Are all low-pitched syllables perceived equally? Evidence from German nine-month-olds

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Background

- **Metrical segmentation strategy:** Infants exposed to stress-timed languages take stressed syllables as word onsets (Bartels et al. 2008, Jusczyk et al. 1996, Kulberg et al. 1988).
- **Stressed syllables** are longer, louder, have more peripheral vowel quality, and are produced with greater vocal effort (Jessen et al. 1995; Schneider & Möbius 2007; Dogil 1995; Delattre 1969; Mooshammer 2010).
- **Interplay between metrical stress and intonation:** Pitch accents serve pragmatic functions (e.g., Kohler 1991, Baumann & Grice 2006, Braun 2006, Truckenbrodt 2007).
  - Position of the pitch peak does not unambiguously signal the position of the stressed syllable.

Intonational realizations

1) **Medial-peak:** L+H*
   - New information (Kohler 1991)
2) **Early-peak:** H+L*
   - Accessible information (Baumann & Grice 2006)
3) **Late-peak:** L*+H / L* H-%
   - Sentence topics, question endings (Braun 2006, Truckenbrodt 2007)

Frequency in infant-directed speech

- **Corpus study** (cf. Zahner et al. 2015)
  - data available from CHILDES (MacWhinney 2010)
  - 8 mothers interacting with children younger than one year (n = 1016 pitch accents)

Research questions:

- Does the position of the pitch peak affect German infants’ segmentation behavior of embedded trochees?
- Does the input frequency of accentual patterns have an influence?

Results

- Head Turn Preference Procedure (Fernald 1985, Jusczyk 1999)

  ![Image]

  **Methods**

  **Participants:** 54 full-term infants from monolingual German families (25 female; Ö: 0.9.1, range: 0.8.19 - 0.9.16)
  - Randomly assigned to the 3 intonation conditions (18 per condition)

  **Procedure:**

  1) **Familiarization phase:** Infants hear 2 (out of 4) passages, each containing 6 sentences with a certain target word (trisyllabic, WSW-pattern, low-frequency)

  2) **Test phase:** Lists with 15 different tokens of SW part words of WSW carrier words (ISI = 800ms), matched for pitch range and total duration

  - WSW carrier words, recorded in 3 intonation conditions, matched for pitch range, total duration, and vowel quality across conditions
    - **Lagune** [ləˈɡʊːnə] ‘lagoon’
    - **Kanone** [kəˈnəʊnə] ‘cannon’
    - **Kasino** [kəˈsɪnoʊ] ‘casino’
    - **Tirade** [tɪˈrɑːdə] ‘tirade’

  - e.g., [ˈɡʊːnə] or [ˈɑːdə] (taken from Lagune or Tirade)

Interpretation

- **High pitch** is a necessary ingredient in the perception of stress by German nine-month-olds (in line with Wellmann et al. 2012).
  - Association between pitch peak and metrical stress is more important than input frequency.
  - Only high-pitched stressed syllables are good word onsets for German nine-month-olds.

- **Question:** Is high pitch also a sufficient ingredient for German infants’ stress perception (leading to a metrical reinterpretation)?

**Future work:**

- Immediate prosodic environment affects infants’ perception of metrical prominence (see Schettino & Wagner 2015 on German adults) and is thus more important than input frequency.

Control experiment in order to exclude alternative explanation of pattern matching in medial-peak condition.

- **Replication**
  - Same result: sign. novelty effect (p = 0.01)

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References


