

# THE COMPLETION OF A SOUND CHANGE IN CALIFORNIA ENGLISH

*Lauren Hall-Lew*

University of Edinburgh, UK

Lauren.Hall-Lew@ed.ac.uk

## ABSTRACT

The fronting of the nucleus of the high back vowel /u/, as in the keyword GOOSE [21], is a sound change in progress that has been widely documented throughout the English-speaking world. This paper provides a detailed analysis of the GOOSE-fronting among a sample of 30 speakers from San Francisco, California, stratified according to age, gender, and ethnicity.

**Keywords:** vowel fronting, sound change, age, ethnicity, English

## 1. INTRODUCTION

The fronting of the nucleus of the high back vowel /u/, as in BOOT or GOOSE is a sound change in progress that is widespread throughout the English-speaking world. It has been documented in the United Kingdom [9, 10], South Africa [15], the United States [2, 3, 4, 5, 6, 11, 13], and elsewhere.

This paper provides a detailed analysis of GOOSE fronting among a sample of 30 speakers from San Francisco, California, stratified according to age, gender, and ethnicity. The results show a correlation between fronting and age, at least in some environments, indicating that the change is still in progress. However, fronting neither correlates with speaker gender nor ethnicity, which has important implications for theories of how social factors constrain changes.

### 1.1. Previous studies on California English

No GOOSE fronting was observed in California as recently as the 1950s [17], indicating that the change is relatively more recent than in other dialects, such as Southern Standard British [9]. Fronting was first documented in California in 1987 [11], based on the auditory coding of 22 young speakers of varying ethnicities who were primarily from the San Francisco Bay Area. More recent acoustic analysis of Southern Californians [5] corroborated these findings. The Atlas of North American English [13] presents acoustic evidence for GOOSE fronting in the speech of one San

Franciscan, a woman of age 45. The other San Franciscan analyzed, a 68 year-old man, only shows fronting after coronals.

In part because of the highly multi-ethnic nature of the Californian population, some studies of GOOSE fronting in California have considered speaker ethnicity as a potentially relevant factor. Two studies in particular considered fronting among Mexican Americans. In the 1980s, Godinez and Maddieson [4] found that GOOSE fronting was not as strong among Mexican Americans in Southern California as among European Americans. However, Fought [2] recently found significant fronting of post-coronal GOOSE among Mexican Americans in Southern California, with fronting varying with respect to a speaker's network structure, gender, and social class.

Hinton, et al., [11] note that back vowel fronting in the 1980s was a feature of mock representations of California English, specifically 'Valley Girl' and 'Surfer Chick' personae. They argue that the fronting of both GOOSE and GOAT vowels was stigmatized and avoided by certain speakers. The present paper suggests that, for the GOOSE vowel in particular, fronting is actually nearing its completion, despite the continued correlation with age, and that one sign of this is its simultaneous loss of its stigmatized social associations. The present paper also considers ethnicity, comparing fronting among Asian Americans and European Americans.

### 1.2. Known phonological constraints

Many varieties of English across the world have fronted productions of the traditionally back vowel GOOSE. Fronting is promoted when preceded by a coronal [1, 9, 18], specifically *anterior* coronal [1], because of the high F2 environment. Ohala [16] suggested that fronting advances through a community as listeners reinterpret a high F2 as an inherent property of the vowel. Fronting is inhibited when GOOSE is followed by /l/ because of the low F2 environment.

In San Francisco English, fronting typically only pertains to the nucleus, while the off-glide is generally kept high and back.

## 2. METHODOLOGY

Data come from a larger, semi-ethnographic project looking at sound change and ethnic identity in one neighborhood of San Francisco known as the Sunset District. Semi-ethnographic fieldwork and interviews were conducted by the author in 2008, and details of the social analysis are published elsewhere [7, 8].

### 2.1. Speakers

The 30 speakers analyzed were of either European American (EA) or Asian American (AA) ethnicity. The 14 EAs identified as Irish, the Italian, German-Jewish, Polish, or mixed/other heritage. The 16 AAs identified mostly as Chinese (of various backgrounds) as well as Japanese, Filipino, and mixed ethnicity. 17 of the speakers were female, 13 male, and they ranged in age from 16 to 76. All have lived in San Francisco their entire lives and are English-dominant.

### 2.2. Data collection

All vowel tokens under analysis were extracted from one-on-one, face-to-face sociolinguistic interviews of approximately an hour in length.

#### 2.2.1. Including and excluding tokens

All instances of the GOOSE vowel were collected and classified as following a coronal consonant (TOO) or not (KOO). Any vowel following a /j/ glide historically or in other dialects (such as *dew*, *cute*) was excluded. Tokens with a following /l/ (COOL) were also classified separately.

The analysis is based on 376 tokens of the TOO type, 346 tokens of KOO type, and 328 tokens of the COOL type. All productions were in primary stress position; most were in monosyllabic words.

### 2.3. Measuring fronting

Measurements were taken at the midpoint of the steady-state of the vowel (the point of the highest F1 value), as well as the vowel off-glide (taken approximately two glottal pulses from the end of regular voicing). Since the onset is the part of the vowel most influenced by the place of the preceding consonant, the midpoint data for the post-coronal context is an underestimation of the actual extent of fronting. No off-glide data

indicated fronting of the glide, so the present analysis focuses only on the midpoint values.

Fronting was calculated as the average distance in F2 between GOOSE and the stable front vowel of similar F1 height, /i/ or FLEECE. Fronting could rather have been calculated as distance from the back of the vowel space, represented by COOL [6]. However, most of the speakers in this sample have a lower production of COOL than GOOSE (in F1), and a few speakers have variable fronting of the vowel in COOL. Fronting could also have been calculated with respect to the low back vowel in CLOTH [21], but the position of this vowel is variable in California English.

The calculation ignores F1 differences because these play a minimal role in the fronting process. Similarly, although fronting often involves the unrounding of the nucleus, F3 measurements were not considered in this analysis.

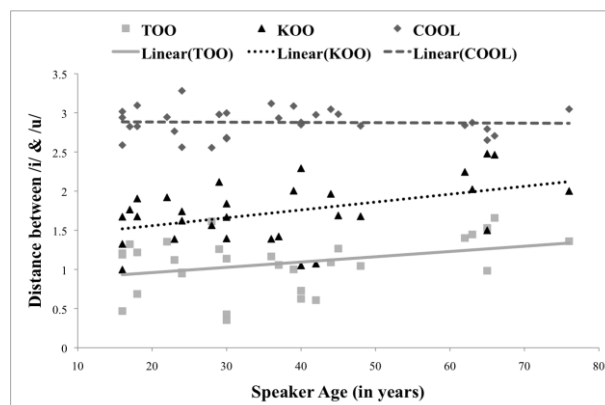
### 2.4. Normalization and statistical modeling

All calculations were based on Bark-converted formant data [19] normalized by applying the formant intrinsic Lobanov algorithm [14, 20].

Statistical analyses were based on average F2 differences between FLEECE and GOOSE (in TOO and KOO environments). The social factors entered into the linear regression model were speaker age (continuous), ethnicity (binary), and gender (binary), and interactions between these three.

## 3. RESULTS

**Figure 1:** Fronting of GOOSE correlates with age in non-coronal environments, but not after coronals (which are the most fronted) or before /l/ (the least).



The results are presented in Figure 1. Lower formant difference values (on the y-axis) indicate closer proximity between FLEECE and GOOSE, or more fronting. The well-known effect of a

preceding coronal context obtained in these data as well: post-coronal (TOO) contexts are fronted further than elsewhere (KOO) contexts, and younger speakers produce a slightly more fronted vowel than older speakers. Tokens that occur with a following /l/ are not fronted at all, and there is no age-based indication that this environment will ever show fronting.

### 3.1. Results for all contexts (GOOSE)

Collapsing across all phonological environments, there is a significant correlation between fronting and speaker age, indicating a change in apparent time across the whole community ( $F[1,29]=6.9$ ,  $p<0.05$ ). There was also an overall trend effect of gender ( $F[1,9]=3.3$ ,  $p=0.081$ ), but no effect of ethnicity, nor any interactions between factors. Specifically, younger speakers showed greater fronting than older speakers, and there was a trend towards women fronting further than men.

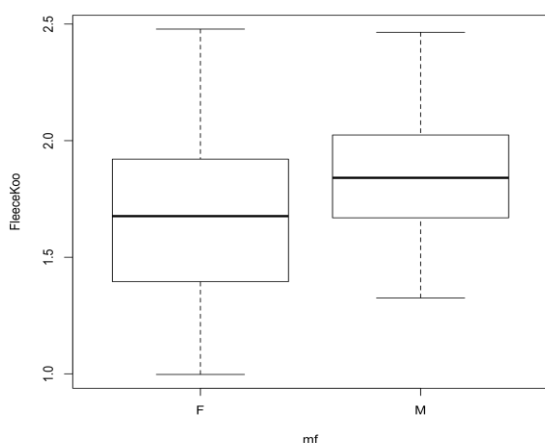
### 3.2. Results for post-coronal contexts (TOO)

The results showed no significant correlations between social factors and fronting in post-coronal contexts; the correlation with age is only trending ( $F[1,29]=3.5$ ,  $p=0.075$ ). There were no correlations with speaker ethnicity or gender.

