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The present study examined the effects of induced guilt on 3- to 5-year-olds' cognitive performance. Participants underwent mood induction procedures and then completed cognitive tasks (i.e., Dimensional Change Card Sort, Shape School task, and Global Local Attention task). The influence of child temperament and parenting style on the levels of guilt experienced by children was also examined. Results indicated that 3-year-olds with high guilt performed better on the DCCS than children with low guilt and children in a neutral emotion group. However, there was no effect of guilt on the 4- and 5-year-olds' DCCS performance. Across age groups, there was no effect of guilt on children's Shape School or Global Local task performance. The results are interpreted with reference to mood-as-information theory and Appraisal theory. In terms of parenting, a permissive style was associated with high levels of guilt for highly fearful children, but low levels of guilt for less fearful children. These findings have implications for developmental theories of emotion and they may also inform educational practice (e.g., consideration of emotions as a context for learning).

THE EFFECTS OF GUILT ON YOUNG CHILDREN'S COGNITIVE PROCESSING

by

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Approved by

_____
Committee Chair

To JD Lapan.

Thanks for always supporting me, being proud of me, and pushing me to achieve greatness, yet still accepting me regardless of my success or failure.

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I

INTRODUCTION

Guilt is an emotion associated with perceptions of a negative outcome resulting from personal agency in a controllable act (Tracy & Robbins, 2006). The experience of guilt is influential in a variety of contexts, such as morality and conscience (Aksan & Kochanska, 2005), prosocial behavior (Caprara, Barbaranelli, Pastorelli, Cermak, & Rosza, 2001; Menesini & Camodeca, 2008), externalizing behavior (Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009), social competence (Walter & LaFreniere, 2007), and clinical disorders (O'Connor, Berry & Weiss, 1999; Stillman, & Baumeister, 2010). Guilt is a necessary social emotion, with extremely low levels associated with increases in externalizing behaviors such as aggression (Kochanska et al., 2009; Stillman, & Baumeister, 2010) and extremely high levels associated with internalizing disorders such as anxiety and depression (O'Connor et al., 1999). As both extremely high and low levels of guilt are detrimental for social functioning, determining the optimal level of guilt response is beneficial for understanding the role of emotions in cognitive and social development.

In children, an optimal guilt response should enable them to acknowledge wrongdoing, but not experience 'choking' behaviors that impair their ability to complete academic and cognitive tasks. The present study examined the influence of guilt on

preschoolers' cognition. The particular cognitive skills of interest were flexibility, inhibition, and visual attention. Flexibility and inhibition skills were of interest because these skills are associated with school readiness and academic achievement (Clark, Pritchard, & Woodward, 2010; Monette, Bigras, & Guay, 2011; Vitiello, Greenfield, Munis, & George, 2011). Cognitive flexibility refers to one's ability to switch between conflicting rules or perspectives and requires one to represent stimuli in terms of multiple dimensions (Zelazo, Müller, Frye, & Marcovitch, 2003). Cognitive inhibition refers to one's ability to override a prepotent, habitual response with a new response (Carlson, 2005). Visual attention can be operationalized as the type of visual information that children attended to, specifically local versus global aspects of stimuli (Kimchi & Palmer, 1982). A local visual attention style is marked by a bias to attend to smaller aspects of stimuli, whereas a global style is marked by a bias to attend to objects a whole. Visual attention biases were of interest because these biases may be beneficial or detrimental to children's performance on other tasks. For example, it has been proposed that a more global visual attention style may be beneficial to solving classic Piagetian conservation tasks, as this style aids in the understanding that even when an item is deconstructed into smaller pieces, they are still part of a whole item (Poirel, Mellet, Houde´, & Pineau, 2008).

Given the importance of these cognitive skills, it is necessary to gain a better understanding of how emotions may be beneficial or detrimental to such abilities. The preschool age is a developmental period marked by rapid increases in children's flexibility and inhibition, as well as a bias toward global visual attention. It is essential to

investigate mood effects on these skills during the preschool period to understand how emotions are influential to these skills as they develop. Specifically, the influence of emotions on cognitive abilities may differ based on an individuals' current mastery of a certain skill (see De Dreu, Baas, & Nijstad, 2008). Additionally, this research will be beneficial to understanding how the effects of mood on these tasks may generalize to real world tasks that require the use of such skills. The main goal of the study was to assess the influence of guilt on children's cognitive flexibility, inhibition, and visual attention and to assess how these effects may differ based on children's current mastery of each skill.

A secondary goal of the study was to investigate how factors such as child temperament, self-efficacy, Theory of Mind (ToM) and parenting style influence children's guilt response. Understanding these influences may be useful for establishing malleable parent or child behaviors to reduce risk of detrimental levels of guilt. This thesis begins with a review of research on guilt development and the effects of emotions on cognitive processing in young children. Mechanisms responsible for this emotion-cognition relationship, as well as how these mechanisms may change across development, will be discussed. Finally, a study is described in which children's guilt was manipulated and they completed measures of cognitive flexibility, inhibition and visual attention.

Development of Guilt

Although the definitions of complex versus basic emotions are often debated, typically happiness, sadness, and fear are considered to be basic emotions that are

instinctive and found across cultures (Oatley & Johnson-Laird, 1987). Complex emotions are initiated by the experience of a basic emotion, but higher levels of cognitive reflection enable the formation of complex appraisals (Oatley & Johnson-Laird, 1987). These appraisals are cognitive evaluations of one's current situation (Roseman & Smith, 2001). The formation of guilt appraisals requires reasoning about the self as an independent entity, inferring that we have control over our actions, and an understanding that these actions violated social norms (Lewis, 1991). Many complex emotions begin to develop in early childhood, including guilt (Russell & Paris, 1994).

Children's understanding of complex emotions is not an "all or nothing" experience. Early signs of guilt are present in children as young as 2 years of age, but there is increasing complexity in children's guilt responses and understanding up to 10 years of age. Many 2-year-olds display signs of guilt such as aversive arousal, negative affect, and tension after committing a transgression (e.g., breaking someone else's favorite toy). These signs are mostly behavioral (e.g., attempts at reparations and avoiding eye gaze), but can also be verbal (e.g., admissions of wrongdoing and apologizing). There is a general tendency for children to show an increase in these behavioral guilt responses between 1 and 5 years of age (Kochanska, DeVet, Goldman, & Murray, 1994). Additionally, these behavioral guilt responses in toddlerhood predict later troublesome behaviors in preschoolers. Specifically, 1-year-olds who display low levels of guilt are more likely to display disruptive behaviors at 5 years of age (Kochanska et al., 2009).

Many theorists posit that these behavioral responses in younger children represent an early form of guilt rather than a complex understanding of guilt (Kochanska, Gross, Lin, & Nichols 2002). Increasing complexity in guilt understanding across development provides support for the idea of early versus complex guilt. For example, 4-year-olds display aversive behavioral responses to transgressions and they can also verbally label the valence and arousal level of guilt. Yet, children of this age lack the ability to describe verbally a situation that would elicit the feeling of guilt (Russell & Paris, 1994). In contrast, 5-year-olds can express verbally the thought processes that correspond to guilty feelings and the actions that can be taken to make feelings of guilt go away (Berti, Garattoni, & Venturini, 2000). There is also a developmental shift in reported action tendencies associated with guilt. Specifically, 5- to 8-year-olds report that they want to escape, forget the event, or do nothing upon experiencing guilt. However, 9- to 10-year-olds report that they want to repair the situation. Therefore, for younger children there is a disconnect between what they want to do (i.e., escape, forget or do nothing) and what they know they should do to make the feeling pass (i.e., make reparations). This research suggests that preschoolers may have a functional, but incomplete, understanding of guilt.

Given the findings concerning guilt reactions and understanding between 2 and 10 years of age, is still unclear what early reactions to transgressions represent and at exactly what ages children shift to experiencing a more complex form of guilt. It is likely that intricate cognitive skills are required for understanding all of the complex aspects of guilt mentioned above. Thus, it is proposed that early behavioral displays of guilt represent an early form of guilt in which young children likely rely mostly on the negative valence of

the emotion (Hoffman, 1982). Later in development, as children gain increasing abilities to reflect on this negative emotion, they begin to understand and integrate more complex aspects of guilt into their experience and reactions (Berti et al., 2000). Based on this proposition, it is predicted that early and complex forms of guilt will differentially influence cognitive processes. Additionally, individual differences in the experience of guilt (i.e., low versus high guilt), will influence the effects of guilt on cognitive processes (Kochanska, et al., 2009). Both of these ideas were of interest in the current study.

Effects of Basic Emotions on Cognition

Evaluating cognitive processes within an emotional context, rather than an unemotional context, provides a more valid assessment of how cognitive processes function in everyday life. For example, children must execute many cognitively demanding tasks in the classroom (e.g., remembering new concepts), while also managing emotions that influence their ability to complete these tasks (e.g., excitement about upcoming recess). Much work has examined how emotions influence cognition in adults (Ashby, Isen, & Turken, 1999; De Dreu et al., 2008; Gasper & Clore, 2002), with little work focusing on children.

To examine the influence of emotion on children's cognition, participants are typically induced into a mood state and then complete cognitive tasks. Researchers have investigated the influence of basic emotions on children's cognitive skills including flexibility (Isen, Daubman, & Nowicki 1987), self-regulation/inhibition (Masters, & Santrock, 1976; Moore, Clyburn, & Underwood, 1976; Schwarz, & Pollack, 1977; Yates, Lippett, & Yates, 1981), problem solving (Greene & Noice, 1988), and spatial

intelligence (Rader & Hughes, 2005). Most studies report that positive emotions are beneficial to children's inhibition and flexibility performance. For example, Qu and Zelazo (2007) investigated the effects of positive, negative and neutral mood on 3-year-olds' flexibility by comparing their performance on the Dimensional Change Card Sort (DCCS) to the Emotional Face Card Sort (EFCS). The DCCS (Zelazo, Frye, & Rapus, 1996) is a standard task used to assess flexibility in early childhood. The task requires children to sort picture cards by one dimension (e.g., shape) and then switch to sort by another dimension (e.g., color) that conflicts with their previously established sorting pattern. For successful performance, children must represent items in terms of both dimensions (e.g., color and shape). The EFCS is equivalent to the DCCS, but the picture cards depict faces. When the EFCS stimuli consisted of happy faces (therefore inducing positive affect), versus sad or neutral faces, children's performance improved. In contrast, performance on the sad and neutral faces was not significantly different.

Positive moods are also beneficial to children's performance on behavioral inhibition tasks (Moore et al., 1976; Schwarz & Pollack, 1977; Toner, Lewis, & Gribble, 1979). For example, Yates et al., (1981) induced positive mood and then administered a delay of gratification task in which children had to inhibit their tendency to receive a small reward immediately and instead wait to receive a larger prize later. Eight-year-olds who were induced into a positive mood through self-generated imagery were able to wait longer for a prize than children in a neutral mood. Four-year-olds were able to wait longer only when the positive mood induction procedure was combined with instructions that children continue to think happy thoughts as they waited. Some research has

investigated the effects of positive mood on cognitive inhibition rather than behavioral inhibition, but only in adults. Some studies indicate that positive mood is detrimental to cognitive inhibition (Phillips, Bull, Adams, & Fraser 2002), while others indicate that it has no effect (Martin & Kerns, 2011). These mixed findings are likely due to differences in the tasks used to measure cognitive inhibition and different methods of mood induction.

