Perceptual reorganization of lexical tones in German-learning infants and toddlers

Antonia Götz, Barbara Höhle
University of Potsdam

Introduction:

Perceptual Reorganization of lexical tones:

- Previous studies show inhomogeneous picture.
  a) Perceptual Narrowing (Mattock & Burnham 2006; Mattock et al. 2018; Yeung et al. 2013, no toddlers tested)
  b) Perceptual enhancement (Chen & Kager 2015, 2017; Hay et al. 2015 no infants tested; Ranschburg et al., 2017)
  c) No difference across age groups (Cabrera et al. 2015, Liu & Kager 2014, 2016)
  d) U-shaped effect (Liu & Kager 2016)

Research Questions:

As previous studies used a wide range of methods (CHT Procedure, Habituation, Stimulus Alternating – Nonalternating Paradigm):

1. Does the method play a crucial role for discriminating lexical tones across several age groups?
   As there is evidence for both perceptual reorganization and perceptual enhancement, as well as a U-shaped effect for a less salient tone contrast:

2. Do we find a U-shaped effect for discriminating a natural Cantonese tone contrast?

Method:

Familiarization

<table>
<thead>
<tr>
<th>Stimuli:</th>
<th>Cantonese high-rising (tone25) vs. mid-level (tone33)</th>
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</thead>
</table>
| Participants: | • 30 6-months-olds (M=176d)
  • 30 9-months-olds (M=273d)
  • 28 18-months-olds (M=540d) |
| Procedure: 1. Phase | Tone25 or Tone33 |
| Criterion | Accumulation of 30s LT LT < 50% |
| Procedure: 2. Phase | 8 trials: |
| | • 4 Alternating (tone25 and tone33) |
| | • 2 Non-Alternating tone25 |
| | • 2 Non-Alternating tone33 |

Habitation

<table>
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<th>Stimuli:</th>
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</thead>
</table>
| Participants: | • 15 6-months-olds (M=182d)
  • 15 9-months-olds (M=270d) |
| Procedure: 1. Phase | Tone25 |
| Criterion | LT < 50% |
| Procedure: 2. Phase | 4 trials: |
| | • 2 Habilitated (tone25) |
| | • 2 Novel (tone33) |

References:


Perceptual Reorganization of lexical tones:

1. Does the method play a crucial role for discriminating lexical tones across several age groups?

2. Do we find a U-shaped effect for discriminating a natural Cantonese tone contrast?

Results: Familiarization:

- Perception of Cantonese lexical tones by 6- and 9-months-olds
- Alternating = high rising and mid level tones
- NonAlternating25 = only high rising tones
- NonAlternating33 = only mid level tones

Results: Habitation:

- Perception of Cantonese lexical tones by 6- and 9-months-old infants
- Habilitated = tone 25
- Novel = tone 33

Results:

- 6-months-olds show week week discrimination between Alternating and NonAlternating25 t=1.677, p = 0.09; 18-months-olds discriminate between Alternating and NonAlternating33 t=2.077,p=0.03; 9-months-olds show no effect for discrimination

Conclusion:

6-months-olds German-learning infants show stronger discrimination effect for the habituation in comparison to the familiarization paradigm

- Previous meta-analysis (Cristia et al., 2016) revealed in general higher effect sizes for habituation than for familiarization paradigms
- Habituation task is more infant controlled than familiarization tasks; eventually more appropriate to test discrimination especially for younger age groups
- In a familiarization paradigm only 18-months-olds show discrimination abilities for the lexical tone contrast