

Prosodically conditioned lenition, not voicing, of lenis obstruents in Seoul Korean spontaneous speech

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This study investigates the realization of Accentual Phrase (AP) medial lenis obstruents in Seoul Korean (SK) spontaneous speech. While voicing of lenis has been the principal focus of previous work [1, 2, 3, 4, 5], this paper proposes that lenis realization exemplifies a more general prosodically conditioned lenition process: the reduction of lenis uniformly signal the continuity of the ongoing prosodic constituent in a gradient manner (the signal continuity view of lenition) [6, 7, 8, 9]. From this view, not just the voiced, but also the fricativized or approximantized realization of lenis can be accounted for, as well as apparently exceptional voiceless realizations, when preceded by devoiced vowels [2]. More generally, the proposal is that SK lenis is realized as a unimodal continuum over degrees of lenition/reduction, rather than a noisy bimodal distribution between voiced vs. voiceless variants (cf. [10] on Spanish and Catalan).

SK lenis voicing is an oft-cited prosodically conditioned process as it applies to AP-medial but not AP-initial lenis obstruents [1, 2, 3]. It is also famously not a categorical rule [1, 2, 3]: previous work limited to laboratory speech already found that AP-medial lenis can be more/less voiced and sometimes completely voiceless [3, 4]. However, other realizations of lenis have not been studied in detail, though it was reported that lenis can be acoustically reduced (not simply voiced but approximantized) in connected speech [5]. Yet, prosodically conditioned voicing and reduction in the realization of obstruents in other languages have been looked at together. These realizations all signal to listeners that the current prosodic constituent is continuing, as opposed to a voiceless/unreduced full stop which would abruptly disrupt the signal [6, 7, 8, 9]. This study parameterized the degree of acoustic reduction in terms of the negative extreme falling velocity (CVE in Figures) during the transitional interval from the preceding vowel to each lenis obstruent following [6, 8, 9]. A faster fall in intensity indicates a full closure, whereas a slow fall indicates that the obstruent is reduced, as it means that the intensity of the lenis is not much different from the preceding vowel. This paper investigated 58,779 PWD medial lenis obstruents in a spontaneous speech corpus of SK unannotated for APs [11]. Only PWD medial tokens were investigated since they were undoubtedly AP-medial [1]. The large corpus size and spontaneity of the production allowed for a wider variety of realizations of lenis than previously investigated [1, 2, 3, 4, 5]. In addition to CVE, the proportion of voiced interval was also measured using the ‘Voice Report’ function in Praat (‘Voicing’).

Fig 2 and 3 show the distribution of PWD medial lenis over Voicing and CVE. First, Voicing (Fig 2A) was bimodally distributed, with 17% of the PWD medial lenis being fully voiceless, replicating [1, 2, 3, 4], while CVE (Fig 2B) was unimodally distributed. Characterizing the variation of lenis realization only as a variable voicing process results in exceptional fully voiceless tokens and misses the generalization that the AP-medial lenis tokens are also reduced. In contrast, considering the degree of reduction (CVE) allows us to understand the variability of lenis realization as being gradiently lenited on a unimodal continuum [10]. Second, the reduced lenis obstruents were voiced after voiced vowels and voiceless after devoiced vowels, therefore yielding a small absolute difference in voicing (yellow region, Fig 3). In contrast, the less-reduced lenis obstruents were voiceless after voiced vowels, thus yielding a large absolute difference in voicing. This trend was also confirmed in a linear mixed effects regression model, which included other known factors that affect the realization of lenis obstruents (e.g., speech rate). In the present data, voiceless tokens occurred after non-high devoiced vowels, not just after high vowels, which earlier work showed were susceptible to devoicing [2]. However, unlike in [2], I argue from the signal continuity view of lenition that these voiceless tokens aren’t exceptional with respect to signaling the continuity of the prosodic constituent, like voiced and reduced lenis tokens. In conclusion, the pattern of lenis realization may be better characterized as a gradient reduction process rather than as a voicing process.

