

# Language Variation and Change in Hawai'i English: KIT, DRESS, and TRAP

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## 1 Introduction

English has been spoken in Hawai'i for over 200 years but very little work has examined variation and change in Hawai'i English or how Hawai'i English is different from other varieties. Using an apparent time approach and acoustic phonetic analysis, this study provides the first description of sociolinguistic variation in the realizations of the short-front vowels in Hawai'i English. We demonstrate that the realizations of the short-front vowels in Hawai'i are conditioned by speaker sex and age, and whether an individual self-identifies as a speaker of Pidgin.

## 2 Literature Review

### 2.1 A Brief History of English in Hawai'i

Hawai'i has a long and complex history of language contact. The first Europeans arrived in 1778, followed shortly by a wave of immigration by people from around the world. As a result, there was a substantial amount of contact between the newly arrived immigrant languages and the indigenous language, Hawaiian. This language contact situation facilitated the development of Hawai'i Creole, known locally as Pidgin. While the main lexifier for Pidgin is English, it contains features from a variety of languages, including Hawaiian, Japanese, Cantonese, and Portuguese. Alongside Pidgin, a local dialect of English has evolved in Hawai'i, referred to by Sato (1993) as Hawai'i English. Hawai'i English is a regional dialect of English, distinct from varieties spoken in the continental United States.

### 2.2 Short-front Vowels and Sound Change

This paper examines the realizations of the Hawai'i English short-front vowels, comparing vowel realizations across speakers' age, sex, and ability to speak Pidgin. Unlike in basilectal Pidgin, where there is no phonetic distinction between FLEECE and KIT or between DRESS and TRAP (Sakoda and Siegel 2008), all four vowels are distinct in Hawai'i English. Our previous work (Kirtley et al. under review) indicates that DRESS and TRAP are realized as low and back in Hawai'i English, and that the high front realizations of KIT and TRAP found in Pidgin (Sakoda and Siegel 2008:222) are not found in the local variety of English. Speakers of Hawai'i English are not aware that their realizations of these vowels differ from realizations found in other varieties of English.

While the low back realizations may suggest there has been a recent sound change, the analysis we present in Kirtley et al. (under review) is based on speakers under the age of 25. From those data alone, it cannot be determined whether the reported realizations result from a recent sound change or not. In the analysis presented here, an apparent time approach is used to determine whether the low, back realizations of the short-front vowels reported by Kirtley et al. are due to a sound change in progress and, if so, whether the shift resembles short-front vowel shifts occurring in continental varieties of American English.

The short-front vowels are shifting in a number of North American English varieties (Labov, Ash, and Boberg 2006). For two such shifts – the Canadian Shift and California Shift – the short-front vowels are lowering and backing, so that young speakers' realizations of TRAP are low and back, much as they are in Hawai'i. In California, the realization of TRAP has been shown to be linked with ethnicity, gender, and phonological environment (Eckert 2008, Kennedy and Grama 2012). For

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Chicano California English speakers, TRAP is low and back in all environments, a realization that is believed to stem from Spanish influence (Eckert 2008). For Anglo California English speakers on the other hand, TRAP is raised and fronted in pre-nasal position and low and back elsewhere (Eckert 2008),<sup>1</sup> and the lowering of TRAP may be led by females (Kennedy and Grama 2012).

As in California, Canadian speakers' realizations of TRAP depend on the surrounding phonological environment; TRAP is raised before nasals and /g/, especially in certain regions (Labov, Ash, and Boberg 2006:221-223). The Canadian Shift appears to be a change in progress, where females lead the retraction of TRAP and males lead the retraction of KIT in at least some regions of Canada (Boberg 2005).

Some scholars have argued that the Canadian Shift and the California Vowel Shift were triggered by the merger and subsequent retraction of the low back vowels, LOT and THOUGHT (e.g., Labov 2010). With the retraction of LOT and THOUGHT, space was left open for TRAP to retract as well. In Hawai'i English, LOT and THOUGHT are merged, at least for young speakers (Hay, Drager & Thomas 2013; Kirtley et al. under review).

