with the measures of self-distraction. This demonstrates that the measure of children's expressive language ability in this study might not be related to their use of distraction at age 4 during the two waiting contexts.

Twelve sets of regression analyses were also conducted to further examine the additive effect of child characteristics (sex, age, anger/frustration, attentional focus, inhibitory control, language) on the measures of behavioral and attentional distraction. None of the regression models was statistically significant.

Table 10

Correlations Between Child Characteristics and Measures of Child Distraction

Child characteristics	N	Waiting contexts												
		Candy delay						Gift-waiting						
		Child behavioral distraction			Child attentional distraction			Child behavioral distraction			Child attentional distraction			
	F	D	L	F	D	L	N	F	D	L	F	D	L	
Age (in weeks)	83	-.01	.02	.04	-.11	.01	.04	79	-.03	.03	-.06	-.08	.10	.03
Temperament	83							79						
Anger/frustration		.05	-.03	.01	.22*	.07	-.06		.06	-.11	-.01	.11	.00	-.18
Attentional focus		-.14	-.13	.06	-.15	.19	-.04		-.12	.07	-.06	-.17	-.15	.19
Inhibitory control		-.05	.08	.06	-.19	.06	.04		-.14	.05	-.13	-.02	.04	.08
Language (MLU)	84	-.06	.06	-.03	-.04	-.02	-.03	80	.15	-.11	-.05	-.03	-.11	.08

Note. MLU = mean length of utterance. Frequency (F) = rate per minute, duration (D) = proportion of total length of observation, and latency (L) = number of seconds since the onset of observation.

* $p < .05$

CHAPTER 6

DISCUSSION

The purpose of the study was to investigate preschoolers' use of self-distraction, including behavioral and attentional, in the waiting contexts of candy delay (mother absent) and gift-waiting (mother present). Regulatory behaviors, such as self-distraction, are important to examine since failure to self-regulate has been linked to increased risk of later behavioral and emotional problems and development of psychopathology and maladjustment; hence, knowledge of effective regulatory strategies might help in preventing poor developmental outcomes. The findings of the current study are discussed below.

Child Distraction as a Preferred Regulatory Strategy

The first goal of the study was to examine the extent to which preschoolers engaged in self-distraction in two waiting contexts (i.e., candy delay where the mother was absent and gift-waiting where the mother was present) relative to another regulation strategy, focus on desired object. It was found that male and female preschoolers differed in their preferred regulatory strategies. More specifically, males engaged in more focus on desired object compared to their female counterparts whereas females preferred distraction as a regulatory strategy compared to their male counterparts. Previous research, however, has found the opposite effect of child sex on regulatory strategies. For example, one study (Rodriguez et al., 2005) found that females were more likely to focus on the desired object compared to males, and another study (Dennis et al., 2009) reported that males were more likely to display distraction than females. It is possible that the choice of gift-wrapping (i.e., yellow bag with cats) and candy (i.e., M&Ms) were more

attractive to males than females. However, given the inconsistent findings, it is important for future studies to further examine why the duration (but not frequency and latency) of regulatory strategy use might differ according to child sex.

When examining child distraction (behavioral and attentional combined) and focus on desired object as regulatory strategies preschoolers used during waiting, different patterns of behaviors were found. Preschoolers, in general, performed more regulatory strategies in the candy delay task (mother absent) compared to the gift-waiting task (mother present). Specifically, preschoolers engaged in greater distraction in terms of frequency, duration, and latency relative to focus on desired object in both waiting contexts. These results suggest that, in general, preschoolers might prefer distraction to focusing on the desired object as a regulatory strategy during waiting regardless of their mother's absence or presence. Previous research showed that when preschoolers engage in self-distraction rather than focusing, they are better at regulating anger and negative affect (Gilliom et al., 2002; Morris et al., 2010; Morris et al., 2011; Hill et al., 2006). Engaging in distraction might be a more effective strategy in helping preschool-aged children reach their short-term goals in difficult situations; in this study, the goal was to acquire the desired object (e.g., cup with more candy, gift).

On average, most preschoolers in this study waited for the desired object for at least 4 minutes. Although assessing the effect of distraction on anger and negative affect was not formally assessed in this study, casual observations revealed that preschoolers in the study rarely showed such behaviors in the waiting contexts, which might indicate the helpfulness of engaging in behavioral and attentional distraction when in a frustrating situation.

