The role of acoustic evidence in resolving phonological ambiguity

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This work presents a cross-dialectal acoustic investigation of laryngeal properties of Korean /s/, a notoriously ambiguous segment which does not fit neatly into the three-way laryngeal contrast (fortis vs. lenis vs. aspirated) that characterizes the other Korean obstruents. /s/ has traditionally been considered lenis, patterning with lenis stops in several phonological processes (Iverson 1983), but phonetic evidence is mixed, with conflicting claims that the glottal configuration matches better with lenis (e.g. Kim et al. 2011) or aspirated (e.g. Kagaya 1974) categories, leading to proposals that /s/ requires a unique laryngeal representation that is neither lenis nor aspirated (e.g. Chang 2013).

Given the increasing importance of tone in the laryngeal system of Korean (Jun 1993, Silva 2006), an important piece of evidence for the phonological affiliation of /s/ is the patterning of the fundamental frequency at the onset of the following vowel (f0). Word-initial /s/ has been reported to pattern with the aspirated (and not lenis) stop series because it is produced with a relatively high tone in Seoul speakers (Cho et al. 2002, Kang et al. 2009, Chang 2013); however, this pattern is not consistent across dialects (Cho et al. 2002). Phonetic evidence is also mixed in terms of the presence vs. absence of intervocalic voicing, a process that characterizes lenis (but not aspirated) stops. While Kim-Renaud (1974) found fully voiceless word-medial /s/ tokens, Cho et al. (2002) reported voicing in about half of the productions in their dataset. The current work presents a systematic investigation of dialect, age, and speaker-conditioned variation in f0 and phonetic voicing in /s/, based on data from speakers varying in dialect (North Korean and Seoul) and age (older and younger speakers), with the larger aim of assessing to what extent these acoustic factors bear on the phonological affiliation (lenis vs. aspirated) of /s/.

Reflecting previous findings, we found that Seoul speakers produced word-initial /s/ with high tone (patterning more closely with aspirated than lenis stops). However, Northern dialect speakers showed the opposite pattern, producing /s/ with a relatively low tone, closer to lenis than aspirated stops. In terms of phonetic voicing, intervocalic /s/ ranged from completely voiceless to completely voiced, on average showing a degree of voicing intermediate between the same speakers’ lenis and aspirated categories. Variability in voicing was influenced by consonant duration, presence of aspiration, and individual speaker tendencies for more or less voicing overall; however, voicing patterns did not differ systematically by dialect or age.

Based on the dialectal differences in f0, we propose that phonetic ambiguity has contributed to an “ambilaryngeal” status for Korean /s/, providing two possible options for phonological affiliation. At the same time, the increasing importance of f0 in the Korean laryngeal contrast exerts pressure for consistency within dialects, leading to categorical group differences such as the ones reported here (i.e. Seoul /s/ as aspirated; Northern /s/ as lenis). On the other hand, the variable patterns of phonetic voicing for intervocalic tokens, which have also been cited as a potential source of phonological ambiguity for /s/, do not reflect these dialectal differences. Instead, they can be attributed to automatic processes of phonetic reduction and do not necessarily provide evidence for phonological laryngeal specification.
References