While we believe that Hawai'i English is a dialect distinct from varieties found on the mainland, it is possible that we could observe trends in Hawai'i reminiscent of those found in North America and that the same linguistic and cognitive mechanisms may be responsible for vowels shifts in these geographically distinct areas.

### 3 Methods

For this study, we analyzed vowels produced during sociolinguistic interviews conducted in the homes or workplaces of the interviewees. Subjects were asked questions about their childhoods, background, and about life in Hawai'i. Toward the end of the interview, participants were also asked questions related to language and identity, such as what the word 'Local' means.

Three factors were considered when determining whether the interviews contained Pidgin or English. The first factor considered was the language used by the interviewer; in all of the interviews analyzed for this paper, the interviewers used English. The second factor considered was the language that the speaker identified themselves as speaking; all of the speakers analyzed for this study reported that they were speaking English rather than Pidgin during the interviews. Finally, the presence of Pidgin word order was used to identify the speech as Pidgin.<sup>2</sup> All but one of the speakers – an older female, Irene – consistently used English word order. The word order produced by Irene varied between that found in English and Pidgin, but because her realizations do not differ considerably from the other older females' realizations, we have included her data in the analysis presented here.

Twenty speakers were interviewed for the present study; all were native speakers of English, born and raised on the island of O'ahu. All 20 speakers came from one of two areas: one that is more rural/suburban (Kāne'ohe) and one that is more urban (Kalihi). These areas were selected because they were among the most frequently mentioned in a perceptual dialectology task conducted on O'ahu (Drager and Grama to appear), in which responses indicate that people from Hawai'i believe that language is used differently in these two areas. Because the analysis of the front vowels shows no consistent difference between speakers from these two areas, the data from both regions is combined in the analysis presented here.

All 20 speakers analyzed in this paper self-identify as 'Local'. While there are many interpretations of what it means to be Local (e.g., Trask 2000, Labrador 2004), for the majority of the participants in this study, being Local means to have grown up in Hawai'i, to identify closely with the supra-culture of the Hawaiian Islands, and to understand Pidgin, if not speak it.

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<sup>1</sup>The link with ethnicity is more complicated than this description implies in that it is mediated via group membership. We recognize that ethnicity is constructed and negotiated using tools such as vowel realizations; ethnicity is not a given. A link between ethnicity and vowel realizations is something we look forward to exploring in Hawai'i in the future.

<sup>2</sup> For example, the Pidgin sentence *Cute your shoes* is equivalent to the English sentence *Your shoes are cute*.

The speakers' age, self-identified gender, and self-identified ability to speak Pidgin are outlined in Table 1. The labels used for each age category are reflective of the speakers' ages relative to other speakers in the sample; speakers in the younger group ( $n=10$ ) are between 18 and 29 years old, and speakers in the older group ( $n=10$ ) are between 45 and 80 years old. Because categorization of speakers as Pidgin and non-Pidgin speakers was done post-hoc, there is an uneven distribution across males and females of different ages. Because there is only one speaker in two of the four cells for the males, models testing a relationship with Pidgin were fit only to the female data.

Age Category	younger	younger	older	older	Total
Age Range	18-29	18-29	45+	45+	
Pidgin	yes	no	yes	no	
Males	1	4	2	1	8
Females	3	2	3	4	12
Total	4	6	5	5	20

Table 1: Number of males and females in each age category who report speaking Pidgin

The interviews were transcribed after the first 15 minutes of conversation. The transcripts and sound files were force-aligned at the segment level using HTK forced-alignment. Resulting TextGrids and sound files containing the target sounds were extracted using LaBB-CAT (Fromont and Hay 2012). No single lexical item was used more than ten times for each speaker, and only the results from content words are described in this paper. All TextGrids were checked by hand in Praat, and only those with accurate vowel alignments were used for analysis.

