The PIN/PEN Merger

Isaiah Solorzano

The PIN/PEN Merger Throughout Kansas
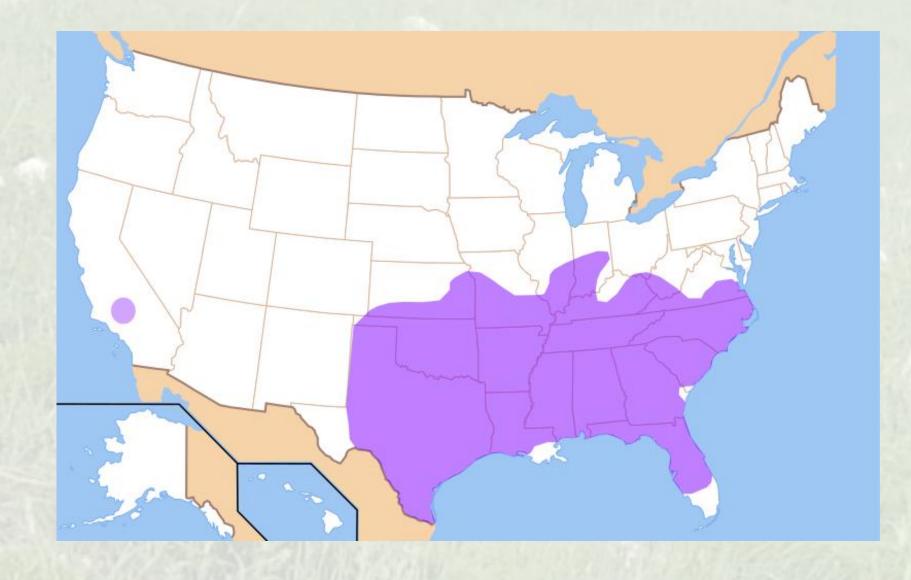
Isaiah Solorzano & Mary Kohn
The Developing Scholars Program & The Kansas Speaks Project
Department of English
College of Arts and Sciences

KANSAS STATE UNIVERSITY

Introduction

Mergers, a sound change that present themselves in the background of everyday conversations, usually go unnoticed and uninterrupted across speech communities. Pin/Pen is a merger that has been shown to be expanding North even as this variable is traditionally associated with Southern Dialects. In 2014, Strelluf suggested the low-back merger is present in Kansas City due, in part, to a large initial population of South Midland speakers. This study indicates the merger should be advancing into the Great Plains region. We do not understand, entirely, how or why sound changes advance. This project builds on Strelluf's insights of sound change, in Kansas City, by 1) empirically exploring data to detect changes in Kansas, and 2) framing issues in a broader sense to understand how this dialect has arose, using a structural and social explanation.
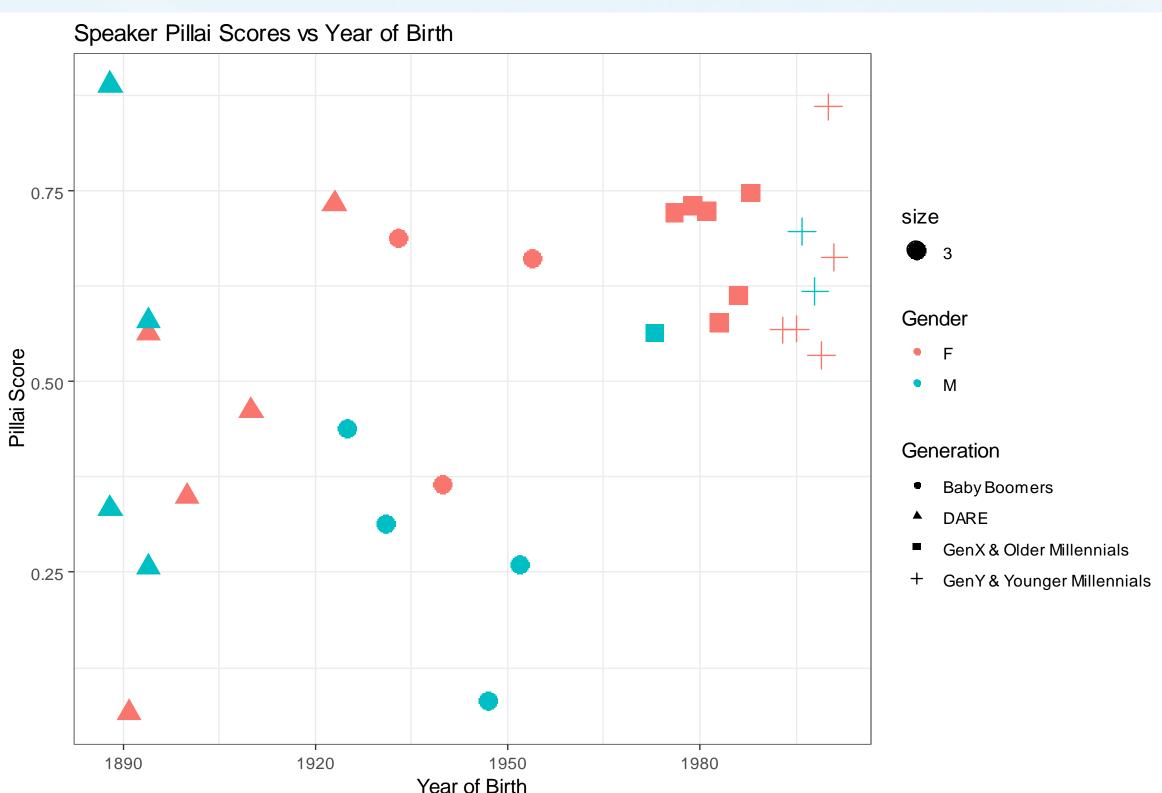
Background

The Pin-Pen merger is a conditional merger of /ɪ/ and /ɛ/ before the nasal consonants [m], [n], and [ŋ]. In Southern American English the merger is complete for most speakers, with some exceptions. It is also found in some Midland Regions of the US (Labov 2006). Some examples of words pairs where these short vowels are found to be merged are pen-pin, gem-gym, him-hem, etc. The short vowels found in these words have been shown to be changing throughout time. The merged vowel sound /ɪ/ is starting to occupy the space of the /ɛ/ vowel.

The merger is continuously present and is even shown to be expanding throughout the United States. Fieldwork is showing that this change is widespread through Kansas City, Houston, Seattle, and even California (Strelluf 2014 & Koops 2008).

Linguistic Analysis

We analyze the first two formant frequencies, F1& F2, of 30 speakers. The speakers are broken up into four generational groups represented in the figure below. Contemporary speakers are residents of Tipton, Abilene, and Emporia, while DARE heritage speakers were sampled throughout the state. The figure below measures the Pillai score of formant frequencies for each speaker, on average, and their birth-year.
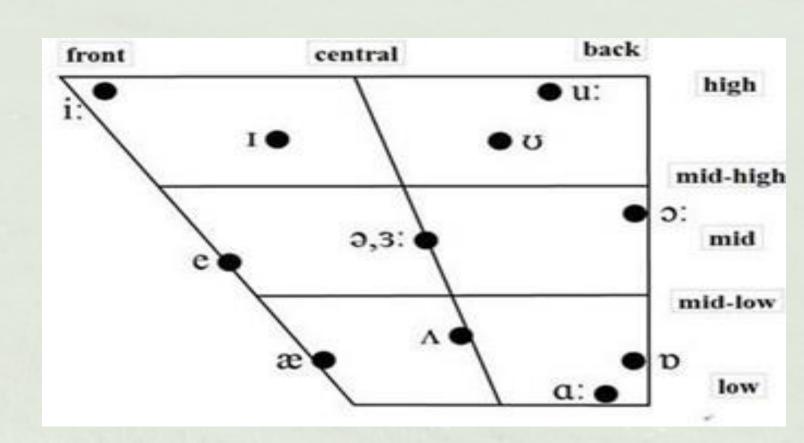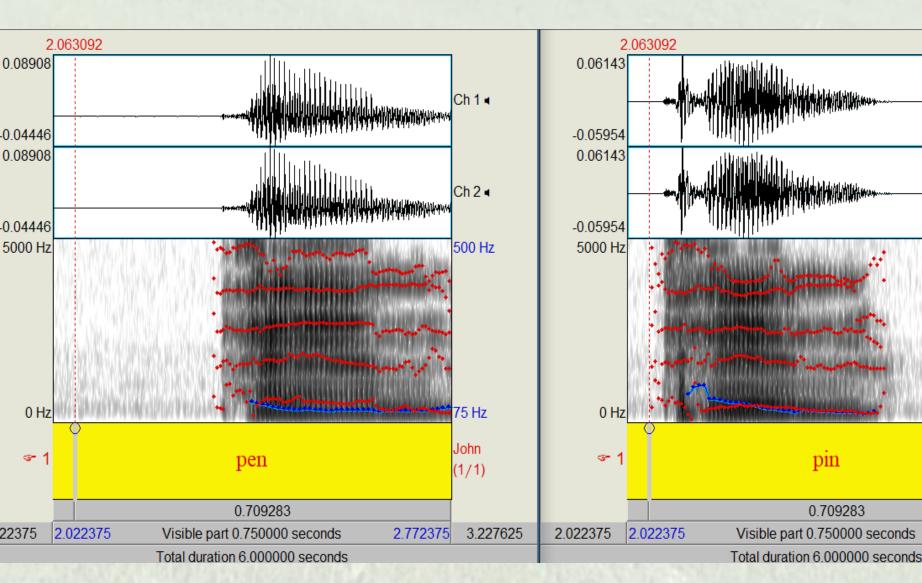

