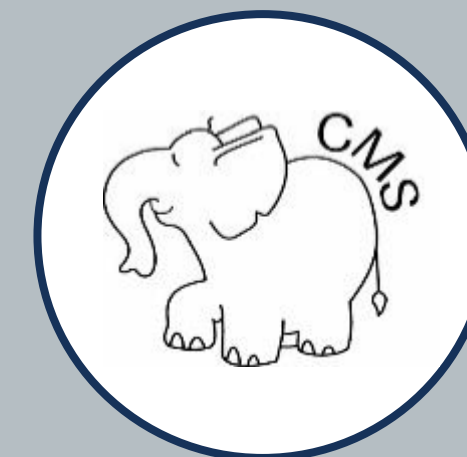


Exploring Metacognitive Monitoring in Kindergarten: Observing Information-Seeking Behaviors in Mother–Child Reminiscing and Deliberate Memory Tasks

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INTRODUCTION

- A rich literature has documented how the use and effectiveness of appropriate strategies for remembering improve across the elementary school years (Ornstein, Haden, & San Souci, 2008).
- Notably, the association between deliberate strategy use and recall is not strong until first grade (Schneider, 2011). This may be due, in part, to differences in individual-level factors such as *metacognition* (Blair & Diamond, 2008; Kuhn, 1999).
- In younger children, *information-seeking behaviors*, such as asking questions, have been examined as components of *metacognitive monitoring*, or children's detection of a comprehension or compliance issue when presented with an ambiguous goal (Revelle et al., 1985; Flavell et al., 1981).
- Although children enter formal school with considerable variability in metacognitive skills (Roebers, 2014; Schneider, 2015), limited research has focused on associations between metacognition and the development of children's deliberate memory skills over time.
- Therefore, the following study aims to build upon recent work linking reminiscing conversations to deliberate memory outcomes (Langley et al., 2017) by examining linkages between (a) parent and child elaborations, (b) children's information-seeking behaviors in two contexts, and (c) children's deliberate memory skills.

AIMS OF THE STUDY

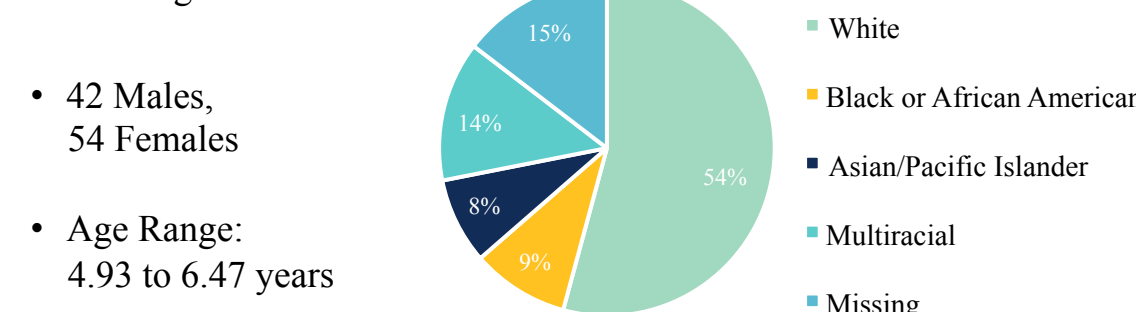
- To characterize parent and child contributions in reminiscing conversations, specifically elaborations and information-seeking memory questions posed by children.
- To explore information-seeking behaviors in an ambiguous goal task.
- To examine linkages between parent and child elaborations, information-seeking behaviors, and deliberate strategy use over the kindergarten year.

METHODS

- Data for this study were drawn from an ongoing longitudinal study of children's memory and cognitive skills as they transition into elementary school.
- Child-, home- and school-level measures were collected across the kindergarten year.
- Continuing data collection will allow for multi-level assessments through the beginning of the second grade.

