The acquisition, contact, and transmission of phonological variation

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Overview

- The effect of ***naturalness bias*** in phonological learning is ***uncertain***
- Specifically, ***in what contexts*** does naturalness bias affect the learning of ***phonological variation***?
- We found that phonological variation is shaped towards the phonetically natural variant in ***language acquisition and language contact***, but ***not in diachronic language change***

Background

Where does language variation emerge?

- ***Language acquisition***: Neogrammarians' tree model (Schleicher, 1853)
- ***Language contact and formation***: wave model (Schmidt, 1872)
- ***Diachronic language change (transmission)***: impureness and unsystematicity (Schuchardt, 1885)

Naturalness bias shaping phonological variation

- Naturalness bias, ***unique to phonological learning***, favors ***phonetically natural patterns*** (Wilson, 2006)
- Which phonological patterns are phonetically natural? e.g., patterns that involve ***articulatory ease*** or facilitate ***perceptual salience***
- Natural vs. unnatural patterns: ***vowel harmony vs. vowel disharmony*** (test case of the current study; equal in complexity)

Current study

- Does ***naturalness bias*** affect phonological variation learning?
  - i.e., by shaping the variation towards the phonetically natural variant
- If so, in ***what contexts*** does naturalness bias shape phonological variation?
- Artificial language learning experiments simulating three contexts
- Predictions:
  - Language acquisition (Exp1): better acquisition of the vowel harmony-dominant language
  - Language contact (Exp2): easier adoption of vowel harmony pattern in contact
  - Language transmission (Exp3): increase or preservation of dominance in vowel harmony

Experiment 1: Language Acquisition

Participants & Stimuli

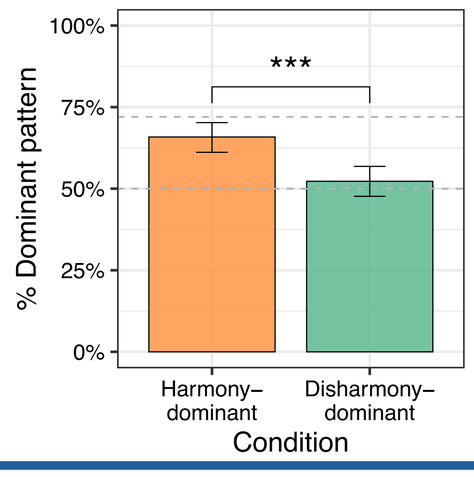
- 56 HK Cantonese speakers
- Vowel rounding harmony [sɔkʰ**u**-mɔ] vs. disharmony [sɔkʰ**u**-mi]
- Two conditions:
  - Harmony-dominant (72% harmony; 26 participants)
  - Disharmony-dominant (72% disharmony; 30 participants)
- Items: 32 training + 42 testing
- Similar stimuli in Exp2 and Exp3

Procedure

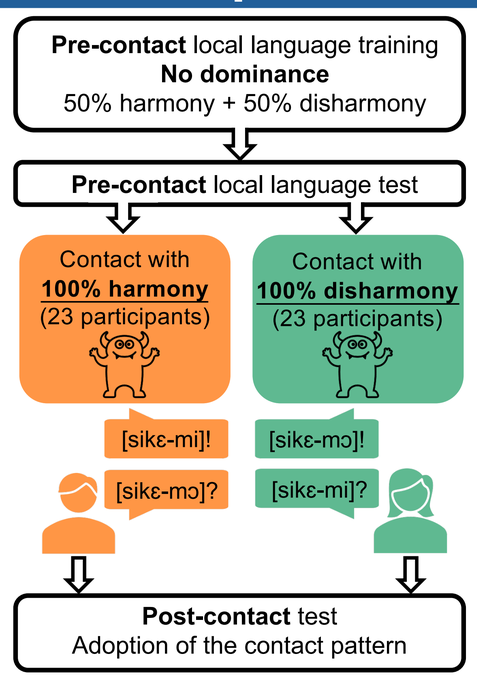
- Training: 3 rounds (96 trials)
- Testing: choice of harmonic, disharmonic, or unseen suffix

Results

- Harmony-dominant: still dominant in harmony (65.85% ***)
- Disharmony-dominant: no dominance (52.27% *N.S.*)
- Dominant pattern rate less than input (72%) in both conditions