Although positive mood has facilitative effects on many tasks, negative moods can also be beneficial to a different cognitive skill set. Gasper & Clore (2002) found that negative mood increased adult's local visual attention. This local processing style can be beneficial to performance on tasks that require more careful processing and close inspection of stimuli (e.g., analytical reasoning). Research has yet to examine the influence of emotion on children's visual attention, but without a mood manipulation, children tend to display a global visual attention bias similar to adults (Huizinga, Burack, & Van der Molen, 2010; Navon, 1977). For example, in one study, 2.5- to 4.5-year-olds completed a visual attention task in which the stimuli consisted of large geometric figures (i.e., global dimension) that were composed of smaller geometric figures dissimilar from the large feature (i.e., local dimension). Children then had to select one of two other figures that matched the target. The non-matching figure differed from the target either on the local or global feature. Children were faster to respond when the non-matching figure differed on its global rather than local feature (De Lillo, Spinozzi, Truppa, & Naylor, 2005).

Mechanisms of Influence

Emotions have a great influence on cognitive processing (Ashby et al., 1999), yet the mechanisms by which emotions influence children's cognition are unclear. Due to the variability in the understanding of guilt across development, it is likely that the mechanisms by which guilt effects cognitive processing also vary across development. Two theories set forth possible predictions for the effects of guilt on cognition: the mood-as-information theory and Appraisal Theory. The mood-as-information theory suggests that the effects of guilt on cognition are based solely on the negative valence of guilt. In contrast, Appraisal Theory assumes a more complex understanding of guilt in which cognitive appraisals are formed. This complex understanding of guilt would most likely be seen in older children and it would result in different effects than those predicted by mood-as-information theory as described below.

The mood-as-information theory posits that positive and negative emotions influence cognition by engaging different cognitive processing styles. When in a positive mood, people perceive signals that their situation is good and there is no cause for concern (Forgas, 2002; Schwarz & Clore, 1996). This sense of ease encourages a reliance on a global processing strategy that increases the use of stereotypes, rules, and heuristics. Global processing strategies improve performance on tasks that require broader thinking and attention such as flexibility (Qu & Zelazo, 2007) and behavioral inhibition tasks (Yates et al., 1981). Such assessments require overcoming a local focus on a single aspect of stimuli and to think more broadly. However, cognitive inhibition may be unaffected or impaired by a global processing strategy because accessing general knowledge may

highlight the prepotent information that one must override (Martin & Kerns, 2011; Phillips et al., 2002). The current study will examine if children's cognitive inhibition is affected differently than behavioral inhibition, as seen in previous studies.

Additionally, the mood-as-information theory posits that negative moods signal that something in one's situation is wrong and that there is cause for concern (Schwarz & Clore, 1996). This sense of concern encourages careful inspection of information and a more local processing strategy. Negative moods decrease performance on delay of gratification tasks (Yates et al., 1981) and increase local responses on visual attention tasks (Gasper & Clore, 2002). A local processing strategy is unbeneficial to flexibility, which is consistent with the findings that negative mood has no influence on children's DCCS performance (Qu & Zelazo, 2007).

Although useful for the interpretation of basic emotions, the mood-as-information theory provides little explanation for how emotional dimensions besides valence can be influential to cognition. Two moods of the same valence (e.g., anger and sadness) can produce differential effects on cognitive processing (Bodenhausen, Sheppard, & Kramer, 1994). Appraisal Theory suggests that to understand these findings, it is necessary to examine the cognitive appraisals associated with each discrete complex emotion (Roseman & Smith, 2001). Based on this appraisal account of emotions, the activation level and regulatory focus of guilt differentiate the effects of guilt on cognition from those of other negative moods. Table 1 presents the classification of some common emotions by activation level and regulatory focus.

Table 1.

Predicted Effects of Emotions on Flexibility by Activation and Regulatory Focus.

Deactivating		Activating	
Avoidant (0)	Approach (0)	Avoidant (-)	Approach (+)
Calm Relaxed	Sad Disappointed	Fear Disgust	Happy Anger Guilt

Note. (0) = no effect, (-) = negative effect, (+) = positive effect.

Another emotional dimension that differentiates guilt from other negative moods is an approach regulatory focus. Regulatory focus refers to the action tendencies associated with a particular emotion and distinguishes between approach emotions, which center on achieving a positive end-state, and avoidant emotions, which center on averting a negative end-state. Approach emotions such as guilt are associated with an increase in heuristic processing which is believed to account for the increase in cognitive flexibility seen during the experience of such emotions (Baas, De Dreu, & Nijstad 2008; Förster & Friedman, 2008). The results of a meta-analysis by Baas et al. (2008) emphasized the importance of considering the interaction between activation and regulatory focus to understand the effects of emotions on flexibility. Within the context of activating emotions, those that are also avoidant (e.g., fear) will impede cognitive flexibility, whereas activating approach emotions (e.g., happiness and guilt) will benefit cognitive flexibility. Table 1 presents a classification of emotions by these dimensions and the proposed effects of each emotion on cognitive flexibility.

As guilt is associated with high levels of activation and an approach focus (Sheikh & Janoff-Bulman, 2010), effects of guilt on cognitive processing should be distinct from other negative emotions that have low levels of activation and an avoidant regulatory focus. Given this information, guilt should increase heuristic processing in children. However, given the limited research with children that has found effects of these emotional dimensions (Green & Noice, 1988; Russ & Kaugars, 2001) it is pertinent to examine these effects developmentally, as there may be shifts in the influence of such dimensions across age.

Research that has examined the moderating effects of activation and regulatory focus has only assessed these effects on cognitive flexibility. Further research is necessary to investigate how these dimensions of emotions and underlying cognitive processing styles affect other cognitive functions, such as inhibition and visual attention. This research will be beneficial to emotion theory (Roseman & Smith, 2001; Schwarz, 1990) in establishing that these effects generalize across a variety of abilities and are not specific to cognitive flexibility. Additionally, only a few of the studies in Baas et al.'s (2008) meta-analysis assessed these moderating effects in children. Therefore, more research on cognitive flexibility is warranted to replicate these effects in child populations.

Current Study

The current study examined how guilt affects preschool children's performance on cognitive inhibition, flexibility, and visual attention tasks. Children were induced into either a neutral or guilty mood and then completed the Shape School task, DCCS and

Global Local Attention task. Two sets of predictions were set forth based on the mood-as-information theory and Appraisal Theory. Table 2 presents the proposed direction of effects by theory and task.

Table 2

Predicted Effects of Guilt on Task Performance by Theory.

Mood-as-Information			Appraisal Theory		
Flexibility	Inhibition	Local Visual Responses	Flexibility	Inhibition	Local Visual Responses
(0)	(-)	(+)	(+)	(+)	(0)

Note. (0) = no effect, (-) = negative effect, (+) = positive effect.

Mood-as-information predictions. If children are only affected by the valence of the guilt induction, then the following predictions apply. The review of literature thus far has established that basic negative moods engage local processing and thus have no effect on flexibility, reduce behavioral inhibition and increase local visual attention. It was predicted that these effects of basic negative mood on task performance would be replicated if children simply used mood-as-information. In this case, the guilt induction would be equivalent to a negative mood induction.

Appraisal Theory predictions. If children experience a more complex form of guilt in which they engage in reflection and are influenced by the activation level and regulatory focus of guilt, then the following predictions apply. Based on previous research findings, a heuristic processing style would be engaged which would increase flexibility performance and inhibition, but have no effect on visual attention.

Developmental predictions. It was also predicted that developmental shifts in the effects of guilt may occur, such that younger children may not form complex appraisals or utilize emotional dimensions besides valence. Thus, the effects of guilt on the tasks may support the mood-as-information theory for the 3-year-olds, but support Appraisal Theory for the 4- and 5-year-olds. It was predicted that children induced into a guilt state would not show any effects on their task performance if behavioral measures supported that the guilt induction was ineffective. Thus, children who displayed no guilt or low guilt were expected to perform similar to children in the neutral condition.

Individual differences in guilt

A secondary goal of the current study was to examine how parent and child factors contribute to the development of individual differences in children's guilt. Previous research has investigated the relationship between children's guilt responses, child temperament, and parenting styles (Cole, Barrett, & Zahn-Waxler, 1992; Kochanska et al., 2002; Liang, Zhang, & Chen, 2009), but little work has examined the interactions between these factors. The current study examined these interactions, as research indicates that the fit between parent and child has a large impact on children's development of guilt responses (Cornell & Frick, 2007).

Temperament refers to children's biologically based and enduring dispositions of reactivity and self-regulation (Eisenberg, 2000; Rothbart & Ahadi, 1994). Certain temperamental characteristics may increase or decrease children's levels of guilt (Kochanska et al., 2002; Liang et al., 2009). Specifically, guilt may be a more typical response for children who are temperamentally fearful, inhibited, shy or emotionally

reactive than for more uninhibited children (Cornell & Frick, 2007). Parenting behaviors have also been implicated as predictors of children's guilt responses (Kochanksa et al., 2002; Liang et al., 2009). For example, increased maternal control predicts increases in 3- to 6-year-olds' guilt displays (Liang et al., 2009). In contrast to parenting behaviors, parenting style is defined as an array of parenting practices, parental attitudes towards one's child, and the emotional climate in which parents enact specific parenting behaviors (Darling & Steinberg, 1993). Examining Authoritarian, Authoritative, and Permissive parenting styles may explain how different parenting behaviors lead to the same outcome through the differing emotional climates in which these behaviors are enacted.

Cornell & Frick (2007) assessed the effects of maternal parenting practices and styles, as well as child temperament on children's guilt development. Temperamentally uninhibited children of low Authoritarian mothers, as well as children who received inconsistent discipline, showed decreased levels of guilt. However, for highly inhibited children, inconsistent discipline and Authoritarian parenting were not associated with children's levels of guilt. There were no interactions found between the Authoritative parenting and temperament.

These findings confirm there are interactions between parenting style and temperament on children's guilt, but the subject merits further research. Cornell and Frick (2007) only contrasted Authoritarian and Authoritative parenting styles, thus, Permissive parenting should be studied. Children with a low fearful temperament and a permissive parent may show lower displays of guilt. However, having a permissive parent may lead

to high levels of guilt in highly fearful children. Cornell and Frick (2007) also only used parental reports of children's guilt experiences. The use of behavioral measures is necessary to increase the validity of the findings.

Another factor that may relate to children's development of guilt responses is self-efficacy. There have been links between the experience of guilt and one's self-efficacious beliefs about making reparations (Baldwin, Baldwin, & Ewald, 2006; Basil, Ridgway, & Basil, 2008). However, children's self-efficacy in other contexts such as cognitive, physical and social self-efficacy may relate to children's guilt proneness. Children with low self-efficacy may show extremely high levels of guilt in response to committing transgressions because they believe they cannot repair the wrongdoing. However, high self-efficacy may foster healthy levels such that children feel bad for their transgression, but are able and willing to make reparations.

