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## Background

- In order to do well in school, children must use executive function (EF) strategies including paying attention, ignoring distractions, planning and organizing work, and persisting on tasks (Meltzer, 2010; Meltzer & Basho, 2010; Meltzer, Katzir-Cohen, & Roditi, 2001).
- However, little is known about children's understanding of such strategies (Meltzer, 2010; Meltzer et al., 2010).
- This is problematic because children need to understand how to execute EF strategies in order to use them effectively (Meltzer, 2010).
- The few studies that have examined children's knowledge of EF strategies have used inventories rather than open-ended interview questions, which may under-represent children's actual knowledge (Meltzer, 2010; Meltzer et al., 2010).

## Current Study

- This study investigated:
  - How children's definitions of their EF strategies compared to experts' definitions
  - Whether children's definitions differed by grade level
  - Whether children's definitions predicted their performance on memory and inhibition tasks

## Method

### Participants

- 173 rising 1<sup>st</sup>-6<sup>th</sup> graders, 54% boys, 54% White, 21% Black, 7% Asian
- 73 1<sup>st</sup>/2<sup>nd</sup>, 55 3<sup>rd</sup>/4<sup>th</sup>, and 45 5<sup>th</sup>/6<sup>th</sup> graders

### Children's Knowledge of How They Learn Questionnaire

- Semi-structured interview conducted individually with children
- Questions related to EF strategies:
  - Paying Attention: "What does it mean to pay attention?" and "What do you do to help yourself pay attention?"
  - Ignoring Distractions: "What do you do to help you ignore distractions (not let them bother you)?"
  - Completing Tasks/Persistence: "What do you do to help yourself keep working on an activity until you are finished?"
  - Organization: "What does it mean to be organized while you are working on an activity that you are learning?" and "What do you do to be organized while you are working on an activity that you are learning?"
  - Planning: "What does it mean to plan your steps while you are working on an activity that you are learning?" and "How do you plan your steps while you are working on an activity that you are learning?"

### Executive Functioning Tasks

- Picture Memory Task
  - 15 picture cards were presented and children were asked to memorize as many as they could in 3 minutes. Scores were the number correctly recalled.
- Stroop Task
  - In this inhibition task, children were asked to identify the color of color-words (**GREEN** - correct answer is "blue").
  - Scores were the number of incongruent items correct / time.

## Method Continued

### Accuracy Score Coding

- EF definition components represent common themes in the current literature on EF strategies. We examined children's open-ended responses to determine whether they mentioned each component of EF strategies identified in the literature. Accuracy scores were the number of components mentioned / total number of aspects identified in the literature.

#### Paying Attention

- Alerting
- Orienting
- Maintaining

#### Ignoring Distractions

- Inhibiting Task-Irrelevant Responses
- Executing Goal-Directed Responses
- Manipulating the Environment

#### Completing Tasks

- Reflection
- Overcoming Obstacles
- Motivation
- Continuance

#### Being Organized

- Managing Materials
- Managing Actions
- Managing Thoughts and Memory
- Managing Time

#### Planning

- Goal Setting
- Executing Sequenced Actions
- Updating and Re-Evaluating Steps Needed to Reach Goal

