GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN IN PUBLICA COMMODA SEIT 1737

PA3

Word-form and word-meaning mismatches in language acquisition

RTG 2636

Form-meaning mismatches

PA3.1 – The development of early vocabulary networks

Student: Judith Kalinowski Supervisors: Nivedita Mani, Markus Steinbach

Ext./Th.Com.: Hedde Zeijlstra

I. The form-meaning mismatch

- Arbitrariness in language has traditionally been seen as a core feature, allowing flexible expression through abstract symbols [1].
  - A chair is called a *chair* in English, *Stuhl* in German and /kʊr.siː/ (kursi) in Hindi
  - Exceptions exist, e.g., onomatopoeia but these are considered just that – exceptions.
- The form of a word does not give information about its meaning → form-meaning mismatch (1:0)
- Recent studies suggest that the probability that two words that are related in meaning are also related in form is greater than expected by chance [2, 3]

Research question

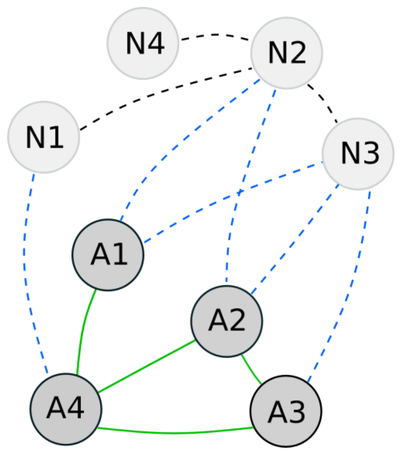
How does similarity in sound and/or meaning to other words

i. already in the lexicon,
ii. which are well connected in the lexicon, and
iii. in the child's environment

impact the learning of this word?

II. Methodology

- Using large-scale longitudinal vocabulary data from word-bank [2], vocabulary networks were created, representing invidivual children's growing vocabularies.
- The growth of these networks were analyzed following three network growth principles:
  - INT (green): words that are similar to many other words within the lexicon attract new similar words
  - EXT (all lines): words that are similar to many words in the environment are learned earlier
  - Lure of Associates (LoA) (blue): words that are similar to many words in the lexicon are learned earlier



- Using generalized linear mixed models, the impact of INT, EXT and LoA on word learning was analyzed.

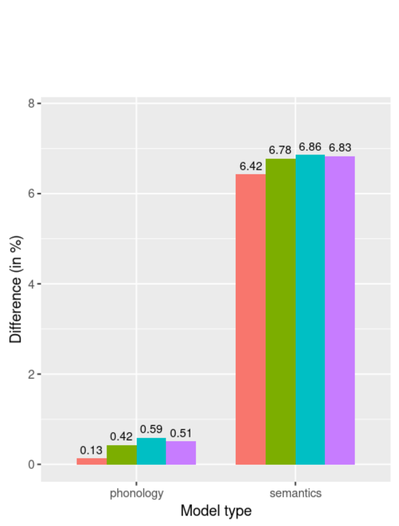
Hypotheses

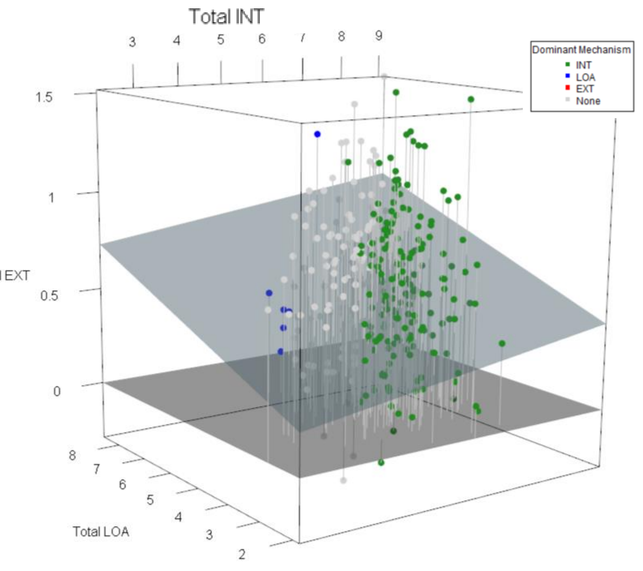
- INT, EXT and LoA influence the learning of new words
- Semantic and phonological similarity leverage word learning
- Concurrent semantic and phonological similarity hinders word learning

III. Results and discussion

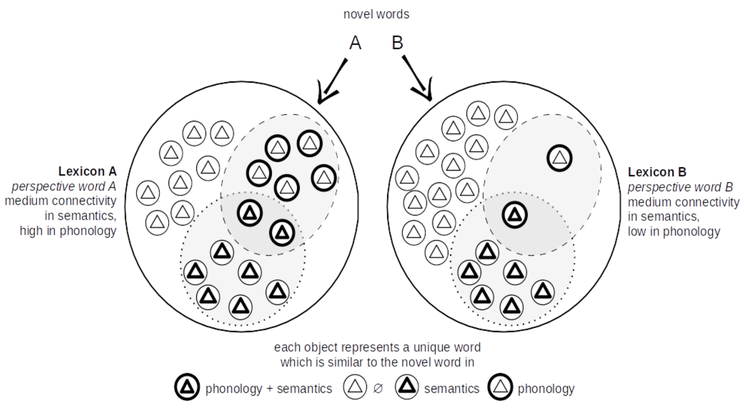
All three growth mechanisms influence word learning:

- INT has the strongest influence, followed by LoA and, with a larger distance, EXT.
- Semantic similarity has a stronger influence than phonological similarity
- Semantic similarity is consistently helpful for learning, while phonological similarity to words in the lexicon is hindering, but words that are phonologically similar to many words in the lexicon attract new similar words.
- Words are learned earlier when they are similar to many other words in meaning only compared to being similar in both meaning and form.
- Children show different characteristics in the way they use INT, EXT and LoA.





- Phon. and sem. similarity impact word learning
- The lexicon grows largely in a rich-get-richer manner
- Learning words that are phonologically and semantically similar to many other words, but not necessarily to the same word, make word learning more complex: A new word needs to be distinguished in form and meaning instead of just on one level
  → increased cognitive load



IV. Consequences and follow-up questions

- Do early words that share meaning overlap also share form overlap? How does form-meaning systematicity influence the acquisition of new words?
- Are early lexicons largely arbitrary (1:0 form-meaning mismatch) or largely systematic?

References: [1] Hockett, C. F., & Hockett, C. D. (1960). The origin of speech. *Scientific American*, *203*(3), 88-97. [2] Monaghan, P., Shillcock, R. C., Christiansen, M. H., & Kirby, S. (2014). How arbitrary is language?. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *369*(1651), 20130299. [3] Dautriche, I., Mahowald, K., Gibson, E., & Piantadosi, S. T. (2017). Wordform similarity increases with semantic similarity: An analysis of 100 languages. *Cognitive science*, *41*(8), 2149-2169. [4] Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. Journal of child language, 44 (3),677–694.