



Perceptual Bias and the Myth of the Gay Lisp

Benjamin Munson and Lindsey J. Zimmerman

Department of Speech-Language-Hearing Sciences, University of Minnesota, Twin Cities



Background

Sexual Orientation and Speech

- There is a widely held popular-culture stereotype that people's sexual orientation can be identified from speech alone. Recent research suggests that people indeed can convey sexual orientation through distinctive patterns of pronunciation. This has been shown in a variety of studies [Gaudio (1994), Linville (1998), Smyth, Jacobs, and Rogers (2003, and related papers and presentations), and various works by Munson and colleagues]
- The principle findings of these studies are as follows:
 - Many people's sexual orientation can be identified at greater-than-chance levels from audio-only speech samples
 - None of the popular culture stereotypes of GLB speech styles are observed in these studies
 - A. Gay men don't lisp (though it's hard to find a good operational definition of 'lispin')
 - B. Gay men don't speak with more 'dynamic' intonation than heterosexual men; lesbian women don't speak with more monotone intonation than heterosexual women
 - GLB speech styles are *not* global approximations of speech patterns of the opposite sex
 - A. No overall f0 differences, no global shifting of the entire vowel space
 - B. Though perceived sexual orientation ratings are highly correlated with perceived masculinity/femininity ratings (more for men than for women), they are associated with unique sets of acoustic predictors.
 - In Minnesota, men are likely to be rated as sounding gay if they produce a low back /æ/, a fronted /u/ and /ou/, and a highly negatively skewed /s/. A woman is likely to be rated to sound lesbian if she produces a very back /u/ and /ou/
 - Gay men are rated as speaking more clearly than heterosexual men (a finding that is consistent with acoustic differences between the groups); lesbian women are rated as sounding taller than heterosexual women. This suggests that men can sound gay by speaking very clearly, and women can sound lesbian by making active articulatory maneuvers to convey greater stature.
- One prominent belief about GLB speech styles is that gay men 'lisp'. An immediate challenge to evaluating this stereotype is that speech-language pathology has abandoned the term 'lisp' in favor of terms that can describe classes of errors (additions, deletions, substitutions, distortions, or 'dentalization', etc.). For the purposes of this study, we operationally define lispin as any substitution error involving /s/ and /z/ in which the substituted sound makes these phonemes more easily confused with other similar-sounding phonemes.
- The gay lisp stereotype has never been substantiated in an experimental study. Two studies (Linville, 1998; Munson et al, 2006) did find that a subset of gay men produce /s/ distinctively; however, the way in which /s/ was pronounced—with a high peak frequency and a highly negatively skewed spectrum—made it *more* distinctive from other similar sounds, rather than less. That is, this was arguably a *hyper-correct* /s/.

Research Questions

- This study evaluates whether the 'gay lisp' stereotype influences listeners' behavior on two perception tasks, one in which listeners rated the accuracy and clarity with which /s/ was produced, and one in which they rated talkers' sexual orientation from single-word stimuli. It includes naturally produced stimuli, and stimuli created by pairing misarticulated fricatives with naturally produced vowel-consonants sequences, produced by men whose perceived sexual orientation had been measured and reported in a previous study
 - Question 1.* Do people rate the variants of /s/ produced by talkers who are perceived to sound gay (as established in a previous study) as less accurate and less clear than those produced by heterosexual-sounding talkers? Are misarticulated fricatives rated to be disproportionately less accurate when paired with a gay-sounding talker than when paired with a heterosexual-sounding talker?
 - Question 2.* Do listeners rate talkers as more gay sounding when they are presented with words containing /s/? Is this tendency disproportionately stronger for talkers who have been identified previously as sounding gay?

