

**Language and sexuality:  
Searching for the phonetic correlates of gay- and straight-sounding male voices\***

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Some studies have provided evidence that a person's sexual orientation can, in some contexts, be identified by the sound of their voice. However, this recent strand of research offers few clues as to which features listeners attend to when making their judgements. The purpose of this paper is to report on the construction of a database of gay- and straight-sounding male voices, with the goal of exploring the phonetic correlates on which listeners base their judgements.

## **Introduction**

In this paper we address the question of why some men's voices are perceived as sounding gay, and others as straight. We describe our method of collecting voice samples which span the range from gay- to straight-sounding, and we also report on our preliminary findings concerning correlations between these judgements and the acoustic properties of the recorded voices.

We begin by examining a related but somewhat simpler issue, namely the acoustic differences between male and female voices. Over the past 30 years, several studies have investigated this question (Schwartz 1968, Ingemann 1968, Schwartz & Rine 1968, Coleman 1971, Coleman 1976, Lass, Hughes, Bowyer, Waters, & Bourne 1976, Lass, Mertz, & Kimmel 1978, Lass, Tecca, Mancuso, & Black 1979, Edelsky 1979, Lass, Almerino, Jordan, & Walsh 1980, Bennett & Montero-Diaz 1982, Günzburger 1984). Generalizing the results, it is clear that listeners can distinguish, with almost perfect accuracy, whether a voice belongs to an adult male or an adult female, at least with regard to the North American English speakers who served as the experimental talker-subjects in most cases. Although listeners are less able to distinguish between the voices of male and female children, the success rate is nonetheless better than chance (Weinberg & Bennett 1971, Sachs, Liberman, & Erickson 1973, Sachs 1975, Bennett & Weinberg 1979a, Bennett & Montero-Diaz 1982). The small number of studies from outside North America provide similar results (Swedish children: Fichtelius, Johansson, & Nordin 1980; Dutch children: Bresser & Günzburger 1985, Günzburger, Bresser, & ter Keurs 1987; Scottish children: Lee, Hewlett & Nairn 1995).

The layperson typically assumes that identifying a person's sex by the voice alone is related to male-female differences in physiology. Certainly, the difference in vocal fold length between men and women would account for the almost uniform finding that the average pitch in adult men is lower than in women (Weaver 1924, Snidecor 1951, Linke 1973, Coleman 1976, Lass, Hughes, Bowyer, Waters, & Bourne 1976, Loveday 1981, Günzburger 1984, Gilmore, Guidera, Hutchins, & van Steenbrugge 1992). But if differences in pitch are purely physiological, this could not account for the

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better-than-chance ability to distinguish between the voices of pre-adolescent boys and girls, whose physical articulatory properties and average pitch are similar (Weinberg & Zlatin 1970, Weinberg & Bennett 1971; Sachs, Liberman, & Erickson 1973, Bennett & Weinberg 1979a, Bennett & Weinberg 1979b, Bresser & Günzburger 1985, Günzburger, Bresser, & ter Keurs 1987, Lee, Hewlett, & Nairn 1995). In their review of the literature, Lee, Hewlett, & Nairn (1995:199-200) conclude that “the current balance of evidence from anatomical studies would suggest that the vocal organs of prepubertal boys and girls are not significantly different”. Even when pitch differences between male and female speakers are eliminated through electronic manipulations, listeners can still distinguish between the two (Schwartz & Rine 1968, Coleman 1971, Lass, Hughes, Bowyer, Waters, & Bourne 1976, Lass, Almerino, Jordan, & Walsh 1980, Günzburger 1984). Therefore, listeners must rely on other cues beyond the fundamental frequency to make their judgements.

In addition to average pitch, pitch variability and range is another pitch-related property that has been explored with regard to male-female speech differences. The general consensus of the published literature is that males tend to use less of the pitch range available to them, and shift their pitch less frequently, than do females (Brend 1975, Lass, Hughes, Bowyer, Waters, & Bourne 1976, Fichtelius, Johansson, & Nordin 1980, Gilmore, Guidera, Hutchins, & van Steenbrugge 1992).<sup>1</sup>

A prevailing belief concerning gay male speech is that it mirrors the patterns of a stereotypical high-pitched women’s voice, including a highly variable intonation. One experiment that refutes this stereotype is by Lerman & Damsté 1969, who found no significant differences in average pitch between their gay and straight talker-subjects. In later studies, researchers recognized the drawbacks of using sexual orientation as an independent variable, since there are no clear criteria, other than self-identification, for classifying subjects as gay or straight. Reliance on self-report means that it is impossible to construct a truly random sample based on sexual orientation. Gaudio 1994 corrected for this shortcoming by ensuring that his four gay and straight talkers did indeed sound “gay” and “straight” respectively, based on listener judgements, and correlating these judgements with pitch behaviour (range and variability). In other words, his independent variable was not so much the actual sexual orientations of the speakers (“gay” versus “straight”), but rather listener perceptions of the sexual orientations of the speakers. Simplifying his conclusions considerably, we note that Gaudio found his gay-sounding speakers employed greater pitch variation than their straight-sounding counterparts in that they used more of the pitch range and changed pitch more frequently. However, this difference was found in only one of the two speaking tasks, and of the thirteen measures, only one showed a statistically significant difference, and eight only approached significance.

