Does Gender Perception Affect Novel Language Learning?

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INTRODUCTION

- A large part of individuals' knowledge about language is unconscious. For example, English plural nouns have an -s on the end when written, but this 's' can be pronounced differently depending on the word. To talk about more than one dog or more than one cat, a speaker doesn't have to think about the fact that "dogs" is pronounced with a 'z' on the end and 'cats' is pronounced with an 's'.
- Listeners unconsciously notice patterns like this in speech sounds. Some patterns sound natural to listeners, and some sound strange. This is because these patterns differ between languages.
- Previous research (Dell et al. (2000), Onishi et al. (2002), Norris et al. (2003)) showed that people's knowledge of what is 'good' and 'bad' can change relatively rapidly after exposure to an artificial language. The more a person hears a certain sound combination, the more used to it they become and the more acceptable it sounds to them.
- Simply put, our knowledge of language is flexible. We are willing to adapt our language patterns to conform to models from new input. We wanted to look at whether people can implicitly learn sex-stratified patterns of pronunciation in a novel language.
- This research transcends traditional disciplinary boundaries, and is built on insights from speech-language-hearing sciences (the adviser's field), linguistics (the students' field), and cognitive psychology.

RESEARCH QUESTION

Are listeners' generalizations about the sound structure of a novel language sensitive to differences in men's and women's production of this language?

That is, if men and women produce a novel language slightly differently, will learners of this language pick up on these differences?

EXPERIMENT

PURPOSE

•To investigate whether listeners can learn associations between gender and speech-sound patterns in a novel language

PARTICIPANTS

•24 English-speaking adult listeners

STIMULI

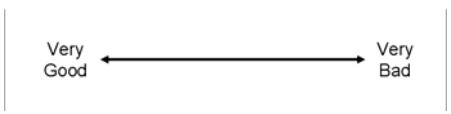
- CVCCVC words (C = consonant and V = vowel)
  - Ex. /lɪfpəm/ (*'leefpum'*) /vɪʃməm/ (*'vishmum'*)
  - #CV, VC, CV, and VC# sequences were all possible English sound sequences (# = start or end of word)
- CC sequences were low- or zero-frequency in English, meaning that they sound fairly unnatural to a native English speaker
- CC sequences = /fk/, /fm/, /fp/, /ʃp/, /ʃk/, /ʃm/, /vb/, /vd/, /vg/. (/ʃ/ is the "sh" sound)
- Stimuli were produced by 5 English-speaking men and 5 women.

PROCEDURE

- Subjects went through a training session, a distracter task, and a test session.
- During the training session, two CC sequences were trained with both men and women's voices, paired respectively with men and women's faces. Four CC sequences were trained with either men or women's voices, paired with men and women's faces. Three each of men's and women's voices were used. Subjects were asked to rate how clearly they thought the speakers produced the words, to keep them focused on the task.

Images courtesy of Michael J. Tarr, Brown University, http://www.tarrlab.org/

- After the distracter task (simple math problems), participants listened to a new set of words, spoken by four new talkers (two men and two women). They were asked to rate how good these words would be as additions to the language.
- Ratings were elicited with a visual analog scale; listeners clicked on a line that went from "Very Good" to "Very Bad" to indicate their judgments.

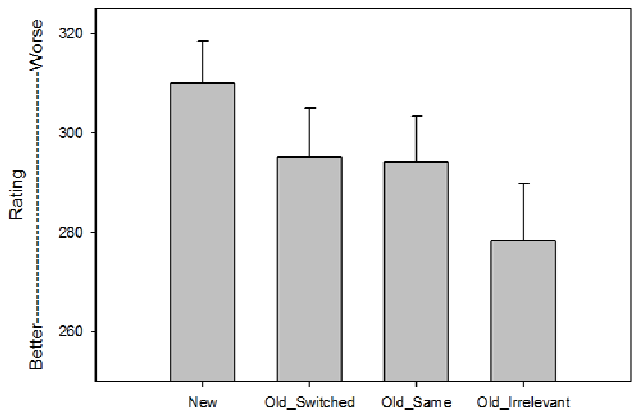


Words with the following types of CC sequences were tested	For Example
1. Sequences that had been trained with both men and women (*old_irrelevant*)	Hear men and women say /vb/ in the training, hear men and women say /vb/ in the test
2. Sequences that were trained with only one sex, and were tested with the same sex with which they were trained (*old_same*)	Hear men say /fk/ in both the training and test sessions and women say /fm/ in both sessions
3. Sequences that were trained with only one sex, and were tested with the other sex (*old_switched*)	Hear men say /fk/ and women say /fm/ in the training; hear men say /fm/ and women say /fk/ in the test
4. Completely untrained sequences (*new*)	Never hear /ʃm/ in the training, hear men and women say /ʃm/ in the test

RESULTS

- A within-subjects ANOVA showed that words with *new* CC sequences were rated poorer than words with *old_irrelevant* CC sequences (i.e., those that the listener heard from both men and women during the training session)
- Old CC sequences that had been trained with only one sex were rated equally well regardless of the sex of the talker who produced them in the test phase.
- The most reliable difference was between totally new sequences and all other sequences ($p<0.01$).
- CC sequences trained with only one sex were rated marginally worse than sequences trained with both sexes. This makes sense, because the listener heard the CC sequences trained with both sexes twice as often.

In the full ANOVA, $F[3,69] = 8.528$, $p = < 0.001$, $\eta^2_{partial} = 0.27$. Bonferroni-corrected post-hoc paired comparisons between new and all three other stimulus types were significant at the $\alpha < 0.01$ level, while those between the old_irrelevant and old_same and between the old_irrelevant and old_new were significant only at the $\alpha < 0.10$ level.



DISCUSSION

- From our data thus far, generalizations about the sound structure of a novel language appear **not** to be linked to the gender of the talker who produces them.
- Our findings do support the previous findings that listeners can make generalizations about novel languages' sound structure with a short period of exposure to the novel language
- However this could change with a longer exposure time, and Dr. Munson's lab is planning experiments to test this in the future. The Phonolab will also use the parts of this experiment (pictures, stimuli, rating scale, etc.) for future experiments in a similar vein.

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