A Praat script was used to extract each vowel's duration, fundamental frequency, and formant values (F1 and F2) at seven equidistant points from 20% to 80% of the vowel's duration. Extracting the formant values from multiple points allows us to examine the formant contour throughout the vowel rather than focus only on a single point. Outliers were hand-checked for accuracy and corrected when necessary. Formant values were normalized using the Lobanov method and the mid-point values from /h/-initial tokens from a wordlist. One older female speaker's data was removed due to ineffective normalization.<sup>3</sup> The analysis presented in this paper includes a total of 745 TRAP tokens, 676 DRESS tokens, and 919 KIT tokens.

For the analysis, formant values at the midpoints as well as formant transitions throughout the vowels were plotted for all three vowels but only select plots are provided in this paper. All trends in the plots were tested for significance using separate linear mixed effects models for each vowel, fit to the normalized values for F1 and F2. The vowel's duration and whether the following segment was a nasal were included as control variables in the models only when they reached significance.

## 4 Results

The results demonstrate a relationship between speaker age, the ability to speak Pidgin, and the realization of TRAP. They also demonstrate a relationship between a speaker's sex and their realizations of DRESS and KIT.

Evident in Figure 1 is the tendency for younger speakers to produce more retracted variants of TRAP. As shown in the model in Table 2, age approaches significance as a predictor of F2; younger speakers produce realizations of TRAP that are more retracted than those produced by older speakers ( $p<0.06$ ). No other social factors reach or approach significance in predicting F1 or F2 of TRAP. Tokens followed by a nasal are both higher ( $p<0.0001$ ) and fronter ( $p<0.0001$ ) than those followed by a non-nasal, though we do not observe a clear "nasal split" such as that found in California English. These findings suggest that TRAP is low for both older and younger Hawai'i English speakers and that TRAP may be in the process of retracting.

<sup>3</sup> Most speakers produced TRAP tokens during the wordlist that were among the lower half of their tokens, whereas one speaker produced high tokens of TRAP during the wordlist but very low tokens in spontaneous speech. This has the effect of making her entire vowel space appear much lower than the other speakers.