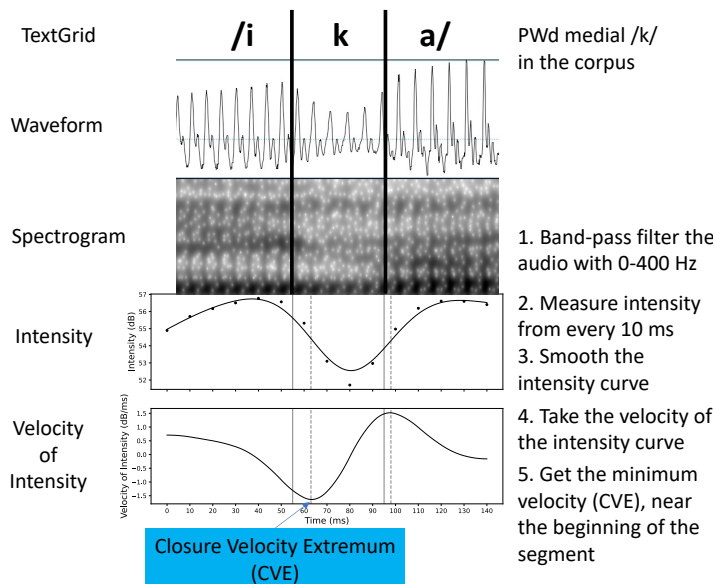


Fig. 1. This figure exemplifies how the Closure Velocity Extremum (CVE) is measured from a PWd medial /k/ token in the data. CVE is used as a measure of quantifying the degree of acoustic reduction of a lenis obstruent token.

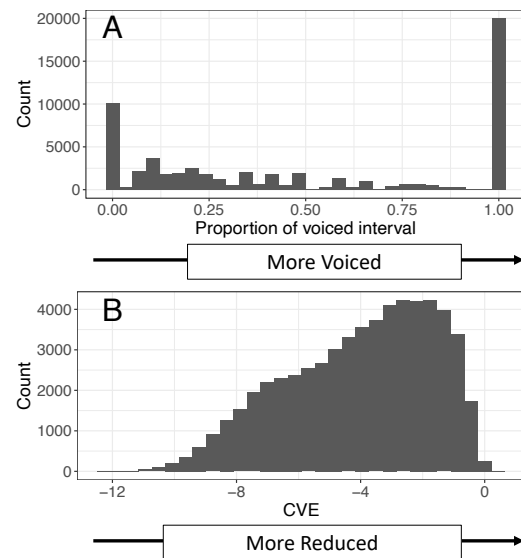


Fig. 2. A: Histogram of the proportion of voiced interval of the PWd medial lenis. **B:** Histogram of the Closure Velocity Extremum (CVE) of the same tokens.

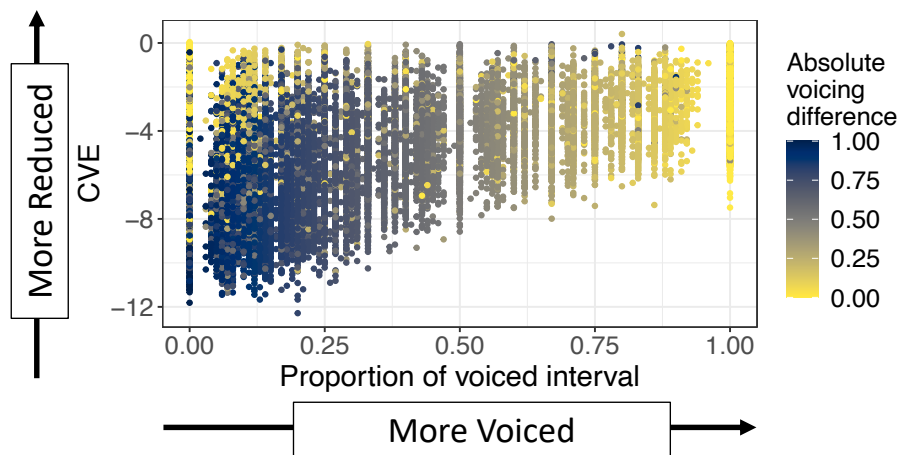


Fig. 3. Proportion of voiced interval and CVE of PWd medial lenis and the absolute difference of voicing between the preceding vowel and the lenis obstruents in color.

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