What Gives Rise to the "Language-Specificity" of Markedness:
The Case of the Acquisition of Fricatives and Affricates

This paper points out that the apparent language-specificity of markedness reported in previous studies stems from adults' perceptual bias (i.e., their misperception of infants' production of phonemes). Specifically, based on a perceptual experiment to adult speakers of four languages, I claim that the alleged crosslinguistic variation in the acquisition of fricatives and affricates are in fact a variation in adults' perception of the same infant speech.

Jakobson (1941/1968) claims that there are substantive universals in the order of acquisition of consonants: for example, stops and voiceless obstruents are acquired earlier than fricatives and voiced obstruents, respectively. However, several studies, such as Beckman et al. (2003) and Kubozono (2003), discuss the exceptional variability in the acquisition order of fricatives and affricates ((1) gives the reported orders of acquisition of fricatives and affricates in some languages). Nevertheless, this alleged exception goes against the general assumption that the markedenss hierarchy (or the order of phoneme acquisition) is universal.

(1) The language-specific orders of acquisition of fricatives and affricates:

a. Affricate-first:	J(apanese):	Yasuda (1970), Kubozono (2003)
	K(orean):	Ahn & Kim (2003)
b. Fricative-first:	C(hinese):	Hua & Dodd (2000)
	E(nglish):	Beckman et al. (2003)

In order to clarify the false image of the above crosslinguistic variation, I conducted an experiment which presents the same sets of stimuli ([ʃ]-[tʃ] continuum) to Japanese, Korean, Modern Standard Chinese, and English speakers. Stimulus syllables were created by deleting the frication of the recorded natural tokens of fricatives in the four languages, listed in (2), by 10 msec steps following the authorized methodology adopted by some relevant experiments like Repp et al. (1978) and Park et al. (1998). The subjects were presented all stimuli—made from both their native and nonnative sounds—and asked to choose between "SH" (for [ʃ]) and "CH" (for [tʃ]) for each of them.

(2) Natural tokens of fricatives:

	Phonetic transcription	Orthography used in the instructions
J:	ɕa ɕi ɕu	しゃ し しゅ
K:	ɕa ɕi ɕu	샤 시 슈
C:	ʂa ʂi ʂu	sha shi shu
E:	ʃa ʃi ʃu	shine, she, shoot

The subjects were grouped into two, as in (1). The affricate-first group consists of 14 subjects (J = 10, K = 4) and the fricative-first group 13 (C = 10, E = 3). Overall, as in Fig. 1, the fricative-first group tended to give "fricative (SH)" responses more frequently than the affricate-first one even though they heard the same set of stimuli. In other words, perceptual boundaries for SH and CH differed between the two groups (see Fig. 2 for an example). A two-way repeated measures ANOVA revealed that the main effects of the language groups and following vowel types were significant (F (1, 75) = 38.65, p < .001; F (2, 75) = 14.38, p < .001, respectively). The interaction between language groups and following vowel types were not significant (F (2, 75) = 1.26, p = .29).

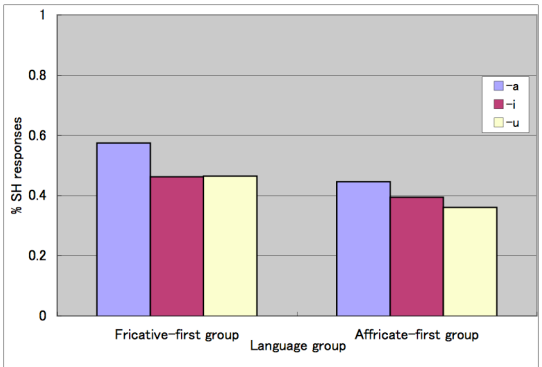

Fig. 1. Overall results (per following vowel)

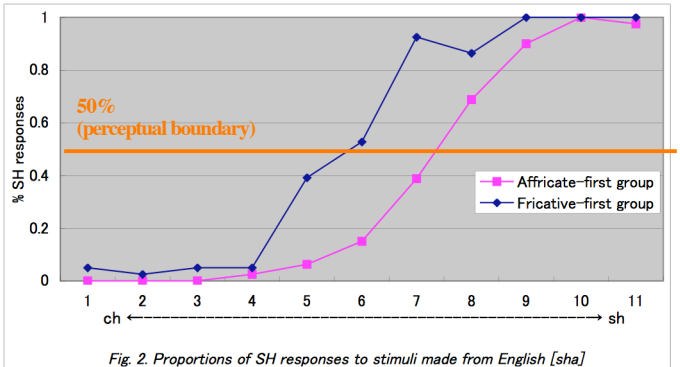

Fig. 2. Proportions of SH responses to stimuli made from English [sha]

These results manifest the correlation between infants' acquisition order and adults' perception bias concerning fricatives and affricates. This parallelism suggests two possible motivations for the crosslinguistic variability of fricative and affricate acquisition observed in previous studies. First, since infants start to be constrained by the phonemic system of their mother tongues by their first birthday (Polka et al. 2007), they might have acquired language-specific biases at an early stage of development. This may cause a preference for a certain manner of articulation. For instance, Japanese-acquiring children acquire affricates earlier than fricatives, for they have a preference for affricates, whose existence is inferred from Japanese-speaking adults' perceptual bias to affricates. Second, since infants' articulation is neither precise nor consistent (Nittrouer 1992), it is supposed to fall around adults' perceptual boundary. If adult listeners whose language has a fricative-bias (as in English and Chinese in the current study) hear such an ambiguous pronunciation, they are subject to fricative judgment (SH in the current study), or vice versa. Note that mistranscription from misperception is the problem that is frequently pointed out in the research of phonological acquisition (Haley et al. 2001; Beckman et al. 2003). This study expects that these factors play critical roles in the emergence of the language-specific orders of acquisition (or markedness hierarchy) of fricatives and affricates.

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