Some researchers have abandoned the notion of sexual orientation altogether by having their speech samples rated on the dimensions of Masculine-Feminine (Terango 1966), or More-Masculine-Sounding (MMS) versus Less-Masculine-Sounding (LMS) (Avery and Liss 1996), and correlating these judgements with specific cues. Terango found that his more feminine-sounding male subjects had higher fundamental frequencies,

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<sup>1</sup> Caution is urged with these findings since there are various practices and disputes on how exactly pitch variability should be measured (c.f. Henton 1989), and indeed not all research supports the prevailing evidence (Snidecor 1951, Linke 1973, Bennett & Weinberg 1979b, Henton 1989).

and only one of his eight measures for range and variability was statistically significant. On the other hand, Avery and Liss' analyses found no differences in fundamental frequency between their two groups, although there was some evidence that the LMS group produced higher formant frequencies in the  $F_2$  of selected vowels. In addition, some of their measures of pitch variability proved significant, but most did not.

In sum, there is no evidence that straight- or masculine-sounding voices have a lower fundamental frequency than gay- or less masculine-sounding voices, and very limited evidence that these voices may be distinguished by some measures of pitch range and variability, depending on the speaking task.<sup>2</sup>

The ultimate purpose of our research program is to expand the existing literature by further exploring the phonetic correlates of gay- and straight-sounding male voices. This paper will describe the procedures used to construct a database of gay- and straight-sounding voices for future analyses, and provide some preliminary results concerning the phonetic cues which listeners attend to when they judge a voice as gay or straight. We will then pose questions for future discussion and research.

It is important to stress again that we are not exploring whether gay and straight men have different voices, but rather the properties of a man's voice that make listeners judge it as gay- or straight-sounding, regardless of his sexual orientation. When we do refer to a subject as "gay" or "straight", this is based on their self-identification; we recognize that these are social labels, and may or may not correlate with the subject's actual sexual orientation.

### **The speaking task**

As a first step, we collected a sample of voices from both straight- and gay-sounding men. The snowballing technique was used to recruit 25 talker-subjects. Because we were not interested in correlating the speaker's personal characteristics (such as sexual orientation) with whether his voice would be rated as gay- or straight-sounding, we were not concerned with random sampling. The talker-subjects ranged in age from 25 to 50 years, and all had native fluency in a variety of Canadian English. Eight self-identified as straight, and 17 as gay.

To begin, the talker-subjects were asked to complete an informed consent statement that did not tell them the purpose for which we were recording their voices. One ethical issue that arose was that some participants might react adversely to knowing that their voices were being collected with the aim of potentially identifying them as gay-sounding — a socially stigmatized speech variety both inside and outside the gay community. However, to inform the participants of the study's aim prior to the recordings could have influenced their speaking style. Therefore, participants were informed that there would be some deception, and that the purpose of the research would be explained to them after the recording session, at which point they would have the right to request that their speech sample be erased. No participant asked to have his recording erased, and in

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<sup>2</sup> We recognize that notions of "gay/straight" are different constructs from "masculine/feminine". Nonetheless, Gaudio 1994 found a high correlation between these constructs. In other words, his listener-subjects rated gay-sounding voices as "effeminate", and straight-sounding voices as "masculine".

fact, most were intrigued with the project and asked further questions.

The talker-subjects were asked to complete three speaking tasks:

- i) read a *textbook paragraph*, adopted from Fairbanks 1966, whose intention was to create a phonetically-balanced passage. We used it because its subject matter (the history and science of rainbows<sup>3</sup>) does not involve any emotional involvement on the part of the speaker;
- ii) read a *dramatic paragraph*, created by Crist 1997 to investigate the use of the phoneme /s/ as a stereotype that men draw upon to make their voices sound more gay. We are using it because its dramatic content (the use of the first person to tell a story about a fire) promised to create a more 'excited' sounding voice; and
- iii) respond to an *open-ended question*, intended to divert the speaker's attention from the tape recorder and elicit a more spontaneous speech sample. Participants were asked to tell a true incident that happened to them based on one of six scenarios (e.g. a recent argument with someone, a bad driving experience, etc.).

The speaking tasks took approximately 30 minutes in total, and participants were given a \$10 music store gift certificate, which they were informed they could keep even if they requested that their recordings be erased after the debriefing.

### The listening task

Three separate listening tasks were constructed, using the tapes from the three speaking tasks. For the textbook and dramatic reading, three of the middle sentences were extracted for each of the 25 speech samples. These were identical for each of the 25 speakers, and the approximate duration was 30 seconds per sample. For the responses to the open-ended question, we selected approximately 30 seconds of speech for analysis. Obviously, identical portions could not be obtained, since each participant's response was unique. However, caution was exercised to ensure that the content of the passage did not explicitly reveal the sexual identity of the speakers (e.g. reference to the sex of romantic or sexual partners, etc.), and did not refer to stereotypical gay or straight behaviour (e.g. lack of familiarity with auto mechanics, etc.).

For each of the speaking tasks, a master tape was constructed with 75 thirty-second speech samples. There was a five-second pause between samples. The voices were presented in a different random order for each task.

