Can musical aptitude and experience predict success in non-native tone word learning?

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Introduction

Previous research

- Musical experience found to provide a significant advantage for non-native lexical tone identification [1-4] and even tone word learning for native English speakers [5]. Furthermore, a pre-existing auditory aptitude developed by musical experience was a predictor of word learning success [5].
- However, it is not yet known to what extent musical experience and aptitude play for listeners with an existing tone language background in learning non-native tone words.

The current study

- Investigated the effects of musical aptitude and musical experience on Cantonese tone word learning and how these musical factors interact with linguistic experience by testing native Thai (with tone language background) and English (without tone language background) musicians and non-musicians.

Experiment Overview

Hypotheses

- 1) in line with [1-5], we hypothesized that English musicians would be more proficient at word learning than English non-musicians. By extension, we predicted that the Thai musicians would also outperform the Thai non-musicians.
- 2) We also hypothesized that higher musical aptitude scores would predict tone word learning success for both Thai and English musician and non-musician groups.

Methods

Participants

Group | Number (male, female) | Age (avg. years) | Mean years musical experience | Mean musical aptitude percentile ranking
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English non-musician (ENM) | 16 (6 M, 10 F) | 24 | 1.5 | 48.9
English musician (EM) | 18 (6 M, 12 F) | 23 | 16 | 77.2
Thai non-musician (TMN) | 18 (10 M, 8 F) | 22 | 0.4 | 43.6
Thai musician (TM) | 16 (5 M, 11 F) | 21 | 11 | 74.9

Stimuli

Musical aptitude stimuli

- 30 pairs of tonal melodies (Gordon, 1989), either same pairs or ones with a single tonal or rhythm difference
- melodies produced on the piano

Tone Word Training Stimuli

- produced by 4 native Cantonese speakers (2 males, 2 females)
- 3 quintuplets of Cantonese CV monosyllables (pseudowords) using 5 Cantonese tones
- each word assigned a meaning in the form of a picture
- contain no semantic content in Thai or English

Procedure

Tasks

- Musical aptitude task
  - Gordon's Advanced Measures of Audiation (1989)
  - Listened to melody pairs and indicated whether same or different
- if different, specified whether difference was rhythmic or tonal

Tone Word Training

- Each training session (see Session chart to the right)
- Training block 1 (see Trial and Block chart to the right)
  - 15 trials per block (5 trials x 3 blocks)
  - Each trial: heard a word and saw its meaning on the screen
- Training block 2 (see Trial and Block chart to the right)
  - 15 trials per block (5 trials x 3 blocks)
  - Each trial: heard a word and saw its meaning on the screen

Session test

- 60 randomized stimuli (15 words x 4 repetitions)
- 10 from 15 options; (5) 10d

Findings

Mean word identification accuracy for first and last training sessions

- 1A - English musician (EM) and non-musician (ENM) groups
- 1B - Thai musician (TM) and non-musician (TMN) groups

Results

- Session x Group: significant group differences were found on last session, although no difference on first session.
- EM had significantly higher word learning proficiency than ENM by the end of training.
- No significant difference between TM and TMN by the end of training.

Mean percent correct for Session 7 against musical aptitude rankings

- 2A - English groups
- 2B - Thai groups

Discussion

Hypothesis (1) partially confirmed; consistent with [5], musical experience aided English listeners in tone word learning. However, musicality was not advantageous for Thai listeners.
- Speaks to difference in relevance of musicality as a function of L1.
- Musicians may not enhance existing tone to word association mechanisms already developed in one’s L1. Thai musicians have experience using pitch locally in their L1, having developed such pitch-semantic mapping mechanisms during first language acquisition. Conceivable that musicianship would not further it.

Hypothesis (2) partially confirmed; musical aptitude scores predicted word learning success for the English but not the Thai group. Results for English group consistent with [5] who suggested that a pre-existing auditory aptitude can aid lexical learning. Thai results consistent with percent correct findings shown in figure 1B, where musical experience did not significantly improve tone word learning proficiency.
- Suggests that musical aptitude and experience enhances tone to word association mechanisms that have not been fully developed by tone language experience, such as for the English musicians.

Conclusions

In sum, results indicate that English musicians had significantly greater tone word learning proficiency than their non-musician counterparts; however, the Thai musicians did not differ significantly from the non-musicians. Regression analyses further support these results, as higher musical aptitude scores predicted word learning success for the English but not the Thai group. These findings suggest that the influence of musical experience in constructing novel lexical representations of tone words differs as a function of linguistic background. It appears that existing mechanisms for mapping tone to semantic information developed during L1 acquisition are not further enhanced by musical training. However, auditory aptitude in participants without a tone language background does seem to aid in the development of tone to word mapping abilities.

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References