When examining the effect of context, this study found that overall preschoolers performed regulatory strategies (distraction and focus on desired object) more frequently and

longer in their mother's absence compared to their mother's presence. Preschoolers were also quicker to perform distraction in their mother's absence. These findings clearly demonstrated that context mattered in self-regulation strategy use: preschoolers preferred to use distraction as a regulatory strategy when they were alone (i.e., mother-absent, candy delay). This supports findings from previous research that have found the same pattern with distraction (both behavioral and attentional) use in mother-absent delay of gratification contexts (Zimmerman & Stansbury, 2003).

Differential Effect of Context (Mother-Absent vs. Mother-Present) on Behavioral and Attentional Distraction

The second goal of this study was to examine whether preschoolers engaged in behavioral or attentional self-distraction in the mother's absence (i.e., candy delay) or the mother's presence (i.e., gift-waiting). Significant interaction effects of context and child distraction strategy were found, suggesting that preschoolers' use of behavioral and attentional distraction was context-dependent. They engaged in attentional distraction more frequently, longer, and quicker while waiting in their mother's absence compared to their mother's presence. On the other hand, preschoolers performed behavioral distraction more frequently, longer and quicker while waiting in their mother's presence compared to their mother's absence. The original hypothesis that preschoolers would engage in more self-distraction in their mother's presence than absence was only partially supported.

One previous study (Dennis et al., 2009) also found that in a mother-present context (i.e., gift-waiting), children performed more behavioral distraction compared to attentional distraction. Additionally, this study found that when children were either happy or angry in a waiting task, they were more likely to use behavioral distraction compared to attentional distraction. In this

study, although children's emotional experience was not assessed, it is possible that maternal insufficient regulation and ignore (predictor of child distraction) incited feelings of distress and anger in children, which, in turn, increased the use of behavioral distraction. Previous research on toddlers' use of distraction also supports the results from the study. Behavioral distraction was the most commonly used strategy by toddlers when a parent was present (Grolnick et al., 1996). Moreover, given the finding that when toddlers used behavioral distraction (i.e., thumb-sucking) in a parent-absent context their distress levels increased unexpectedly, behavioral distraction might not be an ideal regulatory strategy when children are alone in mother-absent waiting contexts. However, future research would still need to explore why preschoolers perform more attentional distraction in a mother-absent context. The findings from this study altogether suggest the differential effect of context on the child's use of behavioral and attentional distraction. Future studies examining self-distraction in preschoolers should consider the context-dependency of child distraction as a regulation strategy. By doing so, researchers could discover the effectiveness of various forms of distraction strategies in different types of stressful contexts.

Maternal Insufficient Regulation and Ignore as Predictors of Child Distraction

The third goal of the study was to examine if maternal regulatory behaviors were related to the use of self-distraction in the two waiting contexts. Results revealed that when mothers engaged in more insufficient regulation and ignore, preschoolers engaged in shorter durations of attentional distraction regardless of the presence or absence of the mother. Further, when mothers performed more insufficient regulation and ignore, preschoolers engaged in more frequent behavioral distraction. Lastly, it was found that maternal insufficient regulation and ignore was the strongest predictor (above and beyond Comforting and Attention Guiding as well as Reasoning and Negative Control) of child attentional distraction in the gift-waiting (mother-

absent) context. Altogether, these findings did not support the original hypothesis that maternal attention shifting, comforting/support and reasoning/explaining would be associated with longer duration, greater frequency, and shorter latency of children's self-distraction.

Although previous studies have demonstrated that maternal ignoring can lead to increased display of negative emotions, focus on desired object, and less distraction (Bridges et al., 1997; Rodriguez et al., 2005), the combined pattern of insufficient regulation and ignore was empirically examined for the first time in this study. It is interesting to note the differential effect of maternal insufficient regulation and ignore on behavioral and attentional distraction; it was associated with increased use of behavioral distraction but decreased use of attentional distraction. As mentioned previously, one study found that when children were either happy or angry, they were more likely to use behavioral than attentional distraction (Dennis et al., 2009). Hence, it is possible that different emotions are associated with children's use of different distraction strategies. It appears that even incomplete or simple maternal responses or lack thereof can influence child distraction use. Future studies should include more refined distinctions among different maternal regulatory strategies.

