INTRODUCTION

Perceptual Assimilation Model (PAM)

Adults’ perception of non-native contrasts is affected by both native language and non-native language experiences.

- In the Perceptual Assimilation Model (PAM), non-native discriminability is predicted by comparing native and non-native phonological systems (Best, 1995).

Japanese syllable structures

- Basic Japanese syllable structure is CV. (Shibatani, 1996)
- Unlike English, codas consonants are not allowed except:
  - 1. Moraic nasal /N/: e.g. /bin/ 'a bottle'
  - 2. The first element of geminate consonants /Q/ in the middle of word: e.g. /kite/kiQte/ (kikuta)/ a stamp’.
- Geminate consonants are usually voiceless. Voiced geminate consonants only occur in loan words, but gemination rate of voiced consonants is low, and mostly pronounced as voiceless geminates, e.g. /beQto/ or /beQdo/ ‘bed’. (Shibatani, 1990; Shikai, 1999; Koizumi, 1989)
- English allows syllable structures that Japanese does not.

Bilabial stops in English and Japanese (Lisker & Abramson, 1964; Homma, 1981)
- English /p/ is pronounced with longer VOT than Japanese /pi/.
- English /b/ is usually devoiced and its VOT range overlaps with the VOT range for Japanese /bi/.
- Japanese /p/ has less aspiration than English /p/.
- In word final position, voice contrast in English appears in the preceding vowel duration.

METHODS

Subjects:

- JO (Monolingual Older Japanese): 8 older native speakers of Japanese with little ability to communicate in English (Mean age = 51.6).
- JY (Monolingual Young Japanese): 12 younger native speakers of Japanese with little ability to communicate in English (Mean age = 19.7).

Both JO and JY participated in the experiment in Japan.

JA (Japanese Advanced learners of English):

- 14 native speakers of Japanese who were students of Indiana University at the time of experiment (Mean age = 25).
- AE: 18 native speakers of American English as a control group (Mean age = 20).

Stimuli:

- Four native speakers of American English.
- Repeated syllables for each utterance were either /ip/, /ib/, or /bi/.
- Repetition rate started slow (450 ms/v) and ended fast (200 ms/v). Rate was controlled with a metronome.
- 21 stimuli were spliced from each original utterance. 7 slower stimuli were grouped as slow rate stimuli.
- Fast rate stimuli were more ambiguous and considered difficult to identify.
- Total number of stimuli: 336.
- Each stimulus contained three syllables.

Tasks:

- Four-alternative forced choice identification (/ip/, /ib/, /bi/, /pi/).
- 100% scale confidence rating for identification answers

PREDICTIONS

- If non-native syllable structure VC is assimilated to Japanese syllable with geminates VCCV, it will be perceived as an extremely deviant exemplar of the category. Identification of VC structure will be good.
- However, voicing identification of the final consonant is expected to be poor because /bi/ and /pi/ could be assimilated to a single category of the voiceless geminates.
- Alternatively, if VC is not assimilated to any native categories, VC structure will be un categorized while CV is categorized as native Japanese category. This will also predict good performance for syllable structure identification. Since the listeners can access the fine phonetic details, voicing identification is also expected to be good.
- Performance will approximate English performance as the listeners experience to English increases.

RESULTS

Non-native syllable perception

1. Japanese listeners can identify the non-native syllable structure VC (/ip/ & /ib/ stimuli) when speech rate is slow.
- Afterward, a bias toward VC for CV stimuli.
- Despite their accuracy, monolingual Japanese (JY & JO) exhibited uncertainty about their answers.

Non-native voicing perception

1. Japanese listeners tend to perceive /bi/ as /pi/ or /ibi/.
2. Bias toward /pi/ responses is weaker for JA group than the other two monolingual groups JY and JO.

Subjects and Fast Stimuli

- 21 stimuli were spliced from each original utterance.
- 0%25% 50% 75% 100%

Tasks

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- 100% scale confidence rating for identification answers

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SUMMARY

- The non-native syllable structure was correctly identified by the Japanese listeners.
- However, native language experiences produced a bias on syllable structure perception and voicing perception.
- Non-native language experience had positive effects on both voicing and syllable structure perception accuracy.
- Native language effects appeared more clearly as the speech rate increases.
- The non-native syllable structure was perceived as an un categorized category for the listeners without English exposure.
- A bias toward a non-native VC category can be seen in the less experienced non-native listeners, but persistent phonemic categorization from the native language also existed.
- PAM can be applied to second language acquisition at prosodic level.


