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 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 eyetracking R [R Core Team, 2019] package. Then, the data was analyzed using linear mixed effect models in R [Core Team, 2019] 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 [Tag, Lammertink 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


○ Image "Gavagai problem" - https://commons.wikimedia.org/wiki/File/Gavagai.jpg