Do gay-sounding men speak like women?

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Research in sociophonetics faces several challenges when it comes to understanding the social significance of gay-sounding male speech. In this paper we first review some of the empirical findings on phonetic microvariation, using a perceptual approach in which speakers’ voices are rated on a continuous scale from gay- to straight-sounding. We then point out similarities and differences between gay-sounding male voices and those of heterosexual women, and discuss the implications for the acquisition of the ‘gay voice’ in childhood vs. adulthood. Finally, we propose that other sociolinguistic categories, such as social class, might also be treated as continuous variables based on listeners’ perceptions.

1. Overview: Phonetics, gender, and sexual orientation

In this paper we examine the extent to which gay-sounding male speakers use phonetic microvariation in the same way as heterosexual females. The notion that gay men speak like women has popular currency, but to date it has not been given deeper scientific consideration. We explore the possibility that gay-sounding speech is acquired at an early age from female role models, that it is based on social affiliation with women and girls, and that it may be linked to the broader notion of gender nonconformity. If this is an appropriate characterization of how gender affects speech, then we should expect a great deal of overlap between the speech of gay-sounding men and that of heterosexual women.

In sociolinguistic research, the speakers’ sex is almost always analysed as an independent variable, along with such factors as socioeconomic status, education, and ethnicity. In the vast majority of this literature, only biological sex is considered: the speech of males is compared to that of females, with no further gender gradations.

There are two major problems with this approach. First, biological sex is only a crude approximation to the more explanatory issues of gender identity. Smith (1985) showed that both self- and other-ratings of gender, for example on the Bem Sex Role Inventory (Bem 1974), provide a more nuanced view of language variation by gender than can be garnered from the biological distinction between males and females. Both men and women can be masculine or feminine to different degrees and in different domains. Moreover, sex and gender may have independent effects on speech: some differences are clearly biologically based, such as those having to do with the size of the vocal tract, while others are socially acquired, such as the peak frequency of sibilant consonants (Heffernan 2004; Stuart-Smith 2006a).
Secondly, the male/female distinction ignores several socially significant sexual minorities: gay, lesbian, male and female bisexual, male-to-female and female-to-male transgendered, and intersexed individuals. Two recent survey books on sociolinguistics (Coulmas 1997; Chambers et al. 2002) treat phonetic variation in considerable depth, and although both volumes have chapters dealing with language and gender, neither mentions the possible effects on speech of these other aspects of gender identity. In his book *Principles of Linguistic Change: Social Factors*, Labov (2001) reports in a footnote that studies of gender differences in language have generally failed to distinguish even between gay and straight speakers. It remains to be seen whether coding speakers as male and female is a sufficient representation of variation by sex and gender in sociolinguistic research. This assumption would be correct if all gender-based variation is the same as heterosexual male/female variation, but this is far from having been confirmed.

A further problem is that there is no one-to-one mapping between a person’s sexual orientation and how they speak. In our work with male speakers, we maintain a distinction between phonetic studies of gay and straight men on the one hand, and studies of gay- and straight-sounding men on the other. Thus, rather than focusing on gender variation as an aspect of the speaker’s sexuality, as Smith (1985) has done, we focus on listeners’ perceptions of the voices. This distinction is crucial because it avoids confounding the psychosocial concept of sexual orientation with the sociophonetic concept of the “gay voice”. The importance of this strategy was confirmed by Smyth et al. (2003), where we reported a ‘gaydar’ accuracy rate of only about 57% for a sample of 46 listeners, despite the fact that they exhibited a good deal of agreement about which voices sounded gay. According to our listeners’ ratings, most straight men and many gay men sounded straight; some gay men sounded gay, to varying degrees, and some straight men also sounded gay. Some men had voices that were not clearly marked as either gay- or straight-sounding.

Perhaps the ideal research strategy would be to combine identity information (sexuality scales) and demographic data (sexual orientation and biological sex) with perceptual data. For example, one could examine whether gay-sounding gay men differ in sexual identity (e.g. on masculinity as a personality variable) from straight-sounding gay men, either as adults, or during the acquisition of phonetic variants in childhood.