Methods

Stimuli

- Two types of stimuli were used. Acoustic Characteristics of the stimuli are presented in Tables 1 and 2.
 - Natural* stimuli were multiple tokens of the words *soon*, *sad*, and *sack* produced by 16 men whose perceived sexual orientation (PSO) had been reported in a previous study (Munson et al., 2006). This group included the 8 men who were rated in that study as most-gay sounding, and the 8 who were rated as most-heterosexual sounding. These judgments were made by 40 naïve listeners, each of whom rated each man 4 times using separate sets of stimuli, on a five-point equally appearing interval scale.
 - Matched-Guise* stimuli were created by pairing the /un/, /æk/, and /æd/ portions of the natural stimuli with four fricatives produced by the first author. *Neutral* /s/ was intended to sound like the average /s/ produced by the entire cohort of 16 talkers; *Dental* /s/ was produced with the tongue tip down, and the tongue lamina pressing against the back of the upper incisors; *Frontal* /s/ was produced with the tongue tip protruding between the upper and lower incisors; *Negatively skewed* /s/ was produced with a high peak frequency and a strongly negatively skewed spectrum. The resulting stimuli were judged to sound highly natural.

Listeners

- Listeners were native, monolingual speakers of English between the ages of 18 and 45, with no reported history of speech, language, or hearing disorders. They were unaware of the purpose of the experiment.
- Different groups of listeners participated in both experiments.

Experiment 1: Perception of /s/ Accuracy and Clarity

- In Experiment 1, listeners were presented with tokens of single words, and were asked to rate the accuracy and clarity of the /s/ in the words. They were not told that the experiment examined sexual orientation and speech, nor were they aware that the stimuli had been manipulated acoustically. Natural and matched-guise stimuli were presented together in a single experimental block. Instructions were as follows: "Welcome. You are in an experiment in which you will listen to words that start with the 's' sound. Your job is to rate how clearly and accurately the 's' sound was produced. The words that you will hear were produced by many different people, who differ in the extent to which they produce 's' clearly and accurately. Each person produced the same words multiple times. We would like you to do your best job trying to rate how well the person said the 's' sound. On each trial, you will see a word on the screen, then hear one of the talkers' production of that word. After you hear the word, you will make your rating on a 9-point scale."
 - Press 9 if you believe the person produced a very clear and accurate production of "s"
 - Press 7 if they produced somewhat clear and accurate production of "s"
 - Press 5 if they produced neither a clear and accurate nor an unclear and inaccurate production of "s"
 - Press 3 if they produced a somewhat unclear and inaccurate production of "s"
 - Press 1 if they produced a very unclear and inaccurate production of "s"

Experiment 2: Perception of Sexual Orientation

- In Experiment 2, listeners were presented with tokens of single words, and were asked to rate how gay sounding the man who produced the words was. They were not told that the experiment focused on the influence of /s/ acoustics on perceived sexual orientation, nor were they aware that the stimuli had been manipulated.
 - "In this experiment, you will be listening to words produced by men and judging how gay-sounding the man's speech is. We are NOT asking you to judge the sexual orientation of the MAN who produced the words. We are asking you to judge how gay-sounding the man's SPEECH is. We don't have any specific instructions for what things you should listen for when determining how gay-sounding each talker is. We are interested in the kinds of things that people listen for when they make these perceptual judgments. You will rate the gay-soundingness of the men's voices on a 9-point scale."
 - Press 9 if this man's voice is definitely gay sounding
 - Press 7 if this man's voice is somewhat gay sounding
 - Press 5 if this man's voice is neither gay sounding nor heterosexual sounding
 - Press 3 if this man's voice is somewhat heterosexual sounding
 - Press 1 if this man's voice is definitely heterosexual sounding

Word	Group	Mean F0 (ERB)		Duration (ms)		F1 (Bark)		F2 (Bark)	
		Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
Sack	Gay	3.04	(0.25)	220	(20)	6.20	(1.33)	11.32	(0.82)
	Het.	3.04	(0.35)	240	(50)	4.89	(1.44)	10.44	(1.19)
Sad	Gay	3.13	(0.23)	268	(44)	6.03	(0.96)	11.96	(0.71)
	Het.	2.95	(0.32)	240	(22)	5.64	(0.58)	11.08	(0.59)
Soon	Gay	3.33	(0.35)	283	(23)	4.22	(1.88)	10.27	(1.72)
	Het.	2.92	(0.38)	255	(27)	5.19	(1.84)	10.77	(1.60)

