



# EYE MOVEMENTS PROVIDE INSIGHT INTO THE DEVELOPMENT OF ANALOGICAL REASONING

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## INTRODUCTION

Analogy is a key driver of cognitive development and is strongly related to academic achievement<sup>1</sup>

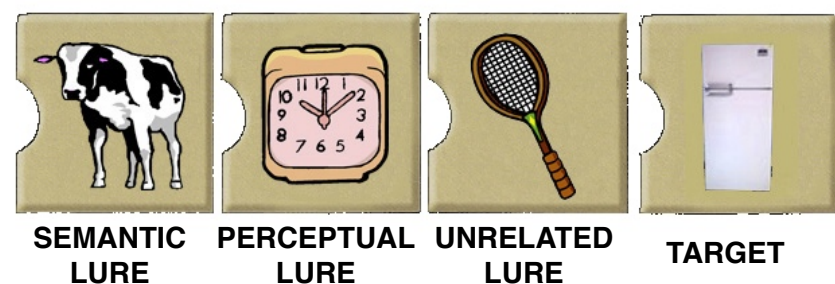
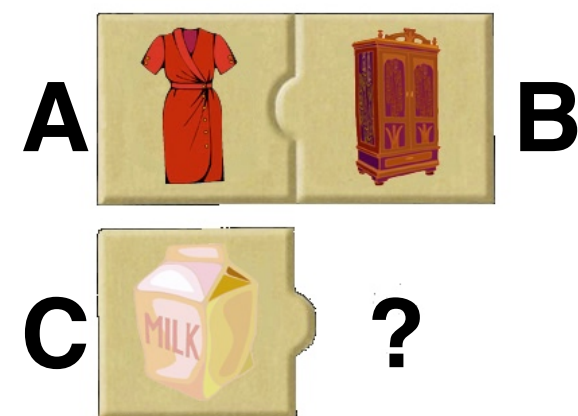
Successful analogical reasoning requires abstracting shared relational features and inhibiting attention towards perceptual and semantic similarities<sup>2</sup>, both of which can be difficult for children

We investigated the development of analogical reasoning using eye gaze patterns to infer different types of problem solving strategies in children and adults

## METHODS

Participants: 21 6-year-olds and 26 adults

Visual propositional analogy task: Which item goes with C the same way that A goes with B?



Each trial contained 4 response choices:

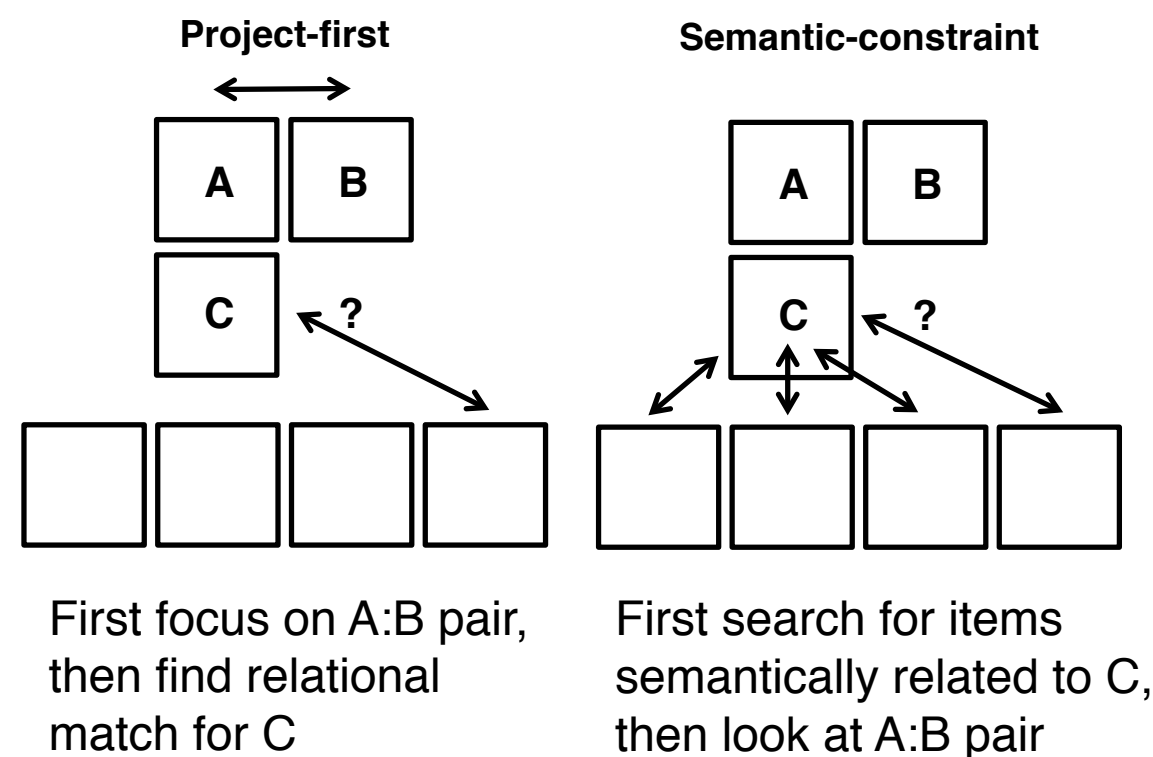
- **Semantic lure:** item is related to C in meaning but does not share the A:B relation
- **Perceptual lure:** item is visually similar to C
- **Unrelated lure:** unrelated item
- **Target:** correct response