A possible answer to this question has emerged in studies of gender-nonconformity in children. For example, Renn (forthcoming) reports that gender nonconformity in childhood, as reported retrospectively by both the speaker and his mother, serves as a better predictor of adult speech (using the Smyth et al. 2003 methodology) than either biological sex or adult sexual orientation. Not only does this confirm the importance of sexual identity in speech, it also situates the acquisition of gendered voices in childhood sexuality.

As a first approximation to these questions, we propose that all male voices can be situated along a gay-straight perceptual continuum, which corresponds roughly to a feminine-masculine continuum (see Smyth et al. 2003 for a note on the differences between these concepts in judgement data). Although we do not yet have data to support the conjecture, it would also follow that female voices can be situated along a lesbian-straight continuum, corresponding roughly to the masculine-feminine continuum. Munson et
al. (2006) have established that listeners are capable of making judgements about which voices sound lesbian, and that information about a woman’s sexual orientation affects perception of her voice: stimuli that are ambiguous between /s/ and /ʃ/ are more likely to be heard as /s/ if the speaker is lesbian, but as /ʃ/ if she is straight, just as one would predict if lesbians, like males, have lower peak frequencies for sibilants.

Thus our general research strategy is to examine the statistical relationship between pairs of continuous variables: microvariation in the acoustic realization of a phonetic feature on the one hand, and variation in perceived sexual orientation on the other.

2. Acquisition of phonetic variants

In this paper we also address the question of how some male speakers acquire the phonetic characteristics which listeners identify as sounding gay. Some boys are labelled at a fairly early age as sounding like sissies, i.e. feminine or gay. Presumably they have acquired these phonetic traits by modelling their speech on that of others. However, a child’s world is not often densely populated with gay-sounding male adults. It is quite possible for a boy to grow up in a community with little or no personal contact with a gay-sounding role-model, and yet sound gay himself.

We therefore suggest that female speech serves as a role model for the acquisition of gay-sounding speech. Virtually any boy has vast interaction with women and girls, both inside and outside his family. In our literature review below, we find support for this view: many, but not all, of the phonetic characteristics of gay-sounding speech are also found in female speech. The mechanism for this is of particular interest: we propose that a gender nonconforming boy, one who has a strong psychosocial affiliation with females, will likely use female speech as his role model during early phonetic acquisition.

Language is acquired subconsciously through face-to-face contact with other speakers of the language. The fine-grained phonetic details of linguistic variation are acquired as part of this process. Thus, children grow up speaking the variety of language that they take to be the appropriate role model. For example, children who grow up in Ontario, but whose parents came from Ireland, will speak English with an Ontario accent, not the Irish one of their parents. Learning a second dialect is also possible; Chambers (1992) discusses general principles governing second dialect acquisition, showing some effects of age and social integration on the acquisition of a British English dialect by Canadian English speaking children. This issue may be relevant to later acquisition of the gay speech style known as camp, to be discussed below.

In the literature on first and second language acquisition, input and intake are distinguished (see Mitchell and Myles 2004 for an overview of this issue). Input to the learner will not affect learning if the “affective filter” (Krashen 1981) prevents it from doing so. Affective factors such as language attitudes, interest and motivation, and acculturation can affect both the amount of interaction with potential linguistic role models and the influence of such input on the learner. Thus, the existence of gender-related phonetic features implies that, to some degree, children selectively choose which gendered voices they attend to.
Our view of the acquisition of gender-specific phonetic features is consistent with the views of those (Eckert & McConnell-Ginet 1995, Eckert 2000) who argue that speakers use the variants available to them to construct their identity, and that they have the ability to do this differently in each social interaction. This point is relevant when we consider that, of two boys in the same family, exposed to the same linguistic variants, one may sound gay and the other straight, presumably because each selectively attends to and integrates different features of the input.

