

SOCIOPHONETICS AT THE INTERSECTION OF VARIABLE PROCESSES: VARIATION IN ENGLISH (ING)

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ABSTRACT

Word-final unstressed English (ING) is a ‘showcase’ sociolinguistic variable, although variation in its vowel has received little attention. We analyse the social and linguistic factors conditioning the (ING) vowel in a socially stratified corpus of Toronto English. The vowels for the velar and alveolar variants show a high degree of overlap. A mixed-effects linear regression model of the normalised F1 values show that the preceding segment has the greatest effect, with interaction effects for social factors and following place of articulation also significant. These findings suggest that (ING) lies at the intersection of variation in both its components, consonantal and vocalic.

Keywords: sociophonetics, variation, vowels, consonants, nasals.

1. INTRODUCTION

The final consonant in English word-final unstressed *-ing* (ING) varies between a velar [ɪŋ] and an alveolar [ɪn] realisation. This ‘showcase’ variable of sociolinguistics has been well-studied in both production (e.g. [5,9,18]) and perception (e.g. [2,17]), and we have a good understanding of its historical origins and its conditioning by social, stylistic and linguistic factors.

However, less attention has been paid to variation in the vowel of (ING), despite occasional mentions in the literature. Recent work (e.g. [14,15]) drawing attention to the existence (at least in Canadian English) of a tense vowel with the alveolar variant [ɪn] has argued that we view the variation as three-way rather than binary. Chambers [4] suggests that the tensed variant is on the rise in Canadian English.

In this paper, we make use of a corpus of conversational Canadian English to address the following questions:

- i. Does (ING) have two variants or three (or more)?
- ii. Does vowel variation in (ING) exhibit the same social stratification as its consonant?
- iii. Are tense-vowel variants increasing in younger speakers?

We begin by providing an overview of the origins of (ING) and previous work on variation in its consonantal and vocalic realisations. We discuss the data used in this study and the methods and analysis employed to address the above questions.

2. THE STUDY OF (ING)

2.1. The origins of (ING) variation

The origins of variation in the realisation of the nasal consonant in (ING) can be traced to the historical convergence of two different morphemes in Old and Middle English: verbal nouns, derived by suffixing *-inge/-ynge*, and the progressive participle, formed by suffixing *-inde* [1,13]. With the loss of final unstressed *-e*, the morphemes developed into the forms *-ing/-in(d)* [7,10,21]. The marginal phonemic status of /ŋ/ in English may have led to convergence toward the alveolar realisation in both morphemes, with the velar variant persisting as a hypercorrection or spelling pronunciation [21]. Realisation of the vowel in (ING) has received little explicit comment, although there is sometimes discussion of variation between the forms [ɪn] and [əŋ], as well as the vowelless form [ŋ] and the “less common” [ɪŋ] and [əŋ] [20,21].

2.2. Sociolinguistic conditioning of (ING)

Variation between velar and alveolar realisations of the final nasal consonant appears to be a ‘vernacular universal’, occurring in all varieties of English to some degree [3]. This variation is conditioned by a fairly consistent set of social, stylistic and linguistic constraints. Higher rates of velars are associated with female speakers and with speakers of higher socioeconomic status, while higher rates of alveolars are associated with male speakers and speakers of lower socioeconomic status. Speakers of different ethnic backgrounds show different rates of use. Stylistically, velar variants occur more in formal speech and alveolar variants more in informal or casual speech [11].

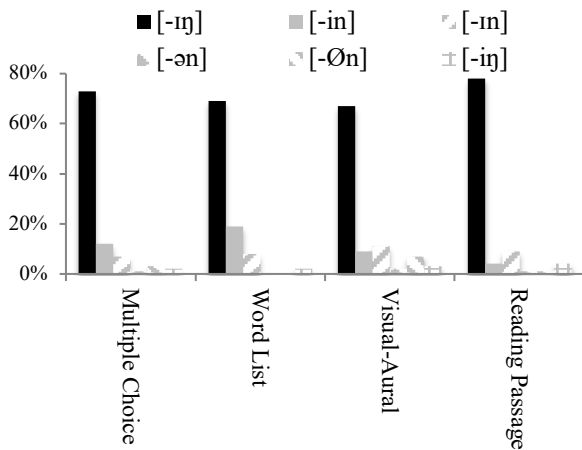
There is also general agreement about the conditioning of the variation by the linguistic context. Most important is the division between verbal forms, which favour the alveolar realization, and nominal forms, which favour the velar variant [10]. This conditioning has been traced back to the historical

origins of the variation discussed above. While phonological context has also been investigated, the results are not consistent across studies [19].

