

Prosody outweighs statistics: evidence from German

Mireia Marimon, Barbara Höhle
Department of Linguistics, Universität Potsdam¹



Introduction

- Infants are able to segment fluent speech into words from about 7-8 months of age (Gout, 2001; Höhle & Weissenborn, 2003; Jusczyk & Aslin, 1995) and that this ability is closely related to later language development (Tsao, Liu & Kuhl, 2000; Höhle et al., 2014).
- At least two mechanisms: prosodic cues, especially the word stress pattern (Jusczyk, Houston & Newsome, 1999; Höhle et al., 2009), and statistical learning, i.e. transitional probabilities (Aslin, Saffran & Newport, 1998).
- Most German words have trochaic pattern (the stress is on the first syllable) and 6-month-old German infants already show a preference for the trochaic stress pattern (Höhle et al. 2009).
- However, the weight of these two mechanisms differs, and this also varies with age (Thiessen & Saffran, 2003).

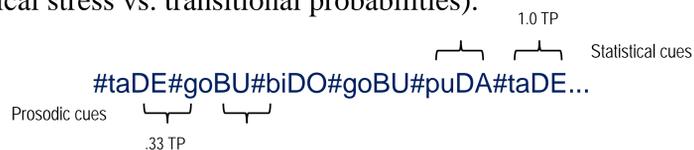
Main goal and hypothesis

- The purpose of the study is to figure out the use of these mechanisms in German, in infancy as well as in adulthood.
- A further goal is to explore whether this ability is related to later language development.
- We expect adults to segment according to prosodic cues. We expected 7-month-olds to rely more on statistical cues.

Methods and procedure

Participants: German monolingual adults (n=38), and a group of 7-month-olds (n=24).

Stimuli: 2-min artificial iambic language string from naturally recorded syllables where the prosodic and the statistical cues conflict (lexical stress vs. transitional probabilities).

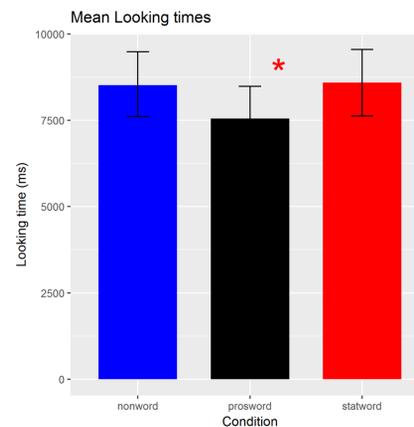


Test phase: prosodic words, statistical words, non-words.

Methods: adults were tested in a forced-choice task (yes/no). Infants were tested in the Head-Turn-Preference procedure (familiarized to the same string).

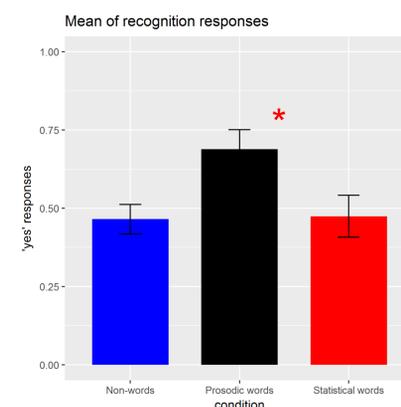
Later language tests at 12 mo (ELFRA-1, n = 20) and at 18 mo (FRAKIS, n = 16).

Results



At 7 months of age:

- No difference between statistical words and non-words ($p = .81$)
- Longer looking times for:
 - Statistical words over prosodic words ($p = .01$)
 - Non-words over prosodic words ($p = .02$)

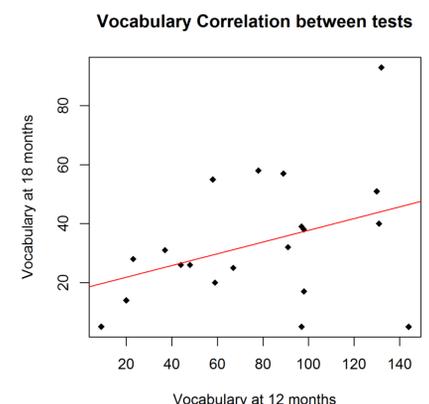


Adults:

- Above chance recognition performance only in prosodic condition ($p = .02$)
- Difference between:
 - Prosodic words and statistical words ($p = .02$)
 - Prosodic words and non-words ($p = .05$)

Later language at 12 and 18 months of age:

- No correlations between performance and language scores
- Positive correlation between the two tests ($r = .51, p = .03$)



Conclusion

- Results show that German monolingual **adults** rely more on the **prosodic cues** to segment words from the string.
- At **7 months of age**, infants look longer to the statistical words and to the non-words. These results can be interpreted as a **novelty effect** and a **preferential use of prosodic cues** for segmentation.
- However, their performance in the HPP task is not correlated to later language development.

References: Gout (2001). Etapes Précoces de l'acquisition du Lexique. Unpublished dissertation. Ecole des Hautes Etudes en Sciences Sociales, Paris, France. • Hirsh-Pasek, Nelson, Jusczyk, Cassidy, Druss, & Kennedy (1987). Clauses are perceptual units for young infants. *Cognition*, 26(3), 269-286. • Höhle, Bijeljic-Babic, Herold, Weissenborn & Nazzi (2009). Language specific prosodic preferences during the first half year of life: Evidence from German and French infants. *Infant Behavior and Development*, 32(3), 262-274. • Höhle & Weissenborn (2003). German-learning infants' ability to detect unstressed closed-class elements in continuous speech. *Developmental Science*, 6, 122-127. • Jusczyk & Aslin (1995). Infants' detection of the sound patterns of words in fluent speech. *Cognitive Psychology*, 28. • Jusczyk, Houston & Newsome (1999). The beginnings of word segmentation in English-learning infants. *Cognitive Psychology*, 39, 159-207. • Aslin, Saffran & Newport (1998). Computation of Conditional Probability Statistics by 8-Month-Old Infants. *Psychological Science*, 9, 321-324. • Thiessen & Saffran (2003). When cues collide: Use of stress and statistical cues to word boundaries by 7- to 9-month-old infants. *Developmental Psychology*, 4, 706-716. • Tsao, Liu & Kuhl (2004). Speech perception in infancy predicts language development in the second year of life: a longitudinal study. *Child Development*, 75(4), 1067-1084. • Höhle, Pauen, Hesse & Weissenborn (2014). Discrimination of Rhythmic Pattern at 4 Months and Language Performance at 5 Years: A Longitudinal Analysis of Data From German-Learning Children. *Language Learning*, 64, 141-164.

CONTACT

marimon@uni-potsdam.de
¹ Faculty of Human Sciences
Karl-Liebknecht-Str, 24-25
14476 Potsdam, Germany