GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN IN PUBLICA COMMODA SEIT 1737

B4

Is there a curiosity boost in word learning across early development?

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Motivation

- Factors such as object novelty, predictability and ambiguity shape infants' attention to objects in their environment.
- However, the consequences of such attention on learning across early development are understudied.

Preliminary work:

- Children steer what, when and whom they learn from[1,2]
- Differences in sampling, but not learning, across development[3] (Fig. 1)

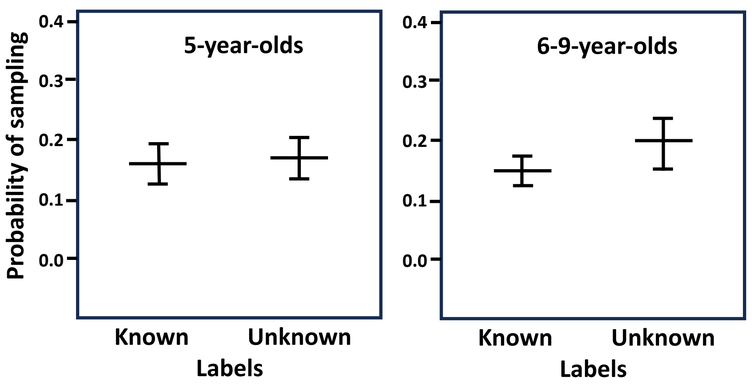

Fig. 1: Older children – but not younger children – sample objects whose label they do not know.

Objectives

- Disentangle attention to – and learning of labels for – objects differing in novelty, predictability and uncertainty across development
- Empirically test predictions of rational models of curiosity that subsume novelty, predictability and uncertainty-based differences in curiosity.

➢ In analysing the consequences of curiosity on learning, this project will speak to the question **Why we are curious?**

➢ In examining the factors that drive attention to specific objects, this project also asks **When are we curious?**

?

How does curiosity shape attention and learning across early development?

Methods

- Head-mounted eye-tracking (with PR Ecker) of parent-child interactions to examine attention to objects varying in novelty, predictability and uncertainty (Fig. 2)
- Tablet tasks examine children's sampling of objects varying along the above axes
- Training on labels for objects[4] and testing of recognition of labelled objects
- Neural correlates of curiosity (i) neural synchrony to curiosity-inducing stimuli and (ii) theta oscillations prior to presentation of labels

Hypotheses:

- Increased attention to – and learning of labels for – novel objects
- Disassociation between attention to and learning of predictable and unpredictable input (Fig. 3)
- Differences in information-sampling strategies across development, with younger children showing increased random sampling relative to older children

Fig. 2: Head-mounted eye-tracking of parent-child interactions. Here, while the parent engages with a different object, the child reaches for and preferentially attends to an unfamiliar object.

Cross-project collaborations

- Key collaborations with projects examining the **factors that trigger curiosity** **A2**, **C2**, **C3** and **C5**
- Focus on **cognitive foundations of curiosity in early development** shared with **A1**, **B3**
- Focus on **ecologically valid settings** in experimental designs with **A1**, **A3**, **B2**, **B3, B4**

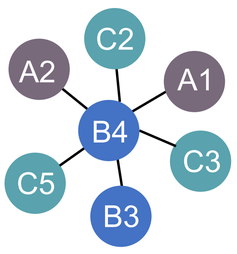

Fig. 3: Some key collaboration partners of doctoral researcher working on Project B4

Potential PhD projects

1. How do factors such as novelty, predictability and uncertainty shape curiosity and curiosity-driven learning?
2. A developmental perspective on the effects of curiosity on learning
3. The neural correlates of curiosity in early development

References

1. Ackermann, L., Hepach, R. & **Mani, N.** (2020). Children learn words easier when they are interested in the category to which the object belongs. *Developmental Science*, 23(3), e12915.
2. **Mani, N.** & Ackermann, L. (2018). Why do children learn the words they do? *Child Development Perspectives*, 12(4), 253-257.
3. de Eccher, M. & **Mani, N.** (under review). Developmental differences in children's uncertainty-driven sampling behaviour.
4. Lüddecke, T. & **Ecker, A.** (2022). Image segmentation using text and image prompts. *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 7076-7086.