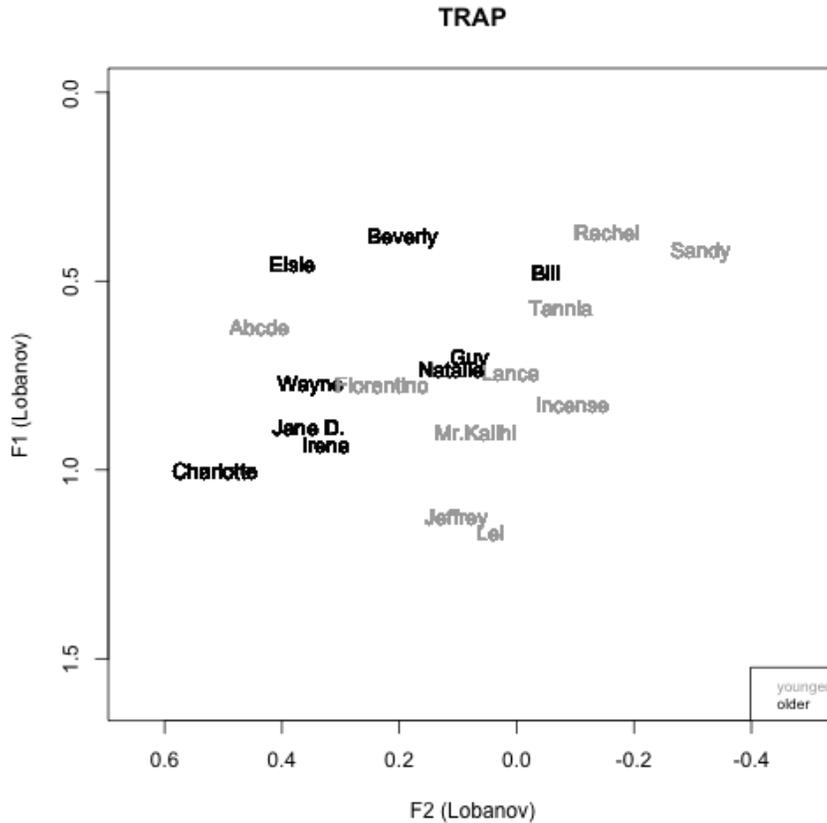


Figure 1: Plot of normalized F1 and F2 mean values for TRAP, shown by speaker. Younger speakers are shown in grey and older speakers are shown in black.

	Estimate	MCMCmean	HPD95lower	HPD95upper	pMCMC	Pr(> t )
(Intercept)	0.0167	0.0153	-0.1117	0.1429	0.798	0.8096
duration	0.8906	0.8871	0.4432	1.3056	0.0001	<0.0001
following = nasal	0.2207	0.2199	0.175	0.2678	0.0001	<0.0001
age = younger	-0.1657	-0.1644	-0.3189	-0.0074	0.0376	0.0596

Table 2: Model fit to normalized F2 values of TRAP

Basing the analysis only on the midpoint values, however, hides some of the variation that is evident in the data. Plotting the change in formants throughout the vowel’s duration, as shown in Figure 2, demonstrates a relationship between a speaker’s age, their ability to speak Pidgin, and the onset of the vowel’s nucleus as well as the degree to which TRAP is diphthongal.

Consistent with the findings based on examining only the midpoints, both groups of young speakers produce tokens that are more retracted than those produced by the older speakers. However, the dynamic nature of the vowel quality differs depending on both age and whether the individual speaks Pidgin. Older speakers – regardless of their ability to speak Pidgin – produce diphthongal variants of TRAP, with an offglide that is lower than the midpoint. In contrast, the ability to speak Pidgin is linked with how diphthongal the speakers’ tokens are for the younger Hawai’i English speakers; young people who do not speak Pidgin produce variants that are less diphthongal than those produced by young people who also speak Pidgin. The young Pidgin speakers’ realizations

start from a position close to DRESS and retract and lower during the course of the vowel, whereas the young non-Pidgin speakers have a lower start-point for TRAP and, while the vowel lowers toward its target, it later raises for the offglide. During auditory analysis, we perceive the tokens produced by the young non-Pidgin speakers as monophthongal, in contrast with those produced by the other groups of speakers.

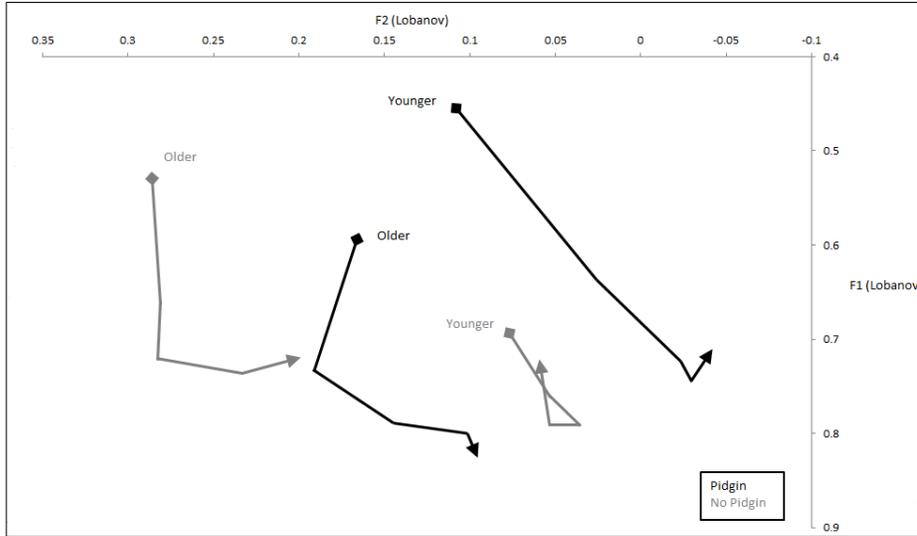


Figure 2: Plot of normalized F1 and F2 contours from 30%-70% of the vowel in TRAP, shown by speaker age and Pidgin ability. People who do not speak Pidgin are shown in grey and Pidgin speakers are shown in black. The 30%-70% portion of the vowel was selected in order to reduce influence from surrounding phonological contexts.