The null findings in relating maternal attention shifting, comforting/support and reasoning/explaining to preschoolers' behavioral and attentional distraction may be due to the infrequent occurrences of these maternal regulatory behaviors (see Table 1) as a result of the mothers' goal in the gift-waiting task: to finish the paperwork as fast as they could. Additionally, it is possible that the instructions given to the mother (e.g., not allowed to initiate interaction with the child but can respond to child's initiation for interaction) also contributed to the infrequency of these maternal regulatory behaviors. Future studies could explore these maternal

regulation behaviors in various other contexts where mothers are explicitly asked to help their child wait.

Role of Child Characteristics in Child Regulation

The fourth goal of the study was to examine whether child characteristics such as age, sex, temperament and language were related to children's use of self-distraction. With the exception of child sex, it was found that preschoolers' individual characteristics were not related to their use of behavioral and attentional distraction. As mentioned previously, boys performed more focus on the desired object than girls whereas girls were more likely to use distraction than boys during waiting in both contexts; however, the distinct role of child sex on behavioral or attentional distraction was not clearly demonstrated.

Previous research has found that 4-year-olds tend to use more self-distraction than 3-year olds (Spinrad et al., 2004; Dennis et al., 2009). It might be because of the restricted age range of the children in this sample (all in their 4th year of life) that there was no significant relationship between child age and distraction behaviors. Future research should examine child self-distraction (both behavioral and attentional) across the developmental spectrum (i.e., among toddlers, preschoolers, school aged children) to further examine whether child age is related to the performance of behavioral and attentional distraction strategies.

Correlational analyses found a positive correlation between the anger/frustration dimension of temperament and frequency of child attentional distraction in candy delay, but subsequent regression analysis did not support this. The lack of strong findings might be because temperament was reported by mothers in this study, which might be biased by maternal subjectivity. Hence, future research should consider using objective measures of temperament

such as children's heart rate variability or cortisol reactivity assessed in response to challenging situations (e.g., Calkins & Dedmon, 2000; Calkins & Fox, 2002).

Previous research has not yielded consistent findings with respect to the role of language in the development of self-distraction. For example, greater expressive language development (e.g., as indexed by MLU) was related to less use of self-distraction (Roben et al., 2013); however, in another study it was found that higher expressive language was related to more distraction usage (Stansbury & Zimmerman, 1999). The results from this study did not support either of these previous findings. Expressive language scores of children from this study were lower than the norm. It is possible that MLU may not be an appropriate measure of expressive language for 4-year-olds. Indeed, one study stated that around the fourth year of age, MLU might begin to lose value as an index of language complexity (Roben et al., 2013). However, it is also possible that the teaching nature of the laboratory tasks (e.g., etch-a-sketch and puzzle) where child speech was gathered influenced the level of social interaction between mother and child, such that the mother spoke majority of the time. Hence, future research should consider examining language development in more naturalistic settings (e.g., mother-child conversation at home) and including indexes of receptive language.

Limitations

A few limitations exist in the current study. First, the current study only included mothers and their children. In the future, it would be ideal to include both fathers and mothers to examine parental self-regulation strategies since only few studies have included fathers in child development research. Another limitation was the homogenous middle-class sample. The mothers were mostly White and had a college education. In the future, it would be a significant contribution to research if child self-distraction was examined in a population with different

characteristics (e.g., low SES, parents with diverse ethnic backgrounds). The development of self-distraction may emerge as a result of children's unique socialization experiences.

Disadvantaged populations such as those are exposed to poverty and other stressors and could benefit from knowledge of regulatory strategies. Moreover, in this study the observations were made in a constrained laboratory setting instead of a naturalistic environment. In the future, it would be interesting to examine self-distraction in naturalistic, real-life situations (e.g., home settings). There was also a limitation in the design of the procedures where the mother was always present in the gift-waiting task and always absent in the candy delay task. Hence, it is unclear whether the nature of the task or the presence of the mother influenced preschoolers' behaviors in each context. Additionally, it is also possible that the order in which the tasks occurred (e.g., gift-waiting always occurred before candy delay) influenced children's regulatory behaviors, such that by the second task (candy delay) they were already accustomed to waiting. In the future, it is important for researchers to randomly assign mothers in both delay of gratification tasks and randomize the order of the tasks to avoid potential order effects.

