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

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Gavagai problem: how can a language learner know to what exactly a new word refers? (Duce, 1966)

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 (Speakers et al., 2010) and Dutch-like non-words;
- 8 word-referent pairs;
- Each pair occurred 7 times.

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 (Boersma & Ferguson, 2008) package. Then, the data was analyzed using linear mixed effect models in R (R Core Team, 2019) from the lme4 package (Bates et al., 2015). Participants 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., 2011). Do children with DLD have difficulty with statistical word-referent learning (offline / online) compared to TD children?

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REFERENCES