Heritage Language Reversal: Phonological Processing in L2 English by Child Returnees

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Phonological processing

- Phonology
  - Implicit knowledge of the principles governing the organization of sounds in language
  - Segments, syllables, prominence, prosody

- Processing
  - Mental operations active in the encoding and decoding of speech
Phonology

- Representations
- Segmental categories
  - English [ð] ~ [d][r]  Spanish [ð][d] ~ [ɾ]
  - English [s] ~ [θ]  Japanese [s]
- Cross-language speech perception
International adoption

- Korean adoptees in Minnesota (USA) (Oh, Au & Jun, 2010)
  - Adopted into American families (n=12) at Age: 0;3~1;0
  - Age range: 18~33 years old at time of testing
  - Cessation of exposure to Korean until start of university language study (first-semester course)
  - Control group of novice learners of Korean with no early exposure to Korean (n=13)
International adoption

- Korean adoptees in Minnesota (USA) (Oh, Au & Jun, 2010)
  - ABX perceptual identification task
    - A /——/ B /——/ X /———{X = A or B}
  - Adoptees exhibit significantly greater accuracy with plain [p],[t],[k] and aspirated [pʰ],[tʰ],[kʰ] stops than American-born participants
  - No difference b/w groups with tense [p*],[t*],[k*] stops
Returnees

Expatriates returning home after an extended period abroad

- **Child returnees**
  - Accompanying parents living abroad on employment-based assignment
  - Leave their homeland at a young age and return before the age of 16
Montrul (2016) gives the following definition:

“Heritage language reversal ... cases are often described as L2 attrition, but in fact it is attrition of a heritage language of the child.” (p. 37)

- These cases are often examples of *English* as a heritage language, as in the case of returnees
Heritage Language Reversal

JAPANESE RETURNEES

- Born in Japan to Japanese-speaking families
- Resided in a (typically) English-speaking community (e.g., U.S) for a number of years
- After return: Precipitous decline in exposure to the second language (unlike international adoptees where exposure to language may suddenly stop at an early age)
L2 attrition

- L2 attrition

  - After a period of living abroad, possible gradual loss of an L2 once back in the home country (e.g., L2 English, Tomiyama, 2000; Yoshitomi, 1999)

  - Usually occurs when exposure/use of the language is (nearly) absent upon return to the home country
## Our Study

<table>
<thead>
<tr>
<th>Age at first exposure to English in Japan (years)</th>
<th>Age at first testing (years)</th>
<th>No. of years living in the U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS (eldest)</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>YS (middle)</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>KS (youngest)</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>
Research Questions

RQ1.) Is there a difference in accuracy and/or response times due to the age of acquisition of L2 English?

RQ2.) Do the 3 sisters experience loss of sensitivity to English contrasts over time?
TOEIC Scores: Listening & Reading

- CS = 905 (advanced)
- YS = 785 ~ 990 (high intermediate) (current score = 865)
- KS = 785 ~ 990 (high intermediate)
## Longitudinal study

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4 (YS only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing intervals</td>
<td>0 weeks</td>
<td>+36 weeks (9 months)</td>
<td>+48 weeks (12 months)</td>
<td>+148 weeks (40 months)</td>
</tr>
</tbody>
</table>

Data collection period:

**T1 - T3:** AUGUST 17, 2011 ~ MAY 3, 2013

**T4:** JULY 18, 2016
Method

- Materials
  - English interdental fricatives [θ], [ð]
    - [θ]~[s], [ð]~[z] Stridency contrast
    - [θ]~[t], [ð]~[d] Continuancy contrast
    - [θ]~[f], [ð]~[v] Place contrast
    - [t]~[s], [d]~[z] Continuancy + Stridency Contrast is in English and Japanese
Method (con’d)

- **Materials**
  - Nonsense CVC monosyllables: [ __ a f ] [ __ ʊ v ]
  - Initial consonant varied among 8 obstruents
  - Two vowel conditions [a] [ʊ]
  - Two final consonants [f]~[v]
  - 32 items (same) + 32 items (different): Total = 64
  - Two versions of the task were created
Method (con’d)

- **Procedure**
  - Listen to a single male native speaker of American English AX — “same”/“different” judgment
  - **Acoustic condition**: Short ISI 250 msec
    
    ![Diagram showing 50mA 250X {RESPONSE}]