Mixed findings have been reported concerning the relationship between adult's self-efficacy and guilt, with some studies reporting no relationship (Baldwin et al., 2006), a positive relationship (Basil et al., 2008), or a negative relationship (Kuhn & Carter, 2006). These mixed results are likely due to the different measures of guilt and self-efficacy used. Self-efficacy is typically considered a domain specific factor in which persons have distinct sets of self-efficacious beliefs about themselves in varying domains. One may believe they are well adept at handling social encounters, but feel unable to perform in the cognitive domain. The current study examined the effects of cognitive, physical and social self-efficacy on children's guilt responses.

Finally, assessments of ToM, or mental state reasoning, were included in the study to examine possible relationships between perspective-taking abilities and children's experience of guilt. Researchers posit that there are cognitive prerequisites to understanding many complex emotions, including guilt, and it was predicted that ToM may be such a skill (Eggum et al., 2011).

CHAPTER II

METHOD

Participants

The study included 34 3-year-olds (*M* = 42.9 months, *SD* = 3.3, 18 males), 33 4-year-olds (*M* = 53.2 months, *SD* = 4.0, 18 males) and 33 5-year-olds (*M* = 64.9 months, *SD* = 3.0, 17 males). Participants were recruited from the Greensboro and High Point areas. Analysis of demographic data indicated that 80.9% of participants were Caucasian, 13.5% African American, 4.5% mixed races, and 1.1% Asian. Participants in the sample varied in their socioeconomic backgrounds, with 58.7% of participants' families reporting an income over $60,000, 21.3% between $40,000 and $60,000, 18.7% between $20,000 and $40,000, and 1.3% less than $20,000. All participants were tested in the University D.U.C.K. Lab (Development and Understanding of Children's Knowledge) during a single session.

Materials

A sponge that looked like a rock was used for the appearance reality ToM task. In addition, a laminated image of a large red castle (8.5x11 inches) was used for this task. The laminated page was covered by a green transparency. For the guilt induction procedure, a toy dog was used that was rigged such that the head fell off when handled by

the participant. As part of the debriefing for participants in the guilt condition, an intact exact replica of the toy dog was also used. Laminated 3x5 inch cards depicting yellow flowers, yellow cars, green flowers, and green cars were used for administering the DCCS. Cards were sorted into open top plastic containers. The Shape School task materials consisted of laminated pictures of red, blue and yellow circles and squares (Espy, 1997). The Visual Judgment Task (Kimchi & Palmer, 1982) was administered on a Dell laptop computer with a touch screen.

Perceived competence measure. Children completed the Harter Pictorial Scale of Perceived Competence and Social Acceptance (PSPCSA; Harter & Pike, 1984). For the full list of items, see Appendix A. To complete the measure, children are presented with two statements describing two children with accompanying pictures (e.g., "This girl is good at puzzles. This girl is not very good at puzzles"). Children must choose which child is most like them and qualify their answer. For example, if a child chose the girl who is good at puzzles, then she would also decide if she is "Very good at puzzles" or "Pretty good at puzzles." The measure is a 24-item scale which consists of two main factors and two subscales per factor. The first factor, perceived competence ($\alpha = .76$), consists of the cognitive competence ($\alpha = .67$) and physical competence ($\alpha = .62$) subscales. The second factor, social acceptance ($\alpha = .87$), consists of the peer acceptance ($\alpha = .74$) and maternal acceptance ($\alpha = .84$) subscales. Children receive a score between 1 and 4 for each item, thus the possible range of scores is 24-96.

Parental report measures. Mothers completed three subscales of the "My Child" early morality inventory (Kochanska et al., 2002) to assess children's average guilt

responses (see Appendix B). This 39-item inventory consists of statements describing types of responses to wrongdoings, for example, “Likely to become quiet or subdued after having done something wrong.” Mothers rated how true each statement was of their child on a 7-point scale (1 = *very untrue*, 7 = *extremely true*). The three subscales used in the present study were affective discomfort after wrongdoing (α = .84), concern about good feelings with parent (α = .84), and empathy (α = .80).

Mothers also completed the Child Behavior Questionnaire (CBQ), a well established measure of temperament (Rothbart, Ahadi, Hershey, & Fisher, 2001). The inventory consists of statements such as “My child is not afraid of large dogs and/or other animals,” and “My child is quite upset by a little cut or bruise,” (See Appendix C for all items). Mothers rated each statement as true of their child on a 7-point scale (1 = *extremely untrue of your child*, 7 = *extremely true of your child*). As in previous research (Kochanska, 1997), three subscales were combined to assess the extent to which children displayed a fearful temperament (α = .63): shyness (13 items), fearfulness (12 items) and discomfort (12 items).

To assess parenting style, mothers also completed the Parenting Styles Dimensions Questionnaire (PSDQ; see Appendix D). The PSDQ is a 62-item measure of self-reported parenting practices for parents of 3- to 12-year-olds. For example, “I guide my child by punishment more than reason.” Each item is ranked on a 5-point Likert scale (1= *never*, 5 = *always*). The PSDQ, confirmed with factor analysis, taps three dimensions of parenting: authoritativeness (α = .91), authoritarianism (α = .86), and permissiveness (α = .75) (Baumrind, 1966; Robinson, Mandleco, Frost Olsen, & Hart, 1995). The

possible range for each subscale varied as there are different numbers of questions for each subscale. Thus, each mother received a mean authoritative, authoritarian and permissiveness score which ranged from 1 to 5.

Design

A 3X2 between subjects design was used with age (3-, 4-, and 5-year-olds) and type of mood induction (guilt or neutral) as independent variables. Participants were assigned randomly to the guilt condition or neutral condition. Performance on the DCCS, Shape School task and Visual Attention task served as outcome measures. These tasks were counterbalanced with three different orders such that each task was completed in the first, second or third position.

Procedure

Participants were tested in the lab in a single visit. First, participants completed the appearance reality task and the PSPCSA. Then, they underwent a guilt induction procedure or engaged in a neutral interaction with the experimenter. After the guilt induction or neutral interaction, participants completed the DCCS, Shape School task and visual attention task. Participants in the guilt condition were then debriefed. During the testing procedures, caregivers filled out the My Child questionnaire, CBQ and PSDQ.

Appearance reality task. Participants completed two trials of the appearance reality task in a randomized order. In one trial, children were presented with what looked like a rock, but was actually a sponge, and asked “Do you know what this is?” After children responded that it was a rock, the experimenter squeezed the item and let the participant feel it to show that it was actually made of a spongy material. Children were

then asked, “So, what is it?” If participants did not identify it as a sponge, the experimenter labeled it as such. Then participants were asked the following test questions: “So when you look at this now, does it look like a sponge or a rock? And what is it really?” In the second trial, participants were shown a picture of a red castle covered by a green transparency that made the castle appear brown. When the transparency was lifted, participants saw that the castle was actually red. The same procedures as above were repeated with the castle picture.

Mood manipulation. After completing the PSPCSA and Appearance reality task, children underwent mood manipulation procedures based on their assigned condition (i.e., neutral or guilt).

Guilt induction. Guilt was induced using a mishap paradigm that has been established as a valid elicitor of guilt responses (Kochanska, Casey, & Fukumoto, 1995; Kochanska et al., 2009). The experimenter first told the participants, “I brought my favorite toy with me today. Would you like to see it?” All participants indicated that they would like to see the toy. The experimenter took out the toy and continued, “This is my toy puppy and it is my favorite toy! Would you like to play with it?” The toy was rigged to break such that when the participants played with it, the dog’s head fell off. If participants were very gentle in handling the toy and the head did not fall off immediately, the experimenter encouraged them to pick up the toy and to continue to play with it until the head fell off. Once the toy broke, the experimenter expressed mild regret by saying**,** “Oh my!” and then sat in silence for 60 seconds. During this time, the experimenter kept intermittent eye contact with the participant. Also, the participants’

behavioral responses to this mishap were recorded and later coded to obtain a measure of guilt. Any verbalizations made by the participants were also recorded. After the 60 second period, the experimenter asked the participants questions about the mishap, "What happened? Who did it? Did you do it?" Answers to these questions were also recorded. For children in the guilt condition, behavioral and verbal codes were applied to obtain a measure of guilt.

*Behavioral coding***.** Codes were applied to each 5 second segment of the 60 second interval; this system was adapted from previous research (Kochanska et al., 2009). The 5 second increment codes included avoiding eye gaze, lip biting, twisting, covering or touching the face, squirming, hanging head, hunching shoulders or hugging self. Raters noted the presence of all behaviors in each 5 second increment. Greater frequencies of these behaviors indicated higher levels of a guilt response. Scores for each behavioral code were summed and then standardized to obtain a measure of guilt. Two raters coded the data and inter-rater reliability was assessed.

*Verbalization coding***.** Codes were also applied to all spontaneous verbalizations made by participants, as well as to their answer to the experimenter's questions (Kochanska et al., 1995). Verbal responses were coded into three factors used to obtain a supplementary measure of guilt to the behavioral coding. The verbalization categories included Confession, Apology/Reparative Comments and Distress/Escape. Higher scores in all three categories represent higher levels of guilt.

Neutral Interaction. For this condition, the experimenter followed the same script as in the guilt procedures, informing the participant that they had brought their favorite

toy and asked them if they wanted to see it. The toy was a plain wooden block. The experimenter gave the block to the child and told them that they could play with it while the experimenter finished some paperwork. The experimenter let the child interact with the block and kept intermittent eye contact for 60 seconds, as in the guilt condition.

Flexibility. The DCCS, a well established measure of flexibility (Zelazo et al., 1996), was administered to all participants. This task assesses children's ability to represent one object in two different ways (i.e., in terms of color and shape). The task requires participants to sort cards by one dimension (e.g., shape) in the pre-switch trials and then switch to sorting the same cards by another dimension (e.g., color) in the post-switch trials. Three participants in the sample did not pass the pre-switch trials and were thus excluded from data analyses (see Zelazo et al., 2003, for similar procedures).

Response inhibition. Children completed the Shape School task (Espy, 1997), in which they were shown a picture with an outdoor scene and an array of different colored shapes that have arms, legs and neutral facial expressions. The first trial was used to ensure that children could label all of the figures by their color and establish a naming rule that would later need to be inhibited (See Appendix E for the full instructions). The time it took the participants to complete the naming process and the number of errors made were recorded for each trial type**.** Then, the next picture was presented, in which some of the students had papers and some did not have papers. This inhibition trial required participants to refrain from naming certain figures, specifically the ones without papers, because those students were described as not being done with their work. Inhibition efficiency scores were computed to assess performance [efficiency = (number

correct – number of errors) / total time] with greater scores indicating better performance (adapted from Espy, 1997).

