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Vowel Duration and Perceptions of the Gay Accent

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Abstract

This study aimed to examine a potential linguistic cue that signals a speaker's sexual orientation. I examined the relationship between vowel duration and perceived sexual orientation for male speakers of American English. Speakers recorded a passage that was heard by naïve listeners and ranked according to perceived sexual orientation. There was no significant difference in vowel duration between men perceived to sound gay and men perceived to sound straight. However, the gay-sounding men produced their diphthongs with more variance in duration than did the straight-sounding men.

Vowel Duration and Perceptions of the Gay Accent

Encoded in our speech is far more than just the information we speak. What we say and the way we say it are both reflections of who we are, or who we want people to think we are. Our language conveys various aspects of our identity, such as our socioeconomic status, race, and where we grew up (e.g., Labov 1972 and Trudgill 1974). This study examines one particular aspect of identity as it relates to speech – sexual orientation.

Sexual orientation and speech is a fairly new topic within sociolinguistics; its study is sometimes referred to as "queer linguistics" or "lavender linguistics" (Munson 2011). Previous linguistic studies have shown that a certain way of speaking is associated with the gay community that listeners – both from inside and outside the gay community – can recognize as sounding gay (e.g., Gaudio 1994; Pierrehumbert, Bent, Munson, Bradlow & Bailey 2004). This is not to say that all gay people speak with the gay accent; it is an accent likely adopted to discretely identify oneself as a member of the gay community. As with other features of our speech, the gay accent can be downplayed or emphasized depending on the circumstances.

There have been a handful of recent studies regarding the male gay accent, but there have been fewer studies regarding the gay accent amongst lesbians. The limited research done on the female counterpart of the accent has shown that while it does exist, it is significantly different from the male accent and less easily identified by listeners (e.g., Moonwomon-Baird 1997); for these reasons, the present study focuses only on the male gay accent.

As not all gay males exhibit the gay accent, a linguistic study that groups all gay males into the same category would not be an accurate examination of the gay accent. For

this reason, research aimed at studying the gay accent studies accents that are *perceived* to sound gay. Previous studies have determined which voices are perceived to be gay-sounding or straight-sounding by having naïve listeners rank how gay or straight-sounding they perceive the voices to be, generally on a five or seven point scale (e.g., Gaudio, 1994; Rogers, Jacobs & Smyth, 2003). Voices are then analyzed once they are grouped into the categories of perceived orientation provided by the listeners. However, the body of linguistic cues that leads listeners to perceive speech as sounding gay or straight is not fully understood. The following is a review of studies of such cues.

Gaudio (1994) examined the relationship between pitch and perceived gayness. Eight men – four gay and four straight – read two passages, one technical and one dramatic. Thirteen naïve listeners then heard the recordings and indicated their perceptions of four aspects of the speaker, including gay/straight. His study showed that average pitch (average F0) was correlated with neither perceived sexual orientation nor actual sexual orientation. However, his data suggest that male voices that use more pitch variation and a larger pitch range were perceived to sound both gayer and more feminine. As female speech tends to have both of these linguistic features, speaking with more pitch variation and a wider pitch range may be a way of showing the gender nonconformity often seen amongst gay males (Rieger, Linsenmeier, Gygax, Garcia & Bailey, 2010).

Rogers et al's (2003) findings confirm the results of Gaudio (1994) with a larger sample. They worked from a data bank of 25 male voices reading passages in various tones that were ranked on various continuums, including gay/straight and masculine/feminine. Rogers et al (2003) also found no correlation between perceived

sexual orientation and F0. They did find that listeners thought it acceptable to list voices as both gay-sounding and masculine-sounding; sounding gay did not always correspond to sounding feminine; Gaudio (1994) found the opposite, that "straight" and "masculine" corresponded and "gay" and "effeminate" corresponded. The changing stereotypes across the decade between these studies could explain this difference.

Munson, Jefferson and McDonald (2006a) looked at fricative identification and perceived sexual orientation. They created a synthetic /s/ to /ʃ/ continuum, from which 40 listeners heard a subset. Listeners rated their perception of the speaker's sexual orientation. The study did not find that perceived sexual orientation had any relationship with fricative identification in male voices.

Gay men in Pierrehumbert et al's 2004 study produced vowels using a more expanded vowel space than straight men. Their study involved self-identified gay and straight men and women reading a set of sentences that were played for naïve listeners. The listeners rated the recordings using a seven point scale, ranging from "sounds totally straight" to "sounds totally gay/lesbian." As their listener judgments were generally quite accurate, they did not regroup speakers by perceived sexual orientation and instead left them grouped by actual sexual orientation. The gay men and lesbian women had more dispersed vowel spaces than their heterosexual counterparts. Straight women had a more expanded vowel space than straight men and tended to have more precise vowels. The vowel space expansion among gay men may be a female speech feature they have adopted as a way of showing gender nonconformity. This explanation, however, does not explain the same phenomenon among lesbian women, though it is perhaps just the result of the backing of /o/ and /u/. Munson, McDonald, DeBoe & White 2006b, discussed

below, found an expanded vowel space to be associated with the *perception* of sexual orientation, though an expanded vowel space was not associated with *actual* sexual orientation.

Munson et al (2006b) examined vowel space and /s/ skewness in gay and lesbian speech. Forty-four speakers recorded a list of single words; these data showed that there is no significant correlation between vowel space and sexual orientation, but that there is significant correlation between self-reported sexual orientation and /s/ skewness. Gay men had more negatively skewed /s/ sounds, though the difference was not significant for lesbian women; this /s/ skewness is what is often referred to as the stereotypical "gay lisp."

Munson et al (2006b) also included a perception experiment in which 40 listeners heard the word lists used in the previous part of the experiment. They ranked, using a five-point scale, their perception of various qualities of the speaker, one of which was gayness or straightness. Predictors of a more gay-sounding rating for women were lower F1 and F2 values and a more contracted vowel space, contradicting Pierrehumbert et al (2004). Predictors of a more gay-sounding rating for men were higher F1 and F2 values and a more negatively skewed /s/.