Forty-six listener-subjects were recruited, 14 of whom were explicitly identified as gay males. The remainder formed a mixed group, by which we mean that we did not ask about their sexual orientation and we presume that most were heterosexual. The mixed group was recruited from the University of Toronto community, and the gay males from the experimenters' friends and acquaintances. The only information we collected on the listener-subjects was their sex and age. Table 1 provides some demographic information on the listener-subjects. First, they were presented with speaking task (i), the Rainbow

TABLE 1. *Sex and mean age of listener-subjects.*

<sup>3</sup> The association between the subject matter of this passage (i.e., rainbows) and the icon that has recently become the symbol of gay pride is purely coincidental.

	n	Mean Age
All Gay Listener Group	14 Males	37.7
Mixed Group	32	26.3
	<i>13 Males</i>	<i>25.5</i>
	<i>19 Females</i>	<i>26.9</i>
Total	46	29.8

Passage. They were instructed to listen to each of the voice samples, and during the five-second pause that followed each token, indicate whether the voice sounded gay or straight; this was a forced-choice response. In addition, they had to mark their confidence in their judgement on a scale from 0, i.e. a “total guess” to 6, i.e. “100% positive”. The same listeners were given the same instruction for speaking task (ii), the dramatic paragraph. This was followed by speaking task (iii), the responses to the open ended question. The listening task took approximately 45 minutes, and participants were given a \$10 music store gift certificate.

### The phonetic analysis

One stereotype of gay male speech is that it has a higher pitch (fundamental frequency) than that of straight-sounding men. Therefore, we investigated the pitch characteristics of samples extracted from the 75 utterances heard by the listeners (i.e. 25 speakers x 3 speaking tasks). An intonation curve for each portion of the speech sample was extracted and then analysed statistically. The taped samples were digitised at 22050 Hz and analysed using *Signalize 3.12*, an acoustic analysis program, on a Power Macintosh 7100/66AV. For the Rainbow Passage, the following sentence taken from the middle of the recording was analysed:

*Since then physicists have found that it is not reflection, but refraction by the raindrops which causes the rainbows.*

The average duration for this sentence was 6.99 seconds. One utterance was discarded because the speaker stumbled and corrected himself in the middle of the sentence. In the second task, the dramatic fire passage, the following sentence taken from the middle of the recording was analysed:

*There were all these people in the apartments upstairs screaming out of the windows; they must have been trapped.*

The average duration for this sentence was 4.99 seconds. For the responses to the open-ended question, the portion for analysis was selected by starting at a break in production which coincided with the beginning of a sentence. The following six seconds

of speech were then analysed; typically, the analysed portion stopped in the middle of a sentence.

Using the sentence from the Rainbow Passage, the pitch was analysed using the 'Temporal Structure Analysis' function in Signalysse. The accuracy of the pitch analysis was verified intermittently (at least twice for each speaker) by measuring the length of the period in the wave form at the corresponding point in time. The nature of Temporal Structure Analysis requires that the settings be adjusted for each speaker to define fairly carefully the lowest and highest expected pitches. The settings for each speaker were recorded. The utterances of the other two tasks were analysed similarly using the same settings as used in the first task.

Five statistical measurements were made from each extracted intonation curve: mean pitch, standard deviation, maximum pitch, minimum pitch, and pitch range.

## Results

### *Distribution of gay- and straight-sounding voices*

The results were first examined against our original goal of creating a data bank of voices for further analysis and judgement studies. We wanted the voices to span the range from very gay-sounding to very straight-sounding. Based on the ratings of the group of listeners of unknown sexual orientation (the "mixed" group), Table 2 shows that we do have a good distribution of mean "sounds gay" ratings. In particular, we have five voices which 80% or more of the listeners from the mixed group rated as straight-sounding (Talkers 4, 23, 13, 21, and 24) and six voices which 80% or more of these listeners rated as gay-sounding (25, 9, 3, 2 and 16).

### *Pitch measures*

The first set of analyses involved linear regressions between the pitch measurements and both the "sounds gay" judgements and their associated confidence ratings. These regressions were run separately for the mixed and self-identified gay listeners. Interestingly, seven of the nine significant correlations were found in the scientific ("Rainbow") passage.

First, and perhaps most importantly, there was no significant relationship between a talker's mean pitch and the number of times he was judged as gay-sounding. This was true for all six correlations (3 tasks x 2 listening groups;  $p > .30$  in all cases).

Secondly, other, less direct measures of pitch did yield some significant findings, although the results are restricted to specific listening groups or discourse types. For example, both listening groups gave lower confidence ratings to higher-pitched voices ( $R = -.41$ ,  $P < .05$  for each group), but only for the Rainbow Passage. Perhaps listeners gave some consideration to the stereotype that high voices sound gay, but other phonetic features were far more important in their final judgements; this would explain the uncertainty in the judgements. Also restricted to the Rainbow Passage was the finding that talkers who used a wider pitch range received lower confidence scores ( $R = -.42$ ,  $P = .04$ ), as did those with a higher pitch standard deviation ( $R = -.45$ ,  $P = .03$ ), although these

results held only for the mixed group of listeners. This suggests that pitch range and variability are at best a weak cue to “sounds gay” judgements, and, like mean pitch, are easily overridden by other phonetic cues.

TABLE 2. “Sounds gay” judgements and mean confidence ratings for 25 male voices, based on the mixed listener group. Scores are collapsed across the three discourse types.

