

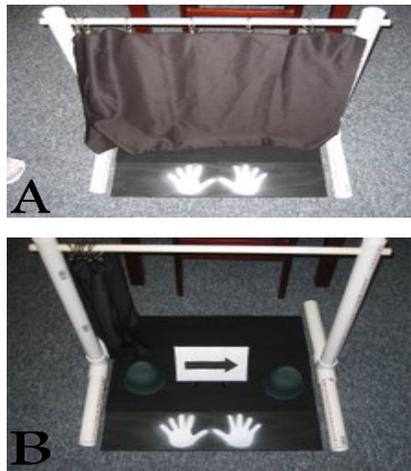
## INTRODUCTION

- Arrows are important symbols that are commonly encountered by adults and used to indicate directionality.
- Adults and children as young as 4 years of age respond faster to a target when they are cued by an arrow than when not cued.
- It is unclear at what age children learn to recognize and understand the symbolic meaning of an arrow.
- Children younger than 4 years may understand what an arrow represents, but the paradigm typically used (a reaction time task) may not be sufficient to show such a result in younger children.<sup>1</sup>
- Thus, a reaching paradigm is needed to examine orienting to arrow cues in young children and possibly even infants.
- The ability to orient to visual cues such as arrows has been used to assess early cognition in both typically- and atypically-developing children.<sup>2</sup>

## PURPOSE

- To use a reaching paradigm to determine if children younger than 4 years of age do indeed understand the symbolic meaning of arrows.
- To determine the age at which this ability manifests.

## FIGURE 1



# The Use of Arrow Cues to Direct the Attention of Young Children

Heather Beck, Kendra Swindler, Lenae Stansky, Sean Johnson, Krisztina Varga, & Dr. Janet Frick

The University of Georgia

Georgia Undergraduate Research in Psychology Conference - Kennesaw, GA

## METHODS

### Participants:

	Younger than 2.5 Years	Older than 2.5 Years
N	11	10
Age (in months)	20.145	35.09
Range (in months)	13-28.1	30-40.4

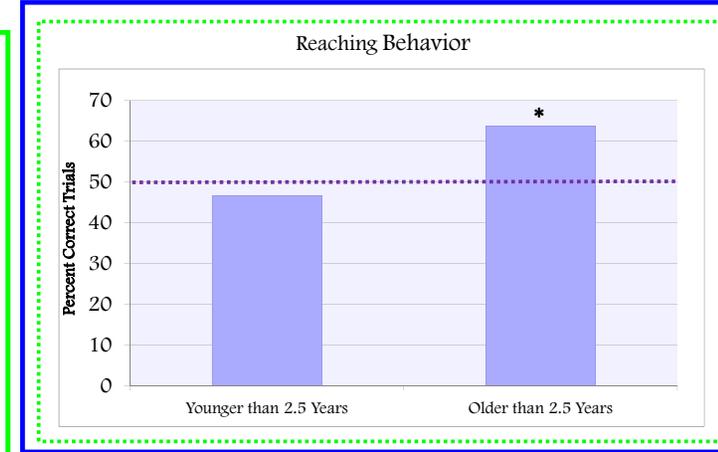
### Procedure:

- The child sat across from experimenter with two buckets placed in front of child (one to the right and one to the left).
- In plain view of the child and without any arrow cues, the experimenter hid a toy in one of the buckets and asked the child to find the toy (this was repeated in each bucket in order to ensure the child understood the instructions).
- On the test trials, a screen was drawn between trials so the child does not see where the toy is hidden (see figure 1A).
- Each trial consisted of the child being presented with two buckets and an arrow pointing to the bucket containing the toy (see figure 1B).
- The child was given these instructions: "This picture will help you find the toy. Where is the toy?"
- Two other experimenters watched the child's reaching behavior.
- Each observer independently indicated the bucket to which the child reached or pointed.
- After the trials, the child was asked if he/she understood what the picture (arrow) means.
- Each child was presented with 8 trials.

## RESULTS

- One-sample t-tests were used to examine whether each age group's percentage of correct responses were different from chance response. The results of the t-tests show that children younger than 2.5 years of age perform at chance levels,  $t(10) = .853, p > .05$ . However, children older than 2.5 years of age perform at a level that is above chance,  $t(9) = 2.283, p = .048$ .
- The results show a significant correlation between age in months and percent of trials correct,  $r(19) = .546, p = .01$ .
- The mean percentage of correct responses is 46.62 ( $SD = 13.11$ ) for children younger than 2.5 years and 63.75 ( $SD = 19.05$ ) for children older than 2.5 years old (see figure 2).

## FIGURE 2



## CONCLUSIONS

- The purpose of this research was to determine if children younger than 4 years of age understand the symbolic meaning of arrows through the use of a reaching paradigm.
- The results support the hypothesis that children younger than 4 years of age may in fact be directed by arrow cues.
- Children may begin to understand the meaning of arrows and use them to cue behaviors by 2.5 years of age, which corresponds with other studies that suggest the emergence of some symbolic understanding at this age.<sup>3</sup>
- Future research could examine the development of directional understanding using a similar paradigm including more, younger participants.

## REFERENCES

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