2.3. Vowel variation in (ING)

Many studies of (ING) note the variation in the realisation of the unstressed vowel (e.g. [21]) but few explicitly examine its distribution. In Gregg’s [6] survey of Vancouver English conducted in the 1970s, he coded not only for the place of articulation of the consonant but also distinguished between a syllabic nasal [-ŋn] and realisations of the vowel as schwa, a lax [ɪ] or a tense [i]. As Figure 1 shows, while the velar variant with a lax vowel is most common across all tasks, the alveolar variant with either a tense or lax vowel is the primary alternative.

Figure 1: Distribution of (ING) variants in Vancouver English [6].



3. VOWEL VARIATION IN TORONTO ENGLISH (ING)

3.1. Data

The data on which this study is based are taken from a long-term research project to investigate the sociolinguistic consequences of increasing ethnic and linguistic diversity in Toronto, Canada’s largest and most multicultural city. Making use of their pre-existing social networks, undergraduate student research assistants conducted and recorded sociolinguistic interviews between 1.5 and 2 hours in length with members of their respective communities. Speakers were stratified by ethnic background, with a control group of British/Irish background and speakers of Chinese (Cantonese), Greek, Italian, Portuguese and Punjabi background. Speakers were also stratified by generation, with 1st-generation informants having arrived in Canada as adults (after age 18) and lived there for at least 20 years. Second- and third-generation speakers were born in Canada (or arrived before age 5) and spent their whole lives there. Comparable samples of Canadian-born speakers of British/Irish background were collected

to match the age-groups of the other ethnolinguistic groups. All groups were equally balanced for sex.

This study uses a subsample of the corpus, as shown in Table 1. First-generation informants were excluded from the analysis because of their status as non-native speakers of English. The retention of the older British/Irish background speakers in the analysis allows us to investigate change in apparent time, by comparing their behaviour with that of younger speakers.

Table 1: Speakers included in the study.

Ethnic Background:	Female	Male
British/Irish, older	8	6
British/Irish, younger	6	6
Chinese, 2 nd /3 rd gen.	11	10
Greek, 2 nd /3 rd gen.	1	3
Italian, 2 nd /3 rd gen.	9	8
Portuguese, 2 nd /3 rd gen.	4	2
Punjabi, 2 nd /3 rd gen.	10	11
Total:	95	

3.2. Methods

The recorded interviews were transcribed into time-aligned files with ELAN [22] using standard English orthography. The transcriptions were force-aligned with the sound file using the FAVE suite [16], which was then used to automatically extract and measure all of the vowels in each interview. Vowel measurements were normalised using the Lobanov method. Vowel alignments were not hand-corrected but tokens were spot-checked with manual measurement to verify the accuracy of measurement.

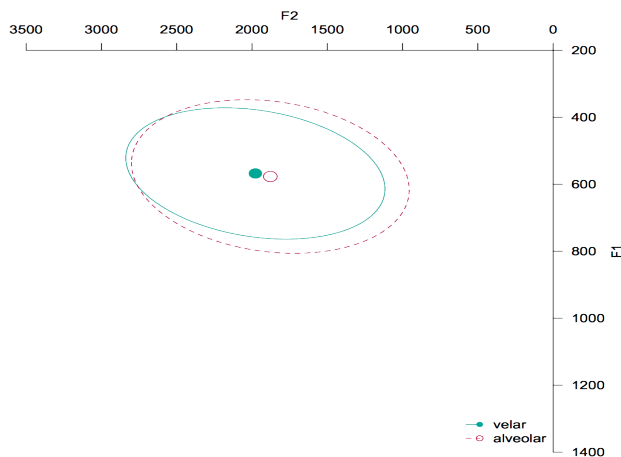
The vowel measurements were taken from each occurrence of word-final unstressed *-ing* with an audible, measurable vowel. This resulted in a dataset of 7,004 tokens, which were coded for a series of social and linguistic factors. The individual speaker was coded, along with their sex, ethnic background and (for British/Irish-background speakers) their age-group. Tokens were also coded for the individual lexical type (word) in which they occurred, along with the place of the following nasal (alveolar or velar) and the preceding segment (vowel, labial, alveolar, palatal or velar). The grammatical status of the word in which the token occurred was coded as noun (e.g. *morning*), verb (e.g. *I was walking*), adjective (e.g. *the walking dead*), preposition (e.g. *during*) or *-thing* compound (e.g. *anything, something*).

3.3. Results

In order to verify whether the realisation of the vowel correlated with a particular consonantal variant, all of the tokens were plotted using the PhonR package in R [12] according to the place of the following nasal.

As Figure 2 shows, there is a high degree of overlap in the distribution of (ING) vowels with a following alveolar and a following velar, which suggests that the two consonantal variants are not distinguished with respect to the positions of their vowels. Nevertheless, the two means do not overlap entirely and the alveolar variant appears to feature a wider range of vowel realisations than does the velar variant.

Figure 2: Overall distribution of (ING) vowels by following place of articulation.



To test differences in vowel height more systematically, we ran a mixed-effects linear regression analysis using the stepup/stepdown procedure incorporated in Rbrul [8]. The Lobanov-normalised F1 values were included as the dependent variable (as a measurement of vowel height), speaker and word were included as random effects and the speaker's ethnicity(/age-group) and sex, the place of articulation of the preceding and following segment and the grammatical status of the word were included as fixed effects. We asked Rbrul to test for interactions between the social and linguistic factors.

The results of the regression analysis are shown in Table 2, which displays the logodds values from the best stepdown run. (Because the unit of measurement is F1, a lower logodds value indicates the likelihood of a higher vowel articulation.)

The factor with the greatest effect is the place of articulation of the segment preceding the vowel, with preceding palatals and velars favouring a higher vowel articulation.

The second greatest effect is that an interaction between the ethnic background(/age-group) of the speaker and the following place. British/Irish-background speakers, regardless of age, tend to

produce higher vowels with following velars (although this effect is stronger for the older speakers, suggesting that it might be weakening for the younger speakers). In contrast, younger speakers of other ethnic backgrounds (with the exception of the Portuguese) tend to produce higher vowels with following alveolars.

Table 2: Contribution of social and linguistic factors to the realisation of F1 of vowels in (ING) ($n = 7,004$). (Random effects: speaker, word.)

Preceding place ($p < .000$)	
Vowel	41.177
Liquid	21.983
Alveolar	-3.032
Labial	-8.014
Palatal	-18.208
Velar	-33.706
Ethnic background (/Age-group) x Following place ($p = .0001$)	
British/Irish (older) x alveolar	16.765
Greek x velar	11.744
Chinese x velar	4.201
Italian x velar	4.145
British/Irish (younger) x alveolar	3.893
Punjabi x velar	1.578
Portuguese x alveolar	1.012
Portuguese x velar	-1.012
Punjabi x alveolar	-1.578
British/Irish (younger) x velar	-3.893
Italian x alveolar	-4.145
Chinese x alveolar	-4.201
Greek x alveolar	-11.744
British/Irish (older) x velar	-16.765
Sex x Following place ($p = .01$)	
Female x velar	3.455
Male x alveolar	3.455
Female x alveolar	-3.455
Male x velar	-3.455
Grammatical status ($p = .02$)	
Preposition	17.535
-thing compound	12.700
Adjective	-4.197
Noun	-12.174
Verb	-13.863

Also significant, though less so, is an interaction of sex and following place, with female speakers producing higher vowels with following alveolars and males producing higher vowels with following velars.

Finally, the grammatical status of the word was significant, although the effects are not the same as those reported for the consonant variation in (ING). Instead of a noun/verb split, we see a split between major word-classes (verb, noun, adjective) on the one hand and prepositions and *-thing* compounds on the

other, with the former favouring higher vowel realisations.

4. DISCUSSION

We are now in a position to answer the questions posed at the beginning of this paper.

Instead of specifying a number of variants for (ING), it might be better to think of the variation as occurring along two dimensions: consonantal, in which the place of articulation varies between alveolar and velar; and vocalic, in which the vowel ranges between a schwa-like central vowel and a tense high vowel. Some of the effects of linguistic conditioning may be traced to co-articulation, with higher vowels produced in the environment of a preceding 'high' consonant (palatal or velar).

Social stratification of the vowel is evident, but this patterning cannot be extricated from the effects of following place. We see a sex-based split, with women favouring [in] and men favouring [ɪŋ]. There is also a split based on ethnic background, with British/Irish-background speakers favouring higher vowels with a following velar and speakers of other ethnic backgrounds favouring higher vowels with a following alveolar.

The age-based difference, in which the effect of following velars is weakened in younger speakers of British/Irish background, suggests that there may be a change toward a tenser variant with following alveolars. However, if this is an ongoing change, it seems to be led by ethnic groups other than the British/Irish.

4. CONCLUSION

Variation in the place of articulation of the vowel has been generally acknowledged but its distribution and conditioning has not been investigated. As a result, it is difficult to know whether the effects observed here are unique to Canadian English. Studying the phonetic realisation of this vowel is made difficult by its lack of stress and relatively short duration, as well as the obscuring effect that the place of the following consonant has on perceiving the vowel. These considerations provide an impetus or future studies of (ING) to take into consideration not only the variation of its consonant but also that of its vowel.

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