Talker Identification	Mean % of listeners who chose “sounds gay”	Mean confidence score	Talker’s actual Sexual Orientation
4	10%	4.2	Gay
23	12%	4.3	Straight
13	14%	4.2	Gay
21	14%	4.5	Straight
24	16%	4.2	Straight
8	24%	3.8	Straight
15	25%	4.1	Gay
14	25%	4.1	Straight
22	28%	3.6	Straight
1	28%	3.7	Gay
10	28%	4	Gay
17	35%	3.6	Straight
19	38%	3.7	Gay
18	39%	3.2	Gay
11	43%	4.1	Gay
6	52%	3.9	Gay
5	53%	3.6	Gay
12	60%	3.8	Straight
7	79%	3.9	Gay
16	80%	4.2	Gay
2	81%	4.1	Gay
20	83%	4.1	Gay
3	84%	4.1	Gay
9	92%	4.5	Gay
25	98%	5	Gay

These correlations should be interpreted with caution because for each group and discourse type, five correlations were run on the same set of judgement or confidence ratings. One option is to apply the Bonferroni correction, dividing the cutoff of  $P = .05$  by the number of overlapping correlations:  $.05 / 5 = .01$ . Using this cut-off, none of our correlations would attain significance. However, the Bonferroni correction is considered by many researchers to be too stringent, especially in exploratory work such as ours (e.g. Keppel 1991). Since our observed correlations are interpretable, we prefer to treat them as marginally significant.

*Main analysis*

In our main analysis we used a mixed analysis of variance design to examine differences in how the two listening groups rated the 25 voices according to passage type, and according to whether the speaker was gay or straight.

There was no main effect of Listener Group ( $F(1,144) = 1.47, p = .23$ ) or any of its interactions on the judgements. However, there was a large main effect of the speaker's sexual orientation ( $F(1,144) = 189.79, P < .0001$ ): the gay men were rated on average as far more gay-sounding than the straight men for each discourse type. There was also a significant main effect of passage type ( $F(2,288) = 7.21, p = .001$ ) and an interaction between passage type and talker orientation ( $F(2,288) = 10.01, P = .0001$ ). The means for this interaction are show in Table 3. The interaction arose because the gay talkers sounded significantly gayer in the open-ended passage than in the other two, whereas the straight talkers sounded significantly gayer in the Rainbow Passage than in the other two.

TABLE 3. *Mean percentage of “sounds gay” judgements by discourse type, across both listening groups.*

	Gay Talkers	Straight Talkers
Scientific Passage	57.6%	35.8%
Dramatic Passage	54.4%	25.4%
Open-Ended Response	60.3%	22.4%

We also conducted an individual differences analysis, comparing the mean judgements and confidence ratings given to each voice by the gay and mixed groups of listeners. The results are shown in Table 4.

Of the 150 possible comparisons (25 talkers x 3 discourse types x 2 measures, judgement and confidence), only twelve significant differences emerged between the gay and mixed listeners, nine involving “sounds gay” judgements and three involving confidence ratings. Although this suggests that there is little difference between the ratings of straight and gay listeners, the pattern of these differences is striking. Eleven of the twelve differences involved gay men's voices. In addition, nine of the twelve differences were for the open-ended response, while two were for the scientific passage, and one was for the dramatic passage. Finally, and perhaps most interestingly, in eleven of the twelve cases the difference was in the direction of the gay listeners rating a voice as gayer, or rating it with more confidence. Only one voice (Talker 25) was rated gayer by the mixed group, and this too was a gay-sounding voice.

TABLE 4. *Significant and marginal differences for between-groups t-tests between gay male and mixed listener groups in the “sounds gay” judgements and confidence scores*

Talker Identification	Scores		P	Speaking Task
	Gay Listeners	Mixed Listeners		
1 (gay)	50.0%	22.0%	.06	Open-Ended Question
2 (gay)	100.0%	78.1%	.06	Open-Ended Question
4 (gay)	42.9%	6.2%	.00001	Open-Ended Question
5 (gay)	85.7%	40.6%	.00001	Textbook Passage
7 (gay)	92.9%	65.6%	.06	Open-Ended Question
8 (straight)	4.71	3.50 (conf. rating)	.02	Open-Ended Question
13 (gay)	5.29	4.28 (conf. rating)	.05	Open-Ended Question
18 (gay)	4	2.75 (conf. rating)	.03	Open-Ended Question
18 (gay)	57.1%	28.1%	.06	Dramatic Passage
19 (gay)	50.0%	21.9%	.06	Open-Ended Question
20 (gay)	100.0%	75.0%	.04	Textbook Passage
25 (gay)	78.6%	96.9%	.04	Open-Ended Question

### *Gaydar analyses*

We also investigated the phenomenon of "gaydar", a term which refers to the ability to identify who is gay on the basis of appearance, speech, nonverbal behaviour, interests, and so on. Following anecdotal suggestions that straight women are either more empathic than men, or have more invested in knowing who is gay, we wondered whether women in the mixed group might have better verbal gaydar than the men in that group, and whether gay men have the best gaydar of all. Note that in this part of the analysis, we deviate from our usual practice and consider a "correct" judgement to be one that corresponds to the talker's self-identification as gay or straight.

We conducted two analyses, one on the gay men's voices and one on the straight men's voices. In both cases the dependent variable was the percentage of "correct" judgements, and the independent variables were Discourse Type and Listener Group, this time with three levels: gay male, mixed female, and mixed male.

In the analysis of the gay men's voices, there was no effect of Listener's Orientation ( $F(2,43) = 2.00$ ,  $p = .147$ ). Mean accuracy was 60.4% for gay male listeners, 56.9% for mixed female listeners, and 51.1% for mixed male listeners. Perhaps with larger sample sizes this trend might prove significant, but it is clear that if there is an effect, it is a rather small one, at least for the listeners we tested. On the other hand, there was a significant main effect of discourse ( $F(2,86) = 3.86$ ,  $P = .03$ ); taken together, the listeners were less successful at identifying gay men on the Crist passage (53.49% correct) than on the open-ended question (58.42% correct); scores for the Rainbow passage fell between these two (56.42%).

For the straight men's voices, there was once again no main effect of Listener's Orientation ( $F(2,43) = 1.90$ ,  $P = .16$ ). Gay men scored 70.83% correct, mixed women

69.96% correct, and mixed men 79.53% correct. Here it is tempting to speculate that the somewhat higher accuracy for the mixed male group might indicate a special sensitivity to phonetic cues for straight-sounding speech. There was again a significant effect of discourse ( $F(2,86) = 9.81, P = .0002$ ). The straight men's voices were judged significantly gayer in the Rainbow passage (34.17%) than in either the Crist passage (25.14%,  $p = .003$ ) or the open-ended question (21.38%,  $p = .0002$ ).

### *Reading task for open-ended passages*

Recall that because each talker's story was unique, we felt it necessary to select for analysis only sentences which did not reveal the talker's sexual orientation through lexical or pragmatic content. However, the fact that the gay men sounded gayest in the open-ended passage, and were more likely to be correctly identified as gay in that condition, led us to suspect that our attempts to remove gay content had not been successful. In order to test this hypothesis we conducted a followup study in which 16 University of Toronto students (eight male and eight female) were presented with written transcripts of the 25 open-ended passages, using the same methodology as in the listening task.

Despite the fact that the raters in this task did not hear the men's voices, there was a significant correlation between the judgements on the listening task and on the new reading task ( $R = .51, P = .009$ ), and the mean ratings for the two methods did not differ ( $F(1,24) = 1.12, P = .30$ ). This provides strong support for our suspicion that lexical and pragmatic content influenced the responses in the open-ended passage, and that these factors account for the fact that the gay men were slightly easier to identify in this condition.

Although the notion of gaydar has popular appeal, the ability to identify a gay man on the basis of his voice is not our main concern. Since about 40% judgements of gay voices and 27% of the judgements of straight voices were wrong, verbal gaydar is not very reliable.

### **Conclusions**

Clearly many of the gay talker-subjects had "the gay voice". But as we cautioned above, this is hardly surprising given that they were not randomly selected. Some of the men were invited to be recorded because we deemed them to have gay-sounding voices, in order to ensure that we would have a varied sample for our database. It is likely that a more representative, random sample would yield a smaller proportion of gay men who in fact sound gay.

Although our results do not provide clear evidence that gay men have a better ability to detect other gay men by the voice alone, it is still interesting to note that for two talkers there were large differences between the ratings of the gay and mixed listening groups. In talker 4's open-ended response, he was given a 6.2% 'gay' rating by the mixed listener group, yet 42.9% by the gay listeners. We have already provided evidence that this could be due to pragmatic content, but it is still worth noting that the mixed group of listeners did not pick up on this. On talker 5's scientific passage, he was rated as 40.6% as gay-sounding by the mixed listener group, and 85.7% by the gay listeners, but in this case we cannot attribute the difference to pragmatics. Thus it does seem that in some cases gay

men have better gaydar than other listeners.

In terms of pitch behaviour, our results correspond with Gaudio 1994 in that the fundamental frequency did not differ significantly between gay- and straight-sounding voices, and they also agree with Avery and Liss 1996 in that their less-masculine-sounding and more-masculine-sounding voices did not differ in fundamental frequency. However, fundamental frequency is only one of many characteristics that may distinguish between gay- and straight-sounding voices. In addition to fundamental frequency, other possible acoustic cues that have been explored as a potential source of differentiation between male- or masculine- or straight-sounding and female or feminine- or gay-sounding voices include vowel length and formant frequencies (Schwartz & Rine 1968, Coleman 1971, Sachs, Liberman, & Erickson 1973, Sachs 1975, Coleman 1976, Lass, Hughes, Bowyer, Waters, & Bourne 1976, Bennett & Weinberg 1979a, Bennett & Weinberg 1979b, Bennett & Montero-Diaz 1982, Bresser & Günzburger 1985, Lee, Hewlett, and Nairn 1995, Avery & Liss 1996, Högberg 1996); sibilant and other consonant production (Schwartz 1968, Ingemann 1968, Avery & Liss 1996, Linville 1998); loudness (Markel, Prebor, & Brandt 1972, von Raffler-Engel & Buckner 1983); high rising terminals (Edelsky 1979, Britain 1992; breathiness (Henton & Bladon 1985, Klatt & Klatt 1990, Hillenbrand, Cleveland, & Erickson 1994); and creakiness (Henton & Bladon 1988). We might also add to this list Voice Onset Time (VOT), duration and stress of syllables, degree of pharyngeal expansion and constriction, and specific intonation contours. It is our intention to make acoustic measurements of these phonetic factors on all 25 of the voices in our database, in order to identify which of them co-occur, and which are the strongest predictors of which voices are judged to sound gay.