PARTICIPANTS

Participants were drawn from 5 schools and included 96 kindergarteners:



MEASURES

Information-Seeking in Parent–Child Conversations

- Parent-child dyads took part in the Mother–Child Reminiscing Task (Reese et al., 1993); parents were asked to discuss two novel, shared, one-time events with their child.
- Conversations were audio-recorded, transcribed, and then coded using a structural/functional coding system (adapted from Reese et al., 1993).
- Particular attention was paid to both existing measures of parent and child contributions to conversations, such as *elaborations*, but also to children's *memory questions*: an indicator of information-seeking behaviors.

| Parent Codes | Definition |
|--------------------|---|
| Elaborations | Utterances that provide additional or new information about the event under discussion or questions that either ask the child for new information or to confirm or deny a piece of memory information |
| Child Codes | Definition |
| Memory Elaboration | Children's utterances that provide additional or new information about the event under discussion |
| Memory Question | Children's "open-ended" memory questions, asking the parent to provide information |

Information-Seeking During a Task with an Ambiguous Goal

- Children took part in an Object Memory Task (OBJ; Baker-Ward et al., 1984) in which they were asked to "work to remember" as many objects as possible, but not given any specific directions on how to do so, during a 2-minute study period. This resulted in a variety of behaviors – as the best way to achieve this goal was intentionally ambiguous.



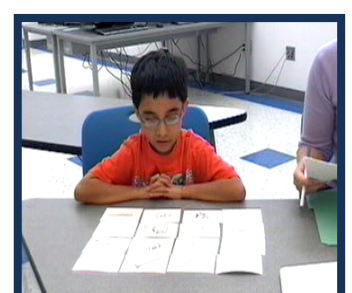
Spontaneous information-seeking behaviors were coded and described below:

| Indicator | Examples |
|-----------------------------------|--|
| Information-Seeking Behaviors | The number of times a child asked the research assistant for the name of an unknown object |
| Latency to Seek Information (sec) | The length of time in seconds it takes to seek information for the first time |

Deliberate Memory Skills

- Children took part in the Free Recall Task with Organizational Training (Moely et al., 1992); children were asked to remember 16 line drawings (from 4 categories; see below). First, children completed a baseline trial (measuring spontaneous sorting), followed by a training trial in which they were instructed in categorical organization, and finishing with a generalization trial that served as an indicator of their abilities to take advantage of this strategic instruction.
- The Adjusted Ratio of Clustering (ARC) measure (Roemer, Thompson, & Brown, 1971) was used to characterize children's sorting during study; the measure ranges from -1 (below chance) to 0 (chance) to 1 (perfect categorical sorting and clustering).

| Category | Line Drawings | | | |
|-----------|---------------|------------|-------|-------|
| Clothing | Pants | Shorts | Shirt | Socks |
| Plants | Flower | Cactus | Tree | Grass |
| Furniture | Couch | Table | Bed | Chair |
| Toys | Block | Teddy bear | Yo-yo | Ball |



WITHIN AND ACROSS TASK RESULTS

Characterizing Parent–Child Reminiscing Conversations

Figure 1. Sample of Coding Parent–Child Reminiscing

| Transcription | Codes |
|---|--|
| P: We ate, did you see anything at Cinderella's castle at night time? | Confirmation; General memory question elaboration |
| C: Fireworks and Tinkerbell! | Memory Elaboration x2 |
| P: What did Tinkerbell do? | General memory question elaboration |
| C: She flew over Cinderella's castle! | Memory elaboration |
| P: And what did she do? Did she light it up? That was super fun, wasn't it? | General memory question elaboration; Yes-no elaboration x2 |
| C: How did she light it up? | Memory Question |
| P: With her little wand. | Statement elaboration |