To test the relationship between formant movement in TRAP, speaker age, and the speaker’s ability to speak Pidgin, a mixed effects model was fit to the difference between females’ F1 values at points 30% and 70% through the vowel. These points were selected to minimize influence from surrounding phonological environment while still observing formant movement.

The model is shown in Table 3. The only social factor to reach significance in the model is the speaker’s ability to speak Pidgin. As shown by the negative coefficient, Pidgin speakers were significantly more likely to produce tokens with high onsets and a high degree of movement downward during the course of the vowel ( $p < 0.05$ ). This tendency is carried by tokens followed by voiced sounds. Including voicing of the following segment as a control variable in the model does not change the significance levels reported. Age does not reach significance in the model, nor does an interaction between age and the ability to speak Pidgin.

	Estimate	MCMCmean	HPD95lower	HPD95upper	pMCMC	Pr(> t )
(Intercept)	-0.0088	-0.008	-0.1701	0.1582	0.9308	0.9126
duration	-1.0083	-1.0122	-1.8499	-0.2118	0.0172	0.0159
Pidgin = y	-0.1727	-0.1721	-0.3566	0.0139	0.064	0.0401

Table 3: Model of difference in F1 between the 30% and 70% points for TRAP, for the female participants. A negative coefficient indicates a greater amount of lowering of the vowel.

In contrast to the results for TRAP, a speaker’s age does not predict the midpoint of DRESS. Instead, there appears to be a distinction depending on speaker sex, shown in Figure 3: the males in this study tend to have lower realizations of DRESS than many of the females. The tendency for males to produce lower variants is significant ( $p < 0.05$ ), as shown in Table 4. Unlike the models for TRAP and KIT, being followed by a nasal does not significantly predict F1 of DRESS. There were no social

factors that reached significance in a model of F2 of DRESS, though tokens followed by a nasal were realized significantly fronter than those that were not ( $p < 0.05$ ).