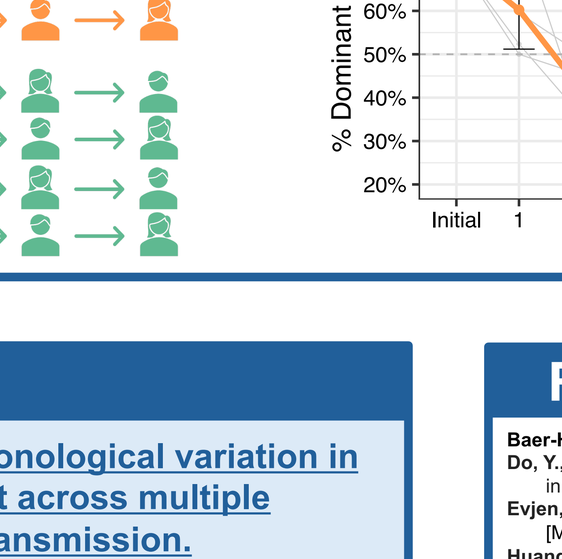


Experiment 2: Language Contact and Formation



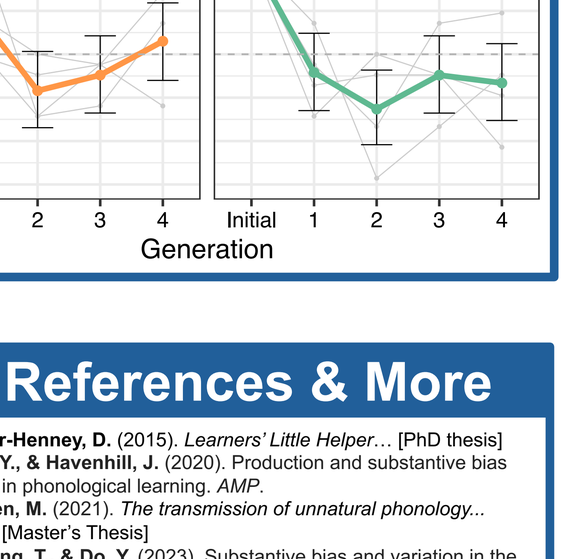
Contact Phase

- Choice of harmony/disharmony with feedback from "aliens"
- Overall increase in accepting the contact pattern (β = 0.015 ***)
- No difference in increase rates between two conditions (p = 0.114)



Testing Phases

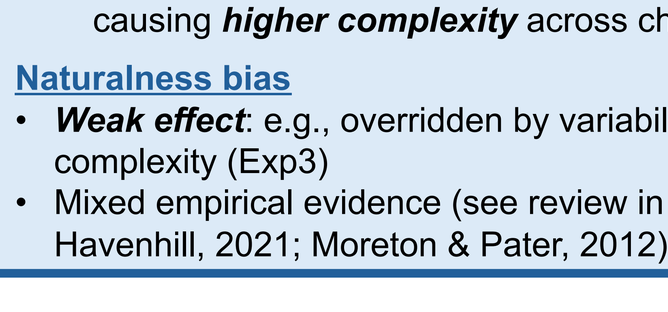
- **Pre-contact**: no dominant pattern in both conditions
- **Post-contact**: Adoption of the harmony pattern (60.06% ***), but not the disharmony pattern (52.68% *N.S.*)



Experiment 3: Diachronic Language Change (Transmission)

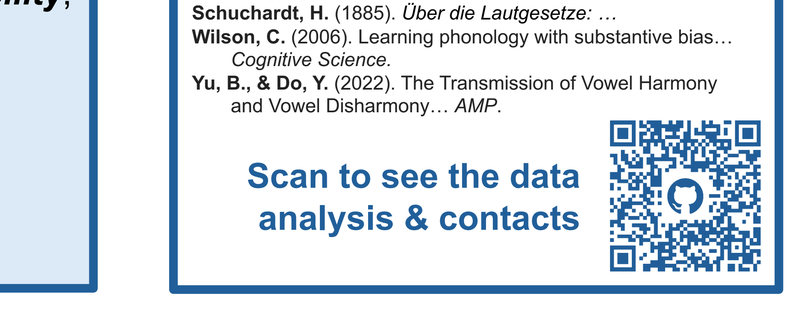
Procedure

- 2 conditions * 4 individual chains * 4 generations = 32 participants
- Iterated learning: current generation's rate of producing the dominant pattern → next generation's input dominance rate



Results

- Harmony-dominant: higher dominance rate (β = 0.288 *) and slower decrease
- Overall convergence towards no dominance
- No general preference for either variant



Discussion & Conclusion

Exp1: Better acquisition of the natural harmony-dominant language

- Preference for phonetic naturalness when the input pattern is ***variable*** (e.g., Baer-Henney, 2015; Huang & Do, 2023), ***not categorical***

Exp2: Easier adoption of a foreign language with a natural vowel harmony pattern

- ***Experimental evidence*** for naturalness bias in a ***language contact*** situation

Exp3: No evidence of a preference for phonetic naturalness in transmission

- Similar findings: categorical input in iterated learning (e.g., Evjen, 2021; Yu & Do, 2022)

Naturalness bias shapes phonological variation in synchronic contexts, but not across multiple generations of diachronic transmission.

- Why *NOT* in Exp3?
  - Synchronic contexts:
    - Exp1: systematic dominance as input
    - Exp2: categorical contact patterns
  - Diachronic contexts (Exp3): ***individual variability***, causing ***higher complexity*** across chains

Naturalness bias

- ***Weak effect***: e.g., overridden by variability and complexity (Exp3)
- Mixed empirical evidence (see review in Do & Havenhill, 2021; Moreton & Pater, 2012)

References & More

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Scan to see the data analysis & contacts