Pronunciation of French vowels by Japanese speakers learning French as a foreign language: back and front rounded vowels /u y ø/

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Objective
- To elucidate the difficulties in perception and production of vowels that could be considered as phonemically and/or phonetically "new" or not in a foreign language:
- the case of French close and close-mid rounded vowels /u y ø/ in isolation, learnt by Japanese-speaking learners.

French and Japanese vowel inventories
- 13 vowels in French
- 5 vowels in Tokyo Japanese

Loanword adaptation of the French /u y ø/ in Japanese
- /u/ > /u/ 「ウ」: e.g. 「Ourcq」 /urk/ > /uruw/ 「ウルク」
- /y/ > /ju/ 「ユ」: e.g. 「Hugo」 /ygo/ > /jyu(R)goR/ 「ユゴ」
- /ø/ > /ø/ 「ウ」: e.g. 「Eugène」 /øgen/ > /ø(R)xeRnu/ 「ウジェーヌ」

French and Japanese /u/:
- Acoustically different

French /u/ /y/ /ø/:
- Focal vowels: grouping of formants -> reinforcement of energy
- Non-focal vowel: no grouping of formants (acoustically central)
Combination of the features [back] and [round]: loanword adaptation of French /y/ in Japanese and Korean

**Français** | **Japonais** | **Coréen**
---|---|---
| | | |
| [ ] | [ ] | [ ]
| [ ] | [ ] | [ ]
| [ ] | [ ] | [ ]

**Acquisition of the French /u y ø/ by Japanese-speaking learners: perception**
- Goodness of discrimination expected by PAM (Perceptual Assimilation Model); Best et al. (1995)

**Difficulty in production**
- Supposed degrees of difficulty

<table>
<thead>
<tr>
<th>/a/</th>
<th>/ø/</th>
<th>/y/</th>
<th>/u/</th>
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<tbody>
<tr>
<td>+</td>
<td>-</td>
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**Hypotheses**
- 1. Perception: /u/-/ø/ difficult to distinguish
- 2. Production: /u/ difficult to produce

**Articulatory synthesis (VTCalc)**
- Input: 7 articulatory parameters (Maeda 1982)
  - jaw position
  - tongue body position
  - tongue shape
  - tongue tip position
  - lip aperture
  - lip protrusion
  - larynx height

**French and Japanese /u/, French /ø/: tongue position and lips**
- Native speaker
- Jp learner
- Native speaker

**“new” and “similar” phones**
- “New” L2 phones have no counterpart in the L1 and so, by definition, differ acoustically from phones found in L1. ex. French /y/ to (American) English speakers
- “Similar” L2 phones, on the other hand, differ systematically from an easily identifiable counterpart in L1. ex. French /u/ to English speakers
- … equivalence classification limits the extent to which L2 learners approximate L2 phonetics norms for “similar” L2 phones judged to be realizations of a category in L1 (e.g. French /u/ by AmE /u/).
Production of /u y ø/ by 47 Japanese-speaking learners
- /u/: only 4 learners (out of 47) produced it with close F1/F2 under 1000 Hz.
- /y/: 20 learners produced it with close F2/F3 at least once.
- /ø/: 31 learners produced an acoustically central vowel, with F2 around 1500 Hz, at least once.

Carrier sentence: "Je dis /u/ comme dans ..."

/u/ pronounced by 5 Japanese-speaking learners perceived by 16 French listeners (x 4 repetitions)

Acquisition of French /u y ø/ by Japanese-speaking learners: production
- How do Japanese-speaking learners produce the French /u/?

Perception of /u y ø/ by Japanese-speaking learners (discrimination AXB)
- Advanced /u-y/ group
- Advanced /u/ group
- Advanced /ø/ group
- Advanced /y/ group

8 responses x 7 learners x 2 levels (of learning experience) for each vowel pair.

Acquisition of French /u y ø/ by Japanese-speaking learners: perception
- How do Japanese-speaking learners perceive the French /u/ and /ø/?

Production of /u/ by 40 female Japanese-speaking learners
- 4 groups of learners
- 2 native speakers of French

Carrier sentence: "Je dis /u/ comme dans ..."

Production of /u y ø/ by 47 Japanese-speaking learners

Production of /u y ø/ by 40 female Japanese-speaking learners

Conclusion
- "Phonetically equivalent" but "Phonetically new" phones would be difficult to learn to pronounce correctly (the French /u/ for Japanese-speaking learners).
- /u/ is also difficult to distinguish perceptually from /ø/. 