Table 1. Acoustic Characteristics of the Vocalic Portions of the Naturally Produced Tokens

/s/ Type ^a	Intensity (dB IL)	Duration (ms)	Center of Gravity (Hz) ^b	Skewness ^b
Sample-Average /s/	65.0	208	6677	-0.31
Negatively skewed /s/	60.0	242	8470	-2.84
Dentalized /s/	57.5	226	6312	-1.08
Frontally misarticulated /s/	55.0	236	3068	0.60

Table 2. Acoustic Characteristics of Matched-Guise Fricatives. ^aSee Text for Details, ^bBased on the methods in Forrest et al. (1988)

Results: Experiment 1

- Average ratings were calculated separately for The two factors were fricative type (5 levels: natural, sample-average, dental, negatively skewed, and frontal) and group (2 levels: gay-sounding and heterosexual-sounding). These were submitted to a two-factor fully within-subjects ANOVA.
 - Post-hoc Bonferroni-corrected pairwise comparisons revealed significant difference in all pairs except two.
 - Sample-average /s/ and natural /s/ did not differ, and the frontally misarticulated /s/ and the negatively skewed /s/ did not differ. There was no significant effect of talker PSO, $F(1,14) = 0.05, p > 0.05$. Average ratings for gay- and heterosexual-sounding men were almost identical. Contrary to expectations, the interaction between fricative and talker PSO was not significant, $F(1,14) = 0.71, p > 0.05$.
 - The surprising finding in this experiment was that negatively skewed /s/ was rated to be as inaccurate and unclear as frontally misarticulated /s/.
- There was no main effect of perceived sexual orientation, nor did this interact with fricative type. This suggests finding suggests
 - The naturally produced fricatives by gay-sounding men are not less accurate or less clear than those produced by heterosexual-sounding men
 - Listeners' accuracy and clarity ratings of the matched-guise /s/ tokens were not mediated by the 'gay-soundingness' of the talker that the /s/ was appended to.

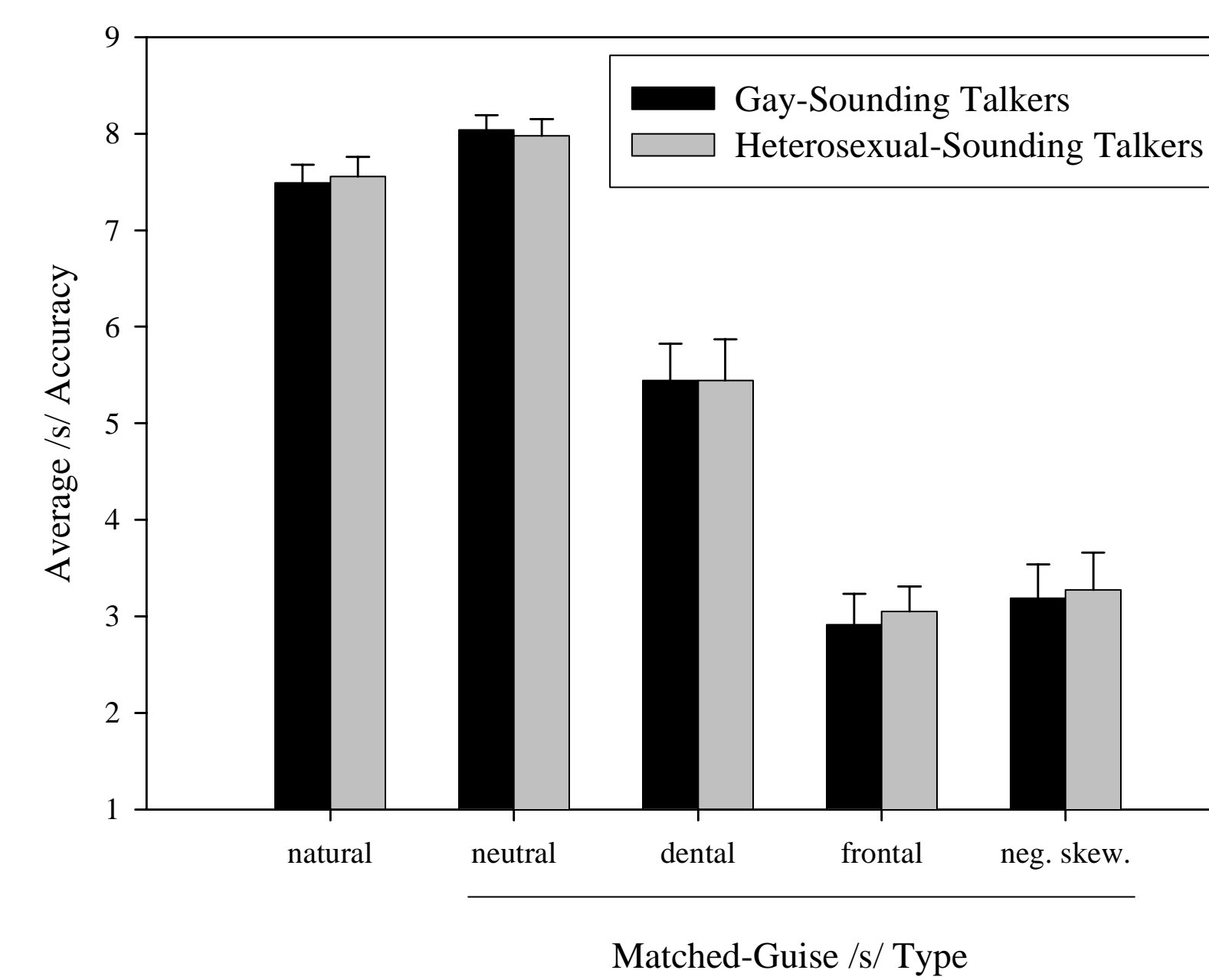


Figure 1. Average /s/ accuracy ratings in Experiment 1 for the four matched-guise fricatives and the natural unedited stimuli, separated by talker perceived sexual orientation

Results: Experiment 2

- Average ratings were calculated separately for The two factors were fricative type (5 levels: natural, sample-average, dental, negatively skewed, and frontal) and group (2 levels: gay-sounding and heterosexual-sounding). These were submitted to a two-factor fully within-subjects ANOVA.
 - Unremarkably, a significant main effect of perceived sexual orientation was found, $F(1,14)=33.37, p < 0.001$, partial $\eta^2 = 0.70$.
 - This finding shows that the set of tokens in this experiment was representative of the larger group of stimuli examined by Munson et al.
 - A significant main effect of fricative type was found, $F(4, 56)=39.03, p < 0.001$, partial $\eta^2 = 0.74$.
 - Post-hoc Bonferroni-corrected paired comparisons showed significant group differences for all pairs except two. First, negatively skewed /s/ and frontal /s/ did not differ significantly. Second, the difference between negatively skewed /s/ and dental /s/ did not achieve statistical significance at the Bonferroni-corrected α level, but did approach a significant difference ($p = 0.078$).
- The interaction between group and fricative type was significant, $F(4, 56) = 4.71, p = 0.004$, partial $\eta^2 = 0.25$. This can be seen by comparing the bar heights in Figure 2. Group differences were smaller for ratings made over the stimuli with the three misarticulated variants of /s/ than for the naturally produced stimuli, or the matched-guise stimuli with neutral /s/.
- Figures 3 and 4 show mean ratings for the eight heterosexual-sounding (Figure 3) and gay-sounding (Figure 4) talkers for the five stimulus types. As these figures show, all talkers received average ratings higher than 5 for the stimuli containing a misarticulated matched-guise /s/.