Radio, television, and movies are sometimes suggested as possible sources for a gay-sounding voice, but they seem to have little effect on linguistic structure, such as the unconscious acquisition of phonetic variation, which requires face-to-face contact. Chambers (1998) notes that television or the other popular media do not affect sound changes or grammatical innovations (see also Stuart-Smith 2006b for further analysis and discussion). In our terms, radio, television, and movies serve as input, but do not often lead to intake, in the development of gendered voices.

Some boys are identified as gender nonconforming from an early age, based in part on their speech, as well as their gait, dress and grooming, gestures, preferred activities, and desire to spend their time with women and girls. For example, Rekers (1986) reports that an eight-year-old boy identified as ‘Carl’ had been described by peers as effeminate and a ‘sissy’ from the time he was only four years old. In a humorous episode in his anthology Naked, David Sedaris (1997: 85) reports that in school he regularly saw the other boys who he thought were gay: “We’d spent years gathered together in cinder-block offices as one speech therapist after another tried to cure us of our lisps. Had there been a walking specialist, we probably would have met there, too.”

Pierrehumbert et al. (2004) draw no firm conclusions as to when the gay-sounding aspects of speech might begin, considering both adolescence and the period of early language acquisition as possibilities. We have suggested (Smyth & Rogers 2000, Rogers & Smyth 2002) that there could be two paths of acquisition: one associated with the early development of gender identity, which affects a young boy’s attention to female input and is part of first language acquisition, and the other associated with the later expression of a gay identity, which affects attention to gay male role models and is related to second dialect acquisition. We assume that early acquisition would be under somewhat less conscious control than late acquisition, as Chambers (1992) has reported for dialect acquisition. A gay- or sissy-sounding boy may have little control over his speech, and little awareness of how it is perceived until he is taunted for it.

Later acquisition through peer contact with gay males may be the source of so-called ‘camp’ speech, i.e. the ability to perform, through speech and gesture, an exaggeratedly feminine or gay identity. However, it is also possible that camp speech has its roots in early language play; many boys can imitate sissy- and “girly”-sounding speech from a young age, even if it is only to mock another child. Thus the phonetic aspects of camp are probably available to all speakers from an early age, but take on a different social meaning in gay and straight contexts. More subtle properties such as stereotypically gay lexical choices, or the expression of stereotypically gay attitudes, may be the only real socially-acquired differences between camp and simply effeminate speech.
3. Gay-sounding speech: Phonetic properties

In an earlier experiment, described more fully in Smyth et al. (2003), we recorded 25 voices of men ranging in age from 25 to 50, all with native fluency in a variety of Canadian English; eight were self-identified as straight, and 17 as gay. The speakers were asked to read the Rainbow Passage, a well-known passage about the scientific nature of rainbows which has been frequently used in speech research.

Subsequently, 46 listener-subjects were recruited, of whom 14 were explicitly identified as gay males. The remainder were from a comparison group of 13 males and 19 females; we did not ask about their sexual orientation, but given our recruitment techniques we presume that most were heterosexual. After listening to the passage for each speaker, the listeners were asked to evaluate the voices as gay or straight, along with confidence ratings. They showed a high level of agreement in these ratings, especially for the gayest- and straightest-sounding voices.

The tape recordings were digitised and analysed using Praat version 3.9 (Boersma and Weenink, 2000). The same portion of text, taken from the middle of each passage and lasting about thirty seconds, was analysed. To determine what information listeners used to make their judgements about whether voices sound gay or straight, we tested for significant correlations between various phonetic features and the gay-straight ratings. Detailed results of our segmental and prosodic analyses can be found in Smyth and Rogers (forthcoming a), and will be discussed in more detail below.

4. Phonetic properties of gay, gay-sounding, and female speech

In this section, we compare the phonetic qualities which have been found to be indexical of gay-sounding speech (particularly from our own data) with those of female speech. We maintain the distinction between gay- and gay-sounding voices, unlike most other researchers. For example, Gaudio (1994) examined the speech of eight participants, apparently self-identified as to sexual orientation (four gay and four straight), with no separate investigation of whether their speech was actually perceived by listeners as gay-sounding or straight-sounding. Similarly, Linville (1998) examined the speech of nine participants, five gay and four straight, with no distinction between gay and gay-sounding speakers. In both of these cases we are surprised that significant findings could have emerged with random sampling, since so many gay men sound straight.