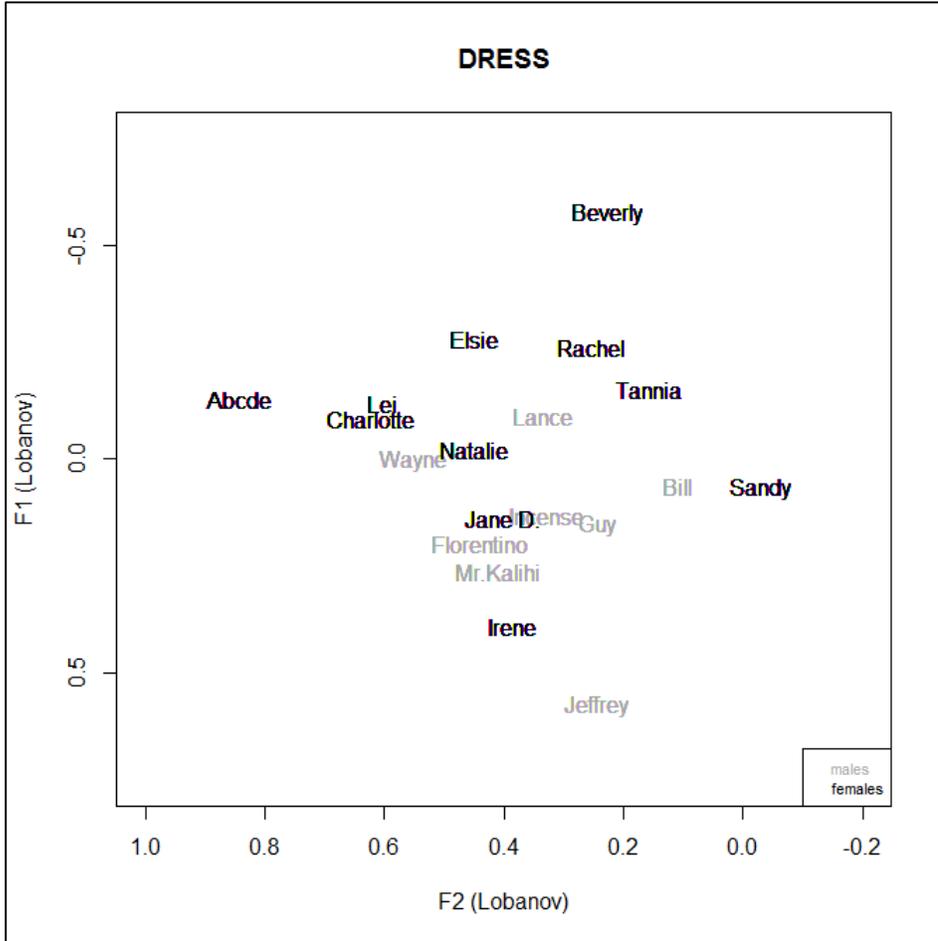


Figure 3: Plot of normalized F1 and F2 mean values for DRESS, shown by speaker sex. Males are shown in grey and females are shown in black.

	Estimate	MCMCmean	HPD95lower	HPD95upper	pMCMC	Pr(> t )
(Intercept)	-0.2456	-0.2449	-0.3773	-0.1182	0.0008	0.0011
duration	1.7058	1.7045	1.1321	2.271	0.0001	<0.0001
sex = m	0.2702	0.2702	0.0884	0.4565	0.0046	0.0125

Table 4: Model fit to F1 of DRESS.

When the entire formant contour is plotted, as done in Figure 4, there appears to be a relationship between speaker age, the ability to speak Pidgin, and the realization of DRESS. People who speak Pidgin produced vowel offsets that were less front than the onset, whereas people who do not speak Pidgin did not. In fact, the young non-Pidgin speakers’ endpoints are further front than the onset. As with TRAP, we observe this trend for vowels followed by a voiced segment. The difference between Pidgin and non-Pidgin speakers’ transitions is significant ( $p < 0.01$ ) but only when fit to all of the data; when fit only to data from the female speakers, it does not reach significance. Therefore, a more balanced dataset is required to explore this further.

For KIT, the males produced lower realizations than did the females ( $p < 0.001$ ), as shown in Table 5. In the model fit only to the female data, shown in Table 6, the ability to speak Pidgin is a significant predictor of vowel height ( $p < 0.05$ ). No social factors reach significance in a model of F2. Whether the following segment is oral or nasal also influences vowel height and frontness: tokens followed by nasals are lower ( $p < 0.01$ ) and less retracted ( $p < 0.0001$ ) than tokens in other environments. The relationship between pre-nasal tokens and vowel height is in the opposite direction of that which was observed for TRAP.

The relationship between gender and realizations of KIT is intriguing. If the short-front vowels are involved in a chain shift in Hawai'i English, we would expect younger speakers, and perhaps young females in particular, to be the most likely to produce low and retracted tokens, but this is not what we observe. Instead, the lowest and most retracted tokens of KIT are produced by young males and by young females who are not Pidgin speakers. A larger, more balanced dataset is required to explore these relationships further.

