Accounting for cognitive effort in a visual working memory task in 13- and 15-month old infants

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Research question
To what extent can cognitive effort (attention) account for developmental increases in visual working memory (VWM) performance?

Methods

Participants & Video Coding

Participants
Younger: 13-14.1 months (N=13);
Older: 14.5-16.5 months (N=14). Only infants who completed 3 or more testing trials were analyzed.

Video Coding
Three coders tracked infants’ behavior (blinded; without viewing eye trace or trial) and noted disengagement due to: external distraction, social referencing, and internal factors (fussiness).

Results (Pupil)

Pupil dilation during trials with correct or incorrect responses (based on first look)

Performance as a function of pupil dilation

Delayed Match Retrieval (aka “Memory Game”)

Proportion correct of Match vs. Non-match card

Overall, older children significantly outperformed younger based on both first look (F(1,26)=7.16, p = .013) and longer look (F(1,.26) =5.2, p = .031).

Video coding results: Preliminary data (N=16) showed no correlation between task performance and overall engagement in two age groups.

Summary & Future directions

15 month-olds had better performance in a Delayed Match Retrieval visual working memory task, compared with 13 month-olds.

Cognitive effort (as measured by pupil response) influenced VWM performance in both age groups.

Interestingly, while the effort expended by older infants advantageously boosted performance, in younger infants it negatively affected performance.

It may be that some of the younger infants were performing a different task (delayed non-match retrieval?) in spite of training. We are currently investigating this possibility.

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