Importance of Findings

In conclusion, despite the limitations, the study contributes to the current literature in many ways. Failure to self-regulate effectively is known to be related to the inability to resolve conflict among thoughts, feelings and responses, which in turn, contribute to the risk of later development of psychopathology, such as violence and aggression (Calkins & Dedmon, 2000; Calkins & Fox, 2002; Cicchetti et al., 1995; Keenan, 2000; Calkins & Leerkes, 2011) and maladjustment, such as social delinquency and poor academic outcomes (Eisenberg et al., 2010). Distraction as a regulatory strategy might help children control their impulses and help them wait successfully in stressful contexts. While future studies will need to further examine how this

mechanism works, some studies have already included distraction as an adaptive process in secondary control (i.e., attempting to adjust oneself to situations) coping strategies that both children and adolescents use rather than primary control (i.e., attempting to alter situations) coping strategies (Skinner & Zimmer-Gembeck, 2007; Compas, 2009). Hence, by engaging in distraction (i.e., shifting attention away from a desired object), children and adolescents find alternative and potentially more positive adjustment to relatively uncontrollable challenges (Compas, 2009; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000).

Because little was previously known about the nature of behavioral and attentional self-distraction, knowledge of their use as regulatory strategies can also improve interventions for children with disabilities and chronic or serious illnesses. Children with attention-related problems, such as Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD) are more likely to experience stressors and have externalizing problems than normally developing children (Hill et al., 2006). Therefore, including self-distraction as a regulatory strategy in early interventions that target this population might be helpful in teaching young children self-initiated control and management of their behavior and impulses. This study contributes to the current literature by addressing the different patterns of behavioral and attentional distraction use in different contexts (i.e., the presence or absence of mother). Hence, interventionists need to be aware of the nature of context-dependency of different forms of self-distraction; for example, different regulatory strategies should be targeted based on whether the intervention occurs in the home where parents are present or in school where parents are absent. Further, interventionists could focus on the importance of child sex since this study found that compared to girls, boys focused on the desired object longer and showed a tendency of reduced use of self-distraction.

Distraction can also be used as an intervention for effective pain management during medical procedures for children with chronic or serious illnesses. Often medical treatments, such as chemotherapy, involve painful procedures that require the child to perform involuntary self-regulation. Few researchers have investigated the role of interactive distraction (e.g., playing a video game while undergoing painful procedure) and found that distraction reduced behavioral distress and anxiety (Wohlheiter & Dahlquist, 2013). In a similar study, children in the distraction group (i.e., where researchers used toys to block the child's view from the needle and instructed the child to play with the toy during the procedure) showed less behavioral distress and anxiety (Dahlquist, Pendley, Landthrip, Jones, & Steuber, 2002). Findings from the study also contribute to the current literature by providing researchers a basis for creating different distraction strategies. Conceptualizing behavioral and attentional distraction as distinctive self-regulatory strategies can be added to the repertoire of training programs that benefit health professionals who interact with young children who undergo painful medical procedures. The findings also suggest that it might be beneficial for health professionals to teach children different distraction strategies depending on different contexts, such as whether they undergo the procedure with or without a parent.

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APPENDIX A

Child Self-Regulation Coding Manual

This coding system is applied to the following tasks at age 4: (a) *Gift Waiting Task*, during which the child is asked to wait to open a gift bag until his/her mother (who is present in the room) finishes filling out several questionnaires, and (b) *Candy Delay Task*, during which the mother is absent and the child is given an opportunity to “win” a large cup of candy if s/he can wait for 5 minutes alone.

CHILD SELF-REGULATION: The following behavioral codes are applied to identify child behavior second by second:

- 1 = Focus on desired object (e.g., cup with candy, bell, or gift bag)
 - a) Looking, touching, playing with desired objects
 - b) Touching or playing with desired object while looking at the toy shelf
- 6 = Seeks maternal support (only coded in the gift-waiting task)
 - a) Talks with mother about any topic (related or unrelated to the task) without focusing on the desired object or other objects in the room
- 8 = Behavioral self-distraction
 - a) Behavior directed toward self or object (other than gift bag/bell/candy) to keep self occupied
 - b) Looking under the table, smiling at the cameras, tapping on table, playing with chair/clothing, sucking on chair, patting oneself, and/or distant exploration (child leaves the table to avoid the presence of the gift bag/shelf toys such as running around the room).
 - c) Combination behaviors: Looking at the toy shelf while tapping cheeks, Looking at the clock while rhythmically tapping legs on the chair
- 9 = Attentional self-distraction
 - a) Sustained focus or gaze on an object (other than gift bag/bell/candy)
 - b) Looking at the toy shelf without engaging in any other behaviors
 - c) Watching mother do the questionnaire
- 10 = Bathroom break

Coding notes:

1. The session starts when the experimenter leaves the room. The session ends when the experimenter returns or when the child opens the gift bag or rings the bell (candy delay procedure).
2. Coded behavior must be 1.5 seconds or longer.
3. Codes must be mutually exclusive (i.e., no repetition)

APPENDIX B

Maternal Regulation Coding Manual

This coding system is applied to the *Gift-Waiting Task*, during which the mother is instructed to complete some questionnaires and her child is given a gift but is asked to wait until the mother finishes. The mother's regulatory behaviors are coded during a 10-second time sampling procedure (i.e., a code is applied for every 10-second segment).