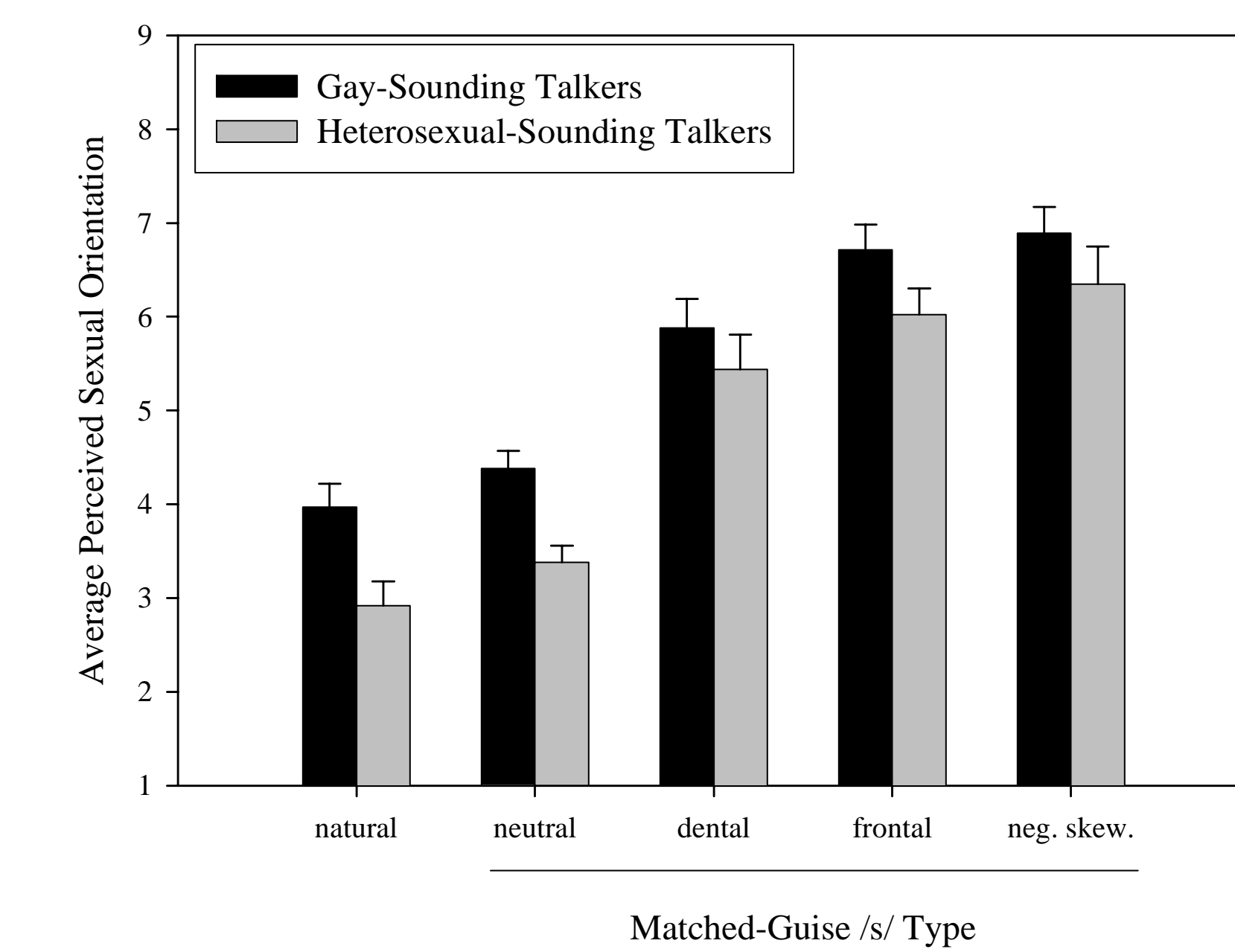


Figure 3. Average talker perceived sexual orientation ratings in Experiment 2 for the four matched-guise fricatives and the natural unedited stimuli, separated by talker perceived sexual orientation.