The current study examines another aspect of vowels and perceived sexual orientation – vowel duration. Based on previous findings that vowel placement (height and backness) cues listeners to make a judgment about the speaker's sexual orientation, as well as my own observations, I hypothesized that vowel duration would also cue a judgment of sexual orientation. The hypothesis driving this study was that male gay-sounding speech includes longer vowels than male straight-sounding speech. I also

hypothesized that this effect might be greater in diphthongs than in monophthongs, based on Pierrehumbert et al's (2004) finding that men speaking with the perceived gay accent articulate more clearly than others; longer diphthongs would emphasize the presence of two vowels in one syllable. In order to test this hypothesis, I followed the methodology of previous studies by recording self-identifying gay men and self-identifying straight men. Listeners then heard these recordings and ranked on a seven-point scale how gay or straight they thought the voice sounded. Based on these rankings, voices consistently judged to sound very gay or very straight were selected for vowel duration measurement.

Methods

Experiment 1 – Production

The goal of Experiment 1 was to record speakers as experimental stimuli and data to test my hypothesis that vowel duration is longer in speech perceived to sound gay than in speech perceived to sound straight.

1.1 Participants

Forty men participated in Experiment 1. Twenty were self-identifying gay men and 20 were self-identifying straight men. Within each of those groups, half were freshmen and sophomores (henceforth underclassmen) and half were juniors and seniors (henceforth upperclassmen). All were native speakers of American English and current students at a small liberal arts college in the upper Midwest. They were recruited through word of mouth.

1.2 Speech Materials

The reading, a passage from Wikipedia about the history of pizza, is a neutral article that does not invite a particularly emotional or dramatic reading (see Appendix A

for the speech materials). It was adapted to include at least two tokens of all the vowels and diphthongs of American English, with the exception of /ɔ/, which many Americans the age of the participants do not produce. The recordings were made using a unidirectional microphone sending information directly to PCQuirer running a PC computer.

1.3 Procedure

Speakers recorded a short passage in a sound attenuated booth in the Linguistics Laboratory over various sessions in October and November of 2010. Speakers were told that they were participating in a study entitled "Sexual Orientation and Communication." They were presented with the passage, which was typed in 12 point Times New Roman font and double-spaced, in the Linguistics Laboratory of the college. Participants were asked to read through it silently to verify that they were familiar with all the target words, though the target words were not specified to participants. All participants reported familiarity with the target words. They were instructed to record the passage in a normal speaking voice at a normal volume. Small errors in reading were accepted, but speakers were allowed to re-read the passage if they made any major errors, which occurred twice. Each recording took approximately ninety seconds. Following the recording, speakers filled out a survey indicating their gender and sexual orientation, native language, age and hometown (see Appendix B). They were asked to indicate on a scale from one to seven how gay or straight they think their voice sounds. An open-ended question asked speakers to reflect on whether they change their voice to sound gayer or straighter, and under what circumstances.

Experiment 2 – Perception

The goal of Experiment 2 was to identify how naïve listeners perceive the sexual orientation of the voices recorded in Experiment 1.

2.1 Participants

Forty listeners participated in Experiment 2. Listeners were all native speakers of American English and current students at the same school as the speakers. Half were freshmen or sophomores and half were juniors or seniors, mirroring the age distribution of the speakers. They varied in gender and sexual orientation. They were recruited through word of mouth.

2.2 Speech Materials

The speech materials recorded in Experiment 1 were presented to listeners in the college's Cognition Laboratory over various sessions between November 2010 and February 2011. Speech materials were presented using PC computers running E-Prime experimental software (E-Prime, 2002). The voices from Experiment 1 were divided into four sets.[1] Each set included five gay male voices, five straight male voices, and 10 female voices. The female voices were placed between each male voice to avoid a priming effect among the male voices, and were kept in a consistent order for each set. This list of 10 female voices was used as a template for all four sets. The male voices were assigned to the slots between the female voices using a random number generator. The order of voices was fixed for all presentations of any given set. Upperclassmen listeners heard underclassmen speakers and underclassmen listeners heard upperclassmen speakers to reduce the likelihood of voice recognition.

[1] The method for identifying the gay-sounding and straight-sounding voices included in these sets is discussed in the results section.

2.3 Procedure

The listeners were told that they were participating in an experiment called Sexual Orientation and Communication. It was explained that they would be listening to a series of recordings and asked to indicate how gay or straight each voice sounds to them on a continuum. To reduce the probability of participants recognizing voices and basing their judgments on this, listeners were told that the voices came from a database of student voices from around the country. Listeners heard each recording from their set once in its entirety. They were then presented with the continuum (see Appendix C) on the computer screen and ranked the voice from one (very gay-sounding) to seven (very straight-sounding). Each listener heard twenty recordings; this portion of the experimental session lasted approximately 30 minutes.

As part of the debriefing process, listeners were told that speakers were, in fact, from the same school and that the deception was used to prevent listeners from trying to recognize voices and basing their judgment of sexual orientation on factors other than the voice itself. Listeners were then asked if they thought they recognized any of the voices. Data associated with guesses about the identity of the speaker – regardless of their accuracy – were removed from the data, as they were likely influenced by suspected recognition. Very few students reported recognizing voices as belonging to individuals, though several, approximately 15%, did find them vaguely familiar.

Results

1. Accent Ratings

I first sought to determine which voices from Experiment 1 were rated as sounding very gay or very straight by listeners in Experiment 2. Each of 40 voices

received 10 ratings. If listeners were overall consistent with their ratings with one or two exceptions; discrepancies in the ratings, determined by boxplots, were removed from further analyses. For each voice, I used the mean, standard deviation and z-scores of ratings to select the voices consistently judged to be extremely gay-sounding or extremely straight-sounding. These 16 voices were made up of eight gay-sounding and eight straight-sounding voices. The average rating (on a seven-point scale) of the eight gay-sounding voices was 2.15, and the average rating of the eight straight-sounding voices was 5.98. Of those 16, the data from one straight-sounding voice, S22, were eliminated because the speaker spoke significantly slower than any other speaker, making his vowels inherently longer and thus skewing the results. Vowel duration analysis was then conducted on a total of 15 voices - eight gay-sounding voices and seven straight-sounding voices. The boxplots of listener ratings, organized by speaker into four sets, are shown below in Appendix D.

