Effects of Singing on Melodic Interval Perception Training.

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Introduction

Goals
• The overall goal of this project is to see whether the differences between musicians and nonmusicians can be used to help people learn tone languages better.
• This poster reports on preliminary investigations for a new phase of this project: investigating the role of learning context on music perception.

Music & Language
• Becoming a musician has powerful effects on the perceptual system.1
• This results in better perception of pitch, and a better ability to learn lexical tone languages.2
• Tone languages, such as Mandarin, include words with rapidly changing pitches, making them difficult for English speakers to learn, but well-suited to musicians.3

Perception & Production
• Almost everyone perceives and produces speech, but an oddity of Western culture is that many people listen to music, but don’t make music themselves (this is not so in every culture).
• Those of us who aren’t musicians still understand how to listen to music using cultural music conventions.
• However, this does not seem to be sufficient to improve our perception of lexical tones.

Hypotheses
• Context, including attention, repetition, and emotion, enhances learning, and active musical participation changes the brain more than passive listening does.4
• So, we expect that activating both modes (listening and producing) of music should improve musical learning.
• This could possibly increase transfer to language as well (not tested here).

Method

Participants
• Eight (8) Brandywine students participated in the study.
• None spoke, or had ever studied, a tone language.
• Participants completed a Language and Music History questionnaire; in general, they had a low level of musical experience.

Materials
• We used a computer program for musical ear training (EarMaster) to train and assess participants’ musical listening skills (Figure 1).
• Participants completed approximately one hour of training to identify four melodic intervals, which are note pairs defined by the distance or ratio between the two notes (Figure 2).
• EarMaster presents musical stimuli to learners, assesses responses, gives feedback and tracks progress via the cloud.
• EarMaster can collect responses via keyboard, mouse, or microphone, which allows responses by clapping or singing.

Procedure
• Three EarMaster tasks were used in this experiment:
  1. Interval Comparison: Learners hear two intervals, and choose which is “larger” (i.e., has notes that are farther apart)
  2. Interval Singing: Learners hear a note, and hum or sing a note a specified interval (e.g., a fifth) above the given note
  3. Interval Identification: Learners hear one interval, and choose its name from a multiple choice list.
• Five participants took only Comparison & Identification.
• Three also took Singing at each level (same # of trials/level).
• Learners progressed through 4 levels based on interval similarity.
  1. M2 vs. 8ve
  2. P5 vs. 8ve
  3. M2 vs P4
  4. P4 vs. P5
• Learners repeated levels until scored 75% at Interval Identification.
• All learners took an Interval Identification quiz on all 4 types.

Findings

Training Progress
• Participants in the Perception-only condition reached similar levels of difficulty during training (Figure 3).
• Singing participants took more training tasks to reach these levels, but were doing 3 tasks/level, rather than 2.

Interval Identification
• Contrary to our hypothesis, perception-only participants outperformed those who received singing training in the 4-interval identification quiz (Figure 4). Some possibilities:
  a. Singing is more distracting than helpful for novices.
  b. Singers have more to learn, and progress more slowly.
  c. Singers heard fewer Identification trials during training.

Future Directions
• We plan to adjust Singing training by replacing (vs. supplementing) Comparison with Singing, to control trials.
• We plan to compare learning by tone language speakers.

References
2. Lee (2007). ICPhS.

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