Descriptive Statistics by Construct

| Variable | Min | Max | Mean | SD |
|---|-----|-----|-------|-------|
| Information-Seeking in Parent–Child Conversations | | | | |
| Parent Elaborations | 7.5 | 119 | 38.90 | 20.73 |
| Child Memory Elaborations | 2 | 84 | 24.52 | 14.76 |
| Child Memory Questions | 0 | 3 | .60 | .78 |

| Variable | Min | Max | Mean | SD |
|--|-----|-----|--------|-------|
| Information-Seeking During an Ambiguous Goal | | | | |
| Frequency of Information-Seeking | 0 | 3 | 0.22 | 0.55 |
| Latency to Seek Information (sec) | 5 | 126 | 109.76 | 33.30 |

Note: *Latency to Seek Information* is reverse scored, in that a smaller score indicates it took the child fewer seconds to seek information, exhibiting greater metacognitive monitoring.

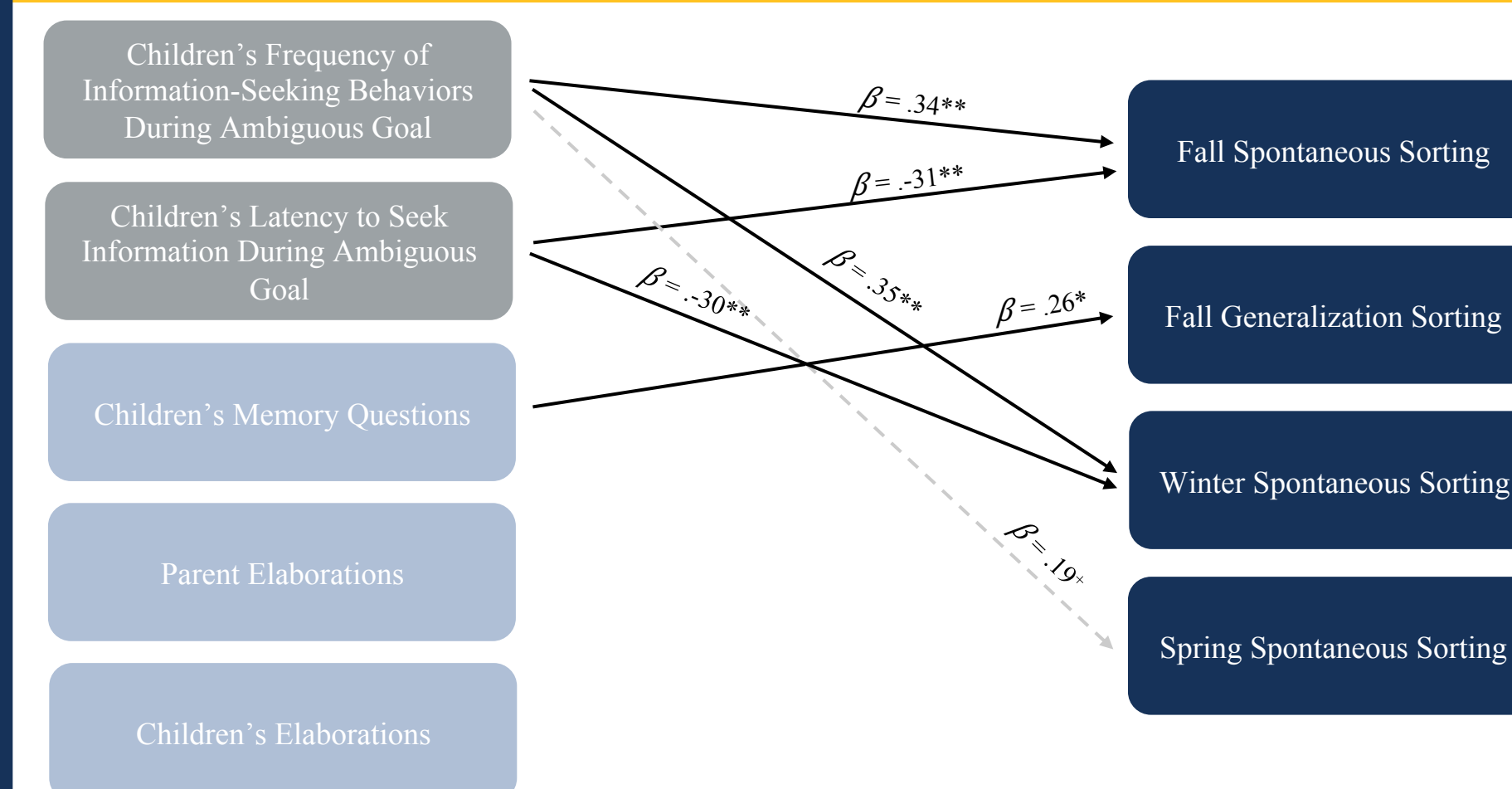
| Variable | Min | Max | Mean | SD |
|-----------------------------|------|-----|------|-----|
| Deliberate Strategy Use | | | | |
| Fall Spontaneous Sorting | -.23 | .78 | -.21 | .11 |
| Fall Generalization Sorting | -.23 | 1 | .03 | .47 |
| Winter Spontaneous Sorting | -.23 | 1 | .05 | .50 |
| Spring Spontaneous Sorting | -.23 | 1 | .10 | .53 |

Correlations Between Predictor Variables

| | 1. | 2. | 3. | 4. |
|--------------------------------|-------|-------|--------|--------|
| 1. Parents' Elaborations | - | | | |
| 2. Children's Elaborations | .73** | - | | |
| 3. Children's Memory Questions | .43** | .34** | - | |
| 4. Info-Seeking Freq. on OBJ | .13 | .03 | .24* | - |
| 5. Info-Seeking Latency on OBJ | -.27* | -.13 | -.39** | -.84** |

- Children's memory questions, but not their elaborations, were significantly associated with their latency to seek information and marginally associated with their total frequency of information-seeking behaviors when presented with an ambiguous goal. *+p < .10, *p < .05, **p < .01*

ACROSS TASK RESULTS



Note: Although all pathways were tested, only significant and marginal effects are illustrated above. *+p < .10, *p < .05, **p < .01*

- Children's total frequency of information-seeking behaviors and their latency to seek information when presented with an ambiguous goal predicted their spontaneous, strategic sorting skills in the fall ($\beta = .34, p < .001; \beta = -.31, p = .003$) and winter ($\beta = .34, p < .001; \beta = -.31, p = .004$) of kindergarten.
- However, it was children's information-seeking behaviors during parent-child reminiscing conversations that predicted children's ability to successfully *take up* and *apply* strategic organizational training when taught by a research assistant ($\beta = .26, p = .03$).
- Neither parents' nor children's elaborations predicted children's deliberate strategy use.

DISCUSSION AND FUTURE DIRECTIONS

- These findings address a gap in the literature surrounding the assessment of young children's emergent metacognitive monitoring skills. Children who *quickly* and *frequently* sought information when presented with an ambiguous goal evidenced greater spontaneous strategy use on a deliberate memory task. Indeed, previous research has suggested that metacognitive skills may serve as a precursor to effective strategy use (Schlagmüller & Schneider, 2002) and may be linked to children's ability to identify the *need for* and *appropriately select* a strategy (Schneider, 1999).
- Findings highlight the role of children's information-seeking behaviors during reminiscing conversations as potential indicators of metacognitive monitoring – or acknowledging what one does not know and subsequently seeking out this information. In the current study, children who frequently posed open-ended questions to their parents were quicker to autonomously seek out information from a research assistant when presented with an ambiguous goal than their peers who posed fewer memory questions when reminiscing.
- Given that there are almost no short-term longitudinal studies examining children's emergent metacognitive skills (Roebers, 2017), future work would benefit from examining the role of reminiscing conversations on longitudinal change in children's metacognition throughout the academic year – as early metacognitive monitoring is thought to set the stage for more advanced study techniques into adolescence (Weil et al., 2013).

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