**INFANTS’ PERCEPTION OF NATIVE AND NON-NATIVE PITCH CONTRASTS**

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**BACKGROUND & GOALS**

- Infants’ ability to distinguish between forms of phonetic variation in speech that are relevant to meaning is essential for their language development.
- Learning a language >> a stronger commitment to the native language as development proceeds, modulated by perceptual assimilation and phonetic salience (e.g., Kuhl 2004, Safran et al. 2006, Best & Roberts 2003, Narayan et al. 2010).

<table>
<thead>
<tr>
<th>Lexical</th>
<th>Limited variation</th>
<th>Segmental variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>✓</td>
<td>only after 6 mos &amp; native (e.g., Skoruppa et al. 2013)</td>
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<tr>
<td>Pitch accent</td>
<td>✓ as early as 4 mos, but only tone learners &gt; 6 mos, unless very salient (Mattuck &amp; Burnham, 2006; Yeung et al., 2013; Liu &amp; Kager, 2014)</td>
<td></td>
</tr>
<tr>
<td>Tone</td>
<td>✓ only as early as 4 mos, but only tone learners &gt; 6 mos, unless very salient (Sato et al., 2009)</td>
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**EXPERIMENT 1**

Native pitch contrast: falling (statement) versus falling-rising (yes-no question) intonation (Frota et al. 2014)

- 5-6 month-olds, n=20:
  - Mean age: 5 mos 29 days; 8 girls
  - Range: 5 mos 3 days – 6 mos 23 days
- 8-9 month-olds, n=20:
  - Mean age: 8 mos 12 days; 10 girls
  - Range: 7 mos 11 days – 9 mos 29 days

**RESULTS**

Visual habitation procedure

- Different pseudo-words used for the habitation and test phase

**DISCUSSION**

Infants’ perception of a native (Experiment 1) and non-native (Experiment 2) pitch contrast, in the presence of segmental variability, was examined in the first year of life.

1. Infants successfully discriminated the native intonation contrast at 5-6 and 8-9 months. ✓
2. Infants failed to discriminate the non-native tone contrast at both ages. ✖

Results suggest that the similar contour shapes of lexical pitch (Braun & Johnson 2011) were not *similar* enough to intonation to be perceived as native.

Segmental content was controlled to be native-like (inventory), analogous in degree of segmental variability, and comparable in frequency of occurrence >> failure due to prosody.

No precocious discrimination abilities for pitch regardless of language experience.

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**EXPERIMENT 2**

Non-native contrast: lexical distinction between Tone 1+Tone 4 and Tone 1+Tone 2 in Mandarin Chinese (also a falling versus falling-rising pitch contrast)

- 5-6 month-olds, n=20:
  - Mean age: 5 mos 25 days; 8 girls
  - Range: 5 mos 2 days – 6 mos 19 days
- 8-9 month-olds, n=20:
  - Mean age: 8 mos 21 days; 10 girls
  - Range: 7 mos 13 days – 10 mos 8 days

**RESULTS**

- Little is known about the developmental course of infants’ perception of pitch contrasts, in the presence of segmental variability.
- Portuguese-learning infants demonstrated discrimination of the statement (falling) vs no question (falling-rising) native intonation contrast as early as 5 months (Frota et al. 2014).
- Non-native discrimination of the Portuguese contrast has different outcomes in English-learning and Basque-learning infants (See Poster Session 10, POSTER 23).

My language!

Language-specific perception for pitch, and for the tone/intonation distinction, emerges as early as 5 months of age (earlier than for vowels, consonants or stress).

Further research into the language-specific aspects behind infants’ precocious sensitivity to pitch differences across languages is needed (ongoing work).

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**VISUAL HABITUATION PROCEDURE**

Different pseudo-words used for the habituation and test phase

- Falling: Tone1+Tone4
- Declarative intonation
- Fall-Rise: Tone1+Tone4

Listening time (s)

**SAME PROCEDURE**

- Tun vs. Tone:  
  - The intonation and lexical pitch distinctions show different distributions of the falling and rising pitch across the bisyllabic utterances >> nature of tone (utterance domain) vs. nature of tone (syllable domain).
  - Pitch range differences:
    - Falling wider in Mandarin; Rising wider in Portuguese.

Effects of language experience predict NO discrimination

Similar overall contour shapes predict early discrimination

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