## Results

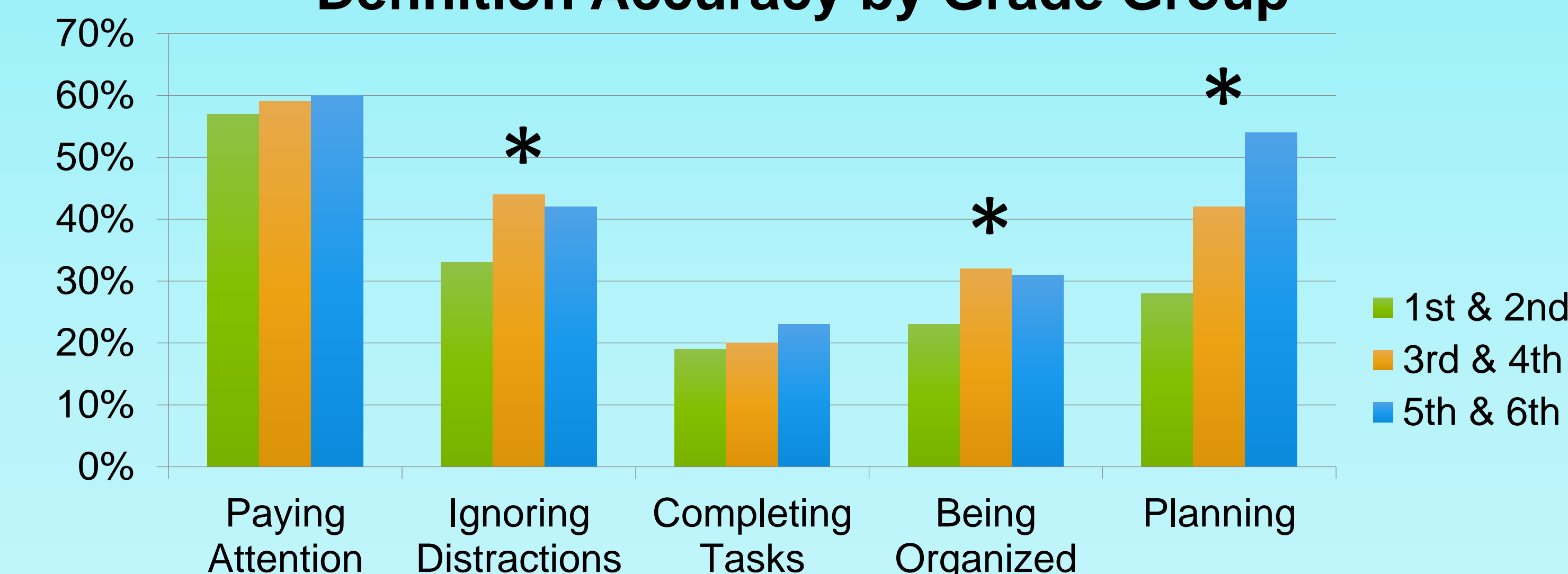
### Components of EF Definitions Mentioned by Children

	Rising 1 <sup>st</sup> & 2 <sup>nd</sup> Grade	Rising 3 <sup>rd</sup> & 4 <sup>th</sup> Grade	Rising 5 <sup>th</sup> & 6 <sup>th</sup> Grade	Overall	Sig. Grade Diff.
Paying Attention					
Alerting	16%	13%	18%	16%	---
Orienting	86%	77%	67%	78%	✓
Maintaining	65%	75%	87%	73%	✓
Ignoring Distractions					
Inhibiting Task-Irrelevant	51%	51%	49%	50%	---
Executing Goal-Directed	33%	42%	36%	36%	---
Manipulating Environment	10%	24%	34%	20%	✓
Completing Tasks					
Reflecting on Task	3%	4%	13%	6%	✓
Overcoming Obstacles	31%	27%	16%	26%	---
Motivation	7%	11%	27%	13%	✓
Continuance	23%	24%	29%	25%	---
Organization					
Managing Materials	63%	84%	84%	75%	✓
Managing Time	1%	2%	2%	2%	---
Managing Actions	15%	24%	27%	21%	---
Managing Thoughts	7%	11%	9%	9%	---
Planning Steps					
Goal Setting	37%	62%	89%	58%	✓
Sequenced Actions	26%	42%	54%	38%	✓
Updating Steps Needed	3%	9%	13%	8%	---

Note.  $\chi^2$  tests were used to examine grade-related differences.

## Results Continued

### Definition Accuracy by Grade Group



Note. \*Significant grade differences ( $p < .05$ )

### Definition Accuracy Predicting Picture Memory Scores

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Paying Attention	-1.20	0.93	-1.32	.190
Ignoring Distractions	2.20	1.06	2.08	.040*
Completing Tasks	-0.50	1.20	-0.42	.677
Being Organized	3.70	1.54	2.40	.018*
Planning	1.59	0.84	1.90	.060
Child Grade	0.82	0.13	6.23	<.001*

### Definition Accuracy Predicting Stroop Scores

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Ignoring Distractions	0.22	0.11	2.05	.042*
Child Grade	0.09	0.01	6.28	<.001*

## Discussion

- Children's definitions of their EF strategies included fewer components than experts' definitions and children appeared to be unaware of the more abstract components of EF strategies, like reflecting on tasks.
- The accuracy of children's knowledge of their EF strategies predicted their performance on memory and inhibition tasks, which are related to school performance.
- Future research should examine possible causal relations between metacognitive knowledge of EF strategies and child achievement.

Presented at the SRCD Biennial Meeting (April 2017) in Austin, TX.

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