



Caregiving Instability and Cognitive Control in Children: Does Timing Matter?

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INTRODUCTION

- Caregiving instability (i.e., changes in a primary caregiver) in childhood is typically associated with negative effects on cognitive control (Fisher et al., 2013). However, according to the specialization hypothesis, early life stress does not only impair cognitive development, but fine-tune it, favoring some skills over others to deal with an adverse environment (Frankenhuis & de Weerth, 2013).
- Set shifting, or the ability to quickly switch between two concepts, is one domain thought to be *improved* by early caregiving instability. In one study examining adults, childhood unpredictability was associated with better cognitive flexibility during a set shifting task (Mittal et al., 2015). Another forthcoming study found that greater total number of caregiving switches, was associated with better set shifting scores in children ages 6-12 (Fields et al., 2020, in prep).
- Timing has also been shown to moderate adversity's effects on cognition. Earlier onset of institutional care, and later age of adoption, for example, are both associated with more negative outcomes on cognitive functioning (Hermenau et al. 2014; Julian 2013). However, no known research has examined the effects of timing of instability on children's cognitive control.

STUDY OBJECTIVES

This study sought to explore effects of 1. The age of onset of caregiving instability, and 2. The end age of caregiving instability on children's performance on a set shifting task.

METHODS

- Participants were (N = 155) children ages 6-12, recruited for caregiving disruptions, including institutionalization, foster care, kinship care, temporary removals from parents, or maltreatment, or no specific early caregiving adversity. (Fields et al., 2020, in prep). For both groups, age of onset and end age of caregiving instability (caregiver switches) was calculated in months.
- To measure set shifting, the Dimensional Change Card Sort (DCSS) task in the National Institute of Health Toolbox Cognitive Battery was used for this analysis. In the task, participants sorted cards according to multiple sets of rules, and reaction time was assessed in a mixed trial of either the initial rule set, or a switch set.
- Switching scores were calculated by subtracting mean switch reaction time from initial reaction time. A negative score indicated a faster reaction time for the new rule set over the old one, and "better" performance on set shifting (Fields et al., 2020, in prep).
- Pearson's correlation and linear regression analyzed the relationships between onset and end age of caregiving instability and set shifting performance.

	Age of Onset (Months)	End Age (Months)	Set Shifting Reaction Time (Seconds)
Mean (sd)	13.89 (23.643)	33.316 (33.854)	0.033 (0.330)
Pearson's r (p-value)	0.087(0.273)	-0.002 (0.984)	

Table 1: Descriptive statistics with mean (SD) age of onset, end age, and set shift reaction time, and Pearson's correlations between onset and set shifting, and end age and set shifting.

RESULTS

- Descriptive statistics for IVs/DVs can be found in Table 1. Table 2 and Figures 1 and 2 illustrate the results of regression analyses for onset age and end age's effects on set shifting. Neither regression results for onset age ($b = 0.0009672$, $t(150) = 0.854$, $p = 0.3942$) nor end age ($b = 0.0005188$, $t(150) = 0.488$, $p = 0.6263$) were significant. For both onset and end age, there were significant effects of age of participants on performance ($p = .02$).