Avery & Liss (1996) investigated the speech of 19 male participants and did have listeners evaluate the voices, but as ‘more masculine sounding’ or ‘less masculine sounding’, with no indication of how these terms relate to sexual orientation. A parallel distinction has not yet been made for lesbian- vs. feminine-sounding voices, although we are currently extending our research to include straight and lesbian women.

Pierrehumbert et al. (2004) analyzed recordings of 103 self-identified straight and gay men and lesbian, bisexual and heterosexual women from the Chicago area. Although they had also collected data on how the speakers’ sexual orientation was perceived, their analyses are based only on biological gender and reported sexual orientation. We are
thus curious to know whether the relationship between perceived and actual sexual orientation was as weak as in our data, and whether a reanalysis based on perceived sexual orientation would give different results.

4.1. **Pitch (Fo)**

The most prominent male-female difference for adults is Fo—pitch. Many studies (Linke 1973; Linville & Fisher 1985; Murry & Singh 1980; Hillenbrand et al. 1995) have shown pitch to be a very strong cue for distinguishing female and male adult voices, with female voices having a pitch about 100–150 Hz higher than male voices (Rogers 2000). At puberty, the larynx changes shape for boys, with a lengthening and thickening of the vocal folds, thus giving post-pubertal males a lower average Fo (Zemlin 1988).

Although pitch is a very salient cue, listeners also accurately identify the sex of the speaker when the speech has been artificially adjusted to equalize Fo for men and women. For example, Coleman (1971) had speakers use an electrolarynx as the voicing source. This means that gender-linked cues other than Fo are present in adult speech.

In our research, there was no significant relationship between Fo and gayness ratings (Smyth & Rogers 2000). The results of other, smaller studies (Avery & Liss 1996, Gaudio 1994, Linville 1998) agree with this finding. Thus, we conclude that for Fo, gay-sounding speakers are not like female speakers.

A series of experiments discussed in Smyth & Rogers (forthcoming b) shows that listeners use perceived pitch (as opposed to the acoustically measured Fo) to make gay/straight judgements, but only in extreme circumstances when the segmental and voice quality information that normally carries gender-related information has been removed.

The stereotype that gay men have high voices could be interpreted as an expectation that this is either a biological predisposition or a socially-acquired reflection of the higher voices of females. Thus far the failure to find any correlation between mean Fo and a gay percept goes against these hypotheses. This is not to say, however, that gay men never use a high pitch to express a gay or feminine identity. As Podesva (2002) points out, lab-based reading fails to capture the full range of sociophonetic variation within the individual. He reports situational variation in creak and falsetto for one gay male speaker, identified as Heath, arguing that this is counter-evidence to our claim about mean Fo. However, we maintain that situational variation in the use of large but brief Fo excursions, as observed in Heath’s speech, is a different matter altogether from the lay notion of a high or low voice. Moreover, Podesva’s analysis fails to compare Heath’s voice to that of other speakers; perhaps all speakers vary their use of creak and falsetto in the same way.

4.2. **Vowel formant frequencies**

Vowel formant frequencies are dependent on the length of the vocal tract. Since women have slightly shorter vocal tracts than men, their vowel formants are slightly higher (Childers & Wu, 1991, Coleman 1976, Peterson & Barney 1952; Wu & Childers 1991,
Hillenbrand et al. (1995). Mattingly (1966) found that women's formants are even higher than predicted from their shorter vocal tracts, indicating that social as well as physical factors are involved. However, he draws no conclusion as to whether men lower their vowel formants for social reasons, or whether women raise theirs, or both.

