Researching, Learning and Training

**Late** Second Language Speech

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My background:

I am a late bilingual (Japan → US → Canada → UK)...

Therefore, my research interest lies in **late** L2 speech learning (age of acquisition > 16 years)
Organization

1. Theories on late L2 speech learning
   - Speech Learning Model (Flege)
   - Critical Period Hypothesis (Abrahamsson, DeKeyser)

2. Previous empirical studies

3. My research projects

4. Extra topic (designing an optimal training method)
For ppt slides, please check the following:

- **My personal website:**
  - [http://kazuyasaito.net/](http://kazuyasaito.net/)

- **L-SLARF Facebook**
Theoretical account 1: Speech Learning Model
Speech Learning Model (SLM)


- The speech learning capacity used for successful L1 speech acquisition remains **active** throughout life and may be invoked in L2 learning, provided ample exposure to L2.

**Similar theoretical accounts**
- Perceptual Assimilation Model-L2 (Best & Tyler, 2007)
- Native Language Magnet (Kuhl, 2000)
- Vocab Restructuring Model (Bundgaard-Nielsen, et al., 2012)
Late L2 speech learning

Mainly incidental/implicit
(similar to L1 acquisition)!
Initial to mid stage of late SLA
Experience effects vs. interlang

L2 performance continues to improve as a function of first 10-15 years of immersion.

L2 experience (e.g., Length Of Residence)
Final stage of late SLA
Age effects vs. ultimate attainment

L2 experience (e.g., Length Of Residence)

Beginner

Proficiency

Advanced

Ultimate attainment

Earlier AOA leads to higher-level ultimate attainment.
Key references


Theoretical account 2: 
Critical Period Hypothesis
Critical Period Hypothesis (CPH)


- Any linguistic performance by late bilinguals is constrained by a loss of plasticity resulting from neural maturation after adolescence.

- Post-critical period SLA relies on **general cognition** (intentional/explicit learning) rather than **language-specific cognition** (incidental/implicit learning).
Late L2 speech learning

Mainly explicit
(different from L1 acquisition)!
Initial to mid stage of late SLA
General skill learning
(e.g., the learning of algebra, computer programming)

Quick improvement over the first few years of LOR, followed by a leveling off.

Additional experience won’t be an affecting factor.
Final stage of late SLA
Ultimate attainment = individual differences

- Advanced
- Beginner

L2 experience (e.g., Length Of Residence)

Near nativelikeness

- No age effects (unlike early SLA)
- Explicit aptitude or/and motivation effects?

Explicit aptitude or/and motivation effects?
Key references

Confounding findings: Experience effects

Who?
- Late L2 learners with a varied length of residence (0 to 10 years)

Question?
- To what degree can Length of Residence (LOR) predict their L2 pronunciation performance?

Findings?
- LOR is significantly predictive of (e.g., Derwing & Munro, 2013) or unrelated to (e.g., Munro, 1993) SLA.
Confounding findings: Age effects

Who?
- Experienced late L2 leaners with extensive length of residence (LOR > 10 years)

Method?
- To what degree can age of acquisition (AOA) predict their ultimate attainment?

Findings?
- Strong age effects (e.g., Flege et al., 2006) vs. no age effects (e.g., Patkowski, 1990)
Problems

Most L2 speech research has exclusively concerned native speakers’ global accent judgments (e.g., 1 = no accent, 9 = heavily accented).

Little research attention has been given to the role of LOR and AOA in adult L2 pronunciation development of **specific** phonetic features (see DeKeyser & Larson-Hall, 2005, p. 93).
Target structure: Word-initial English \(/\mathsf{\mathit{r}}/\) by Japanese learners

- Inexperienced Japanese learners tend to substitute the Japanese tap \(/\mathsf{\mathit{r}}/\) (similar to English \(/\mathsf{\mathit{l}}/\)) for English \(/\mathsf{\mathit{r}}/\) (Guion et al., 2000; Riney et al., 2000)

- Most difficult instance of L2 speech acquisition (Flege, 1995; Best & Tyler, 2007)

- Bradlow (2008)
  ✓“A productive testing ground for general principles of learning and claims about adult neural plasticity” (p. 294).
Current Study (partially reported in..)

