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### Enriching Student Success through a Metacognitive School-Based Intervention

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# ENRICHING STUDENT SUCCESS THROUGH A METACOGNITIVE SCHOOL-BASED INTERVENTION



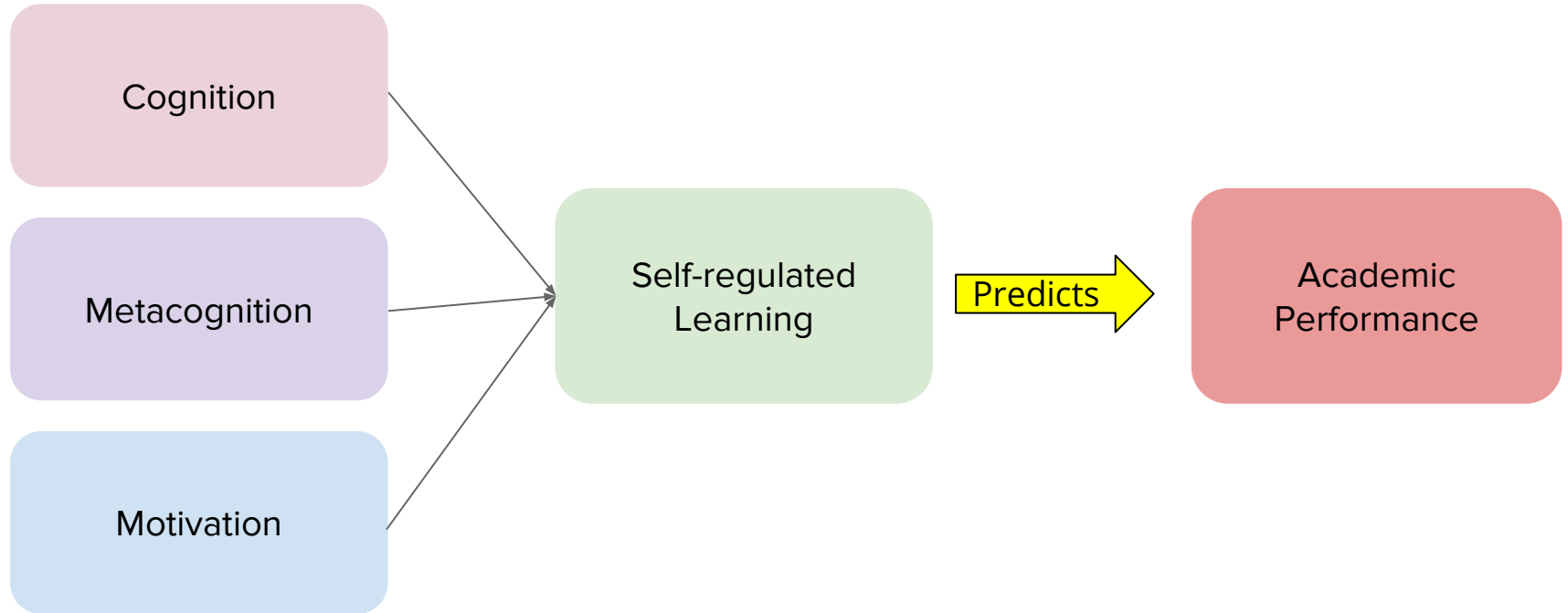
Jiyun (Lisa) Lee , Annabelle Regalado, Evan Scollard

Faculty Advisors: Professor Anselmi and Professor Reuman

Community Partners: Timothy Roarty, Andrea Heller, and

Debra Avery (HMTCA)

# What is Metacognition?



# Model of Metacognition



# Our New Focus

- Adding 7th grade comparison
- Targeted intervention for students with special needs
- New measurement Oregon Trail “think-aloud” procedure