Given that sex differences in overall formant frequency are at least in part socially determined, it is worth asking whether this is also true of differences in sexual orientation. Rogers, Smyth, & Jacobs 2003 found no general tendency for gay-sounding men to have higher formants than straight-sounding men, and Pierrehumbert et al. (2004) report a similar finding, although as previously mentioned they do not report analyses based on perceived sexual orientation. However, they did find significantly lower F1 and F2 values for lesbian and bisexual women than for heterosexual women, although this was restricted to the back vowels /a/ and /u/. This suggests an interesting asymmetry between the sociophonetic behaviour of men and women, but the interpretation is problematic for the methodological reasons discussed above.

4.3. Vowel peripherality

Diehl et al. (1996) report that women's vowels tend to be more peripheral than men's, occupying a larger portion of the vowel space, and Pierrehumbert et al. (2004) replicate this finding. Peripherality may increase the contrastiveness of vowels by pushing them farther away from each other in the vowel space. However, Diehl et al. suggest that since the higher fundamental frequency (F0) of women's voices leads to decreased harmonic sampling compared to male voices, the greater peripherality may be only a compensation for the higher F0, and thus would not lead to greater perceived clarity. To complicate matters, male and female formant values cannot be compared directly, because differences at lower frequencies are more discriminable than differences at higher frequencies. The formant values must therefore be normalised to an appropriate psychophysical scale such as semi-tones or Bark, leaving some doubt as to whether any remaining sex differences are caused by socially-acquired differences in clarity, or by the normalisation procedure itself.

Because there is no relationship between average vocal pitch and perceived sexual orientation in males (Smyth et al. 2003), and no reason to assume vocal tract size differences between gay- and straight-sounding men, the transformation problem does not arise in the analysis of gay- vs. straight-sounding male voices. Rogers et al. (2003) found significantly greater peripherality for /ɪ/, /e(j)/, and /ʌ/ in the gayer-sounding voices, and the peripherality of some of the other vowels was marginally significant. Even in the nonsignificant results there were no cases where the straight-sounding vowels were more peripheral than the gay-sounding vowels.

Avery & Liss (1996) report a significantly more peripheral F2 for /i/ in the less masculine-sounding speakers, and nonsignificant differences in the same direction for F2 of /æ/ and /a/. Pierrehumbert et al. (2004) report that gay men as well as lesbian/bisexual women have a more expanded vowel space than straight speakers. This result is contrary to the expectation that lesbian and bisexual women would pattern more closely with
straight men, but given that Pierrehumbert et al. did not use their perceptual ratings data in this analysis, it is not possible to compare their results with our predictions.

Labov (2001, p.c.) has pointed out that studies of vowel peripherality related to gender must take into account the possible confounding effects of vowel changes in progress in the region where the recordings are made. For example, in the Toronto area the lax vowels /ɪ/ and /ɛ/ are lowering, the vowel /æ/ is retracting, and the vowels /uw/ and /ow/ are fronting (Clarke et al. 1995; de Decker and Mackenzie 2000). If, as frequently happens, these changes are being led by women, there is a conflict between the prediction that women (and gay-sounding men) will have more peripheral vowels, and the often opposing prediction that they are more likely to be undergoing the vowel changes. This caveat applies equally to the work of Pierrehumbert et al. (2004), whose Chicago-area speakers are subject to the Northern Cities Shift. Thus in our current research we intend to examine both vowel shifts and peripherality in straight (and straight-sounding) male and female speakers before deciding on the predicted direction of the gender differences.

### 4.4. Vowel length


Thus if gay-sounding men speak like women, they should have longer vowel durations than straight-sounding men. This was confirmed by Rogers, Smyth, and Jacobs 2000, although significantly so only for the vowels /ɪ/ and /ɛj/. Since in the same data set these two vowels were also found to be more peripheral for the gay-sounding men, it is possible that the peripherality effect is not an independent process. However, the vowel /a/ was more peripheral but not longer for the gayer-sounding men, suggesting that this is a true peripherality effect. Pierrehumbert et al. (2004) reported longer vowels for women than for men, but no effect of sexual orientation of the speaker. Perhaps their failure to find this effect resides in their use of discrete groups rather than rated sexual orientation as the predictor variable.

