



Do Experimental Assessments of Children’s Executive Functioning Skills Predict Classroom-Based Behavior?

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INTRODUCTION

BACKGROUND

Children’s regulation of their cognition, emotions, and behavior is critical to their success in school from early childhood into adolescence and even into adulthood (Zelazo and Müller, 2002; Baumeister and Vohs, 2004; Blair and Razza, 2007; McClelland et al., 2007a, 2013; Rimm-Kaufman et al., 2009). Researchers from different disciplines have relied on multiple techniques when studying executive function (EF) and related constructs (i.e., cognitive control, self-regulation, effortful control, executive attention, work-related skills). However, it remains unclear whether these distinct assessments tap into the same underlying construct in children. Furthermore, the degree to which these constructs are related to one another is less understood. Our study focused on using both group-based and single participant lab-based measurements of response inhibition and attention control in effort to elucidate the relationship between the measurement of these constructs, as well as their relation to one another.

METHOD

PARTICIPANTS

- Recruited from four schools located in Southeast Michigan, ($n = 72$)
- The sample consisted of ethnically and socioeconomically diverse kindergarten students
- Male, $n = 42$; Female, $n = 30$ ($M_{age} = 5.94$ years, $SD = .32$)
- HTKS is the single-based measure of EF and response inhibition game is the group-based for EF



MEASURES

The Head-to-Toes, Knees-to-Shoulders of Behavioral Self-Regulation (HTKS; McClelland, 2014)

- This measure of behavioral self-regulation integrates aspects of EF into a short, age-appropriate task for children ages 4-8 years.
- Using no material but rather relying on interactions between the examiner and the child, the HTKS has three sections with up to four paired behavioral rules: “touch your head” and “touch your toes,” “touch your shoulders” and “touch your knees.”
- Children first respond naturally, and then are instructed to switch rules by responding in the “opposite” way (e.g., touch their head when told to touch their toes).
- Children find this game to be engaging, and correct responses are scored across 30 trials of the task, with a total of 60 points available
- Each trial is scored on a 0-2 scale (0= incorrect, 1= self-correct, 2=correct)

Response Inhibition Group-Based Game

This task consists of five trials. For each trial, children are instructed to march in a circle while no music is playing. When music begins to play, they are told to stop marching and “freeze like a statue” until the music stops and the next trial begins.

Stop Time (milliseconds)