Eye gaze data collected with an SMI REDn eye tracker at 60Hz

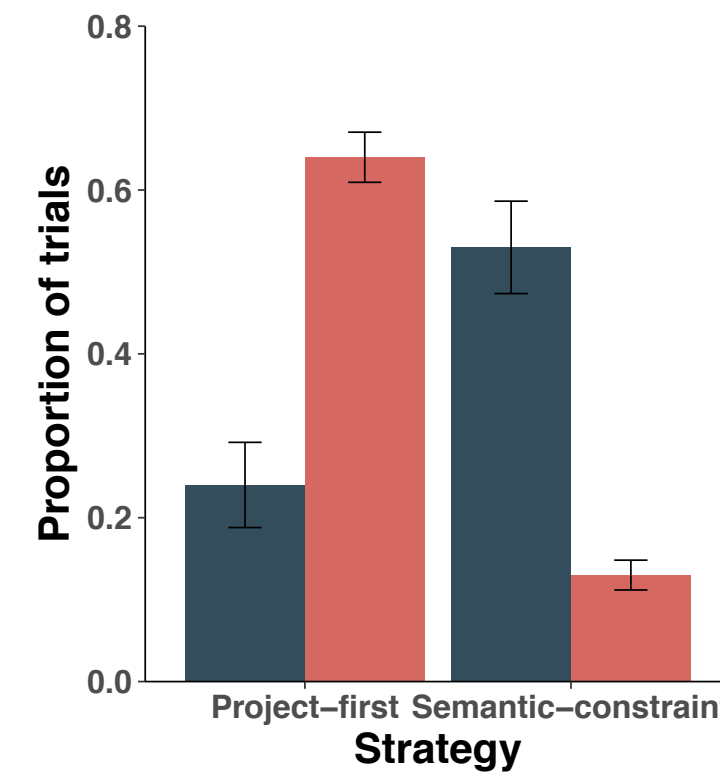
## RESULTS



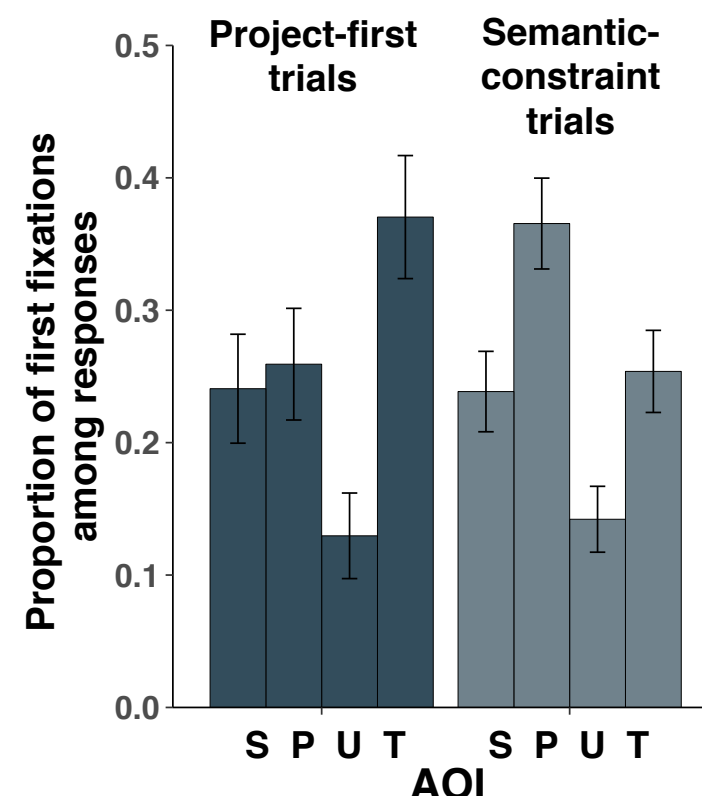
### Operationalizing classic analogy strategies based on eye movements<sup>3</sup>