2. Vowel Duration

Using Praat, I calculated the vowel duration of each of the 26 target vowels (see Appendix E for a complete list). Vowel duration was measured in milliseconds. Average vowel duration was calculated for each individual speaker (see Tables 1 and 2), as well as the average duration of monophthongs and diphthongs. In Table 3 and Figure 1, means for gay-sounding and straight-sounding speakers were computed for overall vowel duration, monophthong duration, and diphthong duration. Although overall vowel duration was longer among gay-sounding voices than straight-sounding voices (8.44 ms longer), as predicted, this difference was not significant, t (9.951) = 1.63, p = .12). The difference for diphthongs was 12.83 ms, t (7.29) = 1.06, ns, and 5.84 ms for

monophthongs $t < 1$, ns. These results suggest that contrary to my hypothesis, average vowel duration alone is not a cue leading listeners to judge a speaker's sexual orientation. The results are shown in the following tables.

Table 1 - Straight-Sounding Vowel Duration

		S03	S25	S26	S31	S34	S36	S39
Diphthong Duration (ms)	Mean	143.0116	142.6663	148.0964	153.7894	145.8225	150.0331	152.9813
	Std. Dev.	60.37221	46.82616	27.67655	37.53380	44.36701	56.60516	47.28674
Monophthong Duration (ms)	Mean	114.2934	114.4081	113.6368	122.3364	116.4601	99.2706	123.7397
	Std. Dev.	36.84376	38.06694	35.20152	43.73851	59.44640	33.93643	38.64907
Vowel Duration (ms)	Mean	125.3388	125.2767	126.8905	134.4337	127.7533	118.7947	134.9865
	Std. Dev.	48.26613	43.07416	36.21524	43.57196	55.14692	49.78752	43.72302

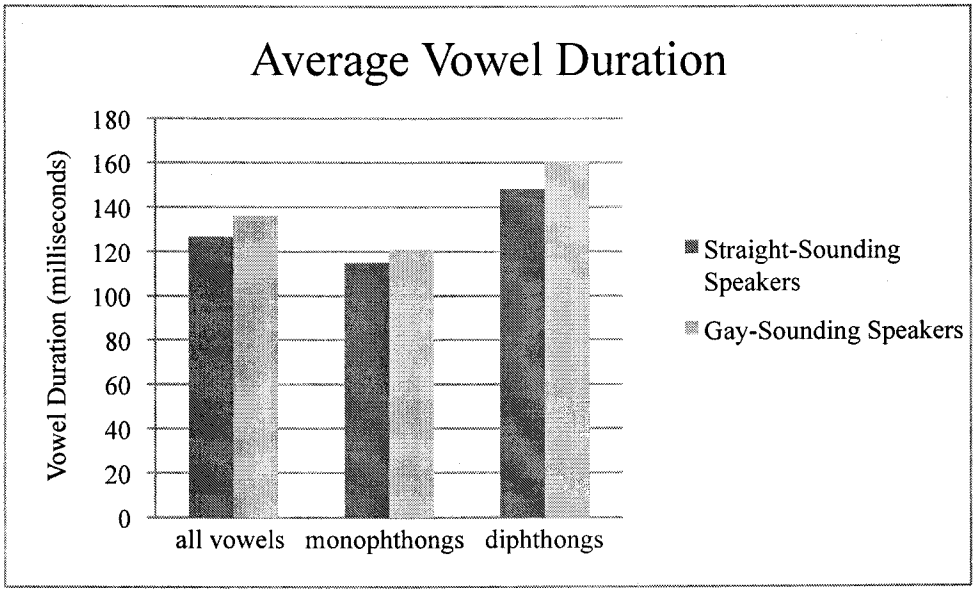
Table 2 - Gay-Sounding Vowel Duration

		G01	G04	G06	G07	G08	S15	G16	G21
Diphthong Duration (ms)	Mean	146.7331	144.9136	149.4485	176.4575	154.9979	135.4295	237.2942	139.8476
	Std. Dev.	48.48088	53.36968	56.65868	69.97795	57.54456	54.56628	356.30585	47.71767
Monophthong Duration (ms)	Mean	111.8177	122.1069	111.4316	120.8156	122.3831	113.3899	103.6496	160.1699
	Std. Dev.	50.56459	57.78954	47.19404	54.09179	51.95362	36.39562	40.26624	199.96295
Vowel Duration (ms)	Mean	125.2467	130.8787	126.0535	142.2163	134.9273	121.8667	155.0514	152.3536
	Std. Dev.	51.77153	56.18906	53.36481	65.42583	55.43864	44.56731	225.99277	157.83688

Table 3 - Average Vowel Duration

		Diphthong Duration (ms)	Monophthong Duration (ms)	Vowel Duration (ms)
Straight-sounding	Mean	148.0572	114.8779	127.6392
	Std. Deviation	4.48190	7.98283	5.62465
Gay-sounding	Mean	160.6402	120.7205	136.0743
	Std. Deviation	33.36328	17.20318	12.59644
Total	Mean	154.7682	117.9940	132.1379
	Std. Deviation	24.64518	13.57898	10.57673

Figure 1 - Average Vowel Duration



I then examined differences in the *variances* of vowel duration (as opposed to difference in *means*) for the three types of vowels and the two categories of speakers. The results are presented in Figures 2 – 5. Gay-sounding speakers produced vowels overall with more variance in vowel duration than straight-sounding speakers, $F = 5.20$, $p = .040$.

This effect was not present for monophthongs ($p > .30$), which were not produced with more variance by gay-sounding speakers than by straight-sounding speakers. The difference in variance was greatest for diphthongs, which were produced with significantly more variance by gay-sounding speakers than by straight-sounding speakers. This difference was confirmed by a significant test of homogeneity of variance, $F = 5.84$, $p = .031$. In the following figures, the grey boxes represent the middle 50% of vowel durations, the thicker middle lines represent the median vowel duration and the extending bars represent the extremes of vowel duration. Figure 5 is a compilation of the previous three boxplots.