### 3.3. Results for elsewhere contexts (KOO)

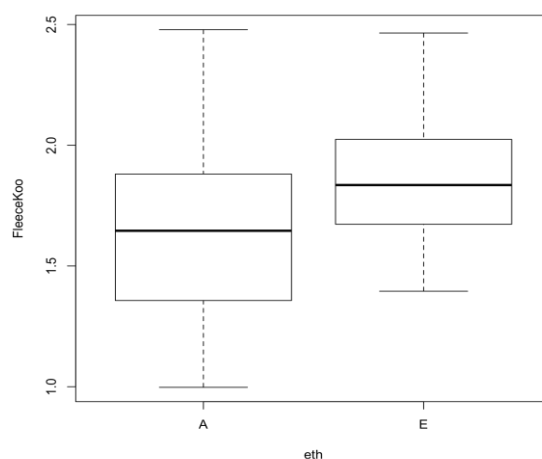
Correlations between social factors and rates of fronting did obtain for productions of GOOSE that follow non-coronal consonants. The correlation with age was highly significant ( $F[1,29]=8.7$ ,  $p<0.01$ ). There were trend correlations for gender ( $F[1,29]=3.2$ ,  $p=0.089$ ) and ethnicity ( $F[1,29]=3.3$ ,  $p=0.085$ ). No interactions were significant.

Figure 2: Fronting of KOO by speaker gender group.



Figures 2 and 3 indicate why correlations with gender and ethnicity were only trending: differences between groups were only apparent among the speakers with the most extreme fronting. In other words, men and women were equally likely show the least amount of fronting, but the women with the most KOO fronting had higher F2 values than the men with the most KOO fronting. For ethnicity, Asian Americans and European Americans were equally likely show the least amount of fronting, Asian Americans with the most KOO fronting had higher F2 values than the European Americans with the most KOO fronting.

Figure 3: Fronting of KOO by speaker ethnic group.



## 4. DISCUSSION

Age was a significant variable overall, indicating that the fronting of the GOOSE vowel is still a change in progress in Northern California. However, there is some evidence to suggest that the change may be nearing completion. Age was not found to be significant in post-coronal contexts, despite all earlier studies indicating finding that it was. In other words, the phonetic environment that most encourages fronting, where the sound change initially began, appears to no longer be correlated with age. Since post-coronal vowels are produced further front than those in other contexts, the lack of an apparent time correlation for post-coronal contexts suggests that fronting may be nearing completion. All speakers regardless of age produce fronted GOOSE vowels after coronals; the apparent time change is now limited to vowels in non-coronal contexts (see a similar result in [10]). Correlations with other social factors, including ethnicity and gender, also no longer obtain for post-coronal vowels, while there was still at least a

trending correlation when following non-coronals. Furthermore, speaker ethnicity was never found to be a significant factor for this sound change. This is itself an interesting finding, because some theories [12] predict that non-White speakers lag behind White speakers with respect to U.S. English vowel change. However, these results unequivocally show that there is no difference between the two ethnic groups. Furthermore, one trend effect for ethnicity points in the opposite direction. If anything, the Asian American speakers are the ones leading in this change. The evidence for this comes from trend correlations with respect to the fronting of GOOSE in non-coronal environments, in particular. A closer look at the data reveals that the youngest Asian Americans are producing the most fronted tokens and the oldest Asian Americans are producing the least fronted tokens in the whole sample.

Gender patterned similarly to ethnicity in some instances, in the sense that a correlation between fronting with gender indicated a strong trend when age was included in the model. This was only the case when post-coronal and elsewhere contexts were collapsed together. Unlike previous studies on the fronting of GOOSE (but like the pattern found here for ethnicity), gender on its own was not a significant predictor. The question is if a gender correlation would emerge with greater statistical power, or if the lack of a correlation with gender is another indication that the sound change is nearing the end of its trajectory and losing its saliency as a social marker.

## 5. CONCLUSION

This paper presents the analysis of GOOSE-vowel fronting based on interview speech from a stratified sample of speakers of California English. The results show that fronting is still a change in progress. Furthermore, speakers of Asian heritage are *not* trailing their European heritage counterparts with respect to the change. There are no significant differences with respect to ethnicity. If anything, Asian Americans are slightly leading.

The change itself appears also to be nearing completion, with no apparent time correlation evidenced in those contexts that most encourage fronting. Correlations with other social variables, which show suggestive associations in non-coronal contexts, are weakest in coronal contexts, indicating that the sound change may be losing its social associations as it nears completion.

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