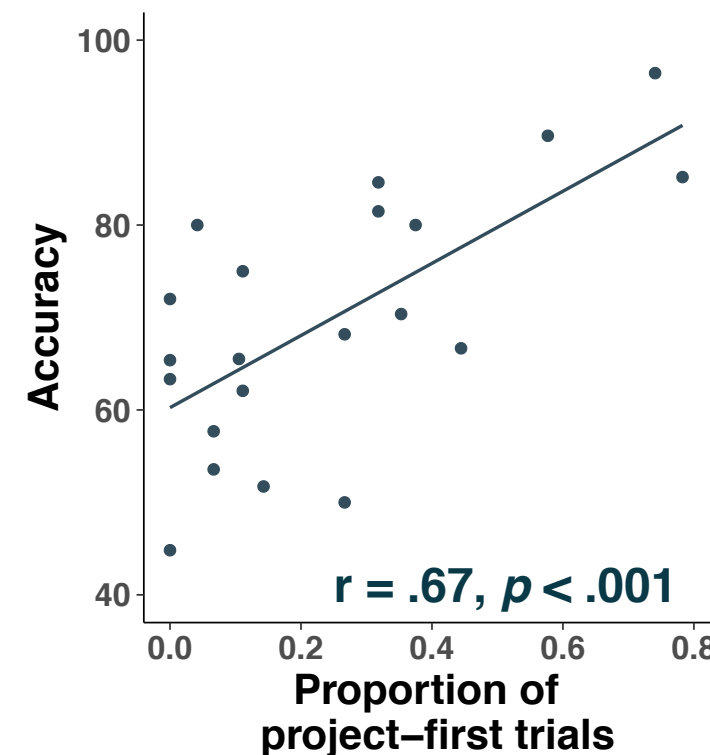
### Strategy use differs between children and adults



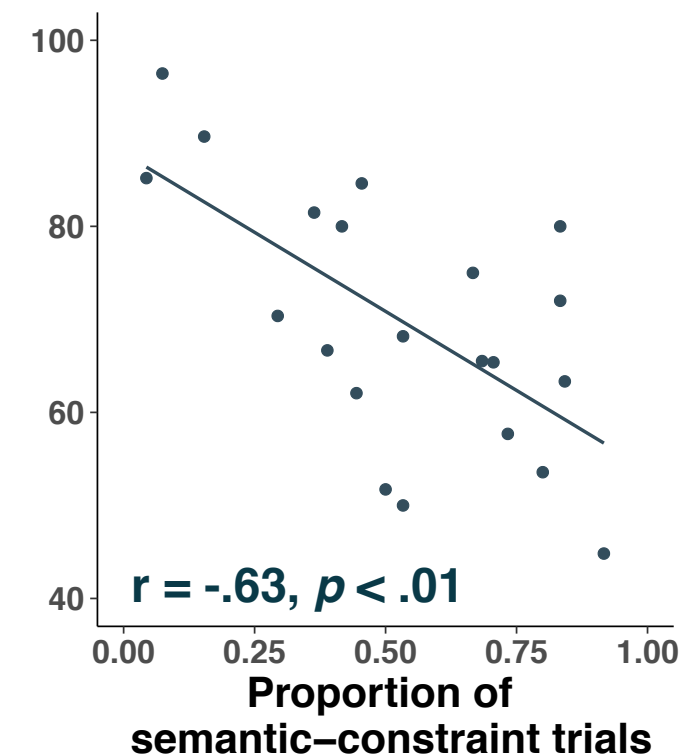
### Location of first response fixation differs by strategy



### Proportion of project-first trials positively correlates with accuracy



### Proportion of semantic-constraint trials negatively correlates with accuracy



## SUMMARY

Improvements in analogical reasoning performance are related to the use of increasingly efficient strategies

Incorrect responses are more likely to be semantic lures than perceptual lures, but participants make equal numbers of fixations on both lure types

Both children and adults are initially drawn to perceptual lures, but children are less able to inhibit attention towards semantic lures

**Future directions: How do semantic knowledge and inhibitory control contribute to analogical reasoning performance and strategy choice?**

### Acknowledgments

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References:

1. Kuncel et al., (2004). *Journal of Personality and Social Psychology*.
2. Gentner, (1998). *Child Development*.
3. Vendetti, Starr, et al., (under review).

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