



## Introduction

- The experience of sadness impairs some of children's cognitive skills (e.g., inhibition; Schmeichel & Inzlicht, 2013), but has no influence on others (e.g., cognitive flexibility; Qu & Zelazo, 2007). In contrast, social emotions (e.g., guilt) may cause broader cognitive impairment because such emotions are more intense and provoke greater arousal than sadness, creating additional regulatory demands (Baas, De Dreu, & Nijstad, 2008).
- Little is known about how children's ability to control their emotions (i.e., emotion regulation) may interact with the effects of social emotions on cognition (Cole, 2014).
- The goal of the current study was to examine the effects of guilt on preschoolers' cognitive flexibility (i.e., ability to switch between mental representations adaptively) and inhibition (i.e., ability to override a prepotent response).
- Due to the intense and arousing nature of guilt, we expected that guilt would impair children's cognitive abilities. However, we predicted that older children's advanced self-regulation skills would minimize the detrimental effects of guilt on children's cognition.

## Method

- 134 3- to 5-year-olds ( $M = 3.78$   $SD = .82$ , 68 male)
- 2 (age: 3- to 4.5-year-olds and 4.5- to 5-year-olds) x 2 (mood: guilt vs. neutral) between-subjects design
- Participants underwent one of two mood manipulations:
  - Neutral:** Participants played with a simple wooden block.
  - Guilt:** Using a standard mishap paradigm (Kochanska & Aksan, 2006), participants were led to believe that they had broken the experimenter's favorite toy.



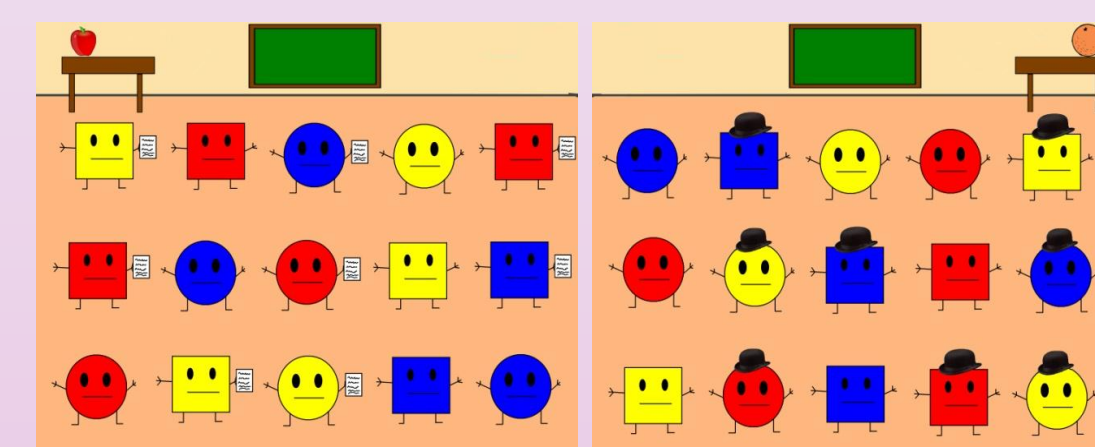
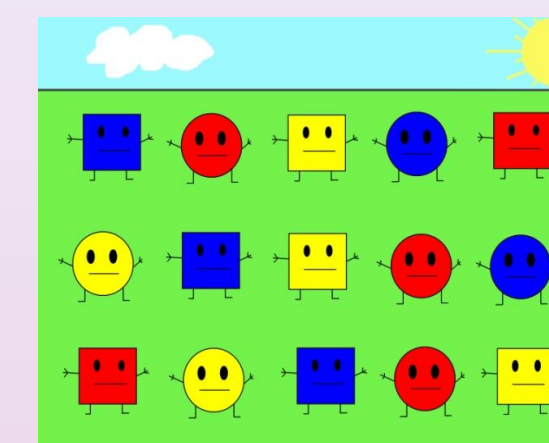
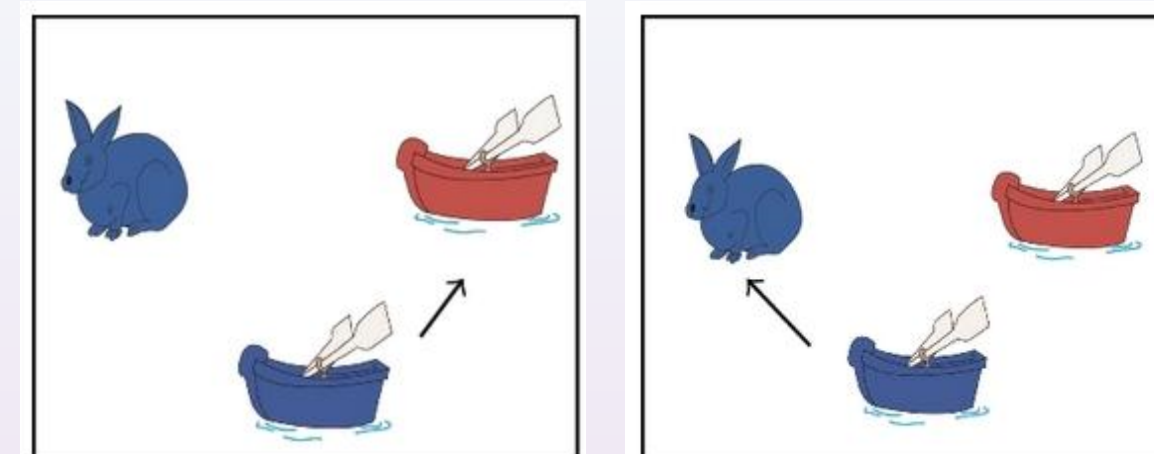
- After the mood manipulation, participants completed the standard Dimensional Change Card Sort (DCCS; Zelazo, Müller, Frye, & Marcovitch, 2003) and a modified version of the Shape School task (Espy, 1997) in a counterbalanced order.