Figure 2 - Vowel Duration Distribution

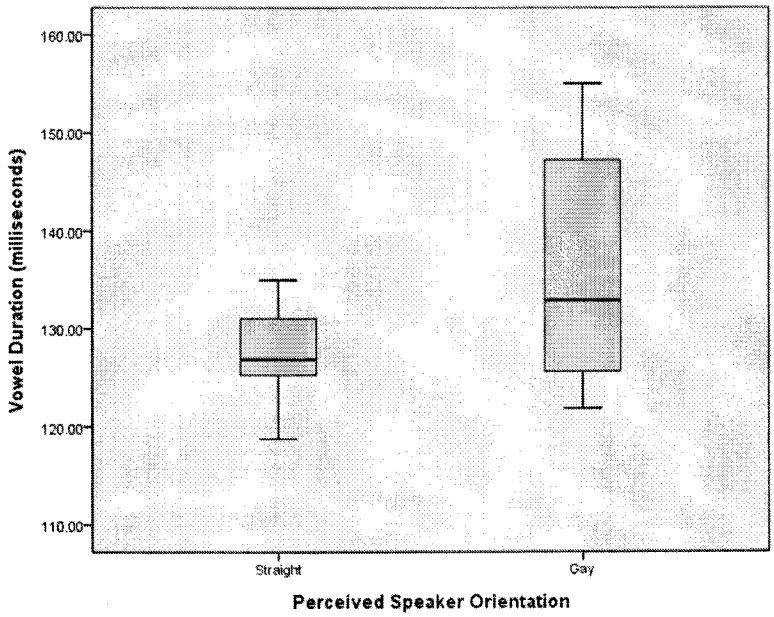


Figure 3 - Monophthong Duration Distribution

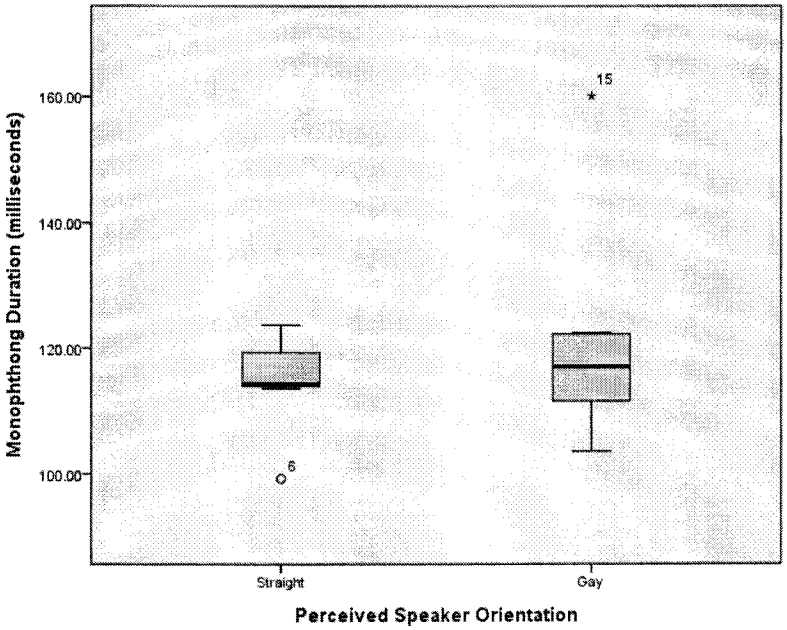


Figure 4 - Diphthong Duration Distribution

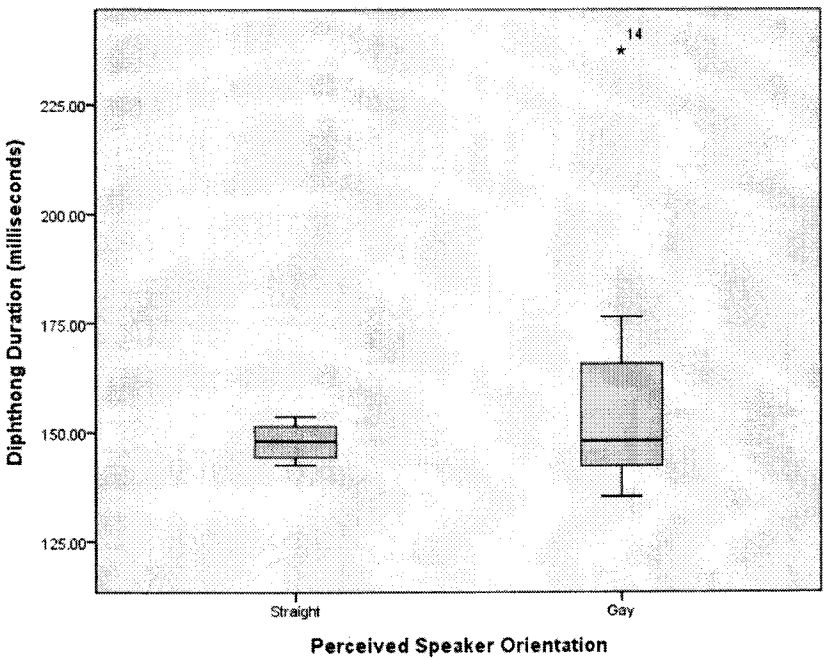
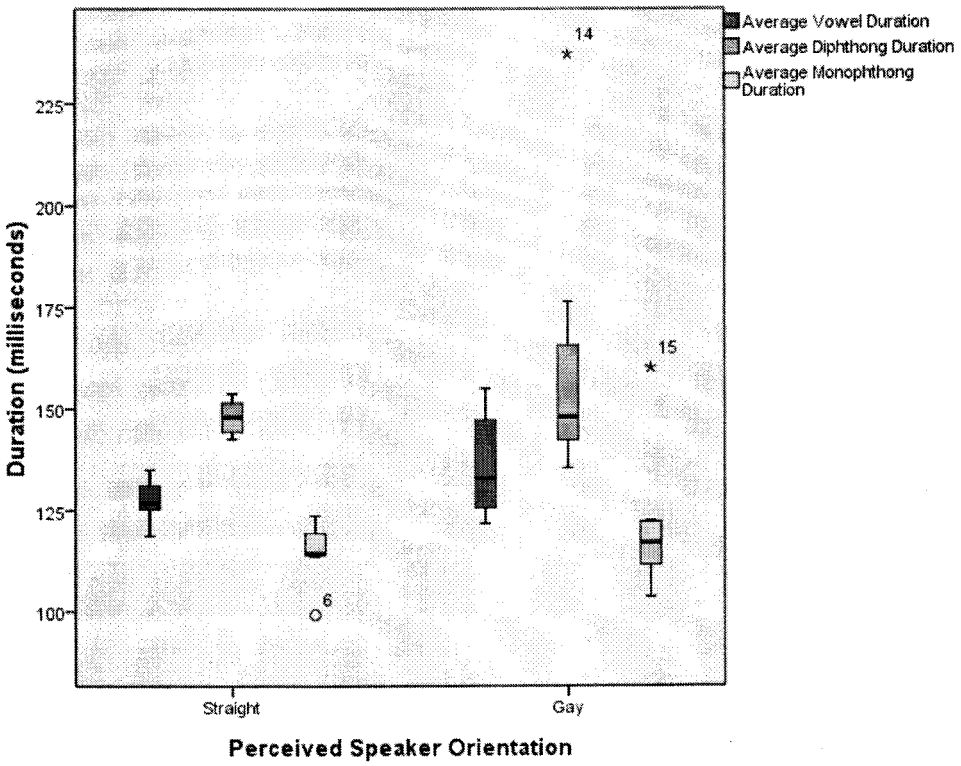


