Distributional learning of visual object categories in children with and without DLD

Broedelet, I.R.L.; Boersma, P.P.G.; Rispens, J.E.

Publication date
2021

Document Version
Final published version

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Distributional learning of visual object categories in children with and without DLD

Iris Broedelet, Paul Boersma & Judith Rispens
University of Amsterdam
Amsterdam Center for Language and Communication

DLD AND DISTRIBUTIONAL LEARNING

- Studies indicate that children with developmental language disorder (DLD) have difficulties with statistical learning (SL) e.g. Siegelman et al., 2017
- Distributional learning, a type of SL, plays a role in the formation of phonetic categories e.g. Maye et al., 2002
- Junge et al. (2018) found that distributional learning contributes to the formation of novel visual object categories in infants

→ It is unknown whether children with DLD have difficulty with this type of visual distributional learning

RESEARCH QUESTIONS

1. Are children with DLD less sensitive to distributional cues compared to typically developing (TD) children when learning novel visual object categories?
2. Does the ability of visual distributional learning contribute to lexical knowledge in children with DLD?

METHOD: FAMILIARIZATION PHASE

Based on Junge et al. (2018) and Chládkova et al. (2020).

- An 11-step novel object continuum was constructed
- Participants were familiarized with tokens from the continuum (288 tokens in total, duration +/- 8 minutes)
- Two learning conditions: distributional peaks at different positions in the continuum
- Between-participant design: PPs did one of two familiarization conditions

Hypotheses

- Eight 2A-FC test questions
- Does token D1 or D2 look more like token S?

Predictions

- PPs in Condition 1 learn that tokens S and D2 belong to one category
- PPs in Condition 2 learn that tokens S and D1 belong to one category

METHOD: PARTICIPANTS

- 25 children with DLD and 25 TD children (7-9 years old)
- The children with DLD were tested on receptive/productive vocabulary size (PPVT, CELF), semantic knowledge (Word Classes CELF) and lexical-semantic organization (Word Associations CELF)

RESULTS

A generalized logistic linear mixed effect model in R was constructed to test:

- Does Condition (1/2) influence stimulus choice
- Is there an interaction between Condition x Group (DLD/TD)?

Children in Condition 1 were significantly more likely to choose stimulus D2 than children in Condition 2: $z = 2.758$, $p = 0.006$. However, there was no significant effect of Group: $z = 0.007$, $p = 0.994$.

Familiarization condition significantly influences whether viewers prefer the combination S + D1 or S + D2. No evidence for a difference between children with and without DLD.

Linear regression analyses showed no significant relationships between visual distributional learning and lexical knowledge in children with DLD.

DISCUSSION

- Familiarization condition significantly influenced our participants’ preference for the combination of S and token D1 or D2, indicating that distributional properties of the input influence the categorization of visual stimuli
- No evidence for or against a visual distributional learning deficit in children with DLD (see also Lammertink et al., 2020)
- No evidence for or against a relationship between visual distributional learning and lexical knowledge in children with DLD
- There seems to be an inherent preference for the combination S + D1. Perhaps the visual continuum should be changed in future studies

REFERENCES


CONTACT
Iris.Broedelet@uva.nl