In addition to exploring the phonetic correlates of gay- and straight-sounding voices, we must also acknowledge the possibility that different gay-sounding voices have different phonetic characteristics. Perhaps there is a “menu” of cues, from which speakers make different selections. All these features may sound “gay”, but in different ways depending on the feature, and the combinations thereof. It may be the case that in a male-as-norm culture that values masculinity, any feature that does not “straight” may be labelled as gay-sounding, even if just one speaker does it.

To what extent do female voices share these phonetic characteristics? The prevalent stereotype is that gay-sounding men sound like women. If it were possible to eliminate the most obvious male/female differences, namely fundamental frequency, would listeners be able to correctly discern the gay-sounding talkers from female talkers? If so, then we must assume that gay men share only some of the characteristics of female speech, and that there may be some factors which are unique to gay-sounding speech. This raises the deeper question of whether gay-sounding speech is in fact modelled on women’s speech.

To what extent do phonetic markers interact with visual cues? When the researchers were brainstorming about possible phonetic cues to explore, they invited a small group of acquaintances to watch several videos of *Q-TV* (a now defunct lesbian and gay TV talk show that aired briefly on a Canadian cable network in the late 1990s). Initially, the television screen was covered, forcing the participants to base their comments solely on the interviewees’ voices. It is interesting to note that in one case, the participants could not readily identify the speaker’s sexuality until the screen was exposed, at which point they quickly identified him as gay. Perhaps judgements about gay- and

straight-sounding voices differ depending on whether the raters hear the voice alone, or in conjunction with body language.

How is this voice acquired? Linville (1998:46), who found some differences in /s/ production between gay and straight speakers, hypothesizes that “this articulatory feature may be acquired unconsciously as a marker of membership in the gay community”. This implies that the gay voice is acquired *after* the coming out process. However, we reject this suggestion, believing that phonological habits are acquired at a much younger age. Boys who later identify themselves as gay have voices which are labelled as ‘sissy’-sounding long before they come out or identify with a gay community. We more closely align ourselves with Zwicky’s (1997:29) speculation that the acquisition of the “gay voice” is somehow related to the “psychosocial mechanisms in the acquisition of a gender identity and its associated norms of behavior”, but he freely admits that he has no answers as to how and why a gay man would adopt a socially stigmatized speech variant. The question of why a straight man would sometimes acquire the gay voice is also puzzling. Indeed, one of our heterosexual talker-subjects (12) was rated as moderately gay-sounding. In addition, if there is indeed a “menu” of phonetic characteristics from which a speaker could choose, what circumstances would lead a speaker to have one set of features versus another?

To what extent are some features consciously adopted as a result of a speaker’s social affiliation with the gay community after the coming out process? Our study, of course, is focussed on the seemingly unconscious use of the gay voice, as opposed to more stylized or ritualized (“camp”) gay performances.

And how do listeners learn to detect these markers? Listeners might be able to distinguish gay- and straight-sounding voices, but are they all attending to the same cues, and combinations of these cues? Interestingly, when we watched the listener-subjects making their decisions, we noted that they made them at similar points in the tape. Rarely did any of the raters wait until the end of the 30-second token to mark their sheets. Obviously, they had made their decision at some point prior to the end of the 30-second speech sample. Purnell, Idsardi, & Baugh 1999 found that their listener-subjects accurately judged a speaker’s race with very short tokens (just by the word “hello”). It might be worthwhile to videotape the listener-subjects engaged in the rating tasks, to see if there is a common decision point at which they mark their responses. The phonetic feature that occurs just prior to the decision may shed light on which cue the listeners were attending to. Another strategy, devised by Crist 1997, is to have speakers mimic stereotypical gay speech, which may reveal which cues are drawn upon when listeners make judgements about the gayness or straightness of voices.

Does social contact with gay males make listeners more sensitive to the phonetic cues carried by the “gay voice”? Although we did not ask our listeners about their contacts with gay men, we think that this is not a major factor, since there were few differences between our gay and unselected listeners even though the former are likely to have more frequent contact with gay men.

How much variation is there in the presence of the phonetic characteristics in different social settings? What is the effect of an experimental setting? Do these phonetic characteristics vary according to race, culture, or class? Henton (1989:303-4) cautions about the use of specific measurements in making sweeping generalizations: “[...] this conglomerate value should not be the mainstay for the argument here, since it is not entirely legitimate to compare values across studies, across languages, and across differing

linguistic environments". Gilmore, Guidera, Hutchins, & van Steenbrugge (1992) found interaction effects between speaking tasks and speaker sex in their measures of fundamental frequency and pitch range. Other studies have also investigated the interaction of race and sex (Lass, Tecca, Mancuso, & Black 1979, Lass, Almerino, Jordan, & Walsh 1980). Loveday (1981) investigated the difference between intonation and politeness formulae between English and Japanese male and female speakers. Henton and Bladon 1988 factored into their design the interaction effects of class and gender. And of course we found that our straight voices sounded gayest in the scientific passage while the gay voices sounded gayest in the open conversation.

