



# Perceived Sexual Orientation and Speech Style: an Acoustic and Perceptual Analysis of Intentionally Clear and Conversational Speech

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## What Makes Speech Sound Gay?

- There are ample social stereotypes that heterosexual people speak differently from their lesbian, bisexual, and gay male (LGB) peers. There are also widespread popular-culture beliefs that a person's sexuality can be discerned at greater-than-chance levels from audio-only samples of content-neutral speech.
- Previous studies have partially supported these conjectures. Pierrehumbert et al. (2004) and Munson et al. (2006) found that self-identified LBG and heterosexual people's speech differs in a number of acoustic parameters.
  - Pierrehumbert et al: Gay men have overall more-dispersed vowel spaces than heterosexual men; lesbian women produce more-back tokens of /a/ and /u/ than heterosexual women.
  - Munson et al.: Gay men produce lower, backer tokens of /æ/ and /s/ with a more-compact spectrum than heterosexual men.
- A parallel set of studies found that Talkers vary in the extent to which listeners judge their voices to sound heterosexual or LBG (Munson, 2007; Smyth, Jacobs, & Rogers, 2003). The acoustic characteristics that predict these judgments are similar to those

that differ between the two groups.

- Munson et al. (2006) found that measures of perceived sexual orientation were correlated with measures of perceived speech clarity. The direction of the relationship was opposite for men and women (Right). Munson et al. speculated that LBG speech styles are, at least in part, exaggerations of clear-speech styles. (See also Podesva, 2004, 2006a; 2006b).
- This presentation examines this hypothesis by examining perception of sexual orientation in intentionally clear and conversational speech samples .
- Stimuli are taken from the Ferguson Clear Speech Database (Ferguson, 2004).