Figure 5 - Vowel Duration Distribution Compilation



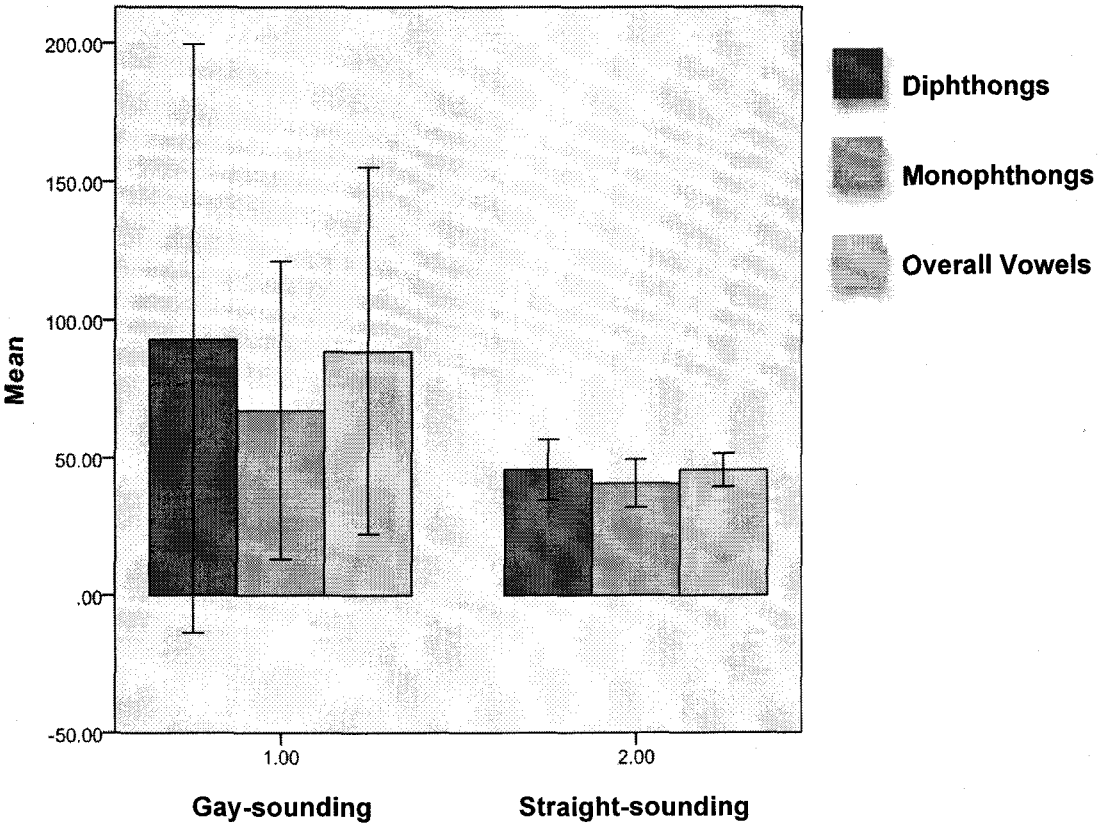
This difference in variances leaves the question of whether the extra variance was caused by 1) individual gay-sounding speakers producing their vowels with much variation in duration (utterance-to-utterance variability within participants); or 2) vowel duration variance varying significantly from speaker to speaker (person-to-person variability). To further explore this, I examined the variability of vowel length duration for each speaker; they appear as standard deviations in Table 4. This is effectively a measure of how far each speaker's vowel duration typically strays from their mean vowel duration. Overall, standard deviations were larger for gay-sounding speakers compared to straight-sounding speakers, suggesting that individual gay-sounding speakers had more variance in vowel duration. Averages of the standard deviation within each of the three vowel categories were computed and are presented in Table 4 and Figure 6. The bar for

"Vowel" represents the average size of dispersion (standard deviation) for each of the eight gay-sounding speakers, and each of the seven straight-sounding speakers. The average standard deviation for the gay-sounding voices was 88.8 ms, compared to 45.7 ms for the straight-sounding speakers; this is visually seen as the bar for gay-sounding speakers being nearly twice as tall as the bar for gay-sounding speakers in Figure 6. This suggests that the gay-sounding speakers, on average, used a wider range of vowel durations than did the straight-sounding speakers. To test this difference for significance, I submitted these data to an independent groups t test. The vowel comparison approached significance, $t(7.131) = 1.83$, $p = .11$. Therefore, the hypothesis that gay-sounding speakers produce vowels with more variance in duration from utterance to utterance is weakly supported.

Table 4 – Standard Deviation of Vowel Duration Measures

		Diphthong	Monophthong	All Vowels
Gay-sounding	Mean	93.0777	67.2773	88.8234
	N	8	8	8
	Std. Deviation	106.58188	54.07680	66.43368
Straight-sounding	Mean	45.8097	40.8404	45.6836
	N	7	7	7
	Std. Deviation	11.03937	8.77982	6.02533
Total	Mean	71.0193	54.9401	68.6915
	N	15	15	15
	Std. Deviation	79.54798	41.00686	52.13975

Figure 6 – Average Standard Deviation of Vowel Duration



In sum, gay-sounding speakers appear to differ from straight speakers in two ways with respect to vowel duration. First, gay-sounding speakers are significantly more different from each other, as individuals, than are straight-sounding speakers. Second, they are marginally more varied within their own speech than are straight-sounding speakers. The latter difference could well contribute to the distinctiveness of the perceived gay accent.

3. Speaker Rating vs. Listener Rating

Speakers were asked, following the recording process, to rank how gay or straight they thought their own voice sounds. They used the same scale, shown in Appendices B and C, as the listeners used to rank the speakers. Table 5 compares the ranking speakers gave their own voice to the average ranking listeners gave that same voice. The two groups of ratings appear to be remarkably similar. Indeed, the correlation between self-

rating and listener-rating is both strongly positive and significant: $r\ (40) = .689, p < .001$ Based on these data, speakers appear to be remarkably aware of how their voice sounds to others.

Table 5 – Rating Comparisons

(Speakers 01-20 are gay, Speakers 21-40 are straight)

Speaker	Average Rating (Listeners)	Speaker's Own Rating	Speaker	Average Rating (Listeners)	Speaker's Own Rating
Speaker 01	3	3	**Speaker 21**	2.5	6
Speaker 02	3.5	3	**Speaker 22**	6.4	7
Speaker 03	5.5	5	**Speaker 23**	4.6	5
Speaker 04	2	3	**Speaker 24**	5.1	5
Speaker 05	4.3	5	**Speaker 25**	5.9	7
Speaker 06	2.8	2	**Speaker 26**	5.7	5
Speaker 07	2.6	3	**Speaker 27**	5.1	4
Speaker 08	3.7	6	**Speaker 28**	4.6	4
Speaker 09	4.9	5	**Speaker 29**	4.2	4
Speaker 10	2.4	3	**Speaker 30**	4.6	5
Speaker 11	2.9	5	**Speaker 31**	5.7	7
Speaker 12	2.4	2	**Speaker 32**	5.6	6
Speaker 13	3.6	5	**Speaker 33**	5.5	6
Speaker 14	1.6	3	**Speaker 34**	6.2	6
Speaker 15	1.6	3	**Speaker 35**	2.5	6
Speaker 16	2.3	2	**Speaker 36**	5.6	6
Speaker 17	3.6	3	**Speaker 37**	4.2	4
Speaker 18	3.8	6	**Speaker 38**	5	5
Speaker 19	2.8	5	**Speaker 39**	6.2	6
Speaker 20	2.8	3	**Speaker 40**	4.2	5

4. Code Switching

The form that speakers filled out after their recording included an open-ended question (see Appendix B) asking if there are situations in which they alter their voice to sound more gay or more straight, and what those situations are. Fifteen participants – three gay men and 12 straight men - responded no, they do not change their voice to make them sound more gay or more straight. As gay-sounding men (who are more likely to be gay) can be met with prejudice because of their voices, it makes sense that most gay

men alter the way they speak under some circumstances. The responses from the gay men who reported that they do change their voice suggest that a gay-sounding voice is the default for them – nine responded in terms of both turning on straight/turning off gay and turning on gay/turning off straight, six responded in terms of turning on straight/turning off gay, and only two responded in terms of turning on gay/turning off straight.

Table 6 lists the situations in which people reported making themselves sound gayer, listed by how many respondents mentioned it.

Table 6 – Situations in Which Gayness is Exaggerated

Situation	Number of Comments
When emotional (stressed, angry, excited)	6
With female friends	3
With friends	1
With other gay men	1
When speaking quickly	1

Table 7 lists the situations in which people reported making themselves sound straighter, listed by how many respondents mentioned it.

Table 7 – Situations in Which Straightness is Exaggerated

Situation	Number of Comments
With straight or very masculine men	5
In unfamiliar situations/with unfamiliar people	4
Around potentially homophobic people	4
In public situations	2
When emotional (uncomfortable, awkward, feeling down)	2
With parents	1
When tired	1

There is a clear dichotomy between the familiar and the unfamiliar – speakers tend to sound gay in familiar situations and straight in unfamiliar situations. The only category included in both gayer and straighter sounding changes is emotion, which is not surprising because both the familiar and the unfamiliar can trigger emotion.

Many participants mentioned some of the features they associate with sounding gay and sounding straight; these features are listed in Table 8.

Table 8 – Features of Gay-Sounding and Straight-Sounding Speech
(as described by the speakers)

Gay-Sounding Features	Straight Sounding Features
Higher pitch (4)	Lower pitch (3)
Lisp (2)	More carefully pronounced (1)
Longer s's (1)	
More flamboyant (1)	
Faster (1)	

Discussion

This study aimed to examine a potential linguistic cue that signals a speaker's sexual orientation. I expected to find differences in the location of mean vowel duration between gay-sounding and straight-sounding speakers, with longer vowels on average for gay-sounding speakers than for straight-soundings speakers. This difference was found, though it was small and not statistically significant. Instead, the *shape* of the distribution of diphthong duration was significantly related to perceived sexual orientation. Gay-sounding voices had significantly more dispersed average vowel duration than straight-sounding speakers. This result suggests that listeners may use vowel duration range, among other cues, as indicators of a speaker's sexual orientation.

The results of this study are strikingly similar to Gaudio's (1994) results about pitch. Both found that while average pitch or vowel duration did not correlate with

perceived sexual orientation, the range of these two features did; more variation and a larger range of pitch and vowel duration both sounded gay. It will be important to see if this pattern applies to other linguistic features.

As previous studies have established, many different linguistic features are associated with the gay accent, but it is difficult, if not impossible, to know which cues lead listeners to rank each individual voice as sounding gay or straight. Any voice can be rated based on one feature or the combination of many; the listener may be conscious of some of these features but not of others. However, the interaction between vowel duration range and perceived sexual orientation in this study was still significant, suggesting that, whether or not listeners are conscious of it, it is a common linguistic feature that we may use to judge sexual orientation.

Of the seven straight-sounding voices used in this experiment, one belongs to a self-identified gay man; of the eight gay-sounding voices, one belongs to a self-identified straight man. I suspect that both of these voices wound up categorized as the mismatching sexual orientation because of their pitch – the straight speaker has a relatively high-pitched voice and the gay speaker has a relatively low-pitched voice. If pitch is the sole cue that led listeners to rank these two speakers as such, they could skew the vowel duration data; however the vowel duration of these two speakers did seem consistent with their perceived sexual orientation categories (i.e., repeat), so I believe it is unlikely that their placement with the "wrong" (inconsistent with their actual) sexual orientation affected the results.