We caution against using the results as a tool for "correction". For example, we question Avery and Liss' (1996:3747) suggestion that their findings have clinical relevance for patients wishing to modify the perception of masculinity invoked by their speech. It is not clear whether the "patients" to whom they refer are the transgendered, who may want to present themselves as their non-biological sex, or men who sound "too effeminate" and wish to alter their speech to sound more socially acceptable. We reject any suggestion that those in the latter category need to be "corrected".

We believe that our results may best be used by exploring correlations between phonetic properties, the notions of gay- and straight-sounding, and personality judgements (c.f. Linke 1973, Sachs 1975, Arnovitch 1976, Edelsky 1979, von Raffler-Engel & Buckner 1983) with a view toward highlighting the potential discrimination faced by both men and women, and girls and boys, who possess voice qualities that deviate from the standard expected by their sex. Purnell, Idsardi, & Baugh 1999 found that landlords in predominantly white American neighbourhoods would deny Black- and Hispanic-sounding voices rental accommodation based on hearing their voices on the telephone. Similar research on the discrimination faced by gay-sounding men would be a worthy endeavour. But we stress that the onus does not lie on the speakers to sound "straight", but rather the listeners to be aware of, and correct, their biases.

## References

- Aronovitch, Charles D. 1976. "The voice of personality: Stereotyped judgments and their relation to voice quality and sex of speaker." *The Journal of Social Psychology* 99: 207-20.
- Avery, Jack D., and Julie M. Liss. 1996. "Acoustic characteristics of less-masculine-sounding male speech." *Journal of the Acoustical Society of America* 99: 3738-48.
- Bennett, Suzanne, and Luisa Montero-Diaz. 1982. "Children's perception of speaker sex." *Journal of Phonetics* 10: 113-21.
- Bennett, Suzanne, and Bernd Weinberg. 1979a. "Sexual characteristics of preadolescent childrens' [sic] voices." *Journal of the Acoustical Society of America* 65: 179-89.
- Bennett, Suzanne, and Bernd Weinberg. 1979b. "Acoustic correlates of perceived sexual identity in preadolescent children's voices." *Journal of the Acoustical Society of America* 66: 989-1000.
- Brend, Ruth M. 1975. "Male-female intonation patterns in American

- English.” *Language and Sex: Difference and Dominance*. Ed. Barrie Thorne and Nancy Henley. Rowley, MA: Newbury House Publishers, 84-7.
- Bresser A., and D. Günzburger. 1985. “Voice recognizability of prepubertal boys and girls.” *Progress Report Institute of Phonetics Utrecht* 10: 25-32.
- Britain, David. 1992. “Linguistic change in intonation: The use of high rising terminals in New Zealand English.” *Language Variation and Change* 4: 77-104.
- Coleman, Ralph O. 1971. “Male and female voice quality and its relationship to vowel formant frequencies.” *Journal of Speech and Hearing Research* 14: 565-77.
- Coleman, Ralph O. 1976. “A comparison of the contributions of two voice quality characteristics to the perception of maleness and femaleness in the voice.” *Journal of Speech and Hearing Research* 19: 168-80.
- Crist, Sean. 1997. “Duration of onset consonants in gay male stereotyped speech.” *University of Pennsylvania Working Papers in Linguistics* 4: 53-70.
- Edelsky, Carole. 1979. “Question intonation and sex roles.” *Language and Society* 8: 15-32.
- Fairbanks, Grant. 1966. *Experimental Phonetics: Selected Articles*. Urbana: University of Illinois Press.
- Fichtelius, Anna, Iréne Johansson, and Kerstin Nordin. 1980. “Three investigations of sex-associated speech variation in day school.” *Women’s Studies International Quarterly* 3: 219-25.
- Gaudio, Rudolf P. 1994. “Sounding gay: Pitch properties in the speech of gay and straight men.” *American Speech* 69: 303-18.
- Gilmore, Stuart I., Angela M. Guidera, Susan L. Hutchins, and Willem van Steenbrugge. 1992. “Intra-subject variability and the effect of speech task on vocal fundamental frequency of young adult Australian males and females.” *Australian Journal of Human Communication Disorders* 20: 65-73.
- Günzburger, D. 1984. “Perception of some male-female voice characteristics.” *Progress Report Institute of Phonetics Utrecht* 9: 15-26.
- Günzburger, D., A. Bresser, and M. ter Keurs. 1987. “Voice identification of prepubertal boys and girls by normally sighted and visually handicapped subjects.” *Language and Speech* 30: 47-58.
- Henton, Caroline G. 1989. Fact and fiction in the description of female and male pitch.” *Language and Communication* 9: 299-311.
- Henton, C.G., and R.A.W. Bladon. 1985. “Breathiness in normal female speech: Inefficiency versus desirability.” *Language and Communication* 5: 221-7.
- Henton, Caroline, and Anthony Bladon. 1988. “Creak as a sociophonetic marker.” *Language, Speech and Mind: Studies in Honour of Victoria A. Fromkin*. Ed. Larry M. Hyman and Charles N. Li. London and New York: Routledge, 3-29.
- Hillenbrand, James, Ronald A. Cleveland, and Robert L. Erickson. 1994. “Acoustic qualities of breathy vocal quality.” *Journal of Speech and Hearing Research* 37: 769-78.
- Högberg, Jesper. 1996. “Some studies of the relationship between speech acoustics, articulation and phonetic structure.” *Quarterly Progress and Status Report: Royal Institute of Technology, Department of Speech* 3: 13-21.