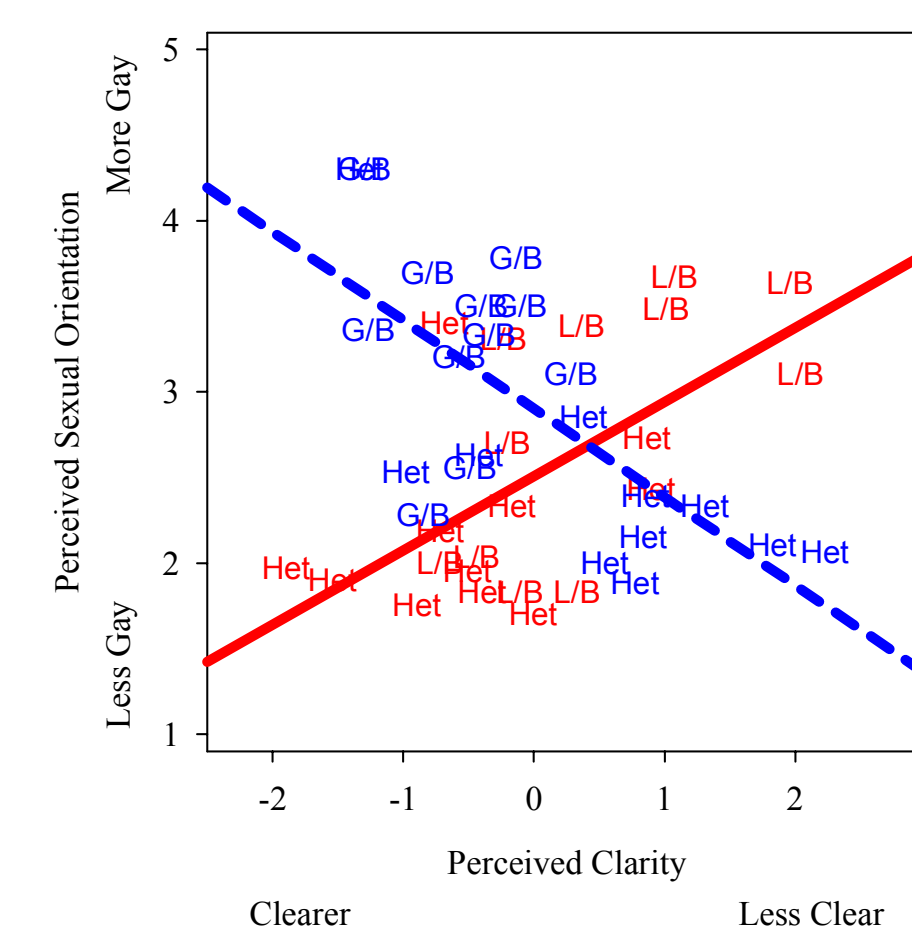


Figure 1: The relationship between perceived speech clarity and perceived sexual orientation for men (blue line and symbols) and women (red line and symbols) (Adapted from Munson et al., 2006)

## Research Questions

- Are male talkers rated as gayer-sounding when producing intentionally clear speech than when producing conversational speech? Are women rated as more-heterosexual sounding when producing intentionally clear speech than when producing conversational speech.
- Are individual differences in this tendency across talkers related to individual differences in the tendency to modify acoustic parameters to make speech clearer?

## Importance

- Understanding the sources of socioindexical variation helps to build better predictive models of phonetic variation.
- Talkers vary in the extent to which they can change the acoustic characteristics of their speech to enhance intelligibility. Studies of the perceived social meanings of clear-speech styles might help explain some of this variability. If clear speech projects social meanings that talkers don't intend to project, then they would presumably avoid these styles.

## Talkers and Materials

- There were four men and four women talkers. Sentences were the CID everyday sentences from the Ferguson database. There were 14 sentences in an intentionally clear-speech style, and 14 in a conversational-speech style. RMS amplitude was equated across sentences.

## Listeners

- There were 30 listeners, 2 of whom were eliminated from the final analysis because they failed a hearing screening. All were students at the University of Kansas.

## Procedures

- Listeners were presented with single sentences and were asked to rate the talkers' perceived sexual orientation on a six point scale. Separate scales were used for men and women. A single block of all 224 stimuli was presented, full randomized.

- 6 *Extremely {gay-,lesbian-} sounding*
- 5 *Very {gay-,lesbian-} sounding*
- 4 *Unsure, but somewhat {gay-,lesbian-} sounding*
- 3 *Unsure, but somewhat heterosexual sounding*
- 2 *Very heterosexual sounding*
- 1 *Extremely heterosexual sounding*

## Stimulus Acoustics

- Two summary acoustic measures were made on other materials from the database to assess the extent to which the talkers were able to manipulate acoustic parameters known to relate to speech clarity. Figure 2 shows average vowel-space size in the clear and conversational stimuli. It shows that three out of four men and three out of four women expanded their vowel spaces in the clear-speech condition.
- Figure 3 shows the difference in centroid frequency between /s/ and /ʃ/. As this figure shows, one of the four women and three of the four men produced a greater distinction between these fricatives in the clear-speech condition than in the conversational one.

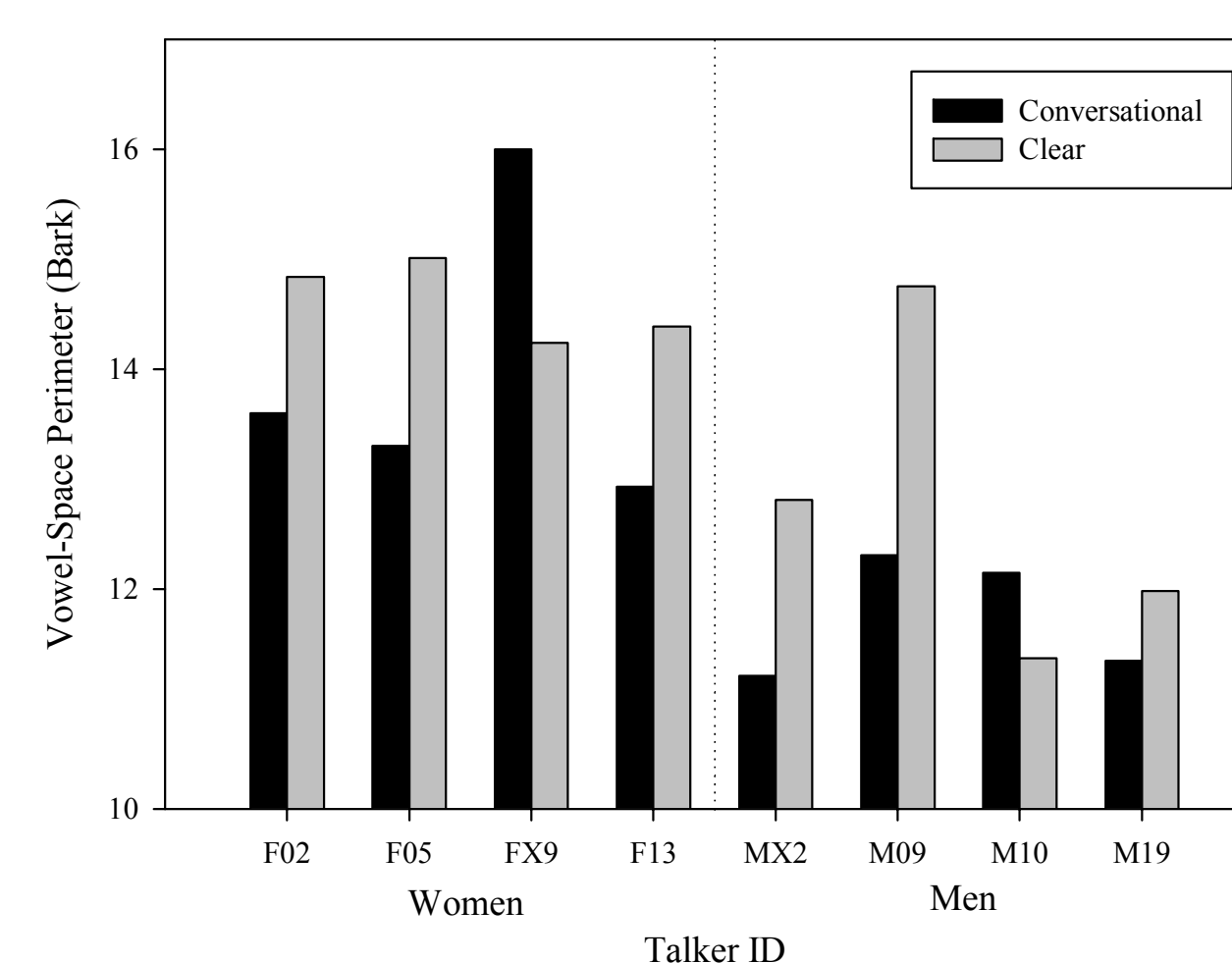


Figure 2: The size of the perimeter of the Bark-scaled vowel space in the conversational and clear conditions

