A case study of childhood L2 learning of phonological contrasts
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**Background**

Children acquiring L1 may go through a period of 'covert contrast' (Scalise et al. 2000).
- Acoustic differences are not perceived by adults.

Adults acquiring difficult L2 contrasts may never get past this stage (Page, Mowse & Sabin, 1992).
- Word final voicing in English for Spanish and Arabic L1 learners.

Child L2 learners may successfully acquire new contrasts after only a few months (Page, 1998).
- Word final voicing in Arabic L1 children.

**Central questions**

Do child L2 learners also go through a period of covert contrast?
Are all contrasts the same?

German L1 English L2
- word final voicing
- front mid-low vowels
- Both contrasts missing in German

**Methods**

**Participants:**
- Two native German speaking children
- Entered the UK at ages 8:10 (child 1) and 6:6 (child 2).
- No prior English exposure.

**Production task:**
- repeat 48 sentences "the next word is ___ now".
- 18 words contained target word-final consonants (/p,b,t,d,k,g/) and vowels (/æ, e/)
- Followed for 15 months after arrival.
- Acoustic analysis of productions and adult native listener judgments.

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**Production Experiment**

"The next word is ___ now"

**Vowels**

native-like from earliest test date

**Stops**

acoustically neutralized at first test date gradually become more distinct with exposure

**Perception Experiment**

12 Native Adult Listeners
4 word forced choice task

Further Questions:
- Why is child 1 perceived more consistently despite less consistent productions?
- Why is the final voicing contrast more difficult to master?
- How is the speech of monolinguals perceived at this age, for this contrast?

**Consonants and vowels follow different trajectories of learning.**

- **Vowels:** native-like formant frequencies from as early as three months of exposure.
- **Perceptual tests confirmed that listeners made few errors of vowel quality.**
- **Voiced and voiceless final consonants:** acoustically very similar after 3 months exposure.
- Gradually became more distinct (time*voicing interaction).
- **Perceptual tests confirmed that listeners often confused voiced stops for voiceless ones for utterances produced within seven months of exposure to English.**
- **Voiced and voiceless final consonants:** even when the children were making acoustic distinctions between voiced and voiceless stops.

- **After 9 months of exposure**, both children produced stops that were identified correctly (>90%).
- **Both children went through a stage of covert contrast of stop voicing** in line with the literature on first language acquisition.

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References: