Gender-related variation of nasality and sound change of denasalization driven by prosodic boundaries in Seoul Korean: A preliminary report

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Degree of consonantal nasality and its influence on the vowel's coarticulatory nasalization can be modified by the prosodic structure in a language specific way [1]. In Korean, different from other languages such as Chinese, French and English, the nasality of the nasal consonant is extremely reduced in a phrase-initial position [1]. Due to the extreme reduction of nasality, it is considered that 'denasalization' is an on-going sound change in Seoul Korean [2], which is originated from a boundary-induced reduction of nasality in phrase-initial position [1].

The current study investigates the prosodically driven, on-going sound change of denasalization in Seoul Korean, examining effects of gender as a sociolinguistic factor and speech rate. First, given that females play a leading role in sound change [3], we examine whether younger females also show more innovative speech form in denasalization. In addition, given that speech production can be influenced by speech rates [2], we aim to study effects of two different speech rates (normal speech vs. fast speech) on degree of nasalization. It has been reported that acoustic cues tend to be systematically different depending on speech rates [2]. When speakers are asked to speak faster, because of time pressure in speech planning, they often show more gestural movement errors and pronunciation (e.g., stress) errors than in normal speech. Moreover, the speakers also cannot detect their speech errors in faster speech [4]. Thus, in the present study, we aim to test how the nasality of the nasal consonant and the degree of vowel nasalization is controlled by prosodic boundary and how the position-sensitive denasalization process can be different between the female versus the male speech in two different speech rates (normal vs. fast) in Seoul Korean.

Twenty speakers (F: 10, M:10) in their 20's from Seoul read a passage that contains the bisyllabic target words with nasal consonants (/mami/, /mima/). The passage was originally constructed to induce these words to be produced in different prosodic boundary contexts. To elicit an IP boundary context, the target names were preceded by an adverbial phrase, which aided the speaker in inserting a phrase boundary as in **Table 1** (a); and to elicit an IP-medial context, each target word was used as the second part of a two-word compound noun as in **Table 1** (b). The first and the second syllables were analyzed separately. Nasal duration (N-duration) of nasal consonant (/m/) and degree of vowel nasalization (V-nasalization, 25%, 50%, and 75% in the vowel for relative timepoints) were measured. We also measured A1-P0 at absolute time points (20ms, 40ms, and 60ms) from the vowel onset, but the results are not included due to the space limit.

The results are summarized in Figs, 1 (N-duration) and 2 (V-nasalization). First, we will describe results of N-duration (Fig.1). The main effect of speech rate was significant. When the speakers were asked to speak faster, the N-duration became significantly shorter in general. For the first syllable, Boundary effect was significant (shorter N-duration for IP-initial and longer N-duration for IP-medial) in both speech rates. More importantly, although N-duration was not significantly different between Genders, the females persistently nasalized the vowels more in IP-initial positions than the males in both speech rates (Fig 1.a). In terms of the second syllable, Boundary effect was also significant but there was no gender effect on N-duration in both speech rates (Fig 1.b). Next, turning on to V-nasalization, unlike N-duration, speech rate effect was not significant. Thus, V-nasalization was consistent across Gender and Boundary regardless of speech rate. For the first syllable, in both speech rates, the female speakers nasalized the vowel much more than male speakers in the IP-initial context (Fig 2.c). Notably, they nasalized the vowel to a larger extent, as much as they did in the IP-medial context. In contrast, the male speakers substantially reduced V-nasalization in the IP-initial compared to when in the IP-medial position (Fig 2.c). For the second syllable, there was no effect of either Boundary or Gender on V-nasalization (Fig 2.d).

In conclusion, both N-duration and V-nasalization were consistent in two different speech rates. More importantly, although N-duration was not significantly different between Genders, the females persistently more nasalized the vowels in IP-initial positions than the males in both speech rates. Unlike the previous findings [3], the results indicate that the on-going sound change is being led by males rather than females. We interpret that denasalization might be associated with negative social meanings in females' speech in Seoul Korean.

Table 1. Example sentences
Target words are underlined and '#' refers to a prosodic boundary.

Conditions	Target-bearing sentences
(a) #=IP	[# *mimanɛman kanun salamtɯkwa ʌtʃɛna # maminɛman kanun salamtɯlo nanwiʌssʌ]* '# It was divided into two groups who only go to the bakery 'mami' and bakery 'mima'' …미마네만 가는 사람들과 언제나 마미네만 가는 사람들로 나뉘었어.
(b) #=Wd	*[yaŋpʰa#mimapaŋ, kjɛpʰi#mimap*aŋ, yaŋpʰa#mamipaŋ, kjɛpʰi#mamip*aŋ ilʌnsikulo ilɯmul putyɛttæ]* 'They named as onion #mima bread, Cinamon #mima bread, Onion #mami bread, Cinnamon #mami bread. 양파#미마빵, 계피#미마빵, 양파#마미빵, 계피#마미빵 이런 식으로 이름을 붙였대.

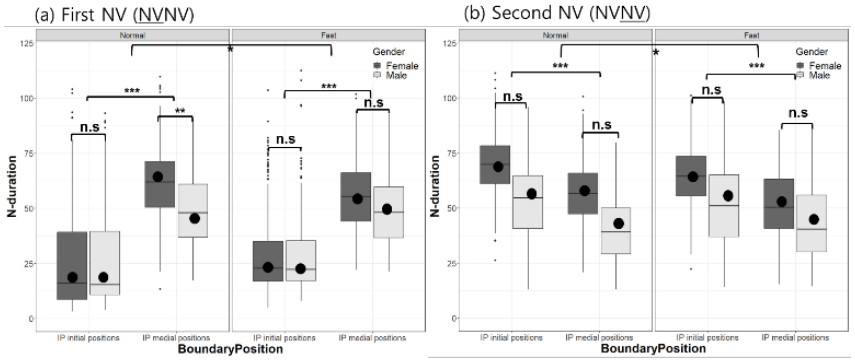

Fig 1. N-duration of first (a) and second (b) syllables across Boundary Positions in normal and fast speech (black dot represents mean values)

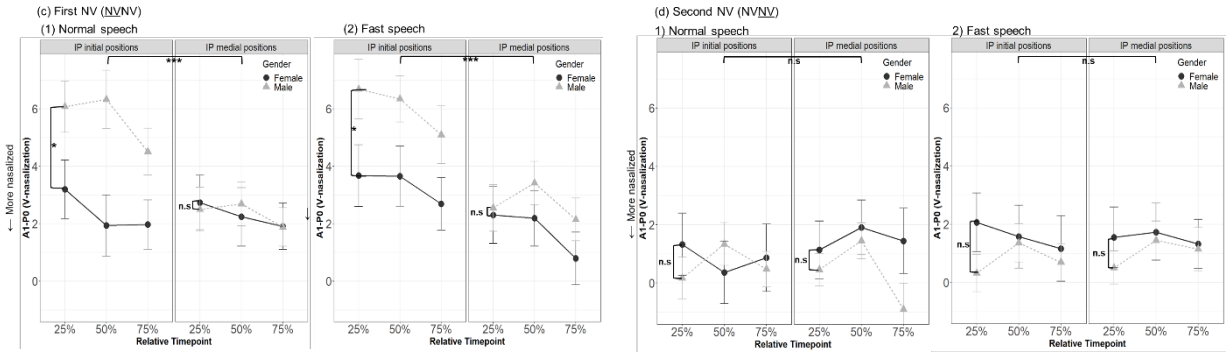

Fig 2. V-nasalization of first (c) and second (d) syllables across Boundary Positions in normal and fast speech

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