The Role of Musical Aptitude in the L2 Acquisition of Tonal Words: Evidence from Cross-situational Statistical Learning

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Introduction

- Cross-situational word learning (CSWL) is a learning paradigm in natural environments (Yu & Smith, 2007).
- Learning tonal words is difficult for non-tonal adults.
- Ge et al. (2024): Some non-tonal adults can learn tonal words in a CSWL paradigm, while others cannot.

So, what causes this learning variation?

- **Musical aptitude**
  - Cross-domain transfer (Ong et al., 2016)
  - Overlapping domains: tonal cues
  - Pitch perception aptitude; duration perception aptitude

**What we have known so far**

- The role of musical aptitude in CSWL of Native-like language (Smit et al., 2012).

**Aim**

- Whether musical aptitude can influence non-tonal adults’ tonal word learning in natural environments.
- Whether the higher musical aptitude can compensate for the weakness of learners’ tone perception ability in CSWL of tonal words.

Methods

**CSWL task**

- Native English adults (N = 49)
  - Age: 18–30

**Stimuli**

<table>
<thead>
<tr>
<th></th>
<th>Tone 1</th>
<th>Tone 2</th>
<th>Tone 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short tone</td>
<td>/pi1:lu1/</td>
<td>/pa2:lu1/</td>
<td>/pa4:lu1/</td>
</tr>
<tr>
<td>Long tone</td>
<td>/pa1:lu1/</td>
<td>/pa2:lu1/</td>
<td>/pa4:lu1/</td>
</tr>
</tbody>
</table>

**Trial types**

<table>
<thead>
<tr>
<th>Suprasegmental level</th>
<th>p-MP</th>
<th>d-MP</th>
<th>(p-MP + d-MP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch minimal pair</td>
<td>/pi1:lu1/</td>
<td>/pi2:lu1/</td>
<td>/pi1:lu1/</td>
</tr>
<tr>
<td>Duration minimal pair</td>
<td>/pi1:lu1/</td>
<td>/pi1:lu1/</td>
<td>/pi1:lu1/</td>
</tr>
</tbody>
</table>

**Segmental level**

| Vocalic minimal pair (v-MP) | /pi1:lu1/ | /pa1:lu1/ |

**Debriefing Questionnaire**

**Music Aptitude Test**

Results

**Musical Aptitude Test**

**CSWL performance**

- **The correlation between musical aptitude and CSWL**
  - Melody score*: $(\chi^2(1) = 4.797, p < .05)$
  - Loudness score*: $(\chi^2(1) = 4.627, p < .032)$

Conclusion

**The findings from the CSWL task**

- An overall cross-situational learning effect for English participants.
- Non-native sounds pose a challenge to native English speakers. (Ge et al., 2024)

**How does musical aptitude influence learners’ CSWL performance?**

Reference