All participants were students at a liberal, gay-friendly college. While the sample may not be representative of the general population, it does provide a strong test of the

hypothesis in question. Because of the school's gay-friendly environment, speakers may have been less likely to feel the need to tone down their gay accent and listeners likely had more exposure to the gay accent than the average listener. Therefore if average vowel duration is a reliable feature of the gay accent, it would most likely be detected in this environment. The fact that I did not detect it in such an environment makes it unlikely that average vowel duration is a feature of the gay accent.

The passage used in this study may have been too long. Each reading lasted approximately ninety seconds, and each listener heard 20 recordings. This made for bored listeners on whom I counted for their attention to the voices for accurate ratings. Some listeners reported making a judgment as to the speaker's sexual orientation within seconds of the start of the recording, making the full ninety seconds unnecessary. Future researchers would be wise, for the sake of their listeners and their results, to keep the passage as brief as possible.

The list of linguistic cues that we use to judge a speaker's sexual orientation is still incomplete, and the field is open to many more studies. The topic of vowel duration could be further broken down, either by height and backness or by individual vowels. Other aspects of speech and their relationship to the perception of sexual orientation could also use more research.

There is also the more difficult question of how and why individuals adopt the "gay accent." As Munson (2011) points out, it appears counterintuitive that one would seek to speak with a stigmatized accent. One hypothesis is that the gay accent is modeled on speech styles of people whose social roles speakers identify with and who speakers see as role models (Munson 2011). Another possible explanation, as suggested by Rieger

(2010), is that the gay accent stems from the evolutionary instinct to mark sexual orientation to help find a mate.

Conclusion

As hypothesized, gay-sounding men in this study produced their vowels with slightly longer durations than straight-sounding men, though this difference was too small relative to average differences in the population to be statistically significant. Vowels produced by gay-sounding speakers, however, had a much *wider distribution of duration.* Further analyses showed that this is largely due to variation from speaker to speaker; gay-sounding speakers were less consistent with their vowel duration than straight-sounding speakers. Weaker evidence indicated that the larger distribution was also in part due to more variability from utterance to utterance within an individual speaker for gay-sounding compared to straight-sounding speakers. This variability of vowel duration may be a linguistic cue used by listeners when judging a speaker's sexual orientation. This subject is open to much more research to add to our understanding of how we use speech to represent sexual orientation.

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Appendices

Appendix A - Speech Materials

The word "pizza" is a contemporary mispronunciation of the word "pita," a type of bread and dish that exists since ancient times in Middle Eastern and Mediterranean cuisines. By 997 the term had appeared in Medieval Latin, and in 16th century Naples a flatbread was referred to as a pizza. Pizza was a baker's tool: a dough used to verify the temperature of the wood-burning oven. A dish of the poor people, it was sold in the street and was not considered a kitchen recipe for a long time. Before the 17th century, the round pizza was covered with white sauce. This was later replaced by oil, cheese, tomatoes or fish. In June 1889, to honor the Queen consort of Italy, Margherita of Savoy, the Neapolitan chef Raffaele Esposito toiled to create the "Pizza Margherita," a pizza garnished with tomatoes, mozzarella cheese, and basil, to represent the colors of the Italian flag. He was the first to add cheese. The sequence through which flavored flatbreads of the ancient and medieval Mediterranean became the dish popularized in the 20th century is not fully understood. Now popular pizza toppings to try are mushrooms, bacon, kalamata olives, avocado, and pineapple. Most people buy cheese made from cow's milk, but other cheese options can brighten up your pizza; try using a cookbook to find more unique pizza ideas.

Appendix B – Speaker Information Sheet

Speaker Information – Sexual Orientation and Communication

Speaker # ____ Date _____

Age _____ Year in school _____

Hometown _____

Are you a native speaker of English?

☐ Yes

☐ No

The gender with which I most identify is (check one)

☐ Male

☐ Female

☐ Other

I am primarily sexually attracted to (check one)

☐ Men

☐ Women

☐ Both

How gay or straight do you think your voice sounds?

1 2 3 4 5 6 7

gay |---------|---------|---------|---------|---------|---------|---------| straight

Do you change the "gayness" or "straightness" of your voice under different circumstances? What are these circumstances?