MATERNAL SELF-REGULATION:

0 = No regulation – no interaction between the child or the mother or mother responds but does not attempt to change child's behavior. Some examples are:

- a) Mother is simply filling out paperwork
- b) Mother simply announces that she's done with the paperwork - when the mother indicates that she is fully available, this is considered the end of the coding session
- c) Mother simply smiles at child without any accompanying verbalization
- d) There is no regulation from the mother, even if the child is talking to himself/herself

1 = Attention shifting (i.e., distraction) – mother attempts to shift attention away from the desired object in order to refocus attention on something non-distressing. Some examples are:

- a) Mother asks child to say ABCs
- b) Mother tells child to practice counting
- c) Mother directs child's attention to the toy shelf or mother mentions shelf toys
- d) Mother talks about a different task (e.g., fish game, etch) with the intention to distract the child as evidenced by the child looking at the gift bag or child talking about the gift bag

2 = Attention focusing – mother directs child's attention to the desired object. This depends on the mother's intention and the child's ongoing activity (i.e., child keeps looking at the gift bag). Some examples are:

- a) Mother asks child to count how many cats and dogs are on the gift bag
- b) Mother asks child to sing a song about the bag
- c) Mother talks about child's feelings about the gift bag/task – for example, “Are you excited about the gift/what's in the bag?”
- d) Mother says she's hurrying so the child can get the gift faster – when the child is already anxiously looking at the gift bag, and the mother's intent is to continue the child's attention to the gift bag

3 = Comforting/Support – includes physical behaviors, such as hugging or holding, and verbalizations, such as “It'll be okay” that the mother uses to comfort the child without attempting to change the situation. Includes supportive statements and positive feedback, such as “You're doing a great job waiting”

- a) You can do it.

- b) Don't worry, I'll tell you when I'm done – mother comforts child by letting him/her know that she's almost done; the intention was to have the child not worry instead of the progress of the questionnaire

a. Also depends on the tone of voice – warm, sincere, comforting, soothing tone

4 = Insufficient regulation – the mother gives a simple answer without explanation and did not provide reasoning or response was not useful *from the child's perspective* (i.e., child's strategy did not change, or mother's response directed child's attention to the desired object)

- a) If the child asks the mom something simple (i.e., "What was that noise?") and the mom responds with "I don't know."
b) "Just wait."
c) "Don't look."
d) Child asks, "Are you done?" Mother responds with, "Almost."

5 = Ignore – when the mother ignores the child's bids without responding. (Child seeks support but mother does not respond).

6 = Reasoning/Explaining – when the mother provides explanations and reasoning to the child's questions or explains the situation or task to the child. Reasoning and explanation should be age-appropriate.

- a) Reminds the child that he/she can open the gift bag when the paperwork is done – Reminds the child about the experimenter's rule – "Remember you can only open the gift bag once I'm done with this paperwork."
b) Mother gives a reason for telling the child she has to wait – for example, "Because that's the rule" or "Until I finish this work" or "That's what Jamie said"
c) Mother gently or patiently explains that if the child talks a lot, she will take longer – if the way the mom says this in a positive manner or puts humor into it
d) Child asks, "What was that noise outside?" and mother responds, "Those are the people who are mowing the lawn" or "The children who go to school here are playing in the playground."

7 = Negative control – includes scolding, negative remarks or expressions. Also includes anger expressions without explanation. Examples:

- a) No's
b) Stop doing that!
c) Mother's tone conveys impatience or irritation

8 = Break (Off-task or bathroom break)

Note:

If a particular code takes up the larger proportion of the time, this would be the predominant code, with exceptions:

- If the dominant code is "0" (no regulation), but a behavior occurs even for a couple seconds, this behavior should be coded.
- When there is "7" negative control – occurrence of this behavior in a segment supersedes any other regulation code.