Toddlers’ eye-movements reflect (un)certainty about their knowledge of a word’s meaning

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BACKGROUND

- How children learn the meanings of words in an environment flooded with uncertainty while receiving very little feedback about their knowledge state, remains a great puzzle.
- To achieve this feat, it has been suggested that children come equipped with hardwired constraints on what words are more likely to map onto [1] together with the general-purpose ability to keep track of the statistical regularities between word occurrences and the environment [2].
- Learning, however, cannot be reduced to a passive observational process of the external world.
- There is increasing evidence that infants actively engage in self-directed learning to learn about the physical, social and linguistic world surrounding them.
- Infants use pointing in an interrogative fashion [3].
- Request information from others when they do not know [4].
- Orient selectively their attention [5].
- But how do infants decide where to look and what to listen to?
- In adults, efficient self-directed learning is predicted by accurate episodic monitoring [6].
- Yet, it is an open question whether children can monitor the uncertainty of their own knowledge and actively guide their learning behaviour on the basis of this monitoring [7].

METHOD

Participants: 53 18- to 30-month olds (68 tested)
Procedure: We adapted a version of the post-decision persistence wagering paradigm (see [8] in rats and [9] in infants) with an anticipation eye-movement paradigm using an eyetracker.

MEASURES AND HYPOTHESIS

- **Performance**: first anticipative look during the delay period
- **Uncertainty**: children’s willingness to persist in looking toward the side of their first gaze.

RESULTS: PERFORMANCE

Mean accuracy of the first anticipative look
First anticipative look seems to be a poor indicator of performance:
- no difference between known and unknown words
- marginal above chance performance for known words

Possible reason: First look measured from target word onset, this may not leave sufficient time for children to process the word and retrieve the correct location.

RESULTS: (UN)CERTAINTY

Relationship between persistence and accuracy depending on word type

Children showed increased persistence in their initial gaze after making a correct as compared to an incorrect gaze only when the meaning of the word was known, suggesting an appropriate evaluation of their knowledge.

CONCLUSIONS

- Persistence times seem to capture children’s knowledge about word meanings but are not indexed on their objective performance.
- On-going work: modification of the paradigm to improve first-look performances.
- Future work: how persistence times are influenced by graded uncertainty about word meanings?

REFERENCES