Thus we find mixed evidence for a vowel duration effect in relation to perceived sexual orientation. Larger data sets and standardized methodologies are needed before we can reach any firm conclusions.

### 4.5. Voice Onset Time

Longer VOT has been found for women’s voices than for men’s (Swartz 1992, Whiteside & Irving 1997). We found that for gay-sounding speakers, VOT in voiceless stops was significantly correlated with how gay the voices were judged. This was true across a number of positions with the syllable (Smyth & Rogers 2000).
4.6. **Sibilants /s/ and /z/**

*Ingemann (1968) and Schwartz (1968) independently found that listeners could accurately determine the gender of the speaker merely from listening to a voiceless /s/ in isolation. Schwartz says that /s/ of women has higher spectral peak frequency and suggests that this difference is likely responsible for the ability to identify gender. Fox et al. (2001) measured fricatives for both genders and various ages. They report that the spectral mean for /s/ is higher for women, and significantly higher than for /ʃ/.*

*Avery and Liss (1996) and Linville (1998) both found similar results for gay speech, examining only /s/ and with smaller samples. In an impressionistic study of New Zealand English, Taylor (1998) describes a higher-frequency allophone of /s/ in gay speech.*

*For the gayer-sounding voices in our studies (Smyth & Rogers 2000), /s/ and /z/ had significantly higher spectral peak frequency, as well as greater duration. This confirms that variation in sibilants is socially determined, since there is no reason to assume differences in vocal tract size between gay- and straight-sounding men. We did not examine /ʃ/ or /ʒ/.*

*Stuart-Smith (2006a) further examines the question of whether higher /s/ and /z/ frequencies in females result from sex differences in vocal tract size or from socially-acquired articulations. She argues for social variation, pointing out that while various frequency measures are correlated with sex, they also interact with age and social class. Moreover, she found that in Glasgow English it was the working class females’ sibilants that had the lowest frequencies. This is contrary to the expectation that male speakers would have lower frequencies due to the larger resonating cavity.*

4.7. **Lighter vs. darker /l/**

*Dalston (1975) and Stevens & Blumstein (1994) report a higher F2 for /l/ in adult female speech than in male speech. The acoustic effect of a higher F2 is a clearer (less velarized) type of /l/. Both dark and clear allophones occur as positional variants of /l/ in North American and southern British English; a clear /l/ is reported for Ireland in all positions, and a dark variety in all positions for Australia (Rogers 2000). Note also the clear /l/ of ‘Valley Girl’ English. This evidence, that both men and women can make both clear and dark /l/, shows that its production is not physically linked to gender.*

*In our data, we found that the gay-sounding speakers had an /l/ with a higher F2 than the straight-sounding speakers. There was no such effect for F1 of /l/.*

4.8. **Comparison**

*The cases where female and gay-sounding phonetic characteristics coincide mainly involve consonants: longer VOT, a higher peak spectral frequency and longer duration for /s/ and /z/, and lighter /l/.*
With vowels, there is some agreement between the characteristics of gay-sounding and female speech. Women may have generally more peripheral vowels than men (assuming that the normalisation techniques make them comparable), whereas our gay-sounding voices have significantly greater peripherality only for /ɪ/, /e(j)/, and /ʌ/, although all of the other vowels showed a difference in the same direction. Women have generally longer vowels than men; of the vowels we measured, only /ɪ/ and /e(j)/ were longer for the gayer-sounding men.

In two characteristics there is no agreement between gay-sounding and female speech. First, women’s voices have generally higher vowel formant frequencies than men’s voices, but for male voices, we found no significant difference in vowel formant frequency based on whether the voice sounds gay or straight.

Second, women’s voices have a higher F0 than men’s voices; for male voices, there is no significant difference in F0 based on whether the voice sounds gay or straight. However, our most recent work on this topic (Smyth & Rogers, forthcoming b) shows that people use the stereotype of higher F0 to make gay/straight judgements in the unusual circumstance where all segmental information is removed and voice quality is held constant. Higher voices were judged to be gayer sounding, but the ratings did not match those for the intact voices. Thus while listeners associate gayness with high voices, this is based on a stereotype and is not borne out in the the phonetic measurements of real voices.

5. Social vs. physical bases for phonetic variation

Gendered phonetic variation can occur as a result of either physical (i.e., anatomical or physiological) or social differences between speakers. For example, adult men have longer vocal folds than women, resulting in voices with a lower fundamental frequency. A second example of physically-based variation is that high vowels have higher F0 than low vowels. The muscular action involved in raising the tongue to produce a high vowel causes greater tension in the vocal folds which results in a higher F0. This latter situation holds for both male and female voices. Since men and women differ somewhat in their vocal tract anatomy, we must question whether a difference in a particular cue is physical or social in nature. Many phonetic differences are social in nature—that is, they have no sex-related physical basis, but are simply part of the general phonetic variation which occurs in all languages. Social variation is learned from other speakers. For example, English happens to have alveolar stops whereas French has dental ones. This is simply an accident of history with no physical relevance. And although we are unaware of any direct measurements of the vocal tract length of gay and straight men, or of gay- and straight-sounding men, there is no a priori reason to expect such a difference to emerge. Pierrehumbert et al. (2004) state that their results, derived from the analysis of vowels, are inconsistent with gay men having shorter vocal tracts than straight men.

During the early stages of language acquisition, the vocal tracts of preadolescent boys and girls do not differ from each other (Fitch & Giedd 1999). As a result, any
differences in their speech must be social in nature. We will examine these differences below, and consider how that evidence might bear on the physical-social question.

The characteristics shared by gay-sounding and female speech—different articulation and greater duration of sibilants, longer VOT and vowel duration, and higher F2 for /l/—are all socially acquired. The quality of a sibilant or /l/ is determined by tongue position; there is no reason to believe that any speaker could not produce any variety. The different durations of the sibilants, vowels, and VOT also are social in nature. Duration is a matter of timing relationships of various articulatory activities, and there is no reason to believe that any speaker could not produce all of the other durations. Vowel duration also conforms to this generalisation; it is clearly social, and we have found it to be a characteristic of gay-sounding speech, but significantly so for only two vowels in our sample.

The available evidence strongly suggests that gay and gay-sounding men do not have higher voices than other men. Fundamental frequency differentiation between males and females is physical in origin and is the most salient distinguishing trait for sex, but it is not adopted by gay-sounding speakers at all (although it seems to be available for camp speech). Perhaps this is not so surprising, given the large difference in F0 that would have to be implemented in order for a man to speak in a female F0 range.

On the other hand, the characteristics of vowel formant frequencies are at least partially physical in nature: women's shorter vocal tracts resonate at higher formant frequencies. Our failure to find a general raising of all formants in gay-sounding speech indicates that these speakers do not have a strategy of shortening the vocal tract (e.g. by raising the larynx) in order to be able to produce higher, more feminine-sounding vowels. This is somewhat surprising, given the evidence that the speech of pre-adolescents does show sex differentiation even in the absence of differences in vocal tract size between boys and girls.

The greater vowel peripherality observed in female speakers seems to be only slightly adopted by gay-sounding speakers, perhaps only for certain vowels. This topic deserves more attention in terms of identifying which vowels are involved and why, especially because of the apparent relationship between gay and ‘prissy’ speech. Perhaps larger samples are needed in order to establish whether there are significant effects for all vowels. Importantly, a finding of greater peripherality in gay-sounding men could shed light on Diehl et al.’s claims about the relationship between articulatory peripherality and harmonic dispersion. With lower F0’s, gay-sounding men would not have the communicative need to make their vowel formants more perceptible, and would not notice women's greater peripherality because it is merely a compensation for information lost to harmonic dispersion. But if women's vowels are both more peripheral and more perceptible, then gay-sounding men would be able to both perceive and emulate the female pattern.