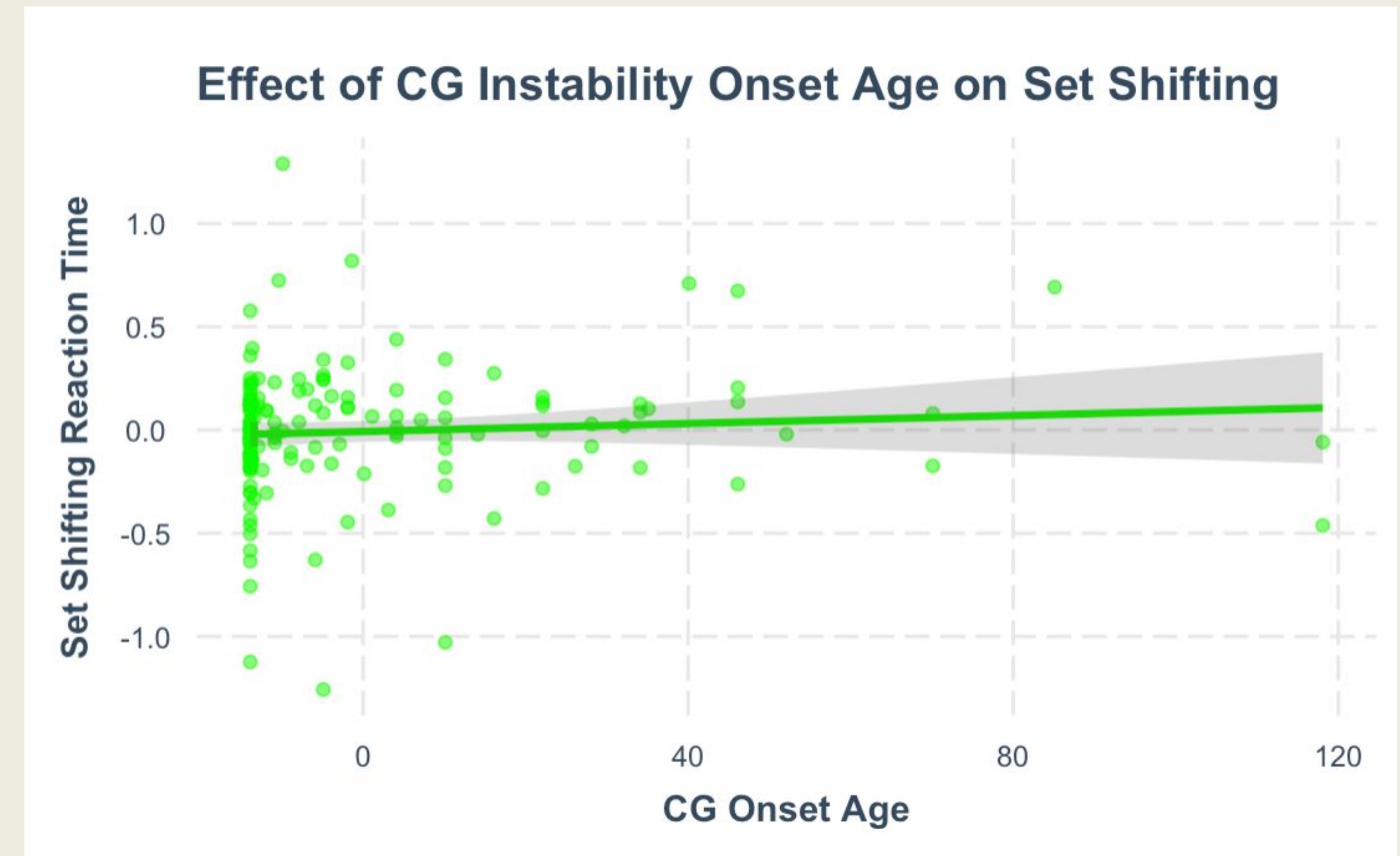


Figure 1: Linear regression illustrating the relationship between onset age of CG instability (mean centered) and set shifting score, controlling for age of testing, duration of instability, and sum of caregiver switches.

