Music Training Or Focused Music Listening For Cochlear Implant Recipients?

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Introduction

- CI recipients ↓ perceptual accuracy for music. Music less enjoyable post-CI than NH. Music perception and enjoyment can be improved through targeted training (Looi et al., 2012).

- Besides training, focused music listening (FML) also suggested to help, but yet to be a study comparing music training to FML. (Gfeller et al., 2002; Looi et al., 2012).

- Training program - more structure, feedback & guidance. FML - greater flexibility and personalisation.
This study

• **Aim:**
To compare the effectiveness of a computer-based music appreciation training program (MATP) to FML for improving music perception and enjoyment in postlingually deafened CI recipients.
Participants

- 10 CI recipients – postlingually deafened, at least 6mths CI use, fluent in English, Singaporean residents.

- Randomly allocated to either:
  Training (MATP) or Focused Music Listening (FML)

- 5 - MATP (age 13-31y; M = 26y)
  5 – FML (age 15-46; M= 24y).

- All devices (5 Cochlear, 3 MED-EL, 2 AB).
Training Program (MATP)

- Take-home, computer-based auditory training program developed by Looi, King, Kelly-Campbell, et al. (2012)
- 3 modules – Single Instruments, Ensembles, Music Styles.
- Program automatically datalog use and results.
# MATP Stimuli

<table>
<thead>
<tr>
<th>Module 1</th>
<th>Module 2</th>
<th>Module 3</th>
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<tbody>
<tr>
<td>Solo Inst</td>
<td>Ensembles</td>
<td>Musical Styles</td>
</tr>
<tr>
<td>Piano</td>
<td>Brass band</td>
<td>Classical – solo</td>
</tr>
<tr>
<td>Violin</td>
<td>Choir</td>
<td>Classical – small group</td>
</tr>
<tr>
<td>Cello</td>
<td>Duets – instrumental</td>
<td>Classical – large group</td>
</tr>
<tr>
<td>Flute</td>
<td>Duets – voice + piano</td>
<td>Country and Western</td>
</tr>
<tr>
<td>Clarinet</td>
<td>Instrument + orch</td>
<td>Eastern</td>
</tr>
<tr>
<td>Trumpet</td>
<td>Jazz band</td>
<td>Jazz</td>
</tr>
<tr>
<td>Trombone</td>
<td>Orchestra</td>
<td>Modern/pop - (1990s on)</td>
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<tr>
<td>Xylophone</td>
<td>Rock band</td>
<td></td>
</tr>
<tr>
<td>Drum kit</td>
<td>String quartet</td>
<td></td>
</tr>
<tr>
<td>Guitar</td>
<td>Voice + orchestra</td>
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Focused Music Listening

• Listen to music for = amount time MATP group trained.

• To avoid passive listening – questions to answer. Covered: music features (e.g. “what was the mood?”); instrumentation (e.g. “how many instruments/voices?”); and subjective appraisal (e.g. “what did you like/dislike?”).
MTB – Music Test Battery. Administered pre & post training/listening. All tests used in prior studies.

- **Pitch Ranking (PR)** – 2AFC, ½ & ¼ octave intervals. (Looi et al., 2008a,b, 2012)
- **Single Instrument ID** – 12 inst., 12AFC (Looi et al., 2008a,b, 2012).
- **Music Ensemble ID** – 12 ensembles, 12AFC (Looi et al., 2008a,b, 2012).
- **Music Style ID** – 6 common styles, 6AFC (Looi et al., 2012)
- **Music Quality Rating** - 8 pieces, 4 genres. 6 scales per piece. (Looi et al., 2011)
- **Speech in Noise (BKB-SIN)** - 2 lists. BKB sentences; 4-talker babble. (Etymotic Research)
Procedure

- 8 weeks; 4x 30-min sessions p/wk.
- **MATP group**: 2 wks each for modules 1, 2 & 3 (in that order), then 2 wks ‘own choice’.
- **FML group**: No specification on type of music, # pieces per session, genre or listening mode. Only requirement – listen to each piece twice & answer questions.

(Looi et al., 2016)
Procedure

- 2 periods – control (2-4 wks) & training/FML (8 wks).
- MTB administered: i) before control period, ii) after control period before training/FML, iii) after training/FML.
- All MTB stimuli presented from a single loudspeaker.

(Looi et al., 2016)
Results

- **MATP group**: Mean 618 of 960 mins training.
  Note: 2/5 participants forgot to save some sessions to the data log.

- **FML group**: Mean 925 of 960 mins.
  Note: 1 participant didn’t submit listening diary.

- Analysis of FML listening diaries - Most popular genre: English modern pop.

(Looi et al., 2016)
(Looi et al., 2016)
Discussion & Conclusions

• MATP – significant ↑ single inst. ID.
• MATP - Greater degree ↑ in quality ratings than FML.
• FML – substantial improvements observed for some recipients.
• Large degree individual variability.
• Compliance better for FML.
• Indicates potential of both approaches to help music listening; different degree for different people.
• Suggest: Combine a music training program with FML.

(Looi et al., 2016)
Acknowledgements

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• Edmund Choo for help with test set up.
• Audiologists at National University Hospital Audiology Clinic for help with recruitment.
• Participants.


THANK YOU
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<th>MTP group</th>
<th>FML group</th>
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<tbody>
<tr>
<td></td>
<td>1st visit</td>
<td>2nd visit</td>
</tr>
<tr>
<td><strong>MTB (%)</strong></td>
<td></td>
<td></td>
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<tr>
<td>PR ½ oct.</td>
<td>71.7 (15.4)</td>
<td>71.7 (19.0)</td>
</tr>
<tr>
<td>PR ¼ oct.</td>
<td>67.5 (18.6)</td>
<td>61.3 (27.0)</td>
</tr>
<tr>
<td>Inst. ID</td>
<td>60.6 (15.4)</td>
<td>64.7 (14.6)</td>
</tr>
<tr>
<td>Ensemble ID</td>
<td>39.3 (15.8)</td>
<td>48.1 (19.3)</td>
</tr>
<tr>
<td>Style ID</td>
<td>39.8 (6.38)</td>
<td>56.5 (22.0)</td>
</tr>
<tr>
<td><strong>MQRT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ave1-3 (/100)</td>
<td>54.5 (7.79)</td>
<td>63.5 (9.89)</td>
</tr>
<tr>
<td>Ave 4-6 (/50)</td>
<td>5.0 (5.26)</td>
<td>5.5 (5.12)</td>
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<tr>
<td><strong>BKB-SIN</strong></td>
<td></td>
<td></td>
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<tr>
<td>SNR-50</td>
<td>16.20 (5.05)</td>
<td>15.15 (5.02)</td>
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