Teaching Older Adults Language can be Successful When Conditions are Right

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Second Language Learning

• Second language learning is more difficult in later life
• Several years of research have attempted to determine the most effective means of second language training
High Variability Training

- Natural speech tokens are used as training stimuli
- Stimuli are produced by multiple native speakers
- Learners hear multiple tokens and multiple talkers during training
- Feedback is given on each trial
Perrachione et al., 2011

Noting that individual differences in auditory and cognitive performance have been shown to predict second language learning performance, they investigated whether individual differences in pre-training performance interacted with training paradigm to influence learning.
PCPT – Pitch-Contour Perception Test

• Two-alternative forced-choice tone perception

• Performance on this test is correlated with lexical tone learning
Training – Multi Talker

- Hear three items that differ minimally by tone
  - Talkers are mixed
- After presentation, 3-alternative forced-choice of the trained items
  - Feedback on each trial
Training – Single Talker

• Hear three items that differ minimally by tone
  – One talker throughout
• After presentation, 3-alternative forced-choice of the trained items
  – Feedback on each trial
• 18 learned pseudo-words
  – 3 tones x 6 syllables
• 4 novel talkers
• Performance on this test indicates how well learning generalizes to new talkers
Perrachione et al. – Pre-Training

Proportion Correct

High Single  Low Single  High Multi  Low Multi

Proportion Correct

PCPT
Perrachione et al. – Multi-Talker Training

The bar chart illustrates the proportion correct (PCPT) and TLA across different conditions: High Single, Low Single, High Multi, and Low Multi. The chart shows higher proportions for High Multi compared to the other conditions.
The Current Study

Will older adults show success learning non-native speech sounds if training paradigms are matched to their pre-training perceptual abilities?
Participants

• 42 older adults participated
  – 26 females
• Average age 64.69 years, SD 6.81 years
• All participants were screened for cognitive and hearing function
  – MMSE > 24
  – Hearing Thresholds < 40 dB at 1, 1.5, 2, 3, 4, 6, and 8 kHz
## Participants

<table>
<thead>
<tr>
<th>Group</th>
<th>N (N Females)</th>
<th>Mean Age</th>
<th>Mean PCPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Single</td>
<td>9 (7)</td>
<td>63.11</td>
<td>0.67</td>
</tr>
<tr>
<td>Low Single</td>
<td>12 (8)</td>
<td>64.33</td>
<td>0.52</td>
</tr>
<tr>
<td>High Multi</td>
<td>9 (4)</td>
<td>64.22</td>
<td>0.67</td>
</tr>
<tr>
<td>Low Multi</td>
<td>12 (7)</td>
<td>66.58</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Training and Testing

• Identical procedures to Perrachione et al.
• Participants completed the PCPT before training
• Randomly assigned to multi talker or single talker training
• Trained for 8 days
• Completed the TLA post-training
Training – Multi Talker

- Hear three items that differ minimally by tone
  - Talkers are mixed
- After presentation, 3-alternative forced-choice of the trained items
  - Feedback on each trial
Training – Single Talker

• Hear three items that differ minimally by tone
  – One talker throughout

• After presentation, 3-alternative forced-choice of the trained items
  – Feedback on each trial
Pre-Training

The graph shows the proportion correct for different conditions: High Single, Low Single, High Multi, and Low Multi. The x-axis represents the conditions, and the y-axis represents the proportion correct. The error bars indicate the variability in the data.
Multi-Talker Training

![Bar chart showing proportion correct for different conditions and conditions types. The conditions are High Single, Low Single, High Multi, and Low Multi. The conditions types are PCPT and TLA. The y-axis represents proportion correct, ranging from 0.00 to 1.00, and the x-axis represents different conditions and condition types.](image-url)
Single-Talker Training

Proportion Correct

PCPT  TLA

High Single  Low Single  High Multi  Low Multi

Proportion Correct
Conclusions

• Younger adults show an interaction between pre-training ability and training type
• Older adults show greater learning in the multi talker condition, regardless of ability
• Older adults have weaker tone perceptual abilities and smaller training gains overall
• Future studies will determine trainings to increase older adults’ gains