Using eye-tracking to measure cross-situational word learning online in Dutch adults

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CROSS-SITUATIONAL WORD LEARNING

- Gavagai problem: how can a language learner know to what exactly a new word refers? [Quine, 1960]
- Research suggests statistical learning plays a role in tracking the co-occurrences between words and referents. [Yu & Smith, 2007; Smith & Yu, 2008; Suanda et al., 2014]

RESEARCH QUESTIONS

- Are adults able to learn 8-word-referent pairs in a cross-situational word learning task with ambiguous learning trials?
- Can we measure learning online using eye-tracking?

METHOD

- Participants
  - 21 native speakers of Dutch, between 18 and 35 years old (mean age = 25.5).
- Learning phase (approx. 3 minutes)
  - 28 learning trials with novel objects [Kachergis et al., 2016] and Dutch-like non-words;
  - 8 word-referent pairs;
  - Each pair occurred 7 times;
  - A word and its referent always occurred together;
  - Accompanied by another word-referent pair.

- Eye-tracking (online measure)
  - Eye movements were measured during the learning phase to investigate whether participants, while listening to a certain word, looked more at the correct referent as opposed to the distractor picture.

- Test phase (offline measure)
  - 8 four-alternative forced-choice test items.

RESULTS

- Data was made suitable for analysis using the eyetrackingR [Bolker et al., 2008] package. Then, the data was analyzed using linear mixed effect models in R [Crawley, 2013] from the lme4 package [Bates et al., 2015]. Participant and Item were included in the models as random factors.

Eye-tracking (online measure)

The proportion of looking at the correct referent as opposed to the distractor picture significantly increased as exposure to the learning trials increased (t = 3.754, p = .001).

Test phase (offline measure)

Participants scored 83% correct on average (significantly higher than chance level (25%), p < .001).

DISCUSSION AND FUTURE RESEARCH

- Adults can learn word-referent mappings in a cross-situational word learning task with ambiguous learning trials.
- Eye-tracking data reveal online learning on this task.
- Statistical learning might play a role in word learning.
- This paradigm will be used to compare typically developing (TD) children to children with developmental language disorder (DLD). Children with DLD seem to have difficulty with statistical learning [e.g., Lawrence et al., 2015] Do children with DLD have difficulty with statistical word-referent learning (offline / online) compared to TD children?

CONTACT

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REFERENCES

[Image “Gavagai problem”: https://slideplayer.com/slide/7253589/]
[Image “Cross-situational word learning”: http://www.r-project.org/]
[Image “Statistical learning”: https://slideplayer.com/slide/12454408/]