Speaker Pillai Scores vs Year of Birth

The Pillai score, formally known as the Pillai-Bartlett trace, is simply a statistic that is part of the output of a MANOVA model. MANOVA is a type of ANOVA that models variation with respect to more than one dependent variable simultaneously, such as both F1 and F2. The higher the value of the Pillai statistic, the greater the difference between the two distributions with respect to these dependent variables

Vowels Space | Formant Frequencies

Here is a descriptive figure of the vowel space system used in the English language to help illustrate where the vowel space of /ɪ/ and /ɛ/ are located relative to other vowels produced:

Note the red dots under the soundwaves. The first two lines represent F1 and F2. Notice how the formants here are wider apart for pin than for pen. Speakers with a merged vowel system would have formants that appear similar for both words.

An example of F1 and F2 formant frequencies in PRAAT software.

Methods

The independent variables include gender, age, class, and ethnic group. The dependent variables include formant frequencies F1 and F2, stress, duration, and other linguistic variables. We use a sample population of 30 subjects. We predict that men and the working class are leaders of this change, coinciding with Strelluf, but going against standard hypothesis over mergers in the field today.
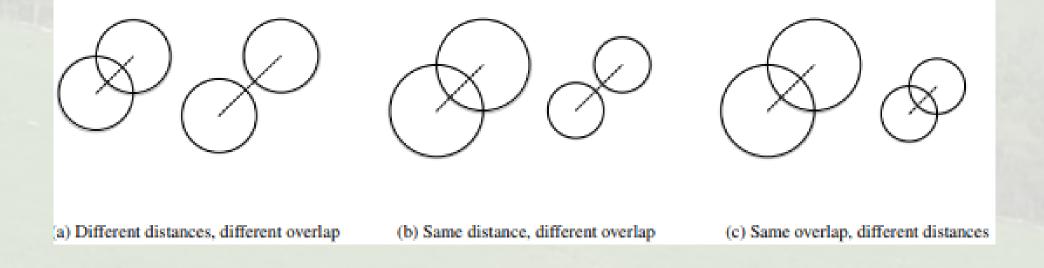
DARE

The Kansas Speaks Project documents language variation and change throughout the Great Plains region

Our data is a corpora collected in 2014-2018 by Kansas Speaks student workers. This data was used in measuring the Pillai scores of 21 speakers. DARE recordings were collected in 1968 as part of a national project.

To extract the vowels from the recorded audio interviews we used Forced Alignment Vowel Extraction (F.A.V.E). A method that is used throughout the field to analyze sociophonetic information in recorded audio.

The Pillai scores here take into consideration the preceding place of articulation as the preceding sound would affect the formant values and needed to be controlled for.

The relationship is between distance and overlap. Each pair of circles represents the hypothetical realization of two vowel categories in acoustic space; two hypothetical speakers are represented in each subfigure. If each category is realized with the same acoustic area across speakers, then distance and overlap have an inverse relationship.

a) Different distances, different overlap   (b) Same distance, different overlap   (c) Same overlap, different distances

Conclusions

Kansas is NOT like Kansas City – According to our data, Kansas is losing the merger. and men and women are both backing away from it. While there is evidence that some Kansans had the merger at some point, participants from generations younger than the baby boomer generation show very little overlap between these two sounds. This may reflect the fact that our sample is mostly from more central and northern locations in Kansas, but it does illustrate that the merger has not spread throughout Kansas.

References
- Scanlon, Michael and Wassink, Alicia Beckford (2010) "Using Acoustic Trajectory Information in Studies of Merger," University of Pennsylvania Working Papers in Linguistics: Vol. 16 : Iss. 2, Article 19.
- Strelluf, Christopher. (2014). "We have such a normal, non-accented voice": A sociophonetic study of English in Kansas City. 10.13140/RG.2.1.4125.9925.v
- Koops, Christian; Gentry, Elizabeth; and Pantos, Andrew (2008) "The effect of perceived speaker age on the perception of PIN and PEN vowels in Houston, Texas," University of Pennsylvania Working Papers in Linguistics: Vol. 14 : Iss. 2, Article 12.
- Labov, W., Ash, S., & Boberg, C. (2006). The atlas of North American English: Phonetics, phonology, and sound change : a multimedia reference tool. Berlin: Mouton de Gruyter.
- Nycz, J., & Hall-Lew, L. (2013, December). Best practices in measuring vowel merger. In Proceedings of Meetings on Acoustics 166ASA (Vol. 20, No. 1, p. 060008). ASA.