

# Automatic Visual Perspective Taking in Children

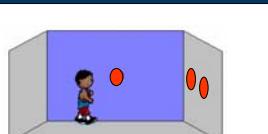
## Persisting egocentrism and low-level perspective taking in a level-1 task

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2- to 5- year old children are prone to making egocentric errors on a variety of perspective taking tasks (Fishbein, Lewis, & Keiffer, 1972; Flavell et al., 1981; Flavell, Flavell, Green, & Wilcox, 1981b; Liben, 1978; Piaget & Inhelder, 1956). We know little about how older children perform once they successfully complete such tasks. The current work outlines the performance of children and adults on a level-1 visual perspective taking task (a task that 2-year olds have the conceptual abilities to complete successfully, Moll and Tomasello, 2006). The experiments employ a paradigm adapted from Samson, Apperly, Braithwaite and Andrews (under submission). We were looking to find evidence as to whether egocentric interference effects continue beyond infancy and whether there exist low-level processes which allow for the taking of others' perspectives.

#### Experiment 1A: Method

Children (Aged 6-10) and adults completed a computer-based task, in which they had to respond to stimuli by pressing buttons. Participants were presented with a picture of a room containing a cartoon figure and a number of coloured discs (see figures 1a and 1b). On each trial they were cued to take either their own perspective or that of the figure and then judged the number of discs that could be seen from that perspective (see fig 2). Self and other perspectives were either consistent (fig 1a) or inconsistent (fig 1b). Reaction times and error rates were measured.



A consistent trial: in this case, both **you** and **he** see 3



An inconsistent trial: in this case, **you** see 3, but **she** only sees 2

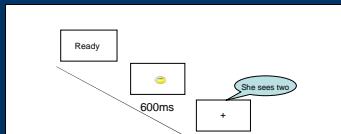


Figure 2: Event sequence

Figure 1a: A consistent trial

Figure 1b: An inconsistent trial

#### Results

Four groups: Undergraduates (n=16), 10-year olds (n=25), 8-year olds (n=34), 6-year olds (n=35). Children completed 48 trials and showed no decrease in performance as the task progressed.

6-, 8- and 10- year old children and adults were slower and more error prone when presented with inconsistent stimuli. All age groups successfully completed the task with an accuracy rate over 85%.

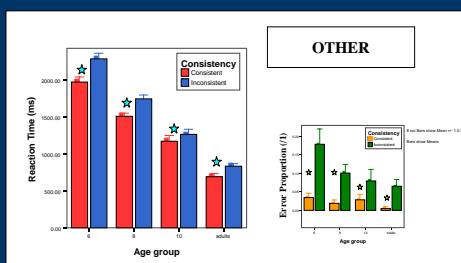


Figure 3: Results from experiment 1A

#### References

Apperly, I. A., Riggs, K. J., Simpson, A., Chiavarino, C., & Samson, D. (2006). Is belief reasoning automatic? *Psychological Science*, 17, 841-844.  
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 Flavell, J. H., Flavell, E. R., Green, F. L., & Wilcox, S. A. (1981b). The Development of 3 Spatial Perspective-Taking Rules. *Child Development*, 52, 356-358.  
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#### Experiment 1B:

Experiment 1A shows that inconsistent stimuli presented were processed at a higher cost than consistent stimuli. In order to investigate whether this was specific to the social domain a control study matched all other demands. 8 year-olds (n=30) completed a task identical to experiment 1A, except this time they had to make decisions by taking cues from a bi-colour stick (fig 4b).

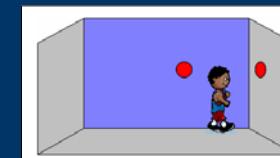


Figure 4a: Example stimulus from Experiment 1A

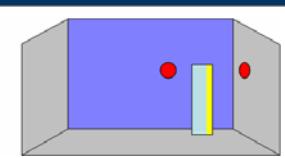


Figure 4b: Example stimulus from Experiment 1B

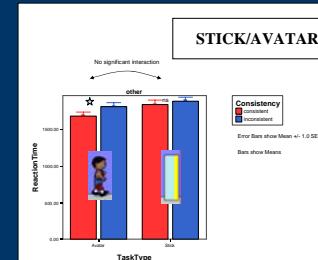


Figure 5: Results from experiment 1B (there were no speed/accuracy trade offs)

Participants showed no significant difference in interference from their own perspective whether taking cues from the avatar or the stick. Participants showed significantly more interference from the perspective of the avatar than from the cue of the stick

#### Discussion

Our task demonstrates that reaction times can indeed be used to study simple perspective taking in older children. Egocentric performance costs shown may be analogous to errors made by very young children. Although older children and adults tend not to make egocentric errors, the need to resist interference from their own perspective still carries a measurable processing cost.

Interference from another perspective when processing one's own perspective suggests that perspective-taking may occur (perhaps automatically) even when it is not beneficial to task performance. This seems to suggest that from an early age we use a low-level process to allow us to take the perspectives of others, and that this may not be preventable by higher cognitive control. This low level process may be what helps infants to show perspective taking abilities (Sodian, Thoermer & Metz, 2007; Song & Baillargeon, 2008) in spite of only limited cognitive resources. This pattern contrasts with the more complex abilities of Level-2 perspective taking and false belief reasoning, which do not appear to be automatic (Apperly et al., 2006) and do require executive control processes

Moll, H. & Tomasello, M. (2006). Level 1 perspective-taking at 24 months of age. *British Journal of Developmental Psychology*, 24, 603-613.

Piaget, J. & Inhelder, B. (1956). *The child's conception of space*. London: Routledge & Kegan Paul.

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Sodian, B., Thoermer, C., & Metz, U. (2007). Now I see it but you don't: 14-month-olds can represent another person's visual perspective. *Developmental Science*, 10, 199-204.

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