Journal of Memory & Language (2013)


Language & Speech (2014)
Current Study

Research Question 1

• Whether and to what degree can experience (measured via Length of Residence) be predictive of Japanese learners’ /u/ production development?

Predictions

• SLM = “Extensive” LOR effects
• CPH = “Limited” LOR effects
Current Study

Research Question 2

- Whether and to what degree can AOA be predictive of the ultimate attainment and nativelikeness of /ɹ/ production by Japanese learners?

Predictions

- SLM = Strong AOA effects
- CPH = No AOA effects
Participants

- $n = 180$ Japanese learners of English in Vancouver and Montreal, Canada.
- All participants had received 6 years of foreign language education in Japan prior to their arrivals in Canada.
- Their age of arrival > 16 years (late bilinguals).
- Highly motivated: Their main language of communication had to be English (self-reported use of English: $M = 5.4$).
Participants

- Their experience substantially varied...

<table>
<thead>
<tr>
<th>Length of residence</th>
<th>$n$</th>
<th>Age of arrival</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6 months</td>
<td>56</td>
<td>16-20 years</td>
<td>31</td>
</tr>
<tr>
<td>6-12 months</td>
<td>30</td>
<td>21-25 years</td>
<td>54</td>
</tr>
<tr>
<td>1-5 years</td>
<td>14</td>
<td>26-30 years</td>
<td>49</td>
</tr>
<tr>
<td>6-10 years</td>
<td>19</td>
<td>31-35 years</td>
<td>28</td>
</tr>
<tr>
<td>11-20 years</td>
<td>34</td>
<td>36-40 years</td>
<td>18</td>
</tr>
<tr>
<td>21-41 years</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>Total</td>
<td>180</td>
</tr>
</tbody>
</table>
Spontaneous production task (adapted from Munro & Mann, 2005)

- Describing 7 different pictures

For “practice”
(to avoid task familiarity effects)

For “English /ʌ/ analyses”
- Three key words (one of which was always a target word)
- Within 5 s of planning time for each picture

### A. Timed Picture Description

<table>
<thead>
<tr>
<th>Following vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>[front]</td>
</tr>
<tr>
<td>[central and back]</td>
</tr>
</tbody>
</table>
Acoustic Analysis of English /ɹ/
Acquisition of English /ɹ/ by L1 Japanese

Adjusting existing cues
- Retracting tongue body (i.e., /w/-like) (lowering F2 values)
- Prolonging the phonemic length (> 50 ms)

Establishing a new articulatory parameter
- Labial, alveolar and pharyngeal constrictions (lowering F3 values)
Results

To what degree can LOR be related to L2 pronunciation?

A piecewise regression was adopted to examine where the LOR-proficiency correlations could be the strongest.
Existing cues: F2

Correlations significant up to 6 months

Japanese tap
\( M = 12.2 \) Bark

Afterwards, their performance = nativelike

English /\( \acute{u} \)/
\( M = 9.8 \) Bark
Existing cues: Duration

Correlations significant up to 12 months

Afterwards, their performance = nativelike

English /ɪ/  
$M = 85\text{ms}$

Japanese tap  
$M = 15\text{ms}$
New cues: F3

Correlations significant up to 10 years

Length of residence (year)

F3 (Bark)

Japanese tap
$M = 15.5 \text{ Bark}$

After 10 years of LOR, their performance subject to a lot of individual variability

English /s/
$M = 11.8 \text{ Bark}$
Results

To what degree can AOA be related to \( n = 88 \) experienced Japanese leaners’ (LOR > 10 years) L2 pronunciation?