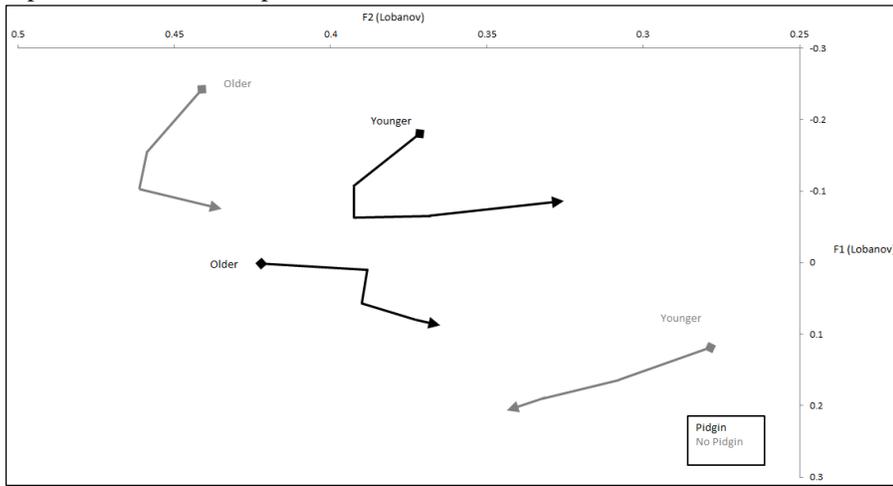


Figure 4: Plot of normalized F1 and F2 contours from 30%-70% of the vowel in DRESS, shown by speaker age and Pidgin ability. People who do not speak Pidgin are shown in grey and Pidgin speakers are shown in black.

	Estimate	MCMCmean	HPD95lower	HPD95upper	pMCMC	Pr(> t )
(Intercept)	-0.8894	-0.8897	-1.0006	-0.7724	0.0001	<0.0001
duration	1.3917	1.3851	0.9095	1.8359	0.0001	<0.0001
following = nasal	0.0931	0.0928	0.045	0.1433	0.0004	0.0002
sex = m	0.3627	0.3636	0.1972	0.5387	0.0004	0.0003

Table 5: Model fit to F1 of KIT.

	Estimate	MCMCmean	HPD95lower	HPD95upper	pMCMC	Pr(> t )
(Intercept)	-0.6945	-0.6931	-1.0054	-0.4234	0.0044	<0.0001
duration	2.0837	2.0808	1.5353	2.6372	0.0001	<0.0001
following = nasal	0.3232	0.3225	0.2467	0.4027	0.0001	<0.0001
Pidgin = y	0.2179	0.2172	-0.1527	0.5719	0.1422	0.0172

Table 6: Model fit to Model fit to F1 of KIT for female speakers only.

## 5 Discussion

The results provide evidence that the low, back realizations of KIT, DRESS, and TRAP observed by

Kirtley et al. (under review) are not due to a chain shift. While TRAP is retracting in apparent time, realizations of all three vowels appear to be linked with the speaker's sex and whether the individual speaks Pidgin or not. An overview of the various findings is shown in Table 7. The remainder of the paper explores some of the possible interpretations of these findings.

### 5.1 Speaker Sex

Speaker sex was the strongest non-linguistic predictor of F1 of the midpoint in DRESS and KIT and of F2 of the midpoint in KIT: males produce lower realizations of both vowels and more retracted realizations of KIT. One possible explanation for this finding is that the normalization procedure applied to the data did not successfully remove differences in formant values that result from physiological differences between the speakers. However, we do not believe this to be the case because this effect would be seen on all three vowels, but it was not. In addition, auditory analysis of the three vowels and their realizations by males and females is consistent with the patterns that are present after normalization.

	Age	Sex	Pidgin
KIT	--	lower for males than females	higher for female Pidgin speakers than female non-Pidgin speakers
DRESS	--	lower for males than females	fronting offglide for non-Pidgin speakers
TRAP	more retracted for younger speakers	--	lower onset and monophthongal quality for young non-Pidgin speakers

Table 7: Overview of findings with age, sex, and the ability to speak Pidgin.

Another possible explanation is the unbalanced dataset. Participants were not recruited on the basis of their ability to speak Pidgin, and classification of the speakers according to Pidgin-speaking ability was post-hoc. A better understanding of the variation would require a more balanced set of participants, particularly with more young males who have the ability to speak Pidgin.