Visual Attention. Visual attention was assessed using a Global/Local Visual Judgment task adapted from Kimchi & Palmer (1982). In this task, participants were presented with a target geometric figure (e.g., a square) made up of smaller geometric shapes (e.g., triangles), which was located at the top of the screen and centered. Below the target, there were two similar figures with local and global features. The experimenter introduced the task by pointing appropriately and stating; "Now we are going to play a computer game. I'm going to show you one shape at the top and I want you to pick which shape at the bottom looks just like the one up here." Then, the experimenter began the task with the first set of practice stimuli in which only one figure matched the target on both global and local feature (i.e., the same exact figure) and the other did not match at all. The experimenter stated, "See the shape up here? I want you to pick which shape down here looks just like the one up here. Just touch which one you think is exactly the same as the one on top." The next two practice trials were used to ensure that participants could match figures with the target based on both local and global features. In these two trials, one figure matched on either a global or local feature and the other figure did not match at all. If participants chose the incorrect figure, they were told, "Oops, that one isn't exactly the same." Then the experimenter labeled what feature did not match (e.g., "See, this one on top is made up of little squares and this one is made of little triangles," or, "See, this one on top has a big shape like a square and this one has a big shape like a triangle,"). Participants had to answer correctly before continuing to the next trial.

Following the practice trials, participants completed 24 test trials. Before they were presented with the first trial they were told “Ok, now I’m going to show you some more shapes on the top and I want you to pick which shape on the bottom you think matches the best. For the rest of these, there are no right or wrong answers. I just want to know which ones you think go best together.” For all the test trials, participants were presented with two similar figures; one that matched the target on the global shape and one that matched on the smaller, local shapes (see Figure 1). Previous versions of this task used with children only had one matching figure for each trial and visual attention biases were examined based on children's reaction times to local versus global matches (Huizinga et al., 2010; Yan, & Su, 2001). If it appeared that participants were not paying attention to the task and just choosing without looking at the options, they were reinstructed as follows: “Make sure you look at all of the shapes and then pick which one you think matches best.” The number of local versus global choices was recorded and ranged from 0 to 24.

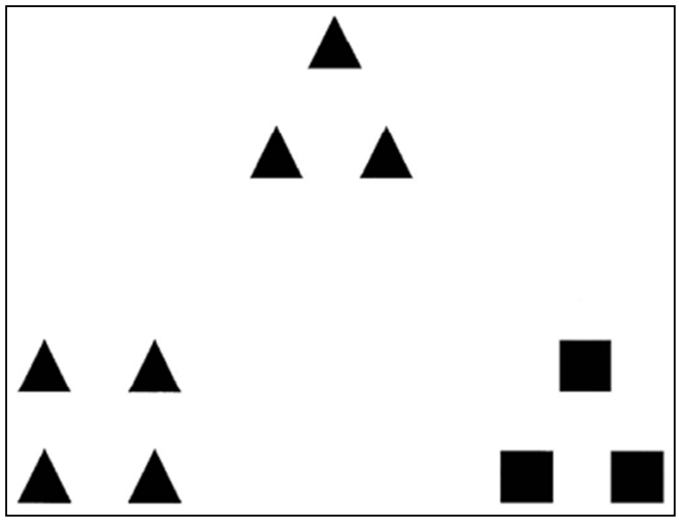


Figure 1. Example of Visual Attention Task Trial

CHAPTER III

RESULTS

Statistical Analysis Plan

Four sets of data analyses were performed. The first set assessed the combined effects of condition and age on task performance. The next set examined only the guilt group to evaluate how the range of guilt scores, along with age, influenced task performance. The third set assessed the relationship between temperament, parenting style and guilt scores. Finally, correlational analyses assessed the relationships between ToM, self-perceptions, guilt scores, task performance and age. Potential effects of gender and demographic factors were examined for each analysis. Because there were no significant effects or interactions involving these variables on any of the dependent measures, they were excluded from the final analyses.

Mood Manipulation Check

Descriptive analyses of the raw guilt scores indicated there was variability in children's guilt responses which ranged from scores of 0 to 26 (M = 7.16, SE = .89). From the raw data, descriptive analyses indicated that only 11% of the sample displayed no signs of guilt (i.e., participants received scores of 0 for all possible behavioral codes). The upper half of the sample was coded as displaying at least 6 behavioral indications of guilt in the 60 seconds. After standardizing these raw scores, the range of scores was between -1.06 to 2.78, (M = 0, SE = .13). A random sample of 40% of the guilt

participants' behavioral data was recoded by an independent rater who achieved high levels of reliability, Cronbach's alpha = .78.

Age and Condition Effects on Task Performance

For all of the following analyses, mean performance by task type and age is shown in Table 3.

DCCS. Based on previous coding procedures, children received a score of 1 for sorting at least 4 post-switch cards correctly or a score of 0 for sorting fewer than 4 correctly (see Zelazo et al., 2003). A logistic regression analysis was conducted with age in months, condition, and the interaction between age and condition as predictors. The overall model was significant, $\chi^2(1, N = 100) = 11.76$, $p = .01$. DCCS performance increased with age, $\beta = 0.07$, *Wald* = 5.54, $p = .02$, however there was no effect of condition, $\beta = -0.88$, *Wald* = .11, $p = .74$, and no significant interaction, $\beta = 0.01$, *Wald* = 0.05, $p = .82$. Three-year-olds performed at chance levels, $t(31) = -1.06$, $p = .30$, whereas 4-year-olds performed marginally above chance, $t(31) = 1.83$, $p = .08$, and 5-year-olds performed significantly above chance, $t(32) = 3.98$, $p < .001$.

Shape School. Linear regression analyses assessed the effects of age in months, condition, and the interaction between age and condition on participants' inhibition efficiency. The overall model was significant, $R^2 = .35$, $F(1, 94) = 16.11$, $p < .001$. Inhibition efficiency increased with age, $\beta = 0.04$, $t(94) = 5.61$, $p < .001$, however, there

Table 3

Descriptive Statistics for Measures by Age

	Age											
	3				4				5			
Measure	M	(SD)	Range	N	M	(SD)	Range	N	M	(SD)	Range	N
DCCS												
Pass Pre-Switch	.94	(.24)	0-1	34	.97	(.17)	0-1	33	1.0	(.00)	1	33
Pass Post-Switch	.41	(.20)	0-1	33	.66	(.48)	0-7	32	.79	(.42)	0-1	33
Shape School Task												
Control Efficiency	.61	(.44)	.25-.94	33	.78	(.23)	.40-1.40	33	.89	(.25)	.47-1.55	33
Inhibit Efficiency	.27	(.40)	-.52-.91	30	.53	(.37)	-.11-1.25	31	.97	(.50)	-.03-1.85	33
Total Local	14.73	(6.36)	0-24	33	10.48	(8.75)	0-24	47	15.24	(9.05)	0-24	33
Guilt Scores												
Verbal	-.08	(.99)	-1.13-2.26	21	.14	(1.18)	-1.13-2.69	21	-.07	(.82)	-1.13-.99	20
Behavioral	-.51	(.57)	-1.06-.86	20	-.16	(.81)	-1.06-1.45	17	.62	(1.15)	-1.06-2.78	21
PSPCSA												
Cognitive	3.26	(.53)	1.83-4.00	31	3.32	(.49)	2.33-4.00	23	3.60	(.36)	2.67-4.00	31
Physical	3.00	(.48)	2.20-3.80	31	3.01	(.54)	2.17-4.00	23	3.24	(.50)	2.50-4.00	31
Peer	3.01	(.56)	2.00-4.00	31	3.07	(.44)	2.33-4.00	23	2.88	(.66)	1.67-4.00	31
Maternal	3.10	(.48)	2.33-4.00	31	3.09	(.58)	2.00-4.00	23	3.00	(.67)	2.00-4.00	31
ToM	2.66	(.90)	0-4	29	3.52	(.73)	0-4	23	3.52	(.93)	0-4	31

was no effect of condition, β = 0.23, $t(94) = 0.42$, $p = .68$, and no significant interaction, β = -0.01, $t(94) = -0.51$, $p = .61$.

Visual Attention. The effects of age in months and condition on participants' local responses in the visual attention task were also assessed. This model was not significant, $R^2 = .00$, $F(1, 98) = 0.08$, $p = .97$. None of the predictors were statistically significant, all p's > .10.

Effects of Guilt Scores and Age on Task Performance

The next set of analyses assessed how varying levels of guilt affected children's task performance. Maternal reports of children's guilt via the My Child questionnaire lacked variability (see Table 4) and were not correlated with the behavioral or verbal indices of guilt. Previous research has used behavioral coding only to assess children's experience of guilt (see Kochanska et al., 2009 for similar procedures), as verbal measures are clearly influenced by children's general language skills (Kochanska, et al., 1995). Verbal measures are typically used to assess children's understanding rather than experience of guilt (Kochanska et al., 1995). The behavioral codes represent a more sensitive measure of guilt free from the constraints of verbal ability. The behavioral index of guilt was used as a predictor and thus, the analyses only included children in the guilt condition.

DCCS. To examine the effects of guilt level on the DCCS, a logistic regression analysis was conducted with age in months, participants' guilt scores and the interaction of the variables as predictors. The overall model was significant, $\chi^2(1, N = 55) = 13.15$,

Table 4

Descriptive Statistics for Parent Report Measures by Age

	Age											
	3				4				5			
Measure	M	(SD)	Range	N	M	(SD)	Range	N	M	(SD)	Range	N
My Child	4.87	(.72)	3.59-6.29	34	4.86	(.59)	3.42-6.18	33	4.93	(.63)	3.84-6.69	32
CBQ	3.85	(.71)	2.44-5.38	34	3.67	(.63)	2.29-4.83	33	3.82	(.71)	2.54-5.24	32
PSDQ												
Authoritative	4.16	(.39)	3.19-4.18	32	4.16	(.28)	3.59-4.78	33	4.10	(.31)	3.56-4.78	32
Authoritarian	1.85	(.29)	1.40-2.89	32	1.83	(.27)	1.20-2.35	33	1.86	(.34)	1.15-2.45	32
Permissive	1.93	(.38)	1.20-3.00	32	1.83	(.25)	1.47-2.40	33	1.87	(.37)	1.13-2.87	32

