

How differing phonetic realizations influence perception of personal characteristics: Speech perception and vowel variations in Seoul Korean

There is a phenomenon called vowel raising in spoken Seoul Korean, where a lower vowel /o/ is raised and realized as [u] in suffixes including a clause connective *-ko* and a particle *-to*. It is related to many social factors such as dialect, age and gender (Yeon, 2012; Chae, 1995). The study by Chae (1995), which is the only study that scrutinizes social factors affecting this phenomenon, found that, in 1994, younger females were leading the sound change of vowel raising. Nevertheless, Chae focused mainly on speech production and did not explore speech perception in depth, using limited groups of participants and stimulus voices. Addressing this limitation, the current study aims to investigate how people perceive this vowel raising in Seoul Korean. More specifically, the following questions will be addressed: (i) Do people relate different social meanings to the raised and unraised vowel variants? and (ii) in addition to the vowel variation, is there any other factor that affects the perception of personal characteristics?

In order to answer these research questions, a perception test was designed using a matched-guise technique (Lambert et al., 1960). In this test, the stimuli consist of both /-ko/ and /-to/, and there are two guises, [o] guise and [u] guise, as shown in (1).

- (1) *nayil-un* *nalssi-to/twu* *chwup-ko/kwu* *palam-to/twu* *pwul-theynikka*
tomorrow-TOP weather-also cold-and wind-also blow-and so
ttattushan *os-ul* *ip-ko/kwu* *naka-sey-yo*
warm clothes-OBJ wear-and go out-HON-POL
'It will be cold and windy tomorrow, so please wear warm clothes when you go out.'

For target stimuli, recordings were made of twelve speakers of Seoul Korean who said the sentence in (1) twice, reading it first with the [o] variant and then with the [u] variant. In Praat, the [u] vowels in the second reading were copied and pasted into the first reading, replacing [o] with the raised variant [u]; the only difference between the two guises is whether the vowel is [o] or [u]. The 12 speakers' ages and genders were evenly divided: 2 older females, 2 older males, 2 middle-aged females, 2 middle-aged males, 2 younger females, and 2 younger males. Thus, a total of 24 items (12 speakers x 2 guises) were used as target stimuli. In addition, the test included the same number of fillers, which were recorded by six male and six female speakers of Korean as a second language and six male and six female Korean speakers from a city other than Seoul. They read the sentence in (1) with the two guises, and the recording that sounded more natural was chosen. Altogether, therefore, there were 48 stimuli, which were played to the participants in random order. The participants were instructed to complete a questionnaire where they answered 12 questions regarding the age and characteristics of each item's speaker. More specifically, the first question asked them how old they thought each of the speakers was, ranging from in their teens to in their 70s, and then they were asked to rate the speakers on various characteristics on a 7-point Likert scale. The questions asked about characteristics such as femininity for female voices, masculinity for male voices, cuteness, sincerity, trustworthiness, friendliness, conservativeness, outgoingness, educational level, economic class, and social class.

Thirty native speakers of Seoul Korean participated in this perception test. The participants were categorized according to age, gender, and social class as follows: (i) Two age categories: 20–29 and 40–49; (ii) Two gender categories: female and male; and (iii) four social class categories: lower working class, upper working class, lower middle class, and upper middle class.

The perception test data on female and male voices were separately fit into mixed effects models using the statistical tool, R, by hand. For both female and male voices, the dependent variable is, for each characteristic, is the degree to which the speaker has the characteristic in the participants'

perceptions, based on the Likert scores, and the random effects are the participants of the test. For fixed effects (or independent variables), I included all factors that were expected to affect the dependent variables and their interactions: vowel variation (voice guise), speaker's age, listener's age, listener's gender, and listener's social class. The results of the mixed effects models are shown in Table 1 for the female voice and Table 2 for the male voice.

Table 1. Summary of results for female voices

Characteristics	Factors that correlate with higher Likert scores for this characteristic
Educational level	Middle-aged voice ($p < 0.0001$)
Friendliness	Younger voice ($p < 0.0001$)
Formality	Middle-aged voice ($p < 0.04$)
Economic class	Younger voice with [o] variant ($p < 0.02$) For male listeners: all voices with [o] variant ($p < 0.006$)
Sincerity	Older voice with [o] variant ($p < 0.06$)
Conservativeness	For younger listeners: all voices with [o] variant ($p < 0.06$)
Outgoingness	[u] variant ($p < 0.006$) For female listeners: all older voices ($p < 0.02$)
Femininity	For female listeners: all older voices ($p < 0.04$)

Table 2. Summary of results for male voices

Characteristics	Factors that correlate with higher Likert scores for this characteristic
Friendliness	Younger voice ($p < 0.0001$)
Economic class	Middle-aged voice ($p < 0.0001$)
Conservativeness	For younger listeners: all older voices ($p < 0.04$)
Masculinity	Younger voice with [u] variant ($p < 0.04$)
Cuteness	Younger voice with [u] variant ($p < 0.005$)
Social class	Middle-aged voice ($p < 0.0001$)

The results show that speaker's age appears to most broadly influence the perception, in that age itself or its interaction with another factor play a role in listeners' judgment of 8 out of the 12 characteristics for female voices and 6 out of the 12 characteristics for male voices. Second, listener's gender and age also partially affect perception about traits of female and male voices. Listener's social class did not seem to cause any difference in perceptions of the speaker's characteristics. Finally, when it comes to the vowel variation (in bold in the tables), which is a main focus of this study, for female voices, the raised variant [u] leads a listener to perceive that a speaker is outgoing, while the unraised variant is indexed to being less outgoing. The different vowel variants also interact with speaker's age, listener's age, or listener's gender to affect the way participants perceive some of the speaker's characteristics. More specifically, when participants evaluated the economic class, sincerity, and conservativeness of female voices, the raised variant [u] had the following effects: younger females were perceived as having lower economic class; male listeners perceived speakers as having lower economic class; older females were perceived as having lower sincerity; and younger listeners perceived speakers as having lower conservativeness. For male voices, the raised variant [u] plays a role in leading to different perceptions when it interacts with voice age: participants evaluated [u] guise voices of younger males as having higher masculinity and [u] guise voices of both younger and middle-aged males as having higher cuteness.

In sum, I found that the participants' perception of personal characteristics differs depending on whether a speaker uses the raised variant or the unraised variant. Moreover, the speaker's age and the personal characteristics of the listeners interact with the vowel variation to influence perceptions of the speakers.