

## Perception of Illusory Vowels in Phonetic Contexts

Japanese speakers tended to hear an illusory vowel in illegal consonant sequences (Dupoux, Kakehi, Hirose, Pallier, & Mehler, 1999). Korean has no sequences of stop followed by nasal (kukmul → kuŋmul ‘soup’); therefore, it is expected that Korean speakers would perceive an illusory vowel in stop-nasal. In an identification task comparing 20 Korean and 20 English listeners on stimuli along a continuum that ranged from no vowel (igna/ikna) to a full vowel (igina/ikina), Korean listeners reported the presence of a vowel significantly more often than English listeners even when there was no vowel in the stimuli, as shown in Figure 1. However, this effect was found only when the stop was voiced, even though [kn] and [gn] are both illegal Korean sequences and voicing is not contrastive in Korean. In an AXB discrimination task, Korean participants had more difficulty discriminating ‘stop-nasal’ from ‘stop-i-nasal’ than English participants, again only when the stop was voiced, as illustrated in Figure 2. The results suggest that voicing, rather than simple illegality induces bias toward perception of illusory vowel in Korean.

Given that voicing is not a contrastive feature in Korean, this is not an expected result in a model that assumes perception is mediated by contrastive phonological features in native language (Brown, 1998). Rather, this is explained better in a model that assumes that all acoustic cues (whether contrastive or predictable) are available to listeners, but that the interpretation of these cues is guided by the native language perception grammar, which may induce greater attention to particular cues (Boersma & Hamann, 2009; Silverman, 1992).

Following Boersma and Hamann’s (2009) Optimality-Theoretic model, this paper develops a perception grammar that maps English voiced stop-nasal sequences, but not voiceless stop-nasal sequences, to the phonological representation containing an inserted vowel. Boersma and Hamann argue that a structural constraint that prohibits rising sonority over syllable boundary in Korean (SylCont) induces insertion of illusory vowels in stop-nasal sequences in the perception grammar. However, this account predicts that both voiceless stop-nasal and voiced stop-nasal sequences should be perceived with an illusory vowel. This is not consistent with the results found in the current experiments, as the perception of illusory vowels was significantly more frequent in voiced stop-nasal sequences than in voiceless stop-nasal sequences. Given that in Korean voiced stops occur only prevocally in intersonorant position (as an allophone of voiceless obstruents), a cue constraint that bans the perception of voicing in coda obstruent can be motivated. Although this constraint is included in Boersma and Hamann’s analysis, its role is different in the analysis that we propose. While Boersma and Hamann use this constraint to account for vowel insertion only in word final position, we argue that this constraint is sufficient to explain the pattern of vowel insertion between stop-nasal sequences as well as after a word-final stop. In summary, we have argued that Korean listeners’ perception of English stop-nasal sequences is explained better in a model that makes critical reference to acoustic cues rather than contrastive features.

Figure 1. Mean percentages of ‘vowel’ responses of English and Korean speakers in the two continua: (a) [gn- gin] and (b) [kn-kin]

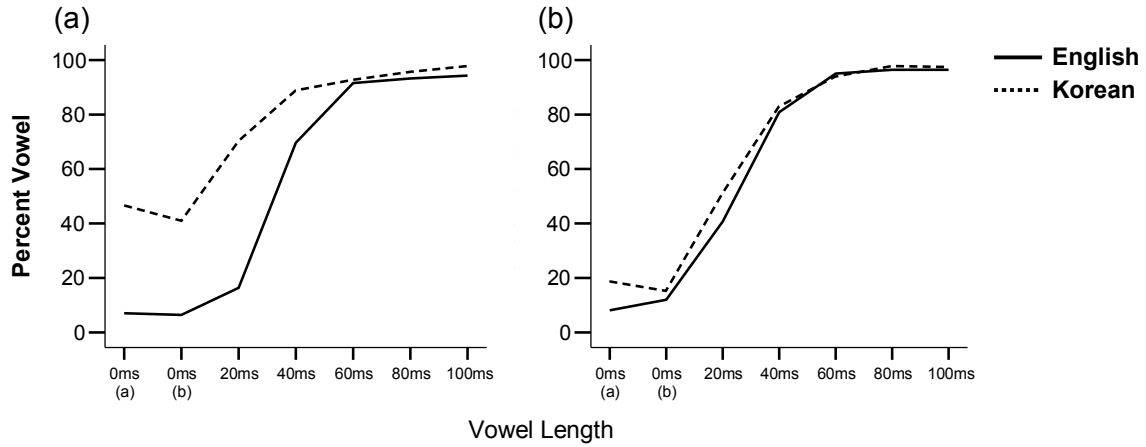
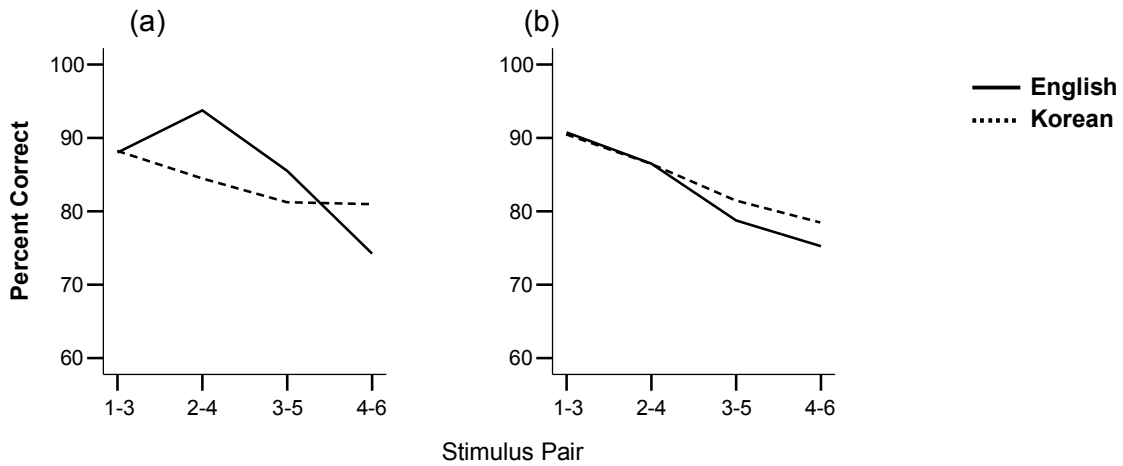


Figure 2. Mean discrimination accuracy of English and Korean speakers in the two continua: (a) [gn-gin] and (b) [kn-kin]



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