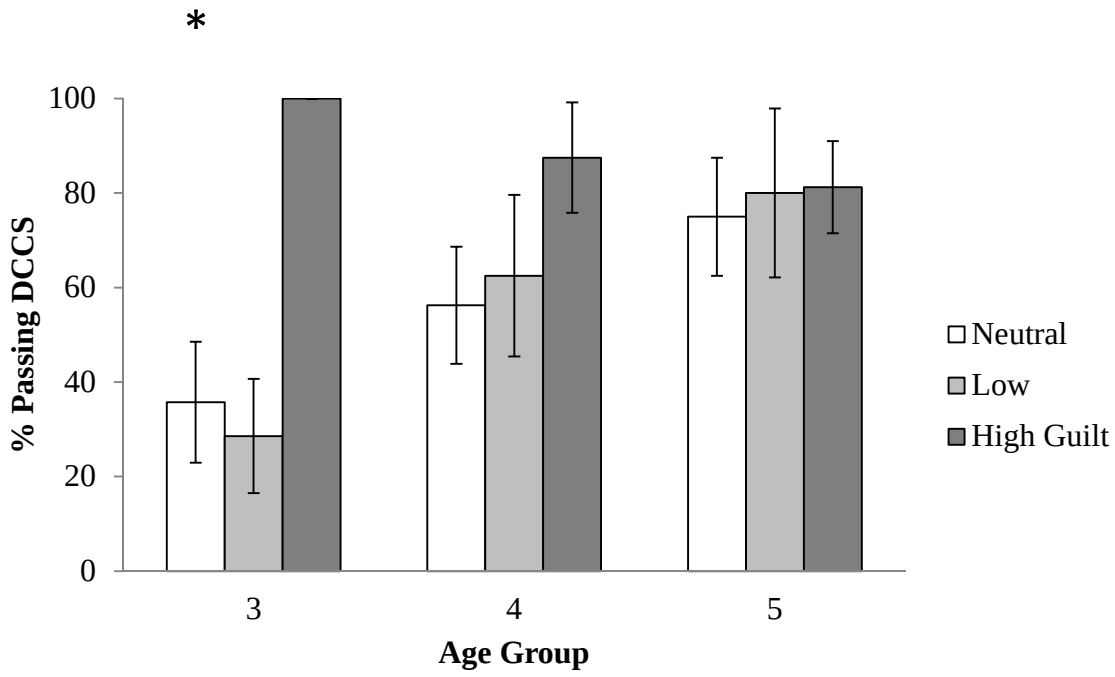
$p < .01$. DCCS performance increased with age, $\beta = 0.14$, *Wald* = 5.46, $p = .02$, and guilt scores, $\beta = 1.11$, *Wald* = 4.54, $p = .03$. These main effects were qualified by a significant interaction between age and condition, $\beta = -0.02$, *Wald* = 4.07, $p = .04$. To examine the interaction, the percentage of participants who passed the DCCS was examined by age and guilt.

A median split was used to classify participants into high and low guilt groups. This cut point also had theoretical significance. Given that there were 6 epochs of coding and the raw score median was 6, these children, on average, consistently displayed behavioral signs of guilt throughout the 60 second guilt induction. Given that the split was conducted for the whole sample, rather than by age, there were variable numbers of high and low guilt children in each age group. The high guilt group contained 4 3-year-olds, 8 4-year-olds, and 16 5-year-olds. Follow-up Chi-Squared analyses assessed if the high guilt versus low guilt groups differed significantly by age. As seen in Figure 2, guilt significantly increased DCCS performance for 3-year-olds, $\chi^2(1, N = 18) = 6.43$, $p = .01$, but had no effect on the performance of the 4-year-olds, $\chi^2(1, N = 16) = 1.33$, $p = .25$, or 5-year-olds, $\chi^2(1, N = 21) = 0.00$, $p = .95$.

An additional logistic regression analysis was conducted to compare the task performance of the high guilt group with that of the neutral group. The model was significant, $\chi^2(1, N = 70) = 13.05$, $p < .01$. Performance on the DCCS increased with age, $\beta = 0.08$, *Wald* = 4.17, $p = .04$, and was greater in the high guilt group as compared to the neutral group, $\beta = 8.47$, *Wald* = 2.95, $p = .08$. The interaction was not significant, $\beta = -$

0.12, *Wald* = 2.29, $p = .13$. However, given that the previous analyses indicated that there were benefits of guilt only for the 3-year-olds, follow up Chi-Squared analyses were still conducted. Similar to the previous findings, 3-year-olds in the high guilt group performed significantly better than 3-year-olds in the neutral condition, $\chi^2(1, N = 18) = 5.14$, $p < .05$, but there was no significant benefit of high guilt for the 4-year-olds, $\chi^2(1, N = 24) = 2.34$, $p = .13$, or 5-year-olds, $\chi^2(1, N = 28) = 0.16$, $p = .69$ (See Figure 2).

Figure 2. Percentage of Participants Passing the DCCS by Age and Condition/Guilt Level



Note. Significant differences are based on Chi Square analyses by age,*$p < .05$

Shape School. A linear regression analysis assessed the effect of age in months and guilt on inhibition efficiency. The overall model was significant, $R^2 = .49$, $F(1, 54) = 16.13$, $p < .001$. There was a positive effect of age, $\beta = 0.02$, $t(54) = 2.36$, $p < .05$, but no

significant effect of guilt, β = -0.10, $t(54) = -1.49$, $p = .14$, and no significant interaction, β = 0.01, $t(54) = 1.54$, $p = .10$.

Visual Attention. Finally, the effect of age in months and guilt scores on children's total local responses was assessed with a linear regression analysis. This model was not significant, $R^2 = .03$, $F(1, 56) = 0.61$, $p = .61$. Neither age, condition, nor the interaction were significant predictors of participants' local responses.

Effects of Inhibition and Parenting Style

Linear regression analyses were conducted to assess the combined relationship between parenting style and inhibition on participants' guilt responses. The parenting styles discussed were not considered mutually exclusive and were treated as separate indices of parenting dimensions. Every mother in the current sample ranked herself highest on the Authoritative subscale (see Table 4). However, based on previous work, variations in Authoritarian and Permissive parenting can be influential even when parents may show a primary Authoritative style (see Cornell & Frick, 2007 for similar procedures). Thus, all mothers were included in each of the following linear regression analyses and their mean parenting style score from the PSDQ for the subscale of interest (i.e., authoritative, authoritarian, or permissive) served as one of the predictors. The other predictors included participants' mean inhibition score from the CBQ and the interaction between parenting and inhibition.

Authoritative. The overall Authoritative model was not significant, $R^2 = .07$, $F(1, 57) = 1.37$, $p = .26$. There was no significant effect of inhibition, β = -4.78, $t(57) = -1.66$, $p = .10$, or parenting style, β = -3.97, $t(57) = -1.41$, $p = .16$. There was a marginally

significant interaction, β = 1.65, $t(57) = 1.88$, $p = .07$, which indicated that participants with high authoritative parents displayed similar levels of guilt regardless of inhibition. However, for participants with low authoritative parents, greater inhibition was associated with higher levels of guilt (See Figure 3a).

Authoritarian. The overall Authoritarian model was not significant, $R^2 = .09$, $F(1, 57) = 1.66$, $p = .19$. There was a marginal effect of inhibition, β = -4.71, $t(57) = -1.74$, $p = .09$, and no significant effect of parenting style, β = 1.93, $t(57) = 0.60$, $p = .55$.

participants with low authoritarian parents displayed similar levels of guilt regardless of inhibition. However, for participants with high authoritarian parents, greater inhibition was associated with higher levels of guilt (See Figure 3b).

Permissive. The overall Permissive model was not significant, $R^2 = .10$, $F(1, 57) = 2.05$, $p = .11$. There was a significant effect of inhibition, β = -5.23, $t(57) = -2.04$, $p < .05$, but no significant effect of parenting style, β = .30, $t(57) = 0.11$, $p = .91$. A significant interaction, β = 3.86, $t(57) = 2.36$, $p < .05$, indicated that for participants with low permissive parents, low inhibition was associated with higher guilt scores. However, for participants with high permissive parents, low inhibition was associated with lower guilt scores (See Figure 3c).

Correlations with ToM

Pearson's correlations indicated a significant positive correlation between ToM and age, $r = .395$, $p < .01$. ToM was positively related to inhibition performance, $r = .347$, $p < .01$. However, ToM was not significantly related to DCCS performance, control A marginally significant interaction, β = 3.20, $t(57) = 1.81$, $p = .08$, indicated that

efficiency or local responses on the visual attention task. There was no significant relation between ToM and participants' guilt scores, $r = .038$, $p = .80$. Finally, there was a significant positive relation between ToM and the perceived cognitive competence scale, $r = .272$, $p < .05$. There was no significant relation between ToM and any of the other subscales of the PSPCSA.

Correlations with PSPCSA

Pearson's correlations indicated a significant positive relation between age in months and the cognitive competence subscale, $r = .337$, $p < .05$, as well as a marginally significant relationship with the physical competence subscale, $r = .205$, $p = .06$. There were no significant correlations between age in months and either the peer acceptance or the maternal acceptance subscale. There was no relation found between any of the PSPCSA subscales and participants' guilt scores.

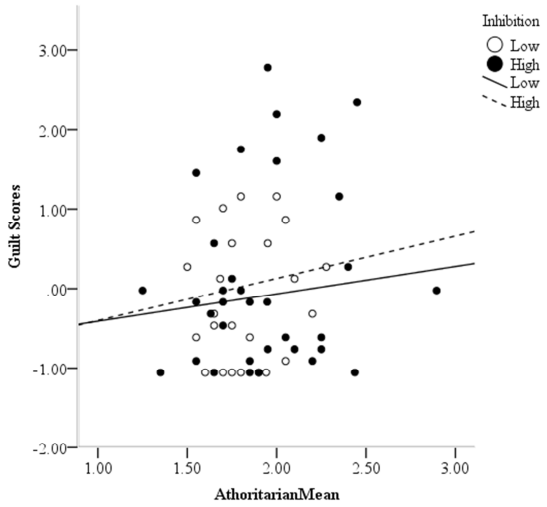


Figure 3a. Guilt Scores by Authoritative Parenting and Inhibition

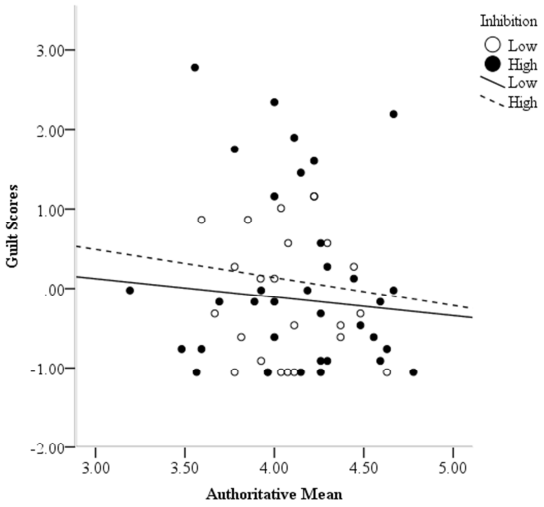


Figure 3b. Guilt Scores by Authoritarian Parenting and Inhibition

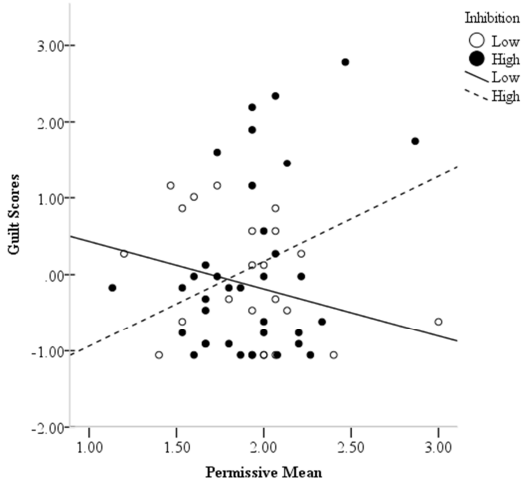


Figure 3c. Guilt Scores by Permissive Parenting and Inhibition

CHAPTER IV

DISCUSSION

The current study examined how the induction of guilt affected 3- to 5-year-olds' performance on the DCCS, Shape School task, and Global Local Attention task. Additionally, the study aimed to gain support for either the mood-as-information theory or Appraisal Theory by examining the pattern of effects of guilt on the three tasks. A secondary goal of the study was to examine how temperament and parenting style interacted to predict children's levels of guilt. Finally, relations between guilt, ToM, self-efficacy and task performance were examined.