  - **Phonological condition**: Long ISI 1500 msec
    
    ![Diagram showing 50mA 1500X {RESPONSE}]
Results

3 Returnees

L1 Japanese L2 English

Native speakers of English
Phonetic condition

Accuracy

<table>
<thead>
<tr>
<th>T1</th>
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<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuancy</td>
<td>[t]~[θ]</td>
<td>[d]~[ð]</td>
<td></td>
</tr>
<tr>
<td>Stridency</td>
<td>[s]~[θ]</td>
<td>[z]~[ð]</td>
<td></td>
</tr>
<tr>
<td>Cont-Strid</td>
<td>[t]~[s]</td>
<td>[d]~[z]</td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>[f]~[θ]</td>
<td>[v]~[ð]</td>
<td></td>
</tr>
</tbody>
</table>

Accuracy levels for each condition are represented by different colors:
- CS: Blue
- YS: Red
- KS: Green
Accuracy of Phonetic Condition

- **Continuancy**: [t]~[θ], [d]~[ð]
- **Stridency**: [s]~[θ], [z]~[ð]
- **Cont-Strid**: [t]~[s], [d]~[z]
- **Place**: [f]~[θ], [v]~[ð]

Native Speaker Control group (n=9)
Phonological condition

Accuracy

5 years of age

Continuancy
[t]~[θ]  [d]~[ð]

Stridency
[s]~[θ]  [z]~[ð]

Cont-Strid
[t]~[s]  [d]~[z]

Place
[f]~[θ]  [v]~[ð]

Accuracy
Accuracy

Phonological condition

Continuancy
[t]~[θ]
[d]~[ð]

Stridency
[s]~[θ]
[z]~[ð]

Cont-Strid
[t]~[s]
[d]~[z]

Place
[f]~[θ]
[ν]~[ð]

Native Speaker Control group (n=9)
Phonetic condition

Response times

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<td>Cont-Strid</td>
<td>Place</td>
</tr>
<tr>
<td>[t]~[θ]</td>
<td>[s]~[θ]</td>
<td>[t]~[s]</td>
<td>[f]~[θ]</td>
</tr>
<tr>
<td>[d]~[ð]</td>
<td>[z]~[ð]</td>
<td>[d]~[z]</td>
<td>[v]~[ð]</td>
</tr>
</tbody>
</table>

Response times:

- **CS**: Blue line
- **YS**: Orange line
- **KS**: Green line
Phonetic condition

Response times

Continuancy [t]~[θ] [d]~[ð]
Stridency [s]~[θ] [z]~[ð]
Cont-Strid [t]~[s] [d]~[z]
Place [f]~[θ] [v]~[ð]

5 years of age

K H C
Response times

Phonetic condition

Continuancy
[t]~[θ]
[d]~[ð]

Stridency
[s]~[θ]
[z]~[ð]

Cont-Strid
[t]~[s]
[d]~[z]

Place
[f]~[θ]
[v]~[ð]

Native Speaker Control group (n=9)
Phonological condition

Response times

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<tr>
<td>Place</td>
<td>[f]~[θ]</td>
<td>[v]~[ð]</td>
<td></td>
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</table>

CS, YS, KS
Phonological condition

Response times

5 years of age

Continuancy
[t]~[θ]
[d]~[ð]

Stridency
[s]~[θ]
[z]~[ð]

Cont-Strid
[t]~[s]
[d]~[z]

Place
[f]~[θ]
[v]~[ð]
Response times for different phonological conditions:

- **Continuancy**
  - [t]~[θ]  
  - [d]~[ð]

- **Stridency**
  - [s]~[θ]
  - [z]~[ð]

- **Cont-Strid**
  - [t]~[s]
  - [d]~[z]

- **Place**
  - [f]~[θ]
  - [v]~[ð]

The graph shows the response times for the Native Speaker Control group (n=9).
Discussion

RQ1.) Is there a difference in accuracy and/or response times due to the age of acquisition of L2 English? No

RQ2.) Do the 3 sisters experience loss of sensitivity to English contrasts over time? No
Phonological component of the grammar (i.e., linguistic knowledge) not vulnerable to loss under conditions of reduced use

Loss of daily exposure to linguistic input is not sufficient to deprive sensitivity to phonological contrasts

Earlier age of acquisition does provide some advantages to phonetic/phonological perception to non-native contrasts
Reduced exposure to L2 input among returnees does not lead to loss of sensitivity to L2 contrasts

- at least over an approx 12 month period for 2 of the sisters, CS and KS
- in Japan, some modest exposure to English may persist, e.g., lessons, friends etc.

- Greatest vulnerability to loss under conditions of reduced use may be limited to *lexical* processing (Bardovi-Harlig & Stringer, 2010, 2012)
Next Step ...

- Speech production: VOTs of /p, t, k/ (Yusa et al. 2010)
  - Frog Story (Mayer 1979)
  - Picture Description Task (Goad & White, 2006)
Acknowledgments

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