### DCCS

- Children were required to sort a set of picture cards in two ways: first by color and then by shape.
- DCCS scores were based on how many cards children sorted correctly after the rule switch (range: 0-5).

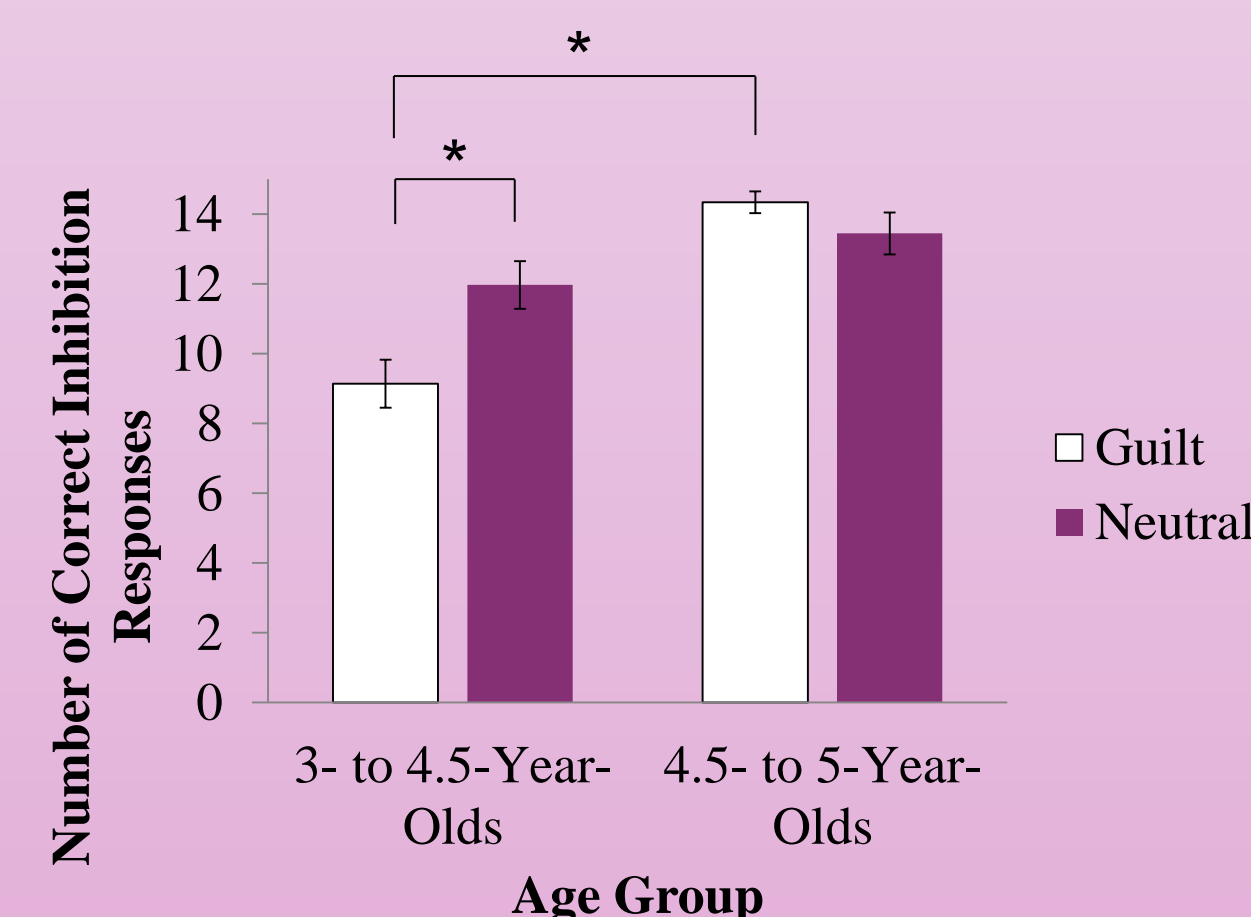
### Shape School

- Children labeled an array of different colored shapes that had arms, legs, and faces first by color (control), then labeled only those holding papers (inhibition), and then labeled them by shape (flexibility).
- Children received a score between 0 and 15 for each trial based on the number of items labeled correctly.



## Results

- Linear regressions were conducted on inhibition and flexibility scores with age in months, condition, and the interaction between age and condition as predictors.
- Performance on all tasks increased with age,  $p$ 's < .01.
- The model for children's inhibitory control performance was significant ( $F = 18.94$ ,  $p < .001$ ,  $R^2 = .31$ ). Children in the guilt condition exhibited poorer inhibitory control than those in the neutral condition,  $B = 1.28$ ,  $t(119) = 1.95$ ,  $p = .05$ . However, this was qualified by an interaction between condition and age,  $B = -2.24$ ,  $t(119) = -3.29$ ,  $p < .01$ . Follow up t-tests indicated that guilt impaired younger children's inhibitory control performance,  $t(79) = -2.72$ ,  $p < .01$ , and had no effect on older children,  $t(30) = 1.32$ ,  $p = .20$ .



## Discussion

- The current findings suggest that, like sadness, guilt does not influence children's cognitive flexibility, but is detrimental to cognitive inhibition.
- The effects of guilt on inhibition were only present for younger children. It is possible that older children experienced less guilt in reaction to the mood induction and this is why there was no effect on cognition. However, coding of children's verbal and nonverbal responses to the mishap indicated that older children actually experienced higher levels of guilt than younger children, similar to previous results (Kochanska, DeVet, Goldman, Murray, & Putnam, 1994).
- We propose that older children possess more advanced emotion regulation skills that help to override the detrimental effects of negative emotions (Cole, 2014). This provides insight into the developmental trajectory of self-conscious emotions and their effect on children's cognition. Specifically, children as young as 4.5 years of age appropriately experience self-conscious emotion when they have wronged another person, but their cognitive skills remain intact. Future research could examine whether individual differences in emotion regulation mediate the relationship between guilt and inhibitory control impairment.
- Finally, older children's performance on the inhibition task was near ceiling. It is possible that the effects of guilt may be evident in older children if they were given a more difficult task that requires advanced inhibitory control. Future studies should assess the effects of social emotions on tasks ranging in level of difficulty.

## References

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