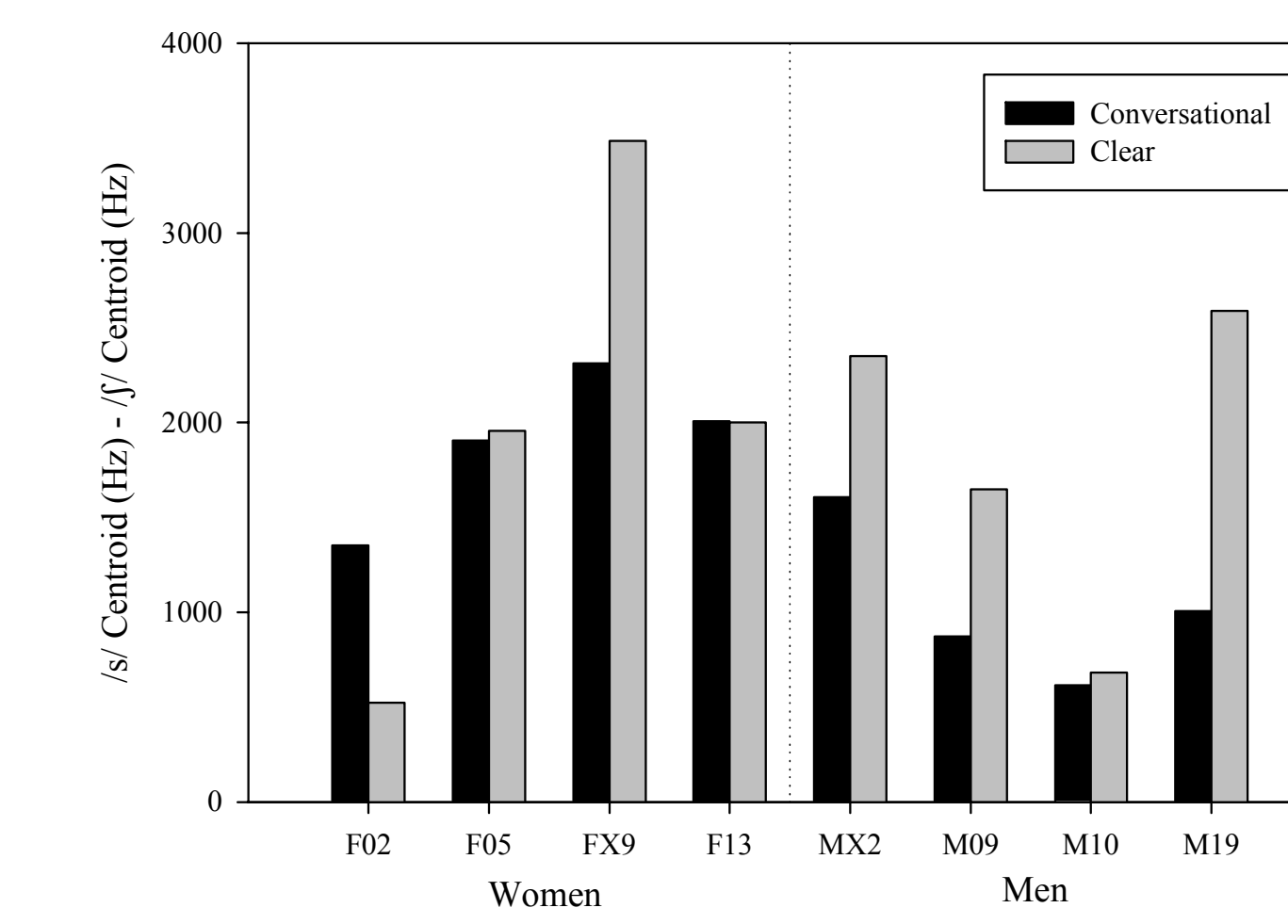


Figure 3: The difference in centroid frequency between /s/ and /ʃ/.

## ANOVA by Listeners

- Listeners' average ratings were submitted to a two-factor (2 sex x 2 style) within-subjects ANOVA. Only the main effect of style was significant,  $F[1,26] = 21.4, p < 0.001, \eta^2_{\text{partial}} = 0.45$ . Contrary to Munson et al.'s findings, both men and women were rated as more-gay sounding when producing clear speech than conversational speech.
  - The three talkers whose ratings were not substantially different between conditions (FX9, M10, M19) did not show vowel-space differences between conditions, but did show fricative-distinctiveness differences; hence, the likely cue for PSO was distinctiveness of the vowel space.

