# A Questionnaire On Music Perception & Music Training for Adult Cochlear Implant Users

## Valerie LOOI
## & Jennifer SHE

Dept. of Communication Disorders,
The University of Canterbury, Christchurch, NZ.

# Existing studies

- Insufficient detail on factors CI users feel contribute to their poor ratings for music.

- Ask CI users to compare back to how they remember music to sound with normal or better hearing, or 'pre-implant'.

  - o However, recollection of musical sounds would be affected by the length, nature & progression of hearing loss, and their exposure to musical experiences.

- Don't ask - What approach should a training program take???

# Aim

- To develop & administer a questionnaire that collects unique information which would assist in the development of a training program for improving CI users' music perception & appreciation.

➔ *The University of Canterbury Music Listening Questionnaire*.

# UCMLQ

- 48 questions divided into 7 sections:
  - o Music Listening & Musical Background
  - o The Sound Quality of Musical Instruments, Instrumental Families & Voice
  - o Musical Styles
  - o Music Preferences
  - o Music Recognition
  - o Factors Affecting Music Listening Enjoyment
  - o Music Training Program

- ~ 1 hr ± ½ hr to complete.

- Combination of visual analog rating scales, closed-set choices & open-ended questions.

# Sound Quality - Instruments

- Rate the sound quality of:

| | | | |
|---|---|---|---|
| Piano | String Family | Woodwind Family | Brass Family |
| Drum Kit | Guitar | Male Singer | Female Singer |

- 2 types of visual analog scales:
  o Unpleasant – Pleasant
  o Unnatural – Natural    } similar to Gfeller et al. (2000, 2002)

Unnatural                                                                    Natural

# Sound Quality - Instruments



- Other scales used a mid-point "**As Expected**".
- As expect it to sound to someone with NH.

e.g.

Emptier                                          As Expected                                          Fuller

- o Emptier – As Expected – Fuller
- o Duller – As Expected – Sharper
- o More Noisy – As Expected – Less Noisy
- o Tinnier – As Expected – Richer
- o Rougher – As Expected – Smoother
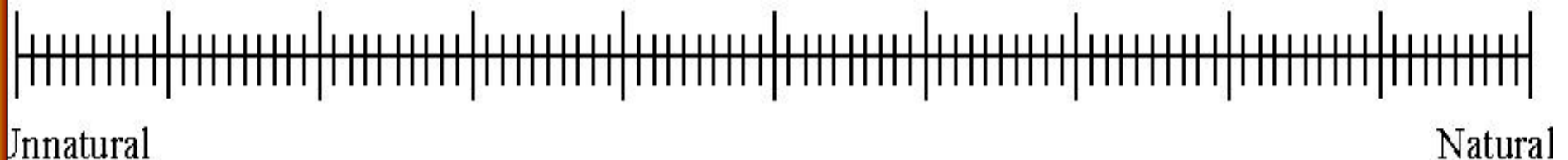
# Sound Quality - Styles

| Orchestra | Classical – Small Group | Classical – Choir |
|-----------|------------------------|-------------------|
| Pop/Rock | Country & Western | Jazz |

- Unpleasant – Pleasant;

- Simple – Complex;

- Can never follow melody line – Can always follow melody line;

- Can never identify this style by listening-alone – Can always identify this style by listening-alone;

- Sounds nothing like I would expect it to sound to a person with NH – Sounds exactly as I would expect it to sound to a person with NH .

# Response Rate

- The questionnaire was sent to 221 adults – all Nucleus CI24 with the ACE strategy.

- 133 (60%) questionnaires were returned. Of these, 100 were completed (45%).

# Results – Music Listening

- ↓ time spent listening to music AND ↓ enjoyment levels now with CI than *pre-hearing loss* (p < 0.001; paired t-test).

- ↑ time spent listening to music AND enjoyment levels now with CI than *just prior to getting CI* (p = 0.003; paired t-test).

- 57% hadn't tried to improve music listening or enjoyment since getting CI.

# Devices for music listening

- 37/93 (40%) noticed difference between *CI-only & CI+HA*. Of these 37, 93% preferred CI+HA.

- 31/81 (38%) noticed difference between *CI-only & HA-only*. Of these 31, 82% preferred CI-only.

- 51% respondents felt CI+HA gave BEST sound quality for recorded music.

# Instrument Ratings

- Instruments rated 'most pleasant & natural':
    1) Guitar, 2) Male Singer, 3) Piano

- Least pleasant & natural: Brass

- For scales with 'as expected' as a mid-point, 1-sample t-test used to see if ratings were significantly different to how subjects expect the instrument(s) to sound to a NH person.