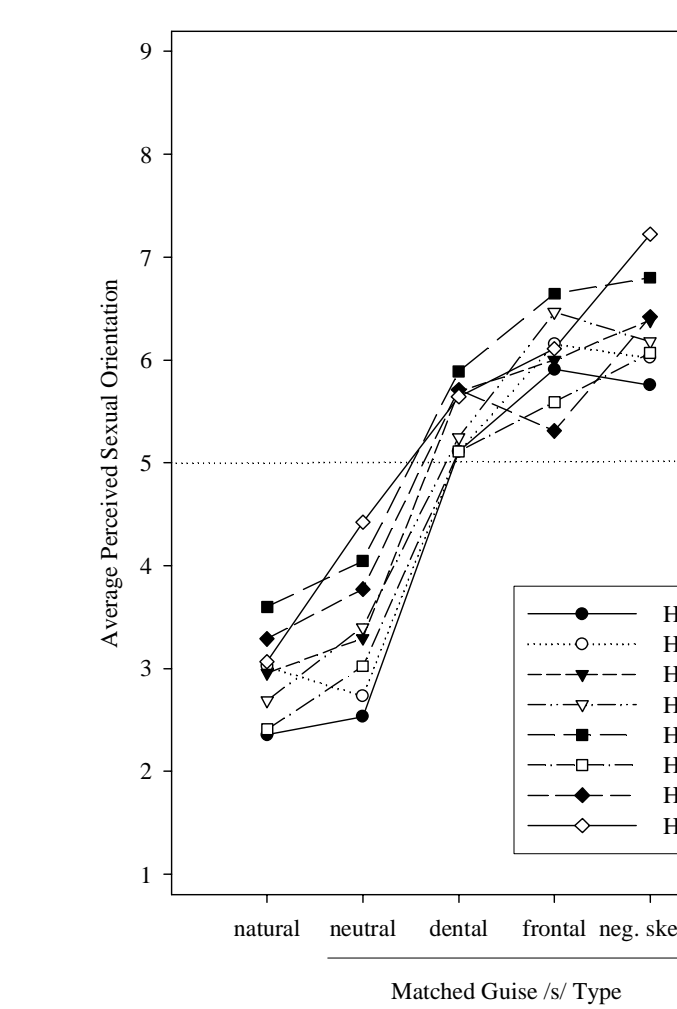


Figure 3. Average ratings for the eight individual heterosexual-sounding subjects in Experiment 2, separated by stimulus type.

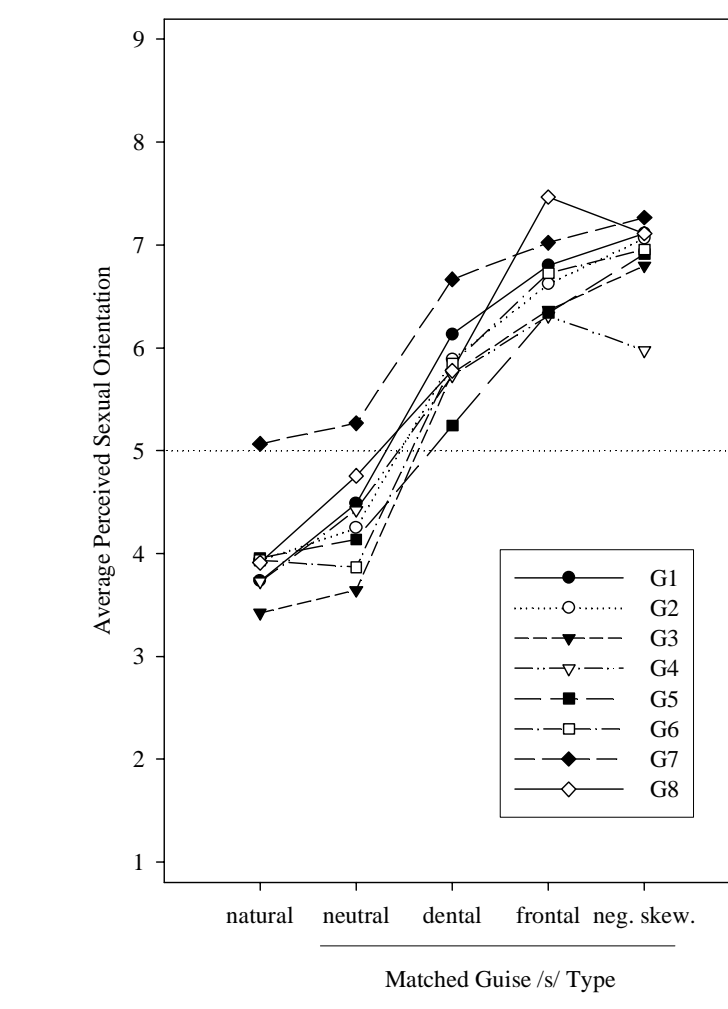


Figure 4. Average ratings for the eight individual gay-sounding talkers in Experiment 2, separated by stimulus type.