*Learn 2 Learn:*  
Developmental Differences  
In Motivation and Metacognition

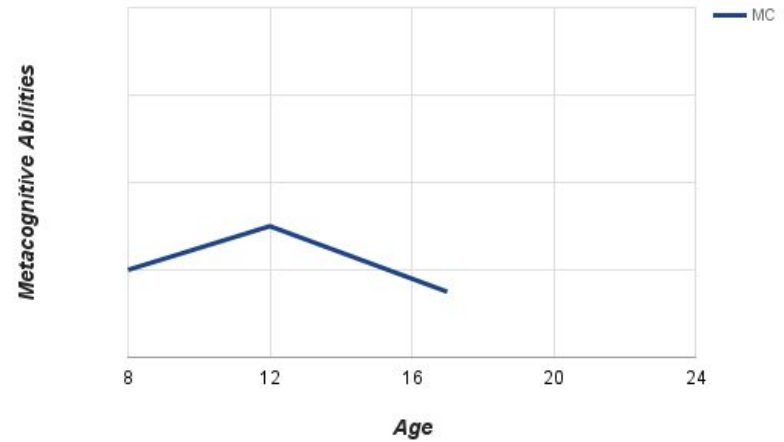
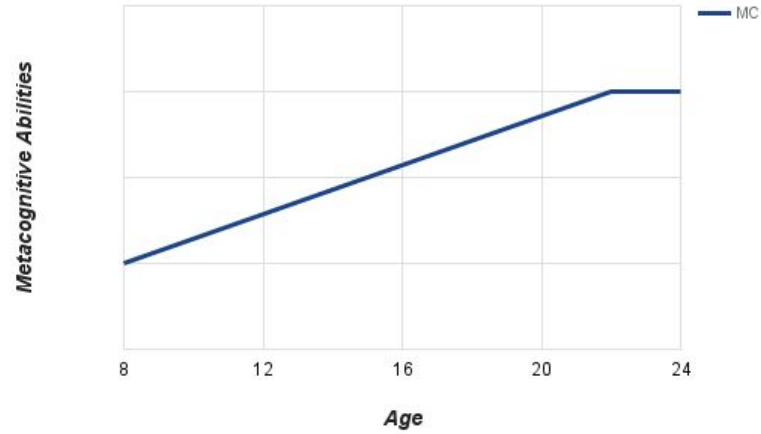
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Evan Scollard

# Introduction

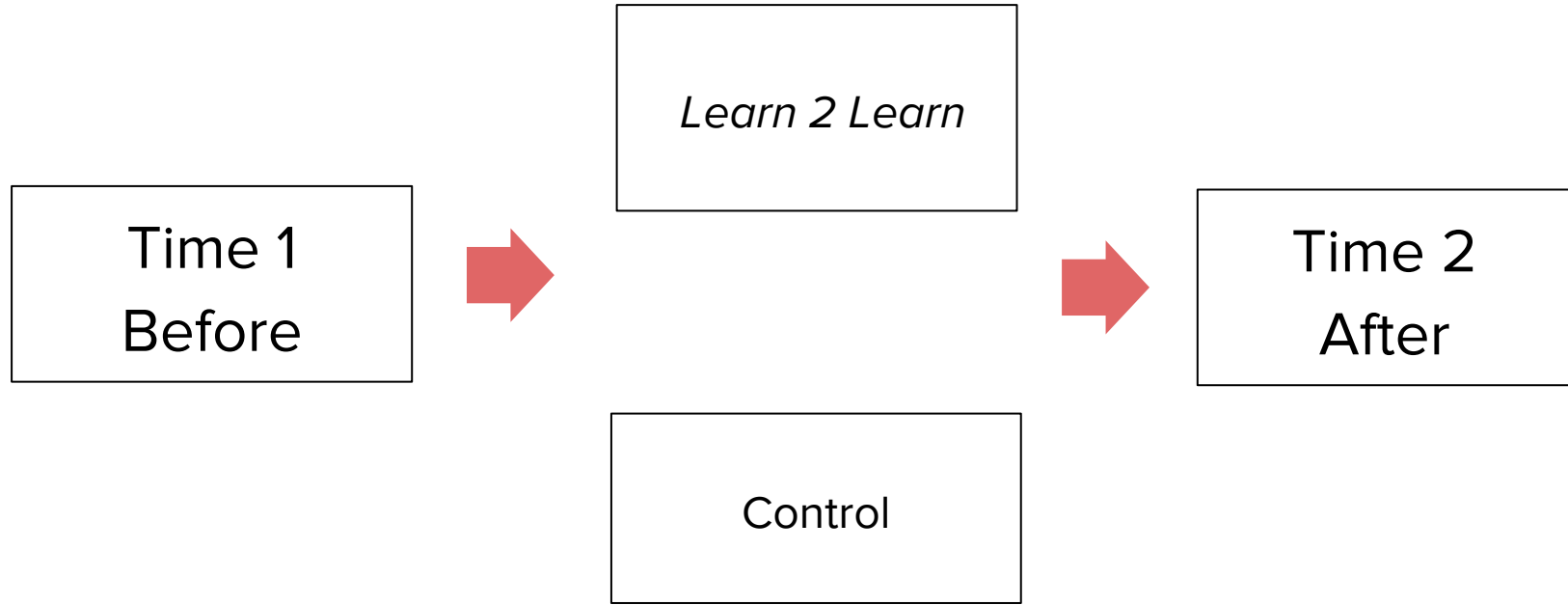
- What is the pattern of developmental change in metacognitive awareness and in motivation in the middle school years?
- A contradiction in the literature
- Past research
- Hypothesis: Motivation and Metacognition will decline with age, while effectiveness of the intervention will hold steady