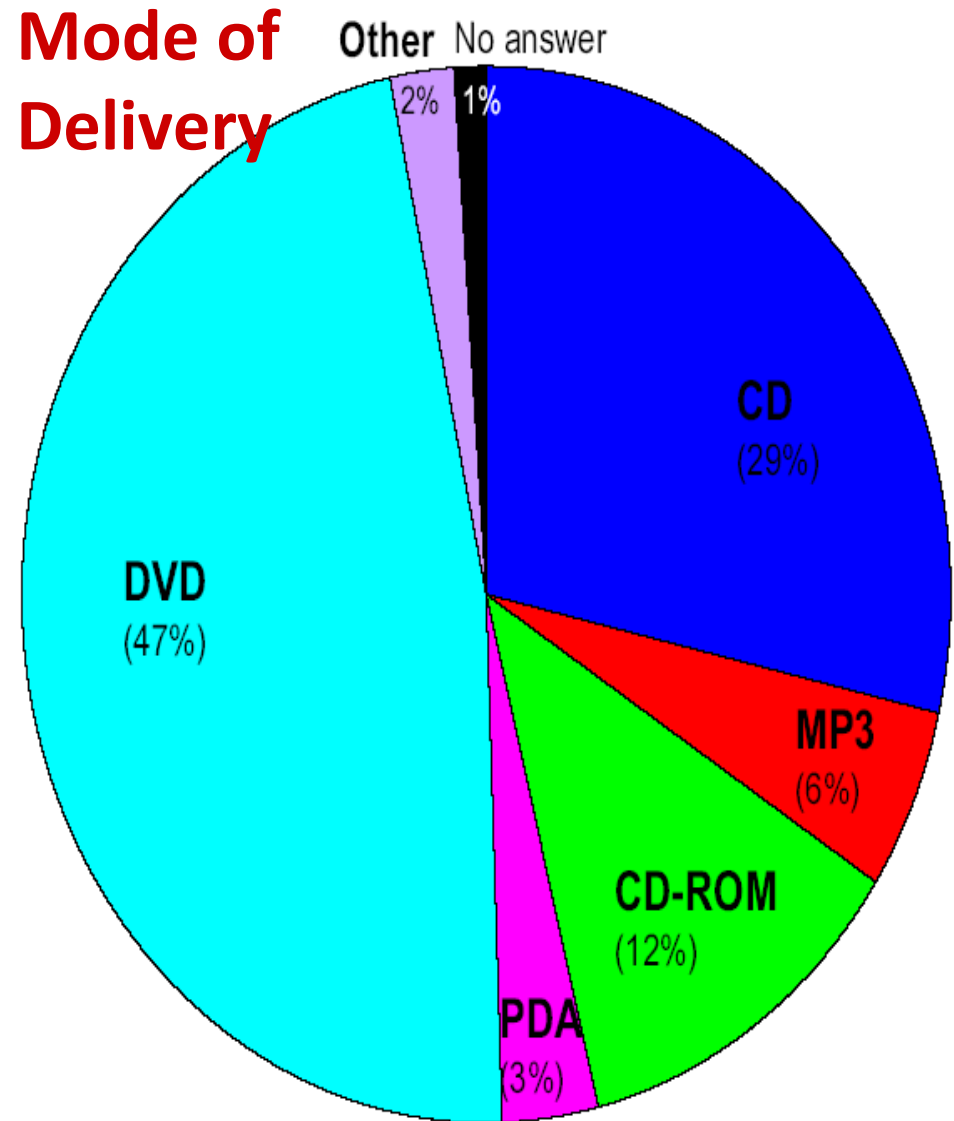| Emptier | Sharper | Noisier | Tinnier | Rougher |
|---|---|---|---|---|
| • Piano<br>• Strings<br>• Guitar<br>• Male<br>• Female | • Drum Kit | • Piano<br>• Drum Kit<br>• Guitar<br>• Female | • Piano<br>• Strings<br>• Woodwind<br>• Brass<br>• Guitar<br>• Female | • Strings<br>• Brass<br>• Drum Kit<br>• Male<br>• Female |