Of course, it is also possible that males and females in Hawai'i manipulate their realizations of DRESS and KIT in different ways in the construction of their gendered identities. Much more work is needed to explore this possibility.

### 5.2 Pidgin Influence

Older speakers produced diphthongal variants of TRAP regardless of whether they speak Pidgin. For younger speakers, however, the reported ability to speak Pidgin seems to be linked with the height of the nucleus onset and the degree of diphthongization in TRAP; younger non-Pidgin speakers produced the least diphthongal variants, whereas younger Pidgin speakers produced the most diphthongal variants of all. The difference in diphthongization appears to stem from the vowel quality of the onset of the nucleus; the young Pidgin speakers began from a position with a higher vowel quality than the young non-Pidgin speakers. This difference is especially noteworthy when the realizations are compared to realizations of TRAP in Pidgin; the TRAP vowel is realized as high and front in Pidgin (Sakoda & Siegel 2008).<sup>4</sup> Thus, the Pidgin-speakers' English tokens of TRAP have onsets that more closely resemble the vowel quality found in Pidgin realizations than observed in tokens produced by the non-Pidgin speakers.

Similarly, the two groups of younger speakers behaved differently in regard to KIT; the younger female speakers who speak Pidgin were more likely to produce raised (i.e., more Pidgin-like) realizations, and the young non-Pidgin speakers were most likely to produce low (i.e., less Pidgin-like) realizations of KIT.

DRESS was monophthongal for all speakers. However, in what formant movement there was, we found that Pidgin speakers – especially young Pidgin speakers – produced variants of DRESS that

<sup>4</sup>The TRAP vowel is not, however, realized as diphthongal in Pidgin (Sakoda, personal communication).

fronted during the course of the vowel, whereas non-Pidgin speakers produced tokens that centralized. It is not known whether or how this might relate to realizations in Pidgin since this has not been investigated in Pidgin.

That young female speakers' realizations of KIT and TRAP are dependent on whether the individuals also speak Pidgin raises the question of why this might be the case. Influence from Pidgin could result from (1) interference between two co-existing phonological systems, (2) a socially-motivated adoption of certain Pidgin-like realizations, or (3) some combination of these. If the difference between the age groups was solely due to linguistic interference between the speakers' two co-existing systems, we would predict that the older speakers would also demonstrate a difference based on whether or not they speak Pidgin. They exhibit no such difference, however, suggesting that the difference in vowel realizations is socially motivated.

It is important to note that we have based our analysis on a speaker's self-report of whether or not they speak Pidgin, and we recognize that some speakers may not realize or admit that they speak Pidgin due to the history of language hegemony in Hawai'i. Thus, the self-reported ability to speak Pidgin might best be interpreted as a component of an individual's identity. Identifying as a Pidgin speaker likely carries with it an important social meaning that is linked with Localness. Therefore, in interpreting the trends in our data, the key element may not be the ability to speak Pidgin so much as an individual's identification as someone who can. People who speak both Pidgin and English have access to phonological forms in both; the Pidgin-like variants could, for instance, be used to signify membership in and alignment with a Local identity. In contrast, young people who do not speak Pidgin may diverge from Pidgin-like realizations of certain vowels, such as KIT. This is something to explore in future work.

## 6 Conclusion

While the low, back realizations of the short-front vowels produced by many of our speakers resemble those found in California and Canada, our data provide little evidence that a similar chain shift is taking place in Hawai'i. Instead, better predictors of the variation are speaker sex and whether a person self-identifies as a Pidgin speaker. We argue that the differences between the vowel realizations of Pidgin and non-Pidgin speakers are likely to be at least partially socially-motivated.

The results reported in this paper raise a number of questions that can be addressed through more controlled sampling of data. This paper supplies some of the first evidence for the rich linguistic complexity found in Hawai'i English, providing a stepping stone for work in the years to come.

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