The role of underrepresented geminates in word segmentation

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Introduction: Present study examines the effectiveness of geminates (double consonants) as a cue to word segmentation. Similar to previous findings that phonotactics facilitates word segmentation process (e.g. Cutler et al., 1986; Finn & Kam, 2008), the current results show that geminates are effective in the process as well. Moreover, the results suggest that during word segmentation, (a) listeners can generalize their native geminate patterns and make use of underrepresented patterns in their language, and (b) also learn new phonotactic patterns by training.

Participant languages: Native Japanese and English speakers were selected to participate because the two languages have contrastive patterns regarding geminates. Japanese has phonemic consonant length contrast and has *true geminates* (Hayes, 1986) that are phonemic in nature, including the /k, s, z/ geminates that are introduced in this study. However, /z/ geminates are underrepresented in the language and only available in few loanwords (NINJAL, 2005). On the other hand, English does not have *true geminates*, but only derived ones.

Experiment 1: 29 Japanese and 26 English speakers participated in a word segmentation experiment that consisted of a listening phase where they were exposed to a novel language and a test phase where they were asked about the words in the language they just heard. Two artificial languages were created by synthesizing six words per language and later concatenating the words into 10-minute strings. Language 1: *mɛzzɛ*, *tɛzzɛ*, *nɛkkɛ*, *bɛkkɛ*, *pɛssɛ*, *dɛssɛ*, and Language 2: *nʌzzʌ*, *pʌzzʌ*, *mʌkkʌ*, *dʌkkʌ*, *tʌssʌ*, *bʌssʌ*. The words contained either /k/, /s/, or /z/ geminates but only one type of vowel was introduced in each language. During the listening phase, participants were exposed to one of the two 10-minute language strings. In the following test phase, a forced choice task was given. In this task, they listened to one of the words in the Language (e.g. *mɛzzɛ*) and a part-word stimulus (e.g. *zɛtɛ*) and chose one that belonged to the language they just heard. The results show that the two participant groups, Japanese and English speakers segmented the speech string in a way that retained /k, s, z/ geminates. This means that they learned geminated words above chance. In addition, there was no significant difference in the results between the two speaker types for each consonant type.

Experiment 2: To make the languages slightly more complex, I introduced three vowels /æ, ɪ, ʌ/ instead of one per language. Language 3: *mæzzʌ*, *tʌzzæ*, *nɪkkʌ*, *bækkɪ*, *pɪssæ*, *dʌssɪ*, and Language 4: *nɪzzʌ*, *pæzzɪ*, *mɪkkæ*, *dʌkkɪ*, *tæssʌ*, *bʌssæ*. 32 Japanese and 24 English speakers participated in Experiment 2. Results show that Japanese participants were able to learn geminated words well like in Experiment 1. In contrast, English participants did not learn geminated words as well as they did in Experiment 2.

Discussion: The findings suggest that (a) listeners are able to extend their native phonotactic patterns by generalizing their native geminate patterns. Japanese speakers were able to learn novel words with /z/ geminates by generalizing their native phonotactics. Furthermore, the findings show that (b) listeners are able to learn new phonotactic patterns by training, as English speakers were able to learn geminated words in Experiment 1. However, their performance difference in Experiment 2 shows that when language becomes more complex, the role of native language phonology amplifies.

Selected References

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