# Instrumental Preferences
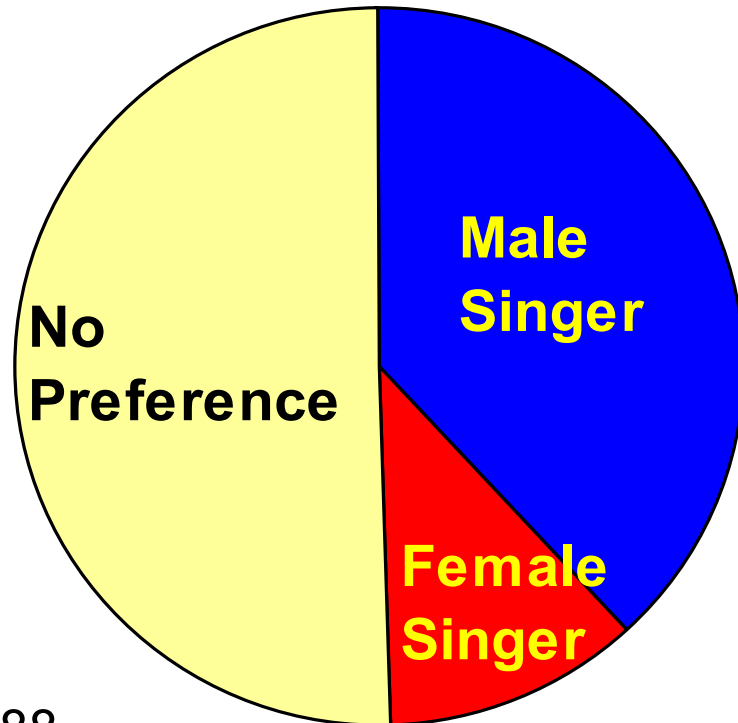


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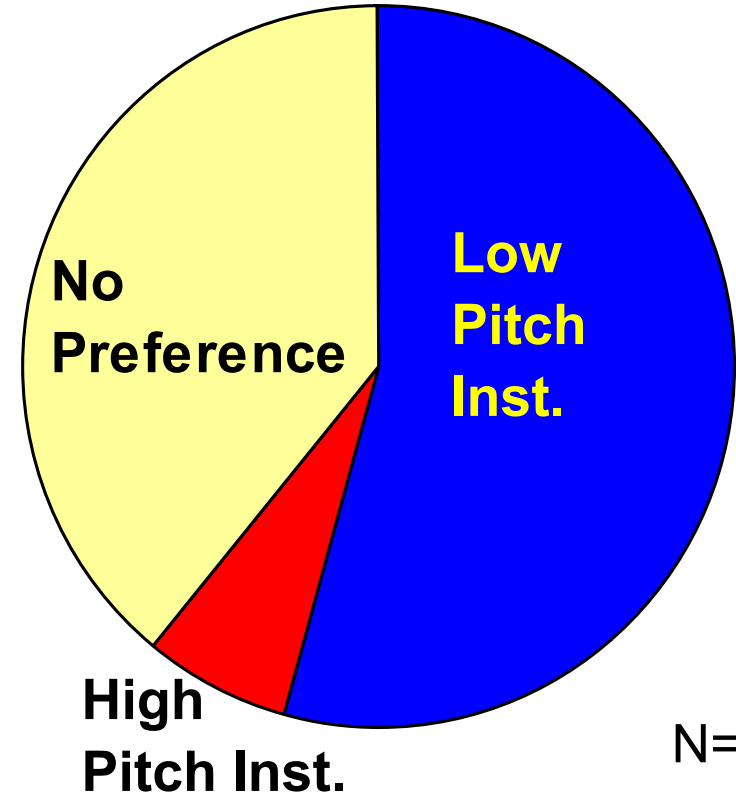
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# Musical Styles

- Highest rated style – Country & Western.

- Lowest rated style – Orchestra.

- CI+HA group gave significantly higher ratings (p=0.028) for musical styles than CI-only *(2-way RM ANOVA). .*

# Music Training Program (MTP)

- 54% interested in a MTP.

- 64% prefer MTP to introduce a wide range of styles.

- 80% would find a written manual helpful.

- Length of each session:
  o M: 35.6 mins
  o Median: 30 mins
  o Range: 10-60 mins

- No. times per week:
  o M: 2.7
  o Median: 2
  o Range: 1-7

**Mode of Delivery**



Pie chart — Mode of Delivery:
- DVD (47%)
- CD (29%)
- CD-ROM (12%)
- MP3 (6%)
- PDA (3%)
- Other 2%
- No answer 1%

# Skills important for MTP

- Skills most often rated as the most important to help music listening enjoyment:

  1. Recognising tunes known prior to implantation.

  2. Recognising commonly-known tunes.

  3. Recognising commonly-known instruments.

  4. Being able to hear pitch changes.

  5. Being able to pick out the tune when presented with accompaniment.

# Overall findings

- CI+HA better than CI-only for music listening.

- Generally, instruments tend to sound emptier, noisier, tinnier & rougher than CI users expect that they'd sound to a person with NH.

- Low pitch range preferred to high pitch range.

- Majority CI users interested in MTP focusing on: Recognise tunes & instruments, better pitch perception, and separating melody-line. 30 min session, 2-3x per week.

# References

- Gfeller, K., Witt, S., Adamek, M., Mehr, M., Rogers, J., Stordahl, J., et al. (2002). Effects of training on timbre recognition and appraisal by postlingually deafened cochlear implant recipients. *Journal of the American Academy of Audiology, 13*(3), 132-145.

- Gfeller, K., Witt, S., Stordahl, J., Mehr, M., & Woodworth, G. (2000). The effects of training on melody recognition and appraisal by adult cochlear implant recipeints. *Journal of the Academy of Rehabilitative Audiology, 33*, 115-138.

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