Results indicated that there was no difference in the performance of the guilt and neutral mood groups on any of the tasks. However the range of children's guilt scores was particularly informative, as varying levels of guilt affected task performance differently. The main findings indicated that only high levels of guilt were beneficial to younger children's DCCS performance, but had no influence on either inhibition or visual attention performance. This pattern of results was not fully consistent with the predictions made by either theory. The prediction that temperament and parenting style interacted to predict children's guilt was also partially supported. Finally, correlational analyses indicated that there was no relation between children's ToM scores or PSPCSA scores with guilt.

Guilt Manipulation

The guilt manipulation was not effective for all participants. This is consistent with other research that has induced guilt in children (Kochanska et al., 1995) and also supports the finding that task performance for the guilt and neutral groups did not differ significantly. However, when participants were classified into high and low guilt groups, a different pattern of results emerged. This finding emphasizes the importance of using behavioral measures to assess the effectiveness of mood manipulations as opposed to self-report, verbal responses or no manipulation check at all. Many other studies examined the effects of mood on cognition without conducting mood manipulation checks (Greene & Noice, 1988; Moore et al., 1976; Qu & Zelazo, 2007), which may result in misleading conclusions. Additionally, using a range of guilt scores, or a range of mood scores for any mood of interest, can provide a more sensitive measure of the effects emotion on cognitive performance.

Younger children who experienced high levels of guilt showed marked increases in their DCCS performance. The documented increase in cognitive flexibility after the induction of guilt is consistent with the predictions of Appraisal Theory and inconsistent with the predictions of the mood-as-information theory. According to the mood-as-information theory, if children relied only on the valence of guilt, the guilt induction was predicted to have no effect on flexibility performance because it encourages local processing. However, Appraisal Theory suggests that the highly arousing activation level

and the approach regulatory focus associated with guilt increases heuristic processing and thus flexibility performance.

However, to conclude that the facilitative effects of guilt on flexibility are due to the appraisal processes of activation and regulatory focus, a negative mood condition is needed for comparison. Direct comparisons of the effects of guilt and negative mood would allow for the discrimination of the mechanisms responsible for the effects seen. However, there is indirect support for the effects of activation and regulatory focus by comparing the current findings with those of Qu & Zelazo (2007). In their study, negative mood, specifically sadness, did not influence children's flexibility performance. Both Qu & Zelazo's study and the current study examined the effect of a negative mood on cognitive flexibility, but the current study found facilitative effects on flexibility, whereas Qu and Zelazo found no effect on flexibility. Thus, it is possible that the effects of guilt on cognitive flexibility were due to the activation and regulatory focus of the emotion and not the valence. However, the methods of mood induction and flexibility assessment were different in each study. Specifically, Qu and Zelazo manipulated participants' moods through the actual DCCS stimuli, such that the cards that children sorted were composed of sad faces. These differences in procedure may possibly account for the different findings. Therefore, the conclusions that can be drawn from the current study are limited and future studies should include guilt and other negative affect manipulations in order to directly compare performance.

The finding that the youngest children showed the greatest benefit from the guilt induction is inconsistent with the predictions that there are developmental shifts from using mood-as-information to later integrating additional emotional dimensions, such as activation and regulatory focus. Even the youngest children in the sample may already be aware of the arousing effects of guilt. This is consistent with research that has found that 4-year-olds can appropriately label the arousal levels of many complex emotions (Russell & Paris, 1994). Although it is unlikely that 3-year-olds possess an advanced understanding of guilt similar to older children and adults, this research suggests that younger children can still be influenced by dimensions of guilt that are more complex than valence. Older children did not show the same benefit of guilt on DCCS performance, possibly because they were already highly skilled on the DCCS (i.e., near ceiling performance). Also, it has been suggested that children older than 4 years of age cannot be successfully manipulated into a guilt state via the mishap paradigm (Kochanska et al., 2002). It is possible that older children showed no effect of guilt on their performance because they were not indeed experiencing guilt. However, guilt scores were highly correlated with age and the manipulation checks indicated that the majority of older children showed at least some signs of guilt. Thus, this interpretation is not supported by the current results.

The finding that guilt had no effect on children's inhibition performance was inconsistent with the predictions made by both the mood-as-information theory and Appraisal Theory. If children relied on the negative valence of guilt, then it was predicted

that guilt would decrease inhibition performance because of an increase in local processing. However, if children formed more complex appraisals, then their inhibition performance would increase due to the heuristic processing engaged by the activation and regulatory dimensions of guilt. These predictions made were based on the assumption that the effects of mood on behavioral inhibition were the same as the effects of mood on cognitive inhibition and that a heuristic processing style was beneficial to both types of tasks. Yet in retrospect these assumptions may be ill-founded, as cognitive and behavioral inhibition tasks may require different cognitive processing styles.

The current findings are consistent with adult research that has investigated the effects of mood on cognitive inhibition tasks (e.g., Stroop Task), such that positive moods, which are arousing and approach focused, are either unbeneficial or detrimental to cognitive inhibition performance (Martin & Kerns, 2011; Phillips et al., 2002). Behavioral inhibition assessments typically require children to delay receiving an immediate reward to receive a larger reward later. For such tasks, heuristic processing may be beneficial because thinking broadly may serve to distract one from the enticing aspects of the reward and allow children to wait longer. However, cognitive inhibition requires replacing a prepotent response to a stimulus with a novel response. In this case, heuristic processing may not be beneficial to task performance because greater access to and use of general knowledge may lead to the incorrect response, whereas a local focus may enable children base their responses on a careful inspection of the stimuli. For example, a more careful and local inspection of the Shape School stimuli may have

increased the salience of the papers in the hands of the characters and thus served as a reminder to only label these characters and inhibit labeling the others. If a heuristic processing style is truly unbeneficial to cognitive inhibition performance, then the current results support Appraisal Theory, as the activation and regulatory focus of guilt increased heuristic processing. Additionally, if a local processing style is truly beneficial to cognitive inhibition performance, then the current findings are inconsistent with the mood-as-information theory, as the negative valence of guilt should have increased local processing.

The guilt induction had no influence on children's visual attention performance. The finding is inconsistent with the mood-as-information theory because guilt should increase local processing and produce a local response bias. However, since participants responded randomly, this is only speculative. No sound conclusions can be drawn from the current data in regard to the effect of guilt on visual attention because even participants in the neutral condition responded randomly on the current version of the task rather than displaying the typical global response bias. In the current study, children chose which figure they thought best matched the target and children’s attentional biases were measured as the number of global versus local matches. The tasks used in previous studies have forced children’s selections such that one figure did not match the target at all and the other matched the figure on either a global or local dimension (De Lillo et al., 2012). In previous studies, a local visual attention bias was observed when children made local matches faster than global matches. However, when both figures could be a possible

match, as in the current study, children did not systematically choose local or global matches. Perhaps children did not understand the task and were responding randomly rather than attending to the different dimensions of the figures.

These results have implications for emotion theory, specifically for the further investigation of Appraisal theory. This study lends support to Appraisal Theory in that dimensions besides emotional valence are essential components involved in the effects of emotion on cognition. Additionally, the current study extends previous work that suggests that these appraisals and emotional dimensions are influential early in development. These results may also have educational applications for how cognitive skills are taught and assessed in the classroom. Specifically, educators could frame learning and assessment activities within certain emotional contexts to increase children's understanding of concepts and performance on assessments. For example, a highly arousing group or game context, rather than a solitary quiet context, may increase the number of children's creative and flexible responses to a brain storming task. However, more applied research is necessary to investigate the task demands of typical academic activities and to establish the emotional dimensions that are most beneficial to performance on such activities. Research has already begun to establish that the integration of structured curricula on emotional competence is beneficial to children's school readiness and academic success (Blair, 2002). Additional research could examine the added benefits of framing academic tasks within an emotional context. Overall, there is a growing body of research that suggests that emotions can be beneficial to cognitive

performance. Thus, educators could begin to use this research to their advantage and integrate emotions into classroom settings.

Predictors of Guilt Responses

There were distinct relations between temperament and guilt that were moderated by variations in parenting style. Consistent with previous findings (Cornell & Frick, 2007), Authoritative parenting was related to similar and moderate levels of guilt regardless of children's level of inhibition, which suggests that this parenting style is supportive in developing children's healthy conscience and may offset the effects of high levels of inhibition. However, the finding that high Authoritarian parenting was related to higher levels of guilt for children with a highly inhibited temperament suggests that this demanding parenting style may increase feelings of guilt in children who are already highly fearful. This is also consistent with previous findings (Cornell & Frick, 2007). Increases in Permissive parenting were related to decreases in uninhibited children's guilt displays, which suggests that fearless children may require a more firm parenting style in order to develop appropriate levels of conscience. For inhibited children, Permissive parenting was related to increased guilt displays.

The results regarding Permissive parenting styles add unique findings to this field of research. Similar to previous research on inconsistent discipline (Cornell & Frick, 2007), Permissive parenting was related to fewer displays of guilt for uninhibited children. However, Permissive parenting styles, unlike inconsistent discipline practices, were positively related to guilt displays for inhibited children. This relationship may be

due to the inhibited child's need for a more protective parent. These children may need more structure and guidance to learn appropriate reactions to transgressions. Since inhibited children are highly shy and tend to experience discomfort easily, their default response to transgressions without more parental guidance may be to react overly guilty.

All of these results indicate that both child and parent factors interact in unique ways to influence children's development of guilt responses. It is clear that there is an essential goodness of fit between parent and child that is influential to children's guilt development (Thomas & Chess, 1985). Essentially, parenting styles can exacerbate or buffer the effects of children's temperamental dispositions on children's emotional well-being. In general, these results further support that child outcomes such as emotional development are influenced by a variety of factors and the interplay between such factors. Thus, the true predictors and relationships between such predictors of child outcomes are increasingly complex. The current results also highlight the notion that there is no one "good" parenting style. The child outcomes associated with parenting styles should be examined along with child factors in order to assess when such parenting behaviors are indeed related to negative child outcomes.

Rather than relying on parent reports of children's guilt as in previous studies, the current study extends such research by collecting observational measures of guilt. Previous findings were replicated with the use of behavioral guilt measures, which should increase confidence that these relationships are robust and can be observed through multiple measures. More sensitive behavioral measures of guilt may also allow for the

discovery of more nuanced relationships that may not be revealed with the use of parental reports. The current study also extends previous studies by examining the effects of parenting styles rather than practices. This approach allows for the assessment of more aspects of parenting, including the emotional context in which parenting behaviors are enacted. This emotional context may be particularly important to children's emotion development.