_____

_____

_____

_____

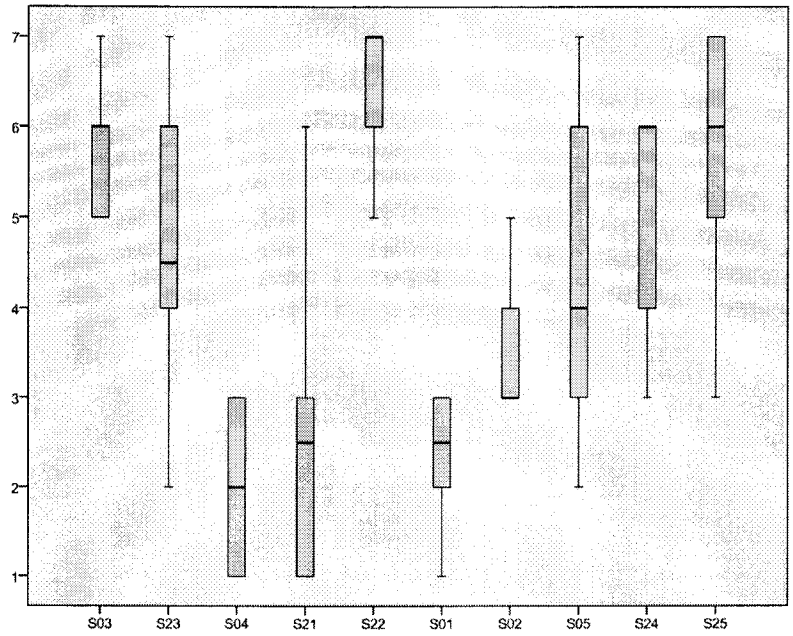
Appendix C – Listener Continuum

1 2 3 4 5 6 7

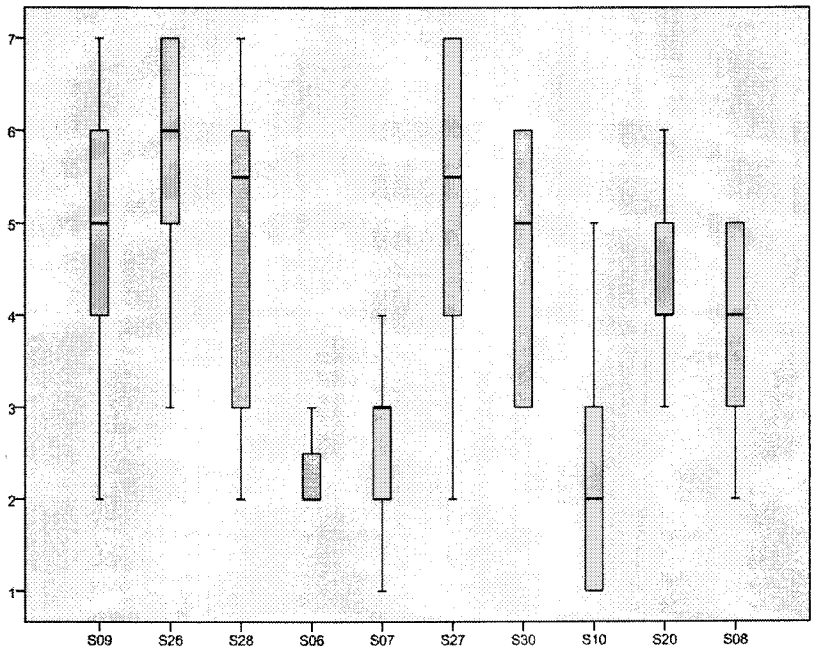
gay |---------|---------|---------|---------|---------|---------|---------| straight

Appendix D – Listener Perception of Speaker Sexual Orientation
(Note: one indicates gay, seven indicates straight-sounding, based on the scale in Appendix C.)

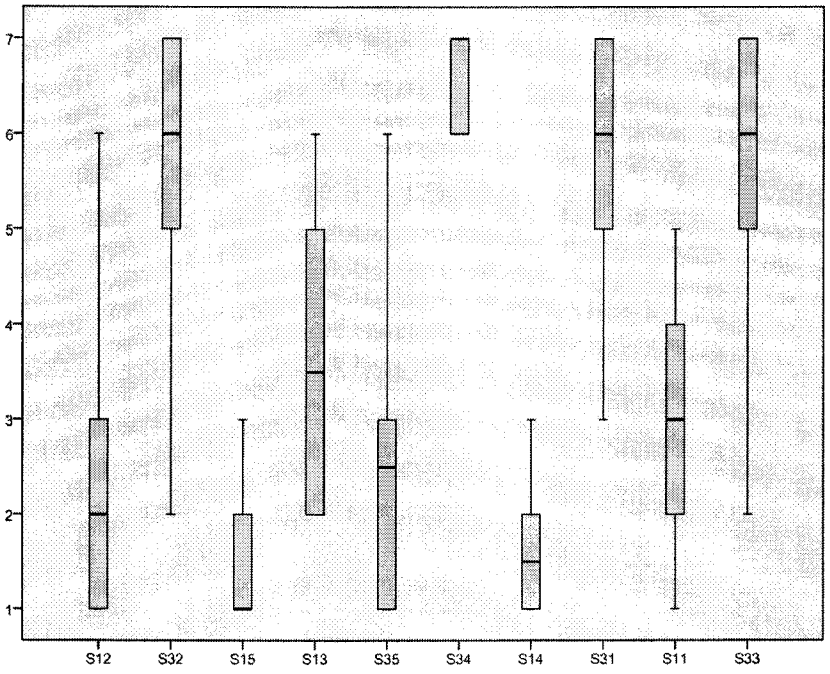
Set One



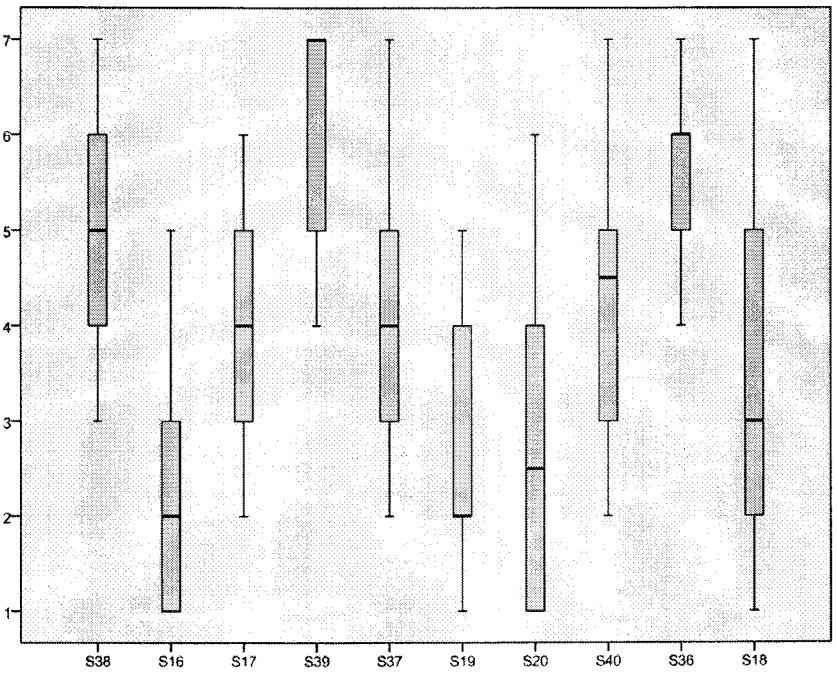
Set Two



Set Three



Set Four



Appendix E – Target Vowels

/i/ – pizza
/i/ – cheese
/ɪ/ - dish
/ɪ/ - fish
/ɛ/ - bread
/ɛ/ - represent
/æ/ – Latin
/æ/ – Italian
/ʊ/ - understood
/ʊ/ - book
/u/ – tool
/u/ – June
/ʌ/ - oven
/ʌ/ - mushroom
/ɑ/ - avocado
/ɑ/ - topping
/e͡ɪ/ - later
/e͡ɪ/ - bacon
/o͡ʊ/ - dough
/o͡ʊ/ - tomatoes
/a͡ɪ/ - try
/a͡ɪ/ - pineapple
/a͡ʊ/ - cow
/a͡ʊ/ - now
/ɔ͡ɪ/ - oil
/ɔ͡ɪ/ - toiled