- Ingemann, Frances. 1968. "Identification of the speaker's sex from voiceless fricatives." *Journal of the Acoustical Society of America* 44: 1142-4.
- Keppel, G. 1991. *Design and analysis: A researcher's handbook*. Englewood Cliffs, NJ: Prentice-Hall.
- Klatt, Dennis H., and Laura C. Klatt. 1990. "Analysis, synthesis, and perception of voice quality variations among female and male talkers." *Journal of the Acoustical Society of America* 87: 820-57.
- Lass, Norman J., Celest A. Almerino, Laurie F. Jordan, and Jayne M. Walsh. 1980. "The effect of filtered speech on speaker race and sex identifications." *Journal of Phonetics* 8: 101-12.
- Lass, Norman J., Karen R. Hughes, Melanie D. Bowyer, Lucille T. Waters, and Victoria T. Bourne. 1976. "Speaker sex identification from voiced, whispered, and filtered isolated vowels." *Journal of the Acoustical Society of America* 59: 675-8.
- Lass, Norman J., Pamela J. Mertz, and Karen L. Kimmel. 1978. "The effect of temporal speech alterations on speaker race and sex identifications." *Language and Speech* 21: 279-90.
- Lass, Norman J., John E. Tecca, Robert A. Mancuso, and Wanda I. Black. 1979. "The effect of phonetic complexity on speaker race and sex identifications." *Journal of Phonetics* 7: 105-18.
- Lee, Alison, Nigel Hewlett, and Moray Nairn. 1995. "Voice and gender in children." *Language and Gender: Interdisciplinary Perspectives*. Ed. Sara Mills. London and New York: Longman, 194-204.
- Lerman, J.W., and P.H. Damsté. 1969. "Voice pitch of homosexuals." *Folia phoniat* 21: 340-46.
- Linke, C.E. 1973. "A study of pitch characteristics of female voices and their relationship to vocal effectiveness." *Folia Phoniat* 25: 173-85.
- Linville, Sue Ellen. 1998. "Acoustic correlates of perceived versus actual sexual orientation in men's speech." *Folia Phoniatrica et Logopaedica* 50: 35-48.
- Loveday, Leo. 1981. "Pitch, politeness and sexual role: An exploratory investigation into the pitch correlates of English and Japanese politeness formulae." *Language and Speech* 24: 71-89.
- Markel, Norman N., Layne D. Prebor, and John F. Brandt. 1972. "Biosocial factors in dyadic communication: Sex and speaking intensity." *Journal of Personality and Social Psychology* 23: 11-3.
- Purnell, Thomas, William Idsardi, and John Baugh. 1999. "Perceptual and phonetic experiments on American English dialect identification." *Journal of Language and Social Psychology* 18: 10-30.
- Sachs, Jacqueline. 1975. "Cues to the identification of sex in children's speech." *Language and Sex: Difference and Dominance*. Ed. Barrie Thorne and Nancy Henley. Rowley, MA: Newbury House Publishers Inc., 152-71.
- Sachs, Jacqueline, Philip Lieberman, and Donna Erickson. 1973. "Anatomical and cultural determinants of male and female speech." *Language Attitudes: Current Trends and Prospects*. Ed. Roger W. Shuy and Ralph W. Fasold. Washington, D.C.: Georgetown University Press, 74-84.
- Schwartz, Martin F. 1968. "Identification of speaker sex from isolated, voiceless fricatives." *Journal of the Acoustical Society of America* 43: 1178-9.

- Schwartz, Martin F., and Hellen E. Rine. 1968. "Identification of speaker sex from isolated, whispered vowels." *Journal of the Acoustical Society of America* 44: 1736-7.
- Snidecor, John C. 1951. "The pitch and duration characteristics of superior female speakers during oral reading." *Journal of Speech and Hearing Disorders* 16: 44-52.
- Terango, Larry. 1966. "Pitch and duration characteristics of the oral reading of males on a masculinity-femininity dimension." *Journal of Speech and Hearing Research* 9: 590-5.
- von Raffler-Engel, Walburga, and Janis Buckner. 1983. "A difference beyond inherent pitch." *Proceedings of the Conference: Sociology of the Languages of American Women*. Ed. Betty Lou Dubois and Isabel Crouch. San Antonio, Texas: Trinity University, 115-18.
- Weaver, Andrew Thomas. 1924. "Experimental studies in vocal expression." *Journal of Applied Psychology* 8: 23-56.
- Weinberg, Bernd, and Marsha Zlatin. 1970. "Speaking fundamental frequency characteristics of five- and six-year-old children with mongolism." *Journal of Speech and Hearing Research* 13: 418-25.
- Weinberg, Bernd, and Suzanne Bennett. 1971. "Speaker sex recognition of 5- and 6 year-old children's voices." *Journal of the Acoustical Society of America* 50: 1210-3.
- Zwicky, Arnold. M. 1997. "Two lavender issues for linguists." *Queerly Phrased: Language, Gender, and Sexuality*. Ed. Anna Livia and Kira Hall. New York: Oxford University Press, 21-34.