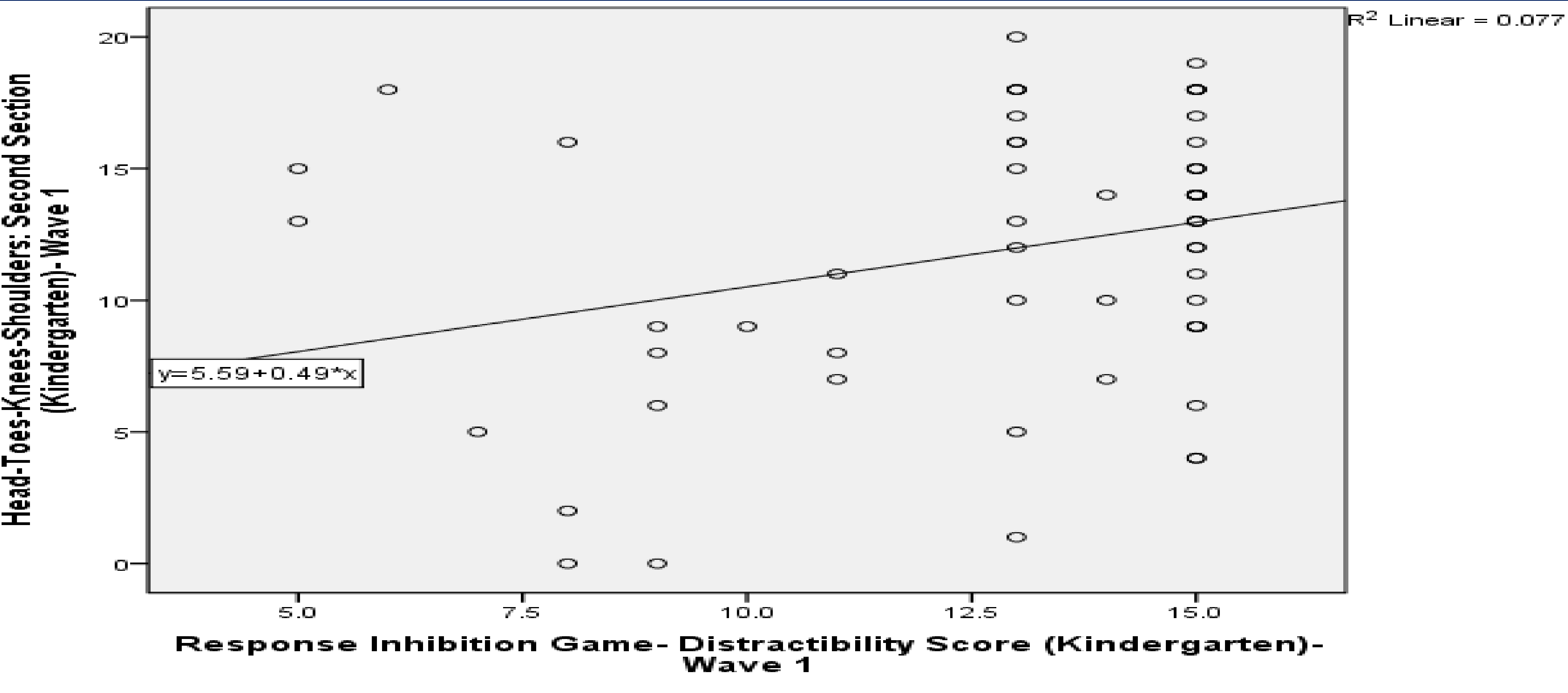
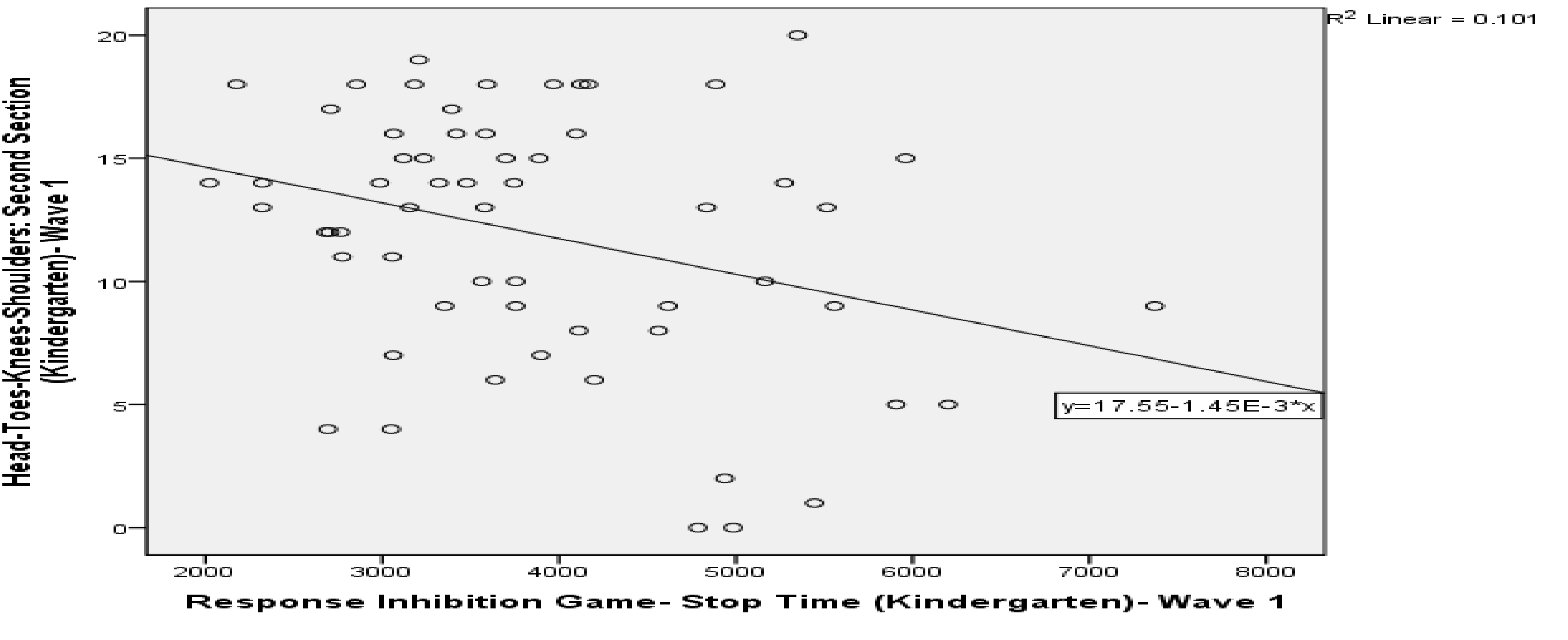
Distractibility/Self-Interference

- 3 Full Attention, No Interference
- 2 Distracted by Peer
- 1 Distracted by Self
- 0 No Attention, Multiple Instances of Interference

RESULTS

- Pearson’s correlation revealed relations between HTKS and response inhibition (stop time) ($r = -.318, p = .013$) and between HTKS and attention control (distractibility score) ($r = .278, p = .032$)
- The results of this study reveal that group-based measures of response inhibition correlate with newly created, group-based measures of response inhibition
- Additionally, it appears that lab-based measures of response inhibition are also capturing aspects of attention control. This indicates that group-based measures of response inhibition might be a more sensitive way of differentiating distinct components of EF in children this age.

RESULTS



DISCUSSION

Through this study, we have explored associations among experimental assessments of EF and children’s classroom behavior.

- Examining sub-components of EF (response inhibition, and attention control), this study revealed EF skills predict classroom-based behavior.
- This finding is informative in several ways. First, this study assists in answering a fundamental question connected with the relationship between experimental assessments of children’s EF skills and predicting classroom-based behavior.
- Second, these results might elucidate the impact of examining the degree of association of measures of EF (and its sub-components) with classroom-based measures.

Future research would benefit from further validating these and other measures by assessing the relation between individually-based and group-based measures of children’s EF, including all sub-components (working memory, attention control, and response inhibition). Additionally, the next steps include understanding the etiology and trajectory of children’s EF skills, their unique predictors in providing educators a more sensitive way of measuring children’s EF in real world settings and their influence on classroom-based behavior.