Stress clash avoidance by 6- to 7-month-olds

Barbara Höhle, Natalie Boll-Avetisyan and Jürgen Weissenborn

1Universität Potsdam, 2Humboldt Universität zu Berlin

Contact: hoehle@uni-potsdam.de

From 6 months onwards infants become sensitive to the prosodic properties of their native language (e.g., Höhle et al. 2009) and start using prosodic cues for segmenting speech into words (e.g., Jusczyk, Houston, and Newsome 1999) and syntactic phrases (e.g., Hirsh-Pasek et al. 1987). Proponents of the prosodic bootstrapping hypothesis argue, therefore, that prosody is crucial for bootstrapping into syntax and the lexicon (Gleitman and Wanner 1982).

The goal of the current study is two-fold. First, we investigate whether infants’ speech segmentation is influenced by prosodic knowledge of stress clash avoidance. Cross-linguistically, speakers avoid producing co-occurrences of two neighboring stressed syllables (Liberman and Prince 1977). If infants have internalized this stress clash avoidance, they should perceptually separate co-occurring syllables if they are both stressed. Second, we put the prosodic bootstrapping hypothesis under test by linking speech segmentation performance in infancy to later language abilities and assess its potential role as a predictor for specific language impairment (SLI), a language development disorder that mainly affects the acquisition of grammar.

For this purpose, we tested a large sample of 119 German-learning 6-7 month old infants. A subset of 33 infants came from families with members who were affected by SLI (parents or siblings), which constitutes an enhanced risk of being affected as well (e.g., Choudhury and Benasich 2003). Using the head-turn preference paradigm, infants were familiarized for one minute with two trisyllables (BATEko and PEGAdi). Both were stressed on the first two syllables and unstressed on the last (strong-strong-weak, henceforth SSw). In a consecutive test phase, the same trisyllables were presented, but now there was a pause of 250 ms after one of the syllables. They either heard S#Sw items (BA_TEko or PE_GAdi) with a pause between the two strong syllables or SS#w items (BATE_ko or PEGA_di) with a pause before the weak syllable.

An ANOVA revealed a preference for SS#w (5737 ms) over S#Sw items (5174 ms, p < .01). A family risk for SLI had no effect (see Figure). These results suggest that infants use stress clash avoidance as a speech segmentation cue. It seems that infants segmented the SSw trisyllables into S#Sw during familiarization, and at test, the occurrence of SS#w—a pattern that is avoided across languages—caused a novelty preference. We did not find evidence that infants with a family risk for SLI show weaker responses to this cue than infants without risk. This is surprising given previous findings that early prosodic processing and segmentation abilities predict later language performance (Newman et al. 2006; Junge et al. 2012; Höhle et al. 2014). However, we note that these prior studies investigated knowledge that must be acquired from the input. Stress clash avoidance, however, might not need to be acquired but originate from a perceptual bias. This could explain why infants with a family risk for SLI have no difficulty using this cue. An ongoing analysis of data from later language measures obtained for the same children investigates the potential relation of stress clash avoidance and later lexical and syntactic development.

References


Höhle, Barbara, Pauen, Sabine, Hesse, Volker, & Weissenborn, Jürgen. 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.


Figure: Mean looking times for S#Sw (stress clash avoiding) and SS#w (stress clashing) items, separated for infants with and without a family risk for specific language impairment (SLI)