The current study assessed parenting style as a continuous, rather than categorical, measure where all mothers received scores for each parenting style and these scores were used to predict children's levels of guilt. Based on the current data, a categorical classification may be limiting and miss important influences of non-dominant parenting practices and attitudes. Specifically, even though all mothers reported a dominant Authoritative parenting style, the continuous variations in their non-dominant parenting style were important in predicting their children's outcomes. The findings of this study, combined with previous research, can be used in the construction of individualized parenting interventions that are tailored to the particular child and parent. For example, for children exhibiting extreme high levels of guilt and possibly anxious behaviors, an intervention should assess both child temperament and parenting style. If the child is classified as having a highly inhibited temperament, then parents could be trained on recognizing and decreasing their engagement in Authoritarian and Permissive parenting styles.

Limitations and Future Directions

Given the ceiling performance of the 4- to 5-year-olds on the DCCS, future research should examine whether guilt improves the performance of 4- and 5-year-olds on a more complex measure of cognitive flexibility (e.g., Goal-neglect DCCS; Marcovitch, Boseovski, Knapp, & Kane, 2010). A more complex assessment of cognitive flexibility may provide an opportunity for older children to benefit from the induction of guilt. The current findings, considered along with the previous findings from Qu & Zelazo (2007), suggest that valence is not likely the only influential dimension of emotions on children's cognition. However, more comprehensive future studies should include a guilt group along with a negative mood group for comparison. Additionally, this future research should replicate the current results with larger sample sizes or over sample certain at risk populations that are known to display high levels of guilt (e.g., highly inhibited children).

The null effect of guilt on cognitive inhibition also raises issues that should be addressed in future studies. Guilt may facilitate behavioral inhibition, rather than cognitive inhibition. It is possible that cognitive and behavioral inhibition require different underlying skills or strategies. Specifically, behavioral inhibition may require more global processing to decrease the salience of the attractive reward. However, cognitive inhibition may require local processing to avoid accessing general knowledge and the dominant cognitive response. Future studies should examine the differential effects of emotions, particularly guilt, on children's ability to inhibit behavioral versus

cognitive responses. Such research would begin to disentangle the abilities required for such tasks and which emotions or emotional dimensions are beneficial to each task. Similarly, the null effects and random responding to the visual attention task indicates that future studies should utilize other visual attention tasks in which global biases are typically observed.

Future studies should investigate how the dimensions of activation and regulatory focus affect additional cognitive abilities in early childhood. Skills that should be investigated include flexibility, inhibition, attention, problem solving, working memory, and spatial reasoning. To capitalize on the use of emotions to enhance performance in academic settings, it is necessary to establish the effects of a range of emotions on many of these different tasks. Additionally, such studies will help to construct a more explanatory theory of emotion and cognition and may aid in the discovery of additional mechanisms of influence. The preschool age range provides a time when many of these essential cognitive skills are developing. Future research should investigate if preschool-aged children experience cognitive benefits from the induction of certain moods that older children or adults may not because of their differences in skill mastery. If so, then the application of this research in the classroom may need to be tailored the age group of interest. The current findings highlight this point, as only the 3-year-olds showed increased DCCS performance in response to the guilt induction. Thus, future studies should consider the task difficulty when assessing the effects of emotions on cognition to avoid false conclusions.

Given the findings concerning parenting style and temperament, future studies should assess more naturalistic measures of parenting style to gauge parenting styles more accurately. This will help to eliminate the possibility of parental report bias. Overall, the current sample consisted of mainly Caucasian participants from a middleclass socioeconomic background. Previous research has shown that minorities are more likely to engage in more Authoritarian parenting styles (Greening, Stoppelbein, & Luebbe, 2010). Thus, the lack of variation in the current sample's reported parenting styles may be due to the sample demographics. Future research with a more diverse sample may even reveal different relationships between parenting styles, inhibition and guilt than what was found in the current study and previous studies. For example, Authoritarian parenting is typically associated with negative child outcomes such as anxiety and depression (Sharma, Sharma, & Yadava, 2011; Takeuchi & Takeuchi, 2008; Zhao, 2010), but not for African American families (Greening et al., 2010). Thus, the increase in guilt for highly inhibited children of Authoritarian parents may also be different in African American families.

Conclusions

The growing body of literature on the effects of emotions on cognition, including the current study, suggests that emotions should be studied individually to determine their impact on cognition. The current examination of the effects of guilt on cognition adds to the increasing evidence that not all positive or all negative emotions affect cognition in the same way. Also, not all cognitive tasks are affected in the same way by a specific

emotion. The current study highlights the importance of creating more rigorous studies of the effects of emotion on cognition that consider numerous influential factors such as task difficulty, developmental period of participants, and mood manipulation validity. Additional stringent and comprehensive investigations of the effects of complex emotions on an array of cognitive skills will enhance theories of emotion and increase researchers' accuracy in explaining the mechanisms by which emotion influences cognition.

REFERENCES

Aksan, N., & Kochanska, G. (2005). Conscience in childhood: Old questions, new answers. *Developmental Psychology*, *41*(3), 506-516. doi:10.1037/0012-1649.41.3.506

Ashby, F., Isen, A. M., & Turken, A. U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review*, *106*(3), 529-550. doi:10.1037/0033-295X.106.3.529

Baas, M., De Dreu, C. W., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation, or regulatory focus?. *Psychological Bulletin*, *134*(6), 779-806. doi:10.1037/a0012815

Baldwin, K. M., Baldwin, J. R., & Ewald, T. (2006). The relationship among shame, guilt, and self-efficacy. *American Journal of Psychotherapy*, *60*(1), 1-21. Retrieved from PsycINFO.

Basil, D. Z., Ridgway, N. M., & Basil, M. D. (2008). Guilt and giving: A process model of empathy and efficacy. *Psychology & Marketing*, *25*(1), 1-23. doi:10.1002/mar.20200

Baumrind, D. (1966). Effects of authoritative control on child behavior. *Child Development*, *37*(4), 887-907. doi:10.2307/1126611

Berti, A., Garattoni, C., & Venturini, B. (2000). The understanding of sadness, guilt, and shame in 5-, 7-, and 9-year-old children. *Genetic, Social, and General Psychology Monographs, 126* (3), 293-318. Retrieved from PsycINFO.

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist, 57*(2), 111-127. doi:10.1037/0003-066X.57.2.111

Bodenhausen, G. V., Sheppard, L. A., & Kramer, G. P. (1994). Negative affect and social judgment: The differential impact of anger and sadness. *European Journal of Social Psychology, 24*(1), 45-62. doi:10.1002/ejsp.2420240104

Caprara, G., Barbaranelli, C., Pastorelli, C., Cermak, I., & Rosza, S. (2001). Facing guilt: Role of negative affectivity, need for reparation, and fear of punishment in leading to prosocial behaviour and aggression. *European Journal of Personality, 15*(3), 219-237. doi:10.1002/per.402

Carlson, S. M. (2005). Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology, 28*(2), 595-616. doi:10.1207/s15326942dn2802_3

Clark, C. C., Pritchard, V. E., & Woodward, L. J. (2010). Preschool executive functioning abilities predict early mathematics achievement. *Developmental Psychology, 46*(5), 1176-1191. doi:10.1037/a0019672

Cole, P., Barrett, K., & Zahn-Waxler, C. (1992). Emotion displays in two-year-olds during mishaps. *Child Development, 63*(2), 314-324. doi:10.2307/1131481

Cornell, A. H., & Frick, P. J. (2007). The moderating effects of parenting styles in the association between behavioral inhibition and parent-reported guilt and empathy in preschool children. *Journal of Clinical Child and Adolescent Psychology, 36*(3), 305-318. Retrieved from PsycINFO.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 113*(3), 487-496. doi:10.1037/0033-2909.113.3.487

De Dreu, C. W., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood-creativity link: Toward a dual pathway to creativity model. *Journal of Personality and Social Psychology, 94*(5), 739-756. doi:10.1037/0022-3514.94.5.739

De Lillo, C., Spinozzi, G., Truppa, V., & Naylor, D. M. (2005). A comparative analysis of global and local processing of hierarchical visual stimuli in young children (Homo sapiens) and monkeys (Cebus apella). *Journal of Comparative Psychology, 119*(2), 155-165. doi:10.1037/0735-7036.119.2.155

Eggum, N. D., Eisenberg, N., Kao, K., Spinrad, T. L., Bolnick, R., Hofer, C., & ... Fabricius, W. V. (2011). Emotion understanding, theory of mind, and prosocial orientation: Relations over time in early childhood. *The Journal of Positive Psychology, 6*(1), 4-16. doi:10.1080/17439760.2010.536776

Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Review of Psychology, 51,* 665-697. doi:10.1146/annurev.psych.51.1.665

Espy, K. (1997). The Shape School: Assessing executive function in preschool children. *Developmental Neuropsychology*, *13*(4), 495-499. doi:10.1080/87565649709540690

Forgas, J. P. (2002). Toward understanding the role of affect in social thinking and behavior. *Psychological Inquiry*, *13*(1), 90-102. doi:10.1207/S15327965PLI1301_03

Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information. *Psychological Science*, *13*(1), 34-40. doi:10.1111/1467-9280.00406

Greene, T. R., & Noice, H. (1988). Influence of positive affect upon creative thinking and problem solving in children. *Psychological Reports*, *63*(3), 895-898. Retrieved from PsycINFO.

Greening, L., Stoppelbein, L., & Luebbe, A. (2010). The moderating effects of parenting styles on African-American and Caucasian children's suicidal behaviors. *Journal Of Youth And Adolescence*, *39*(4), 357-369. doi:10.1007/s10964-009-9459-z

Harter, S., & Pike, R. (1984). The pictorial scale of Perceived Competence and Social Acceptance for Young Children. *Child Development*, *55*(6), 1969-1982. doi:10.2307/1129772

Hoffman, M. L. (1982). Development of prosocial motivation: Empathy and guilt. In N. Eisenberg (Ed.), *The development of prosocial behavior* (pp. 281-313). New York: Academic Press.

Huizinga, M., Burack, J. A., & Van der Molen, M. W. (2010). Age-related change in shifting attention between global and local levels of hierarchical stimuli. *Journal of Cognition and Development, 11*(4), 408-436. doi:10.1080/15248371003700031

Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology, 54*(6), 1122-1131. doi:10.1037/0022-3514.52.6.1122

Kimchi, R., & Palmer, S. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology: Human Perception and Performance*, *8*(4), 521-535. doi:10.1037/0096-1523.8.4.521

Kochanska, G. (1997). Multiple pathways to conscience for children with different temperaments: From toddlerhood to age 5. *Developmental Psychology*, *33*(2), 228-240. doi:10.1037/0012-1649.33.2.228

Kochanska, G., Barry, R. A., Jimenez, N. B., Hollatz, A. L., & Woodard, J. (2009). Guilt and effortful control: Two mechanisms that prevent disruptive developmental trajectories. *Journal of Personality and Social Psychology, 97*(2), 322-333. doi:10.1037/a0015471

Kochanska, G., Casey, R. J., & Fukumoto, A. (1995). Toddlers' sensitivity to standard violations. *Child Development, 66*(3), 643-656. doi:10.2307/1131940

Kochanska, G., DeVet, K., Goldman, M., & Murray, K. (1994). Maternal reports of conscience development and temperament in young children. *Child Development, 65*(3), 852-868. doi:10.2307/1131423

Kochanska, G., Gross, J., Lin, M., & Nichols, K. (2002). Guilt in young children: Development, determinants, and relations with a broader system of standards. *Child Development*, *73*(2), 461-482. doi:10.1111/1467-8624.00418

Kuhn, J. C., & Carter, A. S. (2006). Maternal self-efficacy and associated parenting cognitions among mothers of children with autism. *American Journal of Orthopsychiatry*, *76*(4), 564-575. doi:10.1037/0002-9432.76.4.564

Lewis, M. (1991). Self-conscious emotions and the development of self. *Journal of The American Psychoanalytic Association*, *39*(Suppl), 45-73. Retrieved from PsycINFO.