# Contradictions in the literature





# Design for Grade Comparison



# Measures

## **Metacognition**

Quantitative MC5  
Qualitative MC5

## **Cognition**

Cognitive Strategies  
Questionnaire

## **Motivation**

Self-Efficacy  
Test Anxiety  
Engagement vs. Disaffection  
Achievement Values

## **Academic performance**

Quarterly Grades

# Results

## Finding 1:

- No effect of condition on metacognitive development
- Significant decline in metacognitive ability between 6th and 7th grade, plateauing in 8th grade

# Results

## Finding 2:

- Significant decline in achievement values between time 1 and 2 for 6th and 7th grade
- Significant decline in achievement between 6th and 7th grade, and between 7th and 8th grade

# Results

## Finding 3:

- No effect on self-efficacy by condition
- Significant decrease in self-efficacy between 6th and 7th grade, with a smaller but significant increase between 7th and 8th

# Discussion

- Correlation between drop in motivation and drop in metacognition
- Need for an educational focus on getting students re-engaged
- Self-Regulated Learning: interrelated rather than autonomous components



# Metacognitive School-Based Interventions for Students with and without Special Needs



Jiyun (Lisa) Lee

# Past Research

## 1. Metacognitive challenges

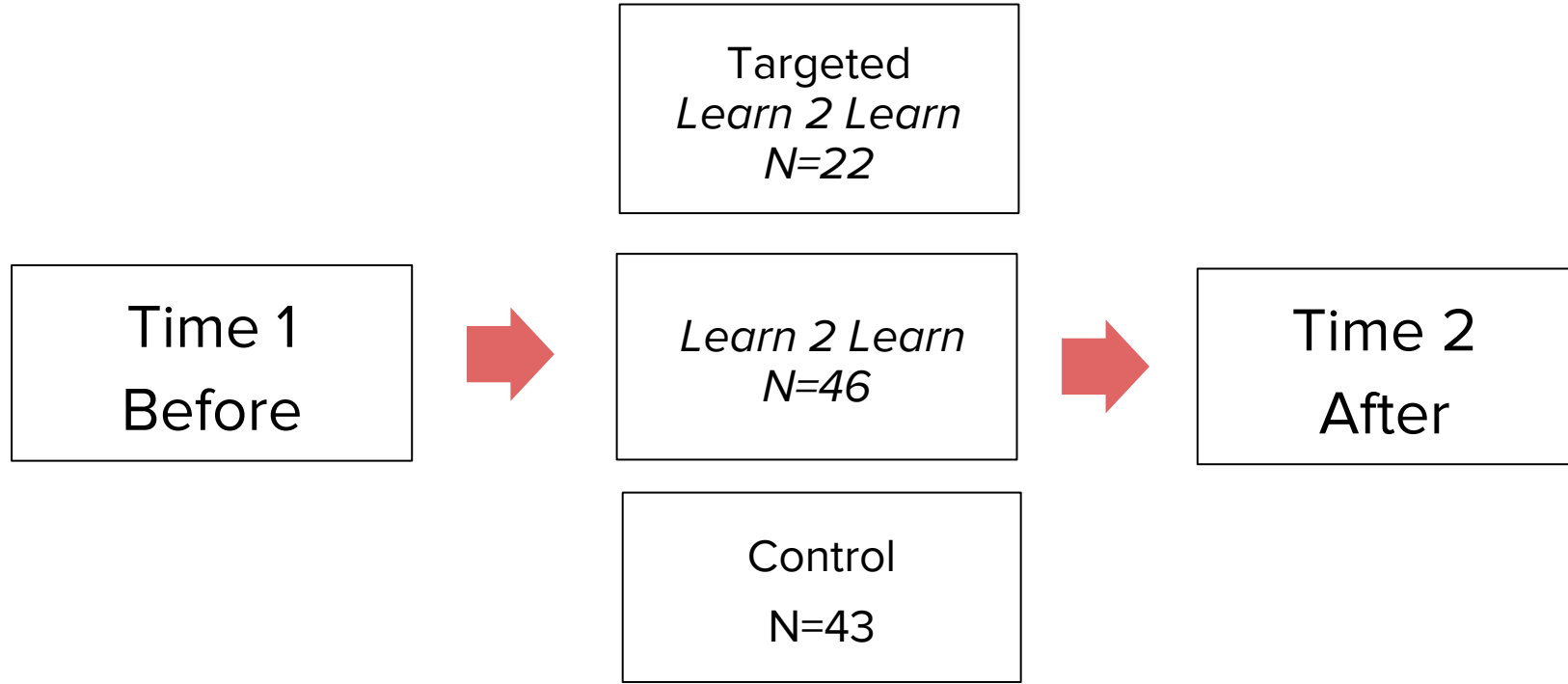
- Passive learners
- Lack skills for systematically approaching academic problems
- Fail to select appropriate task-related strategies

## 2. Motivational challenges


- History of academic failure
- Low motivation to learn
- Maladaptive beliefs about learning



# Research Design



# Interventions

<b>Regular intervention</b>	<b>Targeted intervention</b>
Minimum 2-3 steps covered each session	Targets only one step 
Full instructions and expected to independently follow through	Simple instruction
Not many opportunities for feedback	Extended practice with feedback (from peers and researcher)
Presentation, worksheets, class discussions	More interactive: games, group work, creative activities, videos