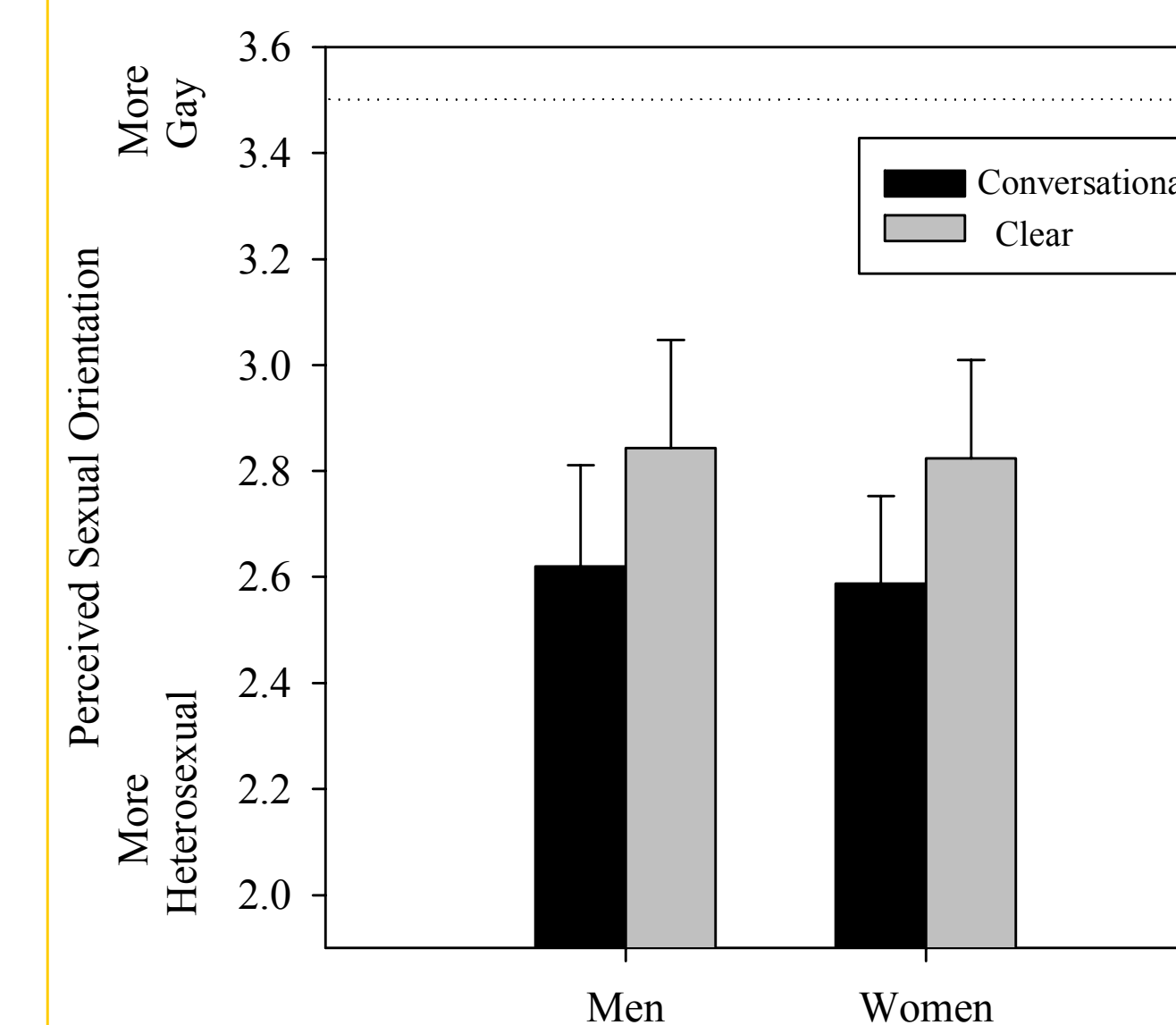


Figure 4 (left): Average perceived sexual orientation, separated by talker sex and speech style