Liang, Z., Zhang, G., & Chen, H. (2009). Relation of children's temperament and parenting style with children's conscience. *Chinese Journal of Clinical Psychology*, *17*(1), 90-92. Retrieved from PsycINFO.

Marcovitch, S., Boseovski, J. J., Knapp, R. J., & Kane, M. J. (2010). Goal neglect and working memory capacity in 4- to 6-year-old children. *Child Development*, *81*(6), 1687-1695. doi:10.1111/j.1467-8624.2010.01503.x

Martin, E. A., & Kerns, J. G. (2011). The influence of positive mood on different aspects of cognitive control. *Cognition and Emotion*, *25*(2), 265-279. doi:10.1080/02699931.2010.491652

Masters, J. C., & Santrock, J. W. (1976). Studies in the self-regulation of behavior: Effects of contingent cognitive and affective events. *Developmental Psychology*, *12*(4), 334-348. doi:10.1037/0012-1649.12.4.334

Menesini, E., & Camodeca, M. (2008). Shame and guilt as behaviour regulators: Relationships with bullying, victimization and prosocial behaviour. *British Journal of Developmental Psychology, 26*(2), 183-196. doi:10.1348/026151007X205281

Monette, S., Bigras, M., & Guay, M. (2011). The role of the executive functions in school achievement at the end of Grade 1. *Journal of Experimental Child Psychology, 109*(2), 158-173. doi:10.1016/j.jecp.2011.01.008

Moore, B. S., Clyburn, A., & Underwood, B. (1976). The role of affect in delay of gratification. *Child Development, 47*(1), 273-276. doi:10.2307/1128312

Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology, 9*(3), 353-383. doi:10.1016/0010-0285(77)90012-3

Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion, 1*(1), 29-50. doi:10.1080/02699938708408362

O'Connor, L. E., Berry, J. W., & Weiss, J. (1999). Interpersonal guilt, shame, and psychological problems. *Journal of Social and Clinical Psychology, 18*(2), 181-203. Retrieved from PsycINFO.

Phillips, L. H., Bull, R., Adams, E., & Fraser, L. (2002). Positive mood and executive function: Evidence from stroop and fluency tasks. *Emotion, 2*(1), 12-22. doi:10.1037/1528-3542.2.1.12

Poirel, N., Mellet, E., Houdé, O., & Pineau, A. (2008). First came the trees, then the forest: Developmental changes during childhood in the processing of visual local-global patterns according to the meaningfulness of the stimuli. *Developmental Psychology*, *44*(1), 245-253. doi:10.1037/0012-1649.44.1.245

Qu, L., & Zelazo, P. D. (2007). The facilitative effect of positive stimuli on 3-year-olds' flexible rule use. *Cognitive Development*, *22*(4), 456-473. doi:10.1016/j.cogdev.2007.08.010

Rader, N., & Hughes, E. (2005). The influence of affective state on the performance of a block design task in 6- and 7-year-old children. *Cognition and Emotion*, *19*(1), 143-150. doi:10.1080/02699930441000049

Robinson, C.C., Mandleco, B., Frost Olsen, S. & Hart, C.H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports, 77*(3, Pt 1), 819–830. Retrieved from PsycINFO.

Roseman, I. J., & Smith, C. A. (2001). Appraisal theory: Overview, assumptions, varieties, controversies. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion: theory, methods, research* (pp. 3-19). New York: Oxford University Press.

Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology*, *103*(1), 55-66. doi:10.1037/0021-843X.103.1.55

Rothbart, M. K., Ahadi, S. A., Hersey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development, 72*(5), 1394-1408. doi:10.1111/1467-8624.00355

Russ, S. W., & Kaugars, A. S. (2001). Emotion in children's play and creative problem solving. *Creativity Research Journal, 13*(2), 211–219. doi:10.1207/S15326934CRJ1302_8

Russell, J. A., & Paris, F. A. (1994). Do children acquire concepts for complex emotions abruptly? *International Journal of Behavioral Development*, *17*(2), 349-365. Retrieved from PsycINFO.

Schwarz, J., & Pollack, P. R. (1977). Affect and delay of gratification. *Journal of Research in Personality, 11*(2), 147-164. doi:10.1016/0092-6566(77)90013-7

Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. Higgins, R. M. Sorrentino, E. Higgins, R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior, Vol. 2* (pp. 527-561). New York, NY US: Guilford Press.

Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experiences. In E. Higgins, A. W. Kruglanski, E. Higgins, A. W. Kruglanski (Eds.) , *Social psychology: Handbook of basic principles* (pp. 433-465). New York, NY US: Guilford Press.

Sharma, M., Sharma, N., & Yadava, A. (2011). Parental styles and depression among adolescents. *Journal of The Indian Academy of Applied Psychology*, *37*(1), 60-68. Retrieved from PsycINFO.

Sheikh, S., & Janoff-Bulman, R. (2010). The “shoulds” and “should nots” of moral emotions: A self-regulatory perspective on shame and guilt. *Personality and Social Psychology Bulletin*, *36*(2), 213-224. doi:10.1177/0146167209356788

Stillman, T. F., & Baumeister, R. F. (2010). Guilty, free, and wise: Determinism and psychopathy diminish learning from negative emotions. *Journal of Experimental Social Psychology, 46*(6), 951-960. doi:10.1016/j.jesp.2010.05.012

Takeuchi, M., & Takeuchi, S. (2008). Authoritarian versus authoritative parenting styles: Application of the cost equalization principle. *Marriage & Family Review*, *44*(4), 489-510. doi:10.1080/01494920802454090

Thomas, A., & Chess, S. (1984). Genesis and evolution of behavioral disorders: From infancy to early adult life. *The American Journal of Psychiatry*, *141*(1), 1-9. Retrieved from PsycINFO.

Toner, I. J., Lewis, B. C., & Gribble, C. M. (1979). Evaluative verbalization and delay maintenance behavior in children. *Journal of Experimental Child Psychology, 28*(2), 205-210. doi:10.1016/0022-0965(79)90084-5

Tracy, J. L., & Robbins, R. W. (2006). Appraisal antecedents of shame and guilt: Support for a theoretical model. *Personality and Social Psychology Bulletin*, *32*(10), 1339-1351. doi:10.1177/0146167206290212

Vitiello, V. E., Greenfield, D. B., Munis, P., & George, J. (2011). Cognitive flexibility, approaches to learning, and academic school readiness in Head Start preschool

children. *Early Education and Development, 22*(3), 388-410. doi:10.1080/10409289.2011.538366

Walter, J. L., & LaFreniere, P. J. (2007). Preschoolers' avoidance in a mishap paradigm: Implications for emotional adjustment, guilt, and shame. *North American Journal of Psychology, 9*(1), 111-130. Retrieved from PsycINFO.

Yan, X., & Su, Y. (2001). Global precedence of hierarchical figure perception in children. *Acta Psychologica Sinica, 33*(2), 142-147. Retrieved from PsycINFO.

Yates, G. C., Lippett, R., & Yates, S. M. (1981). The effects of age, positive affect induction, and instructions on children's delay of gratification. *Journal of Experimental Child Psychology, 32*(1), 169-180. doi:10.1016/0022-0965(81)90101-6

Zelazo, P., Frye, D., & Rapus, T. (1996). An age-related dissociation between knowing rules and using them. *Cognitive Development, 11*(1), 37-63. doi:10.1016/S0885-2014(96)90027-1

Zelazo, P., Müller, U., Frye, D., & Marcovitch, S. (2003). The development of executive function in early childhood: I. The development of executive function. *Monographs of The Society for Research in Child Development, 68*(3), 11-27.

Zhao, J. (2010). Relationships among mothers' attachment, parenting style and preschoolers' anxiety. *Chinese Journal of Clinical Psychology, 18*(6), 806-808. Retrieved from PsycINFO.

APPENDIX A

HARTER PSPCSA SAMPLE ITEMS

1. This girl/boy isn't very good at saying the alphabet, but this girl/boy is pretty good at saying the alphabet (cognitive).
2. This girl/boy isn't very good at swinging by herself/himself, but this girl/boy is pretty good at swinging by herself/himself (physical).
3. This girl/boy has lots of friends to play with, but this girl/boy doesn't have very many friends to play with (peer acceptance).
4. This girl's/boy's mom plays with her/him a lot, but this girl's/boy's mom play's with her/him a little (maternal acceptance).

APPENDIX B

MY CHILD QUESTIONNAIRE SAMPLE ITEMS

1. Will try to comfort or reassure another in distress.
2. Not particularly concerned or worried when s/he has broken a valuable object.
3. Likely to offer toys or candy to a crying playmate even without parental suggestion.
4. May "freeze" in place when caught doing something bad.
5. May occasionally tease a pet if unsupervised.

APPENDIX C

CBQ SAMPLE ITEMS

1. Is not very bothered by pain.

2. Sometimes prefers to watch rather than join other children playing.

3. Is not afraid of large dogs and/or other animals.

4. Is comfortable in situations where s/he will be meeting others.

5. Becomes quite uncomfortable when cold and/or wet.

APPENDIX D

PSDQ SAMPLE ITEMS

1. I encourage my child to talk about my child's troubles.
2. I guide my child by punishment more than reason.
3. I find it difficult to discipline my child.
4. I give praise when my child is good.
5. I spank when my child is disobedient.

APPENDIX E

SHAPE SCHOOL INSTRUCTIONS

Control Trial

"This is the school yard where the students here play. It's easy to figure out the name of all of the students here because their names are their colors. If the student is blue, then their name is blue. If they are red then their name is red and if they are yellow, then their name is yellow. All of the students are lined up to go back inside school because recess is over. Now, I want you to name all of the students as fast as you can without making a mistake, ok? Go."

Inhibit Trial

"Now the students are inside in the classroom. The students here are working on their schoolwork. Some of the students are done and some are not. See their papers? The students who have a paper are done with their work. The students who don't have a paper are not done with their work yet and not ready for lunch time. I need you to call out only the names of the students who are ready for lunch, but don't call the names of the students who aren't ready because they still have to finish their work before going to lunch. Name the students that are ready as fast as you can without making any mistakes and point to the students as you name them. Ready? Ok, go."