# Measures

**Metacognition**

**Motivation**

**Academic  
performance**

## **Cognition**

Cognitive Strategies Questionnaire

**Rehearsal**

**Elaboration**

**Organization**

**Critical Thinking**

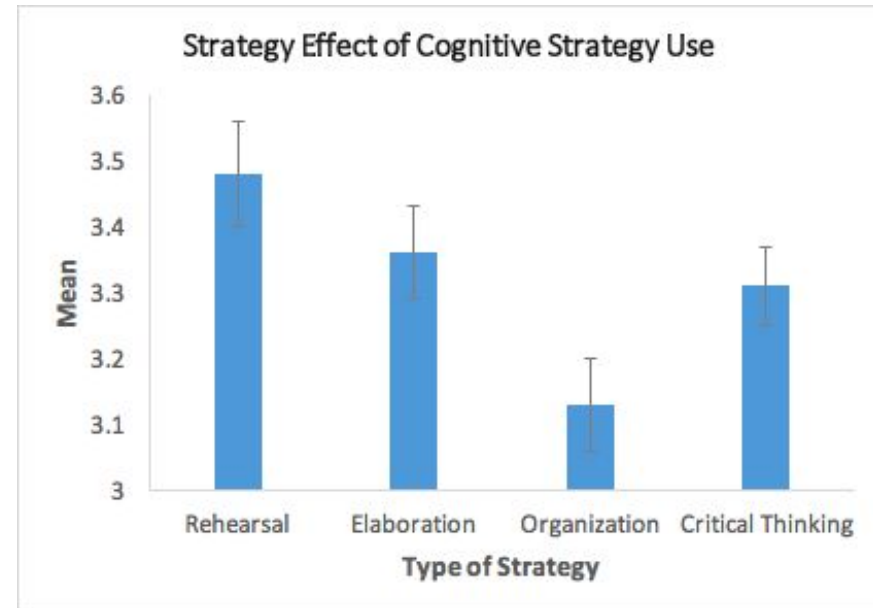
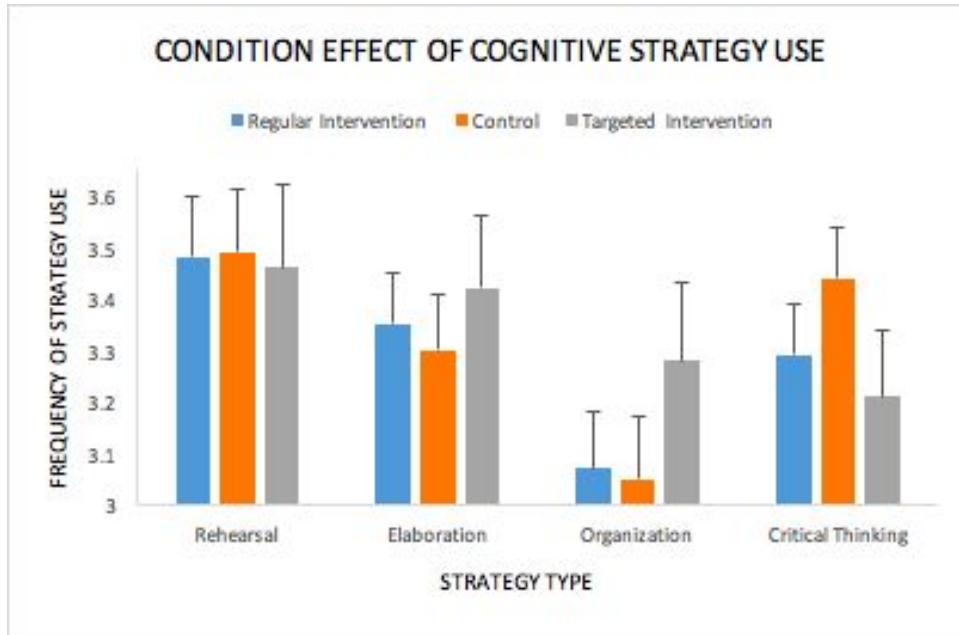
“When I study for a history test, I practice by repeating the information until I know it by heart”