Discussion

- Listeners judged dental /s/ and frontally misarticulated /s/ to be less accurate and less clear than neutral /s/, and naturally produced tokens of /s/. Tokens of /s/ produced by gay-sounding men were not rated to be less accurate or less clear than those produced by heterosexual-sounding men.
- Surprisingly, listeners judged the extremely negatively skewed /s/ to be as inaccurate as frontally misarticulated /s/. The results of acoustic analyses led us to predict that it would be rated as *more accurate* and *clearer* than all other types of /s/.
 - This finding suggests that accuracy and clarity judgments may be made in reference to a 'best exemplar' for /s/, rather than to true judgments of accuracy and clarity.
 - This finding has implications for listeners' perception of intentionally clear speech, as well as to clinical judgments of phoneme-production accuracy.
- In Experiment 2, Listeners rated talkers to be more gay-sounding when the stimuli included frontally misarticulated /s/, dental /s/, and negatively skewed /s/ than natural stimuli or stimuli containing neutral /s/.
 - This occurred *despite* the fact that gay-sounding men were not found in Experiment 1 to produce less accurate, less clear tokens of /s/ than heterosexual men.
 - This suggests that the 'gay lisp' stereotype is powerful enough to over-ride listeners' experiences actual perceptual experiences.
- Consistent with the 'gay lisp' stereotype, all listeners were rated as sounding more-gay for stimuli containing frontally and dentally misarticulated /s/, and negatively skewed /s/. This effect was stronger for men whose naturally produced tokens had been rated as heterosexual-sounding in a previous study.
 - This suggests that the 'gay lisp' stereotype is powerful enough to offset partially the other acoustic features that would lead to the perception of masculinity in men's voices.
- Together, the results have implications both for clinical practice, and for our understanding of the role of social stereotypes on speech perception.

Acknowledgements

This project was supported by a University of Minnesota Undergraduate Research Opportunities Program grant, awarded jointly to both authors, and by a grant-in-aid of research, scholarship, and creativity from the University of Minnesota Graduate School to the first author.

References

Forrest, K., Weismer, G., Milenkovic, P. and Douglall, P. (1988). Statistical analysis of word-initial voiceless obstruents: preliminary data. *Journal of the Acoustical Society of America*, 84, 115-123.

Gaudio, R. (1994). Sounding gay: Pitch properties in the speech of gay and straight men. *American Speech*, 69, 30-57.

Huff, E., Phillips, S., Dancer, J., & Davis, P. (2003). Effects of dentalization and devicing of the /z/ phoneme on listeners' judgment of a speaker's sexual orientation. *Perceptual and Motor Skills*, 97, 631-634.

Linville, S. (1998). Acoustic correlates of perceived versus actual sexual orientation in men's speech. *Pholia Phoniatrica et Logopedica*, 50, 35-48.

Munson, B. (in press). The acoustic correlates of perceived masculinity, perceived femininity, and perceived sexual orientation. *Language and Speech*.

Munson, B., Jefferson, S.V., & McDonald, E.C. (2006). The influence of perceived sexual orientation on fricative identification. *Journal of the Acoustical Society of America*, 119, 2427-2437.

Munson, B., McDonald, E.C., & DeBoe, N.L., & White, A.R. (2006). The acoustic and perceptual bases of judgments of women and men's sexual orientation from red speech. *Journal of Phonetics*.

Niedzielski, N. (1999). The effect of social information on the perception of sociolinguistic variables. *Journal of Language and Social Psychology*, 18, 62-85.

Smyth, R., Jacobs, G., & Rogers, H. (2003). Male voices and perceived sexual orientation: An experimental and theoretical approach. *Language in Society*, 32, 329-330.