The perception of complex onsets in English: universal markedness?

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INTRODUCTION

The primary aim of this study is to investigate speech perception difficulties among Japanese second language (L2) learners of English, in their learning complex syllable structures. Native Japanese speakers often break up English consonantal clusters by inserting a vowel [u] (e.g., "splash" → [s*u*p*u*lash*u*]). Since complex onsets are not allowed in Japanese, an English word such as "splash" cannot be mapped into a single syllable. Past studies have shown that modification of L2 syllable structure occurs at the level of L2 speech perception (e.g., Dupoux et al. 1999). Dupoux et al. (1999) demonstrated that Japanese listeners had difficulties in distinguishing the stimulus with a vowel (e.g., "*ab<u>u</u>ge*") and the one without a vowel (e.g., "*abge*").

The question of interest here is whether different degrees of difficulty exist in perceiving L2 complex onsets. Past studies have shown that English L2 learners whose native languages have relatively simple syllable structure have different degrees of difficulty in *producing* complex syllable and word onsets in English (e.g., Eckman and Iverson, 1993, Cardoso, 2008). Broselow and Finer (1991) tested native Korean and Japanese speakers on production of [pr], [br], [fr], [pj], [bj], [fj]. Based on the markedness principle of sonority, Broselow and Finer predicted relative difficulties to increase from least marked to most marked: pj - pr - bj - br - fj - fr. Results showed that the more marked clusters had higher error rates than the less marked ones for both language groups. The authors concluded that markedness of sonority applied to the production of L2 syllable onsets. The current study explored whether such "markedness" would be applicable to the perception of complex onsets among L2 learners.

METHODS

Thirty native speakers of Japanese served as the experimental group while five native speakers of American English formed the control group. A female speaker of American English produced stimulus materials for the experiment. Nonsense words were of the form /$C^1C^2(C^3)$ani/ and /$C^1VC^2(C^3)$ani/. An unstressed schwa served as the vowel between initial and subsequent consonants. There were 6 CC contexts (/sp, sk, pl, kl, bl, gl/) and 2 CCC contexts (/spl, skl/) in the perception task. These target words were produced in a short carrier sentence, "Say ____ now". An ABX task was employed in which participants heard three short sentences that contained the target word in a row (e.g., "say spani now" – "say s*e*pani now" – "say spani now") and answered whether the third target word was the same as the first or the second one by pressing a button (the first one would be correct in this example). The presentation of the trials was randomized for each participant, thus controlling for possible order effects.

RESULTS

Results showed that overall performance accuracy by the Japanese was poorer than for the Americans (72 % and 98% correct, respectively). The American group showed ceiling effects for all types of consonantal sequences (98% to 100%). In contrast,

the Japanese group's performance for all eight contexts was consistently lower (64% to 80%). Since the American group's performance was at ceiling on all stimulus types, within-group comparisons were performed only for the Japanese data. The Friedman's test showed that Japanese listeners' performance differed significantly by stimulus types (χ^2 (7df) = 30.61, $p < 0.001$). Wilcoxon signed-ranks tests for individual cluster types further revealed that there were no significant differences between CC (e.g., "/sp/") and CCC (e.g., "/spl/") contrasts but significant differences between voiced and voiceless plosive plus liquid pairs. However, a closer look of these results revealed that there were no significant differences between voiced and voiceless velar plosive pairs. These results provide weak evidence to support the markedness of sonority in perception of L2 complex onsets.

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