# Results

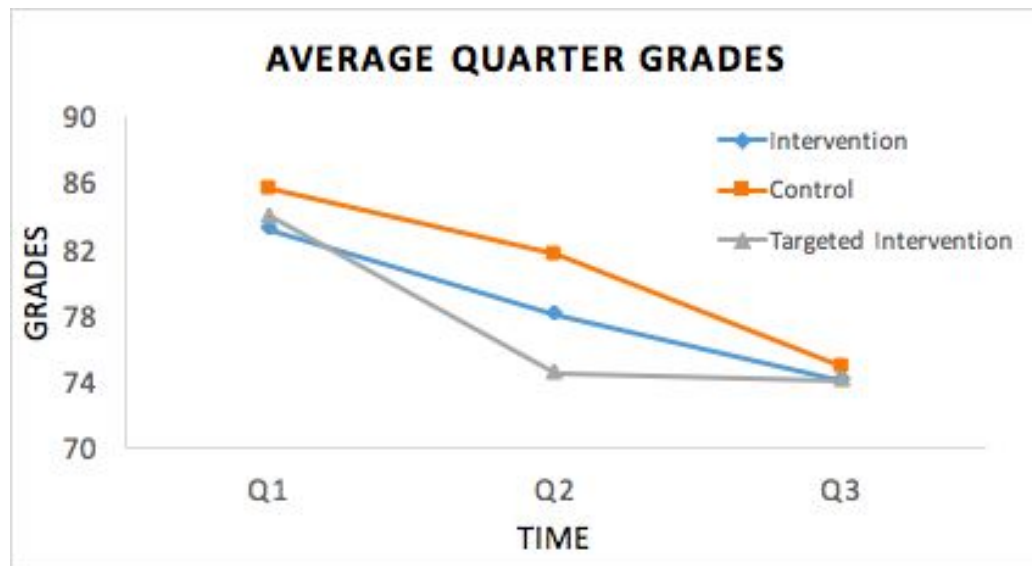
## **Finding 1:** Metacognition

- Both interventions did not increase 8th grade students' metacognition
- Student metacognition scores positively correlated with their academic performance.

## Finding 2: Cognitive Strategy Use



### Finding 3: Academic Performance



# Discussion

1. Areas of improvement for the metacognitive intervention
2. Students with special needs may not be effectively using their cognitive strategies.
3. Students may need more training/instruction on the best use of cognitive and metacognitive strategies



# Alternative Ways to Measure Metacognition: Think-Aloud Assessment



Annabelle Regalado



# Past Research

- Metacognition can be measured by offline (questionnaires) or online measures (i.e. Think-aloud)
- Questionnaires may not always reflect actual behaviors
  - (Veenman et al., 2003; 2006; 2014)
- Online assessment may allow a more definitive assessment method

# Methods

- Participants (n= 15) from the 8th grade *Learn 2 Learn* groups played *The Oregon Trail* for twenty minutes
- They were asked to explain why they made certain game decisions at key points of game play
- Their game play behaviors were tallied and verbal responses were given a score from 0 to 3

# Example of a Participant's Response

- *Student lowers the food rations because of a blizzard and realizes the health worsened.*
- STUDENT: “So this is...the health is fair. I feel like, they would be more comfortable if we had a little bit more food. So now I can change [the food rations] back up so the health can get back up.”



**(3- reflect/adjust with sufficient explanation)**

# Results

Think-Aloud Measure of Metacognition	Survey Measure of Metacognition (MC5)	Social Studies Grades
Behavior Tallies	0.18	0.24
Coded Statements	0.21	0.42

# Discussion

- Is the Think-Aloud method a better way to measure metacognition in middle school students?
- Think-Aloud may provide teachers with a better sense on how to talk to students about their metacognitive awareness and how to improve it.



# *Acknowledgments*

We would like to thank our advisors, Professor Anselmi and Professor Reuman for their guidance and dedication with our research project.

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Lastly, we would like to thank our research assistants as well as the CLI Research Fellows for their assistance throughout the research process.

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# Evan's Discussion

- Correlation between drop in motivation and drop in metacognition
- Need for an educational focus on getting students re-engaged
- Self-Regulated Learning: interrelated rather than autonomous components





# Lisa's Discussion

- Areas of improvement for the metacognitive intervention
- Students with special needs may not be effectively using their cognitive strategies.
- Students may need more training/instruction on the best use of cognitive and metacognitive strategies



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# Annabelle's Discussion

- Is the Think-Aloud method a better way to measure metacognition in middle school students?
- Think-Aloud may provide teachers with a better sense on how to talk to students about their metacognitive awareness and how to improve it.



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