Piecewise regression was adopted to examine where the AOA-proficiency correlations could be the strongest.
Existing cues: F3

Correlations significant without any breakpoints ($r = .356, p < .001$)

- English / ⟨u⟩ / $M = 11.8$ Bark
- $M = 12.2$ Bark
- $M = 14.0$ Bark

Age of acquisition (year)
Discussion

LOR was differentially predictive of various acoustic domains of English /ɹ/ acquisition:
- Adjusting existing cues (< 1 year: nativelike performance)
- Establishing new cues (< 10 years: non-nativelike)

AOA predicted the extent to which experienced Japanese learners (LOR > 10 years) could further approximate the nativelike attainment of the new cue.

Supporting the SLM (experience/age effects)
What would be an effective and efficient training method?
How would you teach?

Problems
Japanese learners of English tend to substitute the Japanese tap /ɾ/ for English /ɹ-l/ contrast

Students
Intermediate adult ESL/EFL learners with high expectations/motivations for their career-related goals

Any ideas?
Explicit phonetic instruction?
Contextualized usage of language?
Fun and meaningful activities?
Useful online tools?
Audiolingual teaching methods vs. L2 pronunciation development
Research Evidence

Mcdonald, Power, & Yule (1994) in *Language Learning*
- 23 ESL learners
- 10 key lexical items

- 66 English learners of Spanish
- 19 Spanish allophones

Saito (2011) in *Language Awareness*
- 20 Japanese learners of English
- 5 English-specific segmentals

Improvement was clear at a *controlled-speech* level but not at a *spontaneous-speech* level

(See Saito, 2012 in *TESOL Quarterly* for research synthesis)
Key references


Contextualized Instruction to teach L2 pronunciation!


Design ($N = 100+$)

Pre-tests

Four 1-hour meaning oriented sessions with **communicative** focus on English /r/ form

Post-tests
Communicative Activities

Theme: “Developing a convincing argument”

Activity 1. How to critique?

Activity 2. English Debating

Activity 3. Argument-creation

Activity 4. Public Speech
English Debating
“*Running* inside is better than *run*ning outside”
S: In spite of winter weather, I can see runners in Montreal.
T: Runners.
S: Runners. So, we can get on coat, sweater, more clothes. If you run [ran]*.. 
T: Run
S: If you run, you get warm so you will take care of weather.
Topics for debate activities

• Which would you prefer, eating rice vs. bread for breakfast?

• Listening to rock music is not good for children

• Is it good to have a rainy day?”

• Is a sense of “rat race” among students good (e.g., tests, entrance examinations)?
Communicative focus-on-form techniques used in the project:

**Focused tasks (e.g., Ellis, 2003)**
- Creating obligatory contexts where learners need to use target features accurately to complete tasks successfully

**Input enhancement (e.g., Han et al., 2008)**
- Italicizing/color-coding target features

**Recasts (e.g., Lyster & Saito, 2010)**
- Correcting without interrupting a flow of communication
Results

Perception

\[ M = 60 \rightarrow 75\% \ (15.5\% \text{ gain}) \]

- The amount of improvement resulting from 4 hr of instruction (15% gain) could be relatively large compared to other intensive lab training studies (e.g., Logan et al., 1992, for 8% gain after 10+ hr of training). (p. 25)
Results

Production
Neither /u/ nor /l/ → Good/probably /u/ at controlled and spontaneous speech tests

• A communitive focus on form could be an optimal method to allow students to promote the interlanguage development of their new phonetic knowledge (F3).
Conclusions
What characterizes late L2 speech learning?
1. The redeployment of existing cues could be achieved within a relatively short amount of immersion (e.g., LOR < 1 year).
2. The establishment of new cues could be *gradual, constant, and extensive* process (i.e., experience effects). The level of ultimate attainment could be subject to age of acquisition throughout a life span (i.e., age effects).
3. Even late L2 learners may draw on qualitatively and fundamentally similar language learning mechanisms as used for early L2 (and L1) acquisition.

The underlying mechanism should be taken into account especially in order to design optimal L2 training methods (e.g., communicative focus on form).
THANK YOU!!