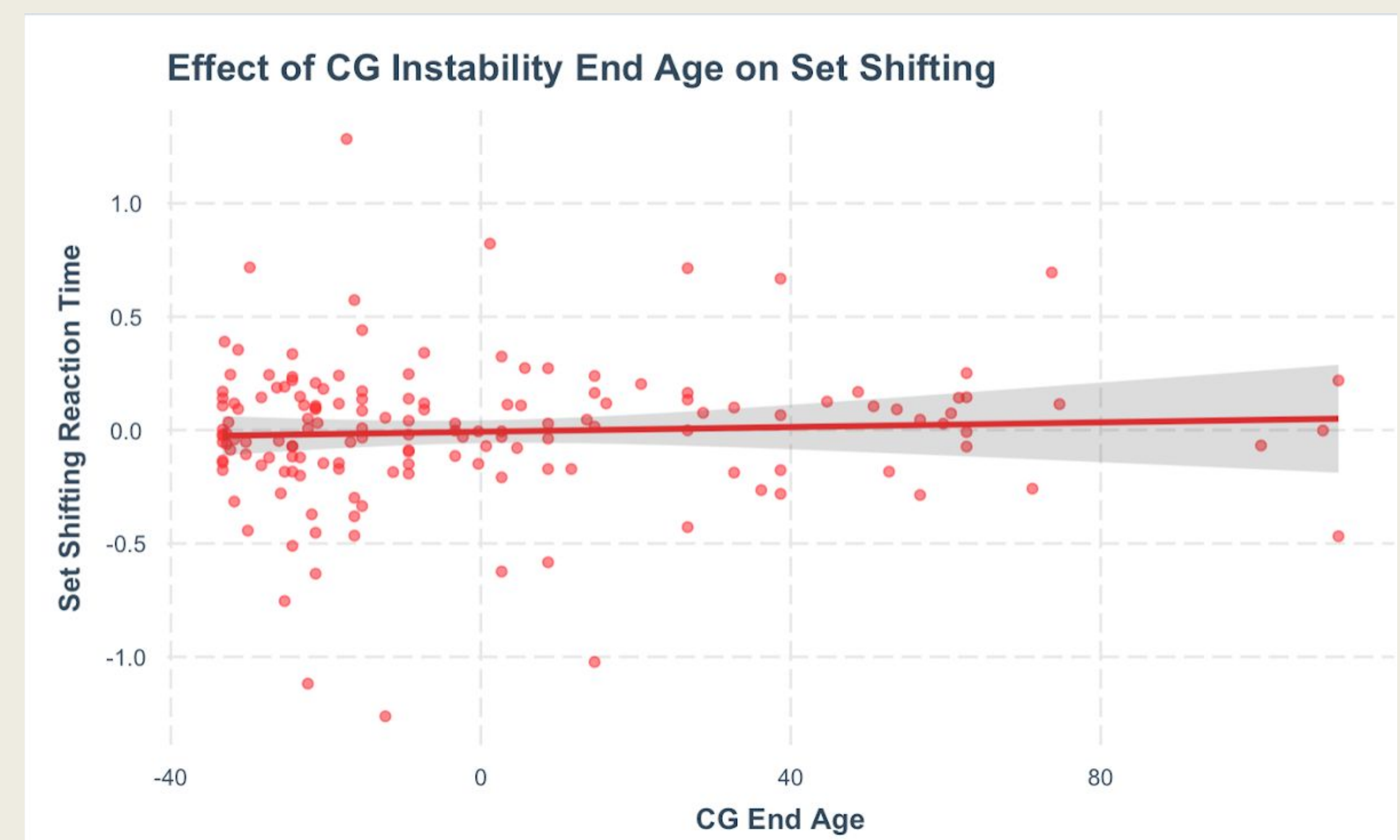


Figure 2: Linear regression illustrating the relationship between end age of CG instability (mean centered) and set shifting score, controlling for age of testing, duration of instability, and sum of caregiver switches.

DISCUSSION

- In this analysis, the age of onset and end age of caregiving instability had no significant relationship with children's set shifting performance. Study limitations may have affected these results. For example, both the age of onset and end age variables were skewed toward earlier ages; further, this analysis only explored linear relationships between onset and end age and set shifting.
- There may be linear or nonlinear effects of timing of caregiving instability on set shifting not found in this sample. Alternatively, these results may signify that developmental timing is a less salient predictor for the effects of caregiving instability on set shifting.
- More evidence is needed to draw any meaningful conclusions, but this study marks a first step in examining the role of timing of caregiving instability on children's cognition. Further study will allow researchers to discover how cognitive processes are enhanced by adversity, as well as harmed.