In summary, we find that the distinguishing characteristics of gay-sounding speech are social in nature and mostly involve consonants. Phonetic characteristics of female speech that are not adopted by gay-sounding speakers are generally physical in nature and mostly involve vowels and fundamental frequency.
6. The speech of pre-adolescents

Using MRI measurements, Fitch and Giedd (1999) report no differences in vocal tract length between young boys and girls. Nevertheless, Sachs, Lieberman and Erickson (1973) report that listeners are able to identify the gender of children’s voices in both sentences and isolated vowels with an accuracy of over 80%. At the period around adolescence, sexual differences appear: boys’ larynges change shape, resulting in longer and thicker vocal folds, and F0 becomes lower for boys than for girls (Zemlin 1988). Perry et al. (2001) found no difference in F0 for children at four and eight years of age, but by twelve years, gender-linked differences in F0 were clearly apparent.

Although younger boys and girls show no significant difference in the length of their vocal tracts, Perry et al. (2001) found lower vowel formant frequencies for boys than for girls, at ages four and eight, even after adjusting for differences in body size, and even though there were no significant differences in average fundamental frequency. Using the raw data which Lee et al. (1999) provided us from their research, we found that the formant frequencies of their five- and six-year-olds had significantly higher values for F1 and F2 for the girls, with the exception that F1 for front vowels showed no sex differences. We conclude that these formant differences are socially determined and realized in speech by raising or lowering the larynx: either girls are adopting higher formants like adult women, or boys are adopting lower formants like adult men, or both.

Thus, the overall situation for vowel formant frequencies is rather complex. Adult women have higher vowel formant frequencies overall than men; this can be attributed at least in part to physical differences, although several researchers, beginning with Mattingly 1966, argue that the differences are greater than one would predict from vocal tract size alone. Preadolescent children of the same body size have vocal tracts of the same length, and the same average fundamental frequency; from a physical viewpoint they should have the same vowel formant frequencies. However, even among preadolescents, girls have higher formant values than boys. The fact that gay-sounding men, who do adopt some features of women’s speech, do not strongly do so for vowels is interesting given that children adjust their formant values for social reasons.

7. Conclusions

Decades of research on gender have made it clear that it is a complex sociolinguistic variable. In our research we have tried to show the extent to which an essentialist approach to gender—one which groups all speakers into discrete categories such as male/female or gay/straight—fails to capture important linguistic generalizations about sex, gender, and sexual orientation. We argue for a more nuanced approach according to which voices are studied in relation to how they are perceived on a continuum from gay- to straight-sounding.

To date, this approach has reaped benefits in terms of significant findings relating female speech to gay-sounding speech, and we propose that the same methodology might be fruitfully employed for other aspects of gender, including the potential relationships
between lesbian speech and male speech and how they compare to the gay/female data discussed above. Future research should also examine the extent to which other sexual minorities adopt stereotypically masculine and feminine features, as opposed to features that are unique to each kind of sexual identity. For example, transsexual speakers who undergo hormone therapy find it difficult to alter average formant frequencies, since vocal tract length is not affected. On the other hand, female-to-male speakers experience a lengthening of the vocal folds and consequently a lowering of F0 in response to male hormones, but male-to-female speakers’ larynges are unaffected by female hormones.

Finally, we also propose that our methodology could be profitably extended to other sociophonetic variables such as social class. As with sex and gender, social class categories are constructed by glossing over the continuous nature of their underlying variables, and by making careful but imperfect choices as to the weighting given to factors such as education, occupation, income, and residence (see Chambers 2003 for an overview of this matter). Our methodology promises to complement this approach: listener judgements along a continuum from lower to higher socioeconomic class would allow us to identify which phonetic (or other) features index social class, regardless of the speaker’s demographics. As with perceived sexual orientation, we assume that social class features are learned at an early age, that they can cross class boundaries, and that there will be either nonsignificant or small differences among listening groups in the ability to judge social class from speech.

References


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