Acquisition of the production of 'new' and 'similar' vowels: the case of /u/ and /y/ in French by Japanese-speaking learners

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Abstract

- French /y/ (F2/F3 close around 1900 to 2100 Hz for males) does not have an equivalent phoneme in Japanese and English, whereas /u/ (F1/F2 close < 1000 Hz) has a phonemic counterpart (high back) in both Japanese and English, but its phonetic realization is different from French /u/, with a higher F2. Flege (1987) [6] found out that it was easier for American English speakers to acquire a native-like production of French /y/ ("new" phone) than that of French /u/ ("similar" phone). Our recording of two groups of male and female adult Japanese-speaking learners of French (JLF) shows a similar tendency. We measured the formants of isolated vowels embedded in a carrier sentence read 3 times by JLFs. In the first group, consisting of 3 elementary learners who volunteered for the task, 2 learners pronounced /y/ with close F2/F3 around 2000 Hz, but none of them produced a low F2 (< 1000 Hz) for /u/. In the second group, consisting of 50 JLFs in 4 different classes and levels (elementary to upper intermediate), only 4 of them, who had all lived in a French-speaking country except one, produced /u/ with a low F2 (< 1000 Hz), whereas 20 of them pronounced /y/ with close F2/F3 at least once.

Japanese: 5 vowels

- Fig. 1 The first three formants (left) and the first two formants in two dimensions (right: F1 on the y-axis; F2 on the x-axis) of the five vowels (male voice) of Tokyo Japanese (Sugi 1995 [18]).

Phonemically “new” and “similar” vowels in L2 French learned by L1 Japanese speakers

- /y/ (F2/F3 close around 1900 to 2100 Hz for males): no phonemic equivalent in L1 Japanese

- /u/ (F1/F2 close < 1000 Hz): phonemic equivalent (high back) /u/ in L1 Japanese is phonetically different [u] (F2 > 1000 Hz)
“New” and “similar” vowels in L2 French learned by American English speakers

- Flege (1987):
  - Native speakers of American English who were experienced in French did not differ from French monolinguals in producing French /y/ (F2/F3 close).
  - However, native English speakers of all groups studied produced /u/ in their L2 French with F2 values which differed significantly (higher) from those of native speakers.

- “similar” sounds: harder to produce in a native-like manner than “new” sounds.

Research question

- Do native speakers of Japanese have more difficulty in producing L2 French /u/ (“similar” sound) than /y/ (“new” sound)?

Target French vowels /u/ and /y/

- Mean formant frequencies of French oral vowels pronounced 3 times in the carrier sentence “Je dis /V/ comme dans...” by 2 male and 1 female native speakers of French.

Experiment I: 3 learners

- French vowels in isolation
- Carrier sentence: “Je dis /V/ comme dans...” (e.g., Je dis /u/ comme dans loup.)
- 3 learners (3 months of learning experience) studying at the University of Tokyo.
- Recorded in an anechoic booth.

- /u/-like vowel

Japanese learner 1 (M)

Japanese learner 3 (F)

Japanese learner 2 (M)

Experiment I: 3 learners

Japanese /u/-like vowel

Mean formant frequencies of French oral vowels pronounced 2 times in the carrier sentence “Je dis /V/ comme dans...” by 2 male and 1 female native speakers of Japanese learning French (3 months of learning).
Experiment I: 3 learners

Mean formant frequencies of French oral vowels pronounced 2 times in the carrier sentence “je dis /V/ comme dans ...” by 2 male and 1 female native speakers of Japanese learning French (3 months of learning).

Japanese learner 1 (M)
Japanese learner 2 (M)
Japanese learner 3 (F)

Diphthongization /y/ [jiu]

Experiment I: /u/

/u/ pronounced by a male native speaker.
/u/ pronounced by a male Japanese-speaking learner.

Relative intensity in 3 frequency zones (0-1 kHz, 1-2 kHz, 2-3 kHz) of /u/ pronounced by the 4 native speakers (fr: mean of 12 tokens) and by the 3 Japanese-speaking learners (jp: mean of 6 tokens). The error bars represent ±1SD.

Experiment I: summary

/u/: none of the learners produced close F1/F2.
/y/: two of the learners produced close F2/F3; the other produced a diphthongized [jiu].

Experiment II

French vowels in isolation
Carrier sentence: “Je dis /V/ comme dans ...” (e.g. Je dis /u/ comme dans loup.)
47 learners of different levels (elementary, intermediate, upper intermediate) studying in universities in Tokyo area.
Recorded simultaneously in CALL rooms.

Experiment II: results

/u/ /y/
**Concluding remarks**

- The findings in the two experiments (/y/ easier to learn to produce than /u/) corroborate the results of Flege (1987): "similar" sounds are harder to learn to produce than "new" ones.

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