**FRAMING**

- **Metacognition**
  - Metacognition is the knowledge, monitoring, and regulation of cognition (Flavell, 1978).
  - Knowledge of person, task, and strategies
  - Monitoring of cognition
  - Regulation of behavior in response to metacognitive monitoring

**Previous research**
- Shows that the predictive strength of metacognition is robust across many academic domains (e.g., Dignath et al., 2008).
- In the recent literature, there is empirical evidence to support the fact that even very young children are able to be metacognitive (e.g., Baten et al., 2017; Coughlin et al., 2015; Marulis et al., 2016).

**In this study**
- We focus on children’s ability to monitor their uncertainty in the domain of mathematics.

**Mathematical Equivalence**

- 2 + 3 = __ + 1

**Research Questions**
- Can children accurately monitor their uncertainty while solving math equivalence problems? In other words, do they know when they have solved a problem correctly vs. incorrectly? Do they tend to be overconfident or underconfident?

**Method**

- **The Sample:** 52 children in 1st (14), 2nd (22), and 3rd (16) grade (48% female) from local private schools in Bloomington, Indiana.
- Children were assessed in two sessions in which they:
  1. Completed a pretest in a whole-class setting in order to establish a baseline of prior knowledge.
  2. Worked in a one-on-one setting with an experimenter to assess problem-solving accuracy and metacognitive uncertainty monitoring.
- There were 5 mathematical equivalence problems (some children worked on Set 1, others worked on Set 2; problems are matched and are structurally equivalent in both sets).

**Method**

- Children were told to figure out what number should go in the box to make the problem true.

**Results**

**Accuracy**

<table>
<thead>
<tr>
<th>Problem-Solving Accuracy</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>38%</td>
</tr>
<tr>
<td>One-on-On Session</td>
<td>47%</td>
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</tbody>
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**Uncertainty**

- Certainty During One-on-One Session

**Discussion**

- Results show that 1st, 2nd, and 3rd graders struggle to solve math equivalence problems correctly, yet they are often confident that they have. On average, participants were accurate 47% of the time, they were confident they had solved the problems correctly 84% of the time, and they were able to accurately monitor their uncertainty 57% of the time. Thus, while these results suggest that some children are able to metacognitively monitor their uncertainty (i.e., they know when they solved problems correctly vs. incorrectly), many children are not able to do so. We are currently working to assess the relations between metacognitive monitoring and help seeking as well as academic performance. Future work in this area may include developing student interventions to scaffold students’ metacognitive monitoring skills in mathematics.