Discrimination of vowel length contrasts in known/learned and unknown/unlearned languages by native speakers of American English

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Both Arabic and Japanese use vowel length contrastively unlike English. Not surprisingly, many studies have reported English-speaking learners' difficulty producing and perceiving length contrasts in Japanese. It is less clear, however, if and to what extent the experience learning Japanese may impact on non-native learners' perception of unknown/unlearned language, e.g. Arabic that has phonemic vowel length. Exploring this question will help us to better understand how generalizable second language (L2) learning might be to spoken language processing in general and subsequent foreign language learning in particular.

This study examined the discrimination of long and short vowels in Arabic and Japanese by native speakers of American English who were learning Japanese (NNJ, n=20) in the United States. The NNJ listeners' discrimination accuracy was compared to two control groups of listeners: native speakers of Japanese (NJ, n=5) and native speakers of American English who did not have any experience with Japanese (US, n=13).

The listeners participated in a two-alternative forced-choice (i.e. AXB discrimination) task and listened to 120 triads each (e.g. bin_3 – bin_1 – $biin_2$ where subscripts indicate different speakers) in Arabic and Japanese in counterbalanced orders. In both languages, C_1VC_2 words (where V was a short or long vowel (/i a u/ in Arabic and /i e a o u/ in Japanese, respectively) and C_2 was a nasal sound) were presented as stimuli. These words were originally produced in a short carrier sentence by native speakers of each language.

All three groups of listeners discriminated the two length categories with at least 80% accuracy, but they showed a different pattern of results for the two languages as shown in Figure 1. The NJ listeners were highly accurate in both Arabic (92%) and Japanese (95%). The NNJ listeners also showed a balanced level of accuracy in Arabic (86%) and Japanese (84%), but they were less accurate than the NJ listeners. The US listeners were clearly more accurate in Arabic (89%) than in Japanese (79%) despite not knowing either language.

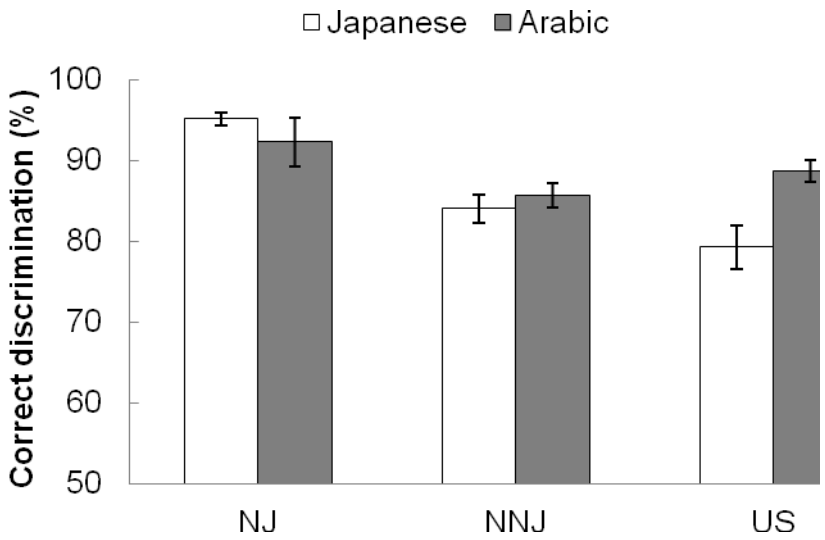

Figure 1 Mean discrimination scores for Japanese and Arabic stimuli by three groups of listeners. The brackets enclose ± 1 standard error.

A two-way ANOVA with Group (NJ, NNJ, US) as a between-subjects factor and Stimulus language (Arabic, Japanese) as a within-subjects factor showed a significant main effect of Group ($p < 0.05$) and a two-way interaction ($p < 0.01$). Between-group difference was significant only for Japanese ($p < 0.01$). The NJ group was significantly more accurate than the NNJ and US groups who did not differ from each other. A simple effect of Stimulus language was significant ($p < 0.01$) only for the US group who were more accurate in discriminating vowel length contrasts in Arabic than in Japanese.

The findings that 1) the NNJ listeners were less accurate than the NJ listeners and that 2) they did not show an advantage over the US listeners in discriminating length contrasts in Japanese reconfirm that it is difficult to acquire native-like perception in vowel length contrasts. However, the observed difference between the NNJ and US listeners in their response patterns to Arabic and Japanese is consistent with the view that cross-language speech perception remains plastic in adulthood.