

Asymmetrical vowel discrimination is affected by native language experience: Crossing language boundaries in vowel perception

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Introduction:

Perceptual Reorganization:

Fast attunement of discriminatory abilities to specific sensory input. This process corresponds to declining discrimination for stimuli not present or relevant in the environment of the infant

Natural Referent Vowel framework (NRV):

Better perception from a less focal to a more focal vowel than vice versa. The framework predicts a universal, language-independent vowel asymmetry (Polka & Bohn 2011).

Native Language Magnet model (NLM):

The discrimination from a non-prototypical to a prototypical native exemplar is better than reverse. The model predicts a language-dependent asymmetry (Kuhl & Iverson 1995, Kuhl et al. 2008).

Research Question:

1. When and how does language experience affect asymmetries in vowel perception?

- a. **NRV framework:** asymmetry from /i/ → /ɪ/ across all age groups because /ɪ/ as the more peripheral/ focal vowel
- b. **NLM model:** an asymmetry from /i/ → /ɪ/, only when infants attune to the native language, since /i/ is less prototypical than /ɪ/

Method:

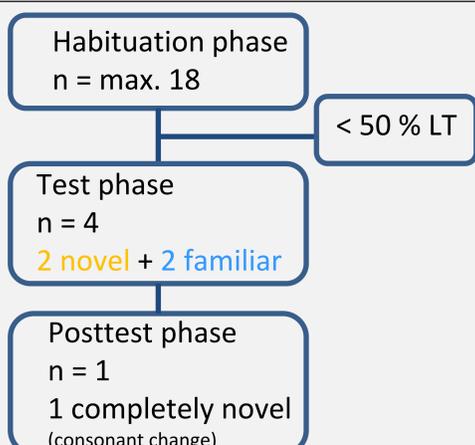
Stimuli:

Language	German (native) /ɪk/	Polish (nonnative) /tik/	
NLM	Prototypical for German listeners	Non-prototypical for German listeners	
NRV	More focal	Less focal	

Participants:

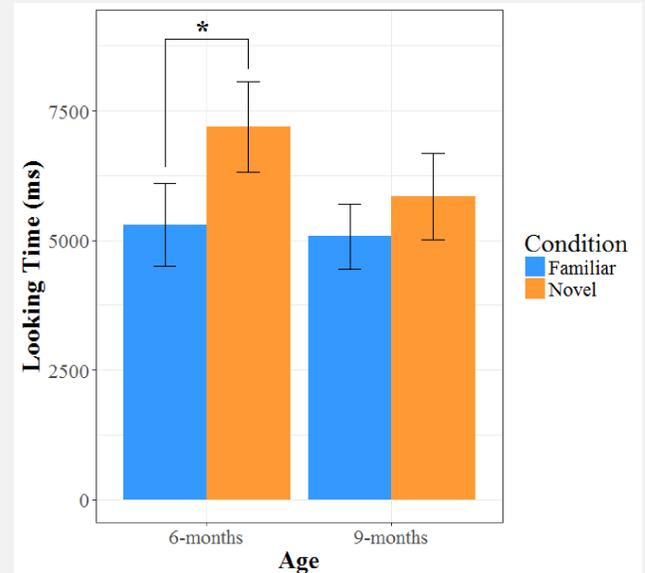
- 15 German monolingual 6-month-olds (M=182d)
- 40 German monolingual 9-month-olds (M=270d)

Procedure:

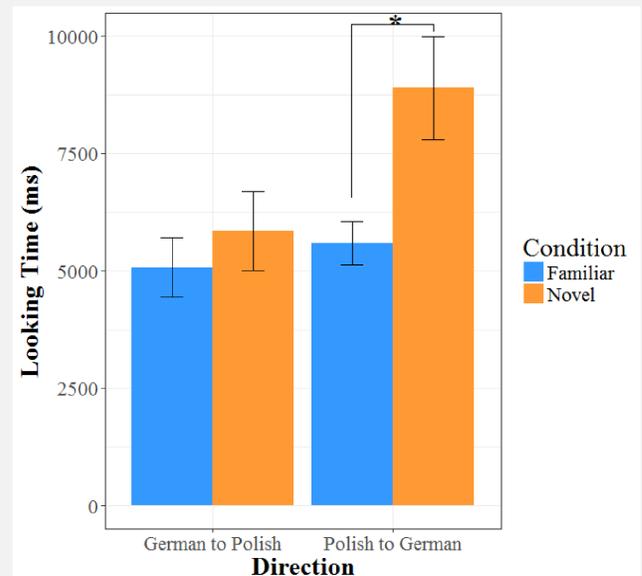


Results: Infants

➤ Perception of Polish and German vowel by 6- and 9-month-olds



➤ Asymmetrical perception at 9-months



Summary:

Age	Discrimination?	Asymmetry?
6-months	✓	?
9-months	✗	Yes*

* Better perception from Polish /i/ to German /ɪ/ vowel

Conclusion:

➤ Infants perceive vowels asymmetrically as soon as the perceptual reorganization sets in

→ Our results favor the NLM rather than NRV

References:

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- Kuhl, P. K., Conboy, B. T., Coffey-Corina, S., Padden, D., Rivera-Gaxiola, M., & Nelson, T. (2008). Phonetic learning as a pathway to language: new data and native language magnet theory expanded (NLM-e). *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 363(1493), 979–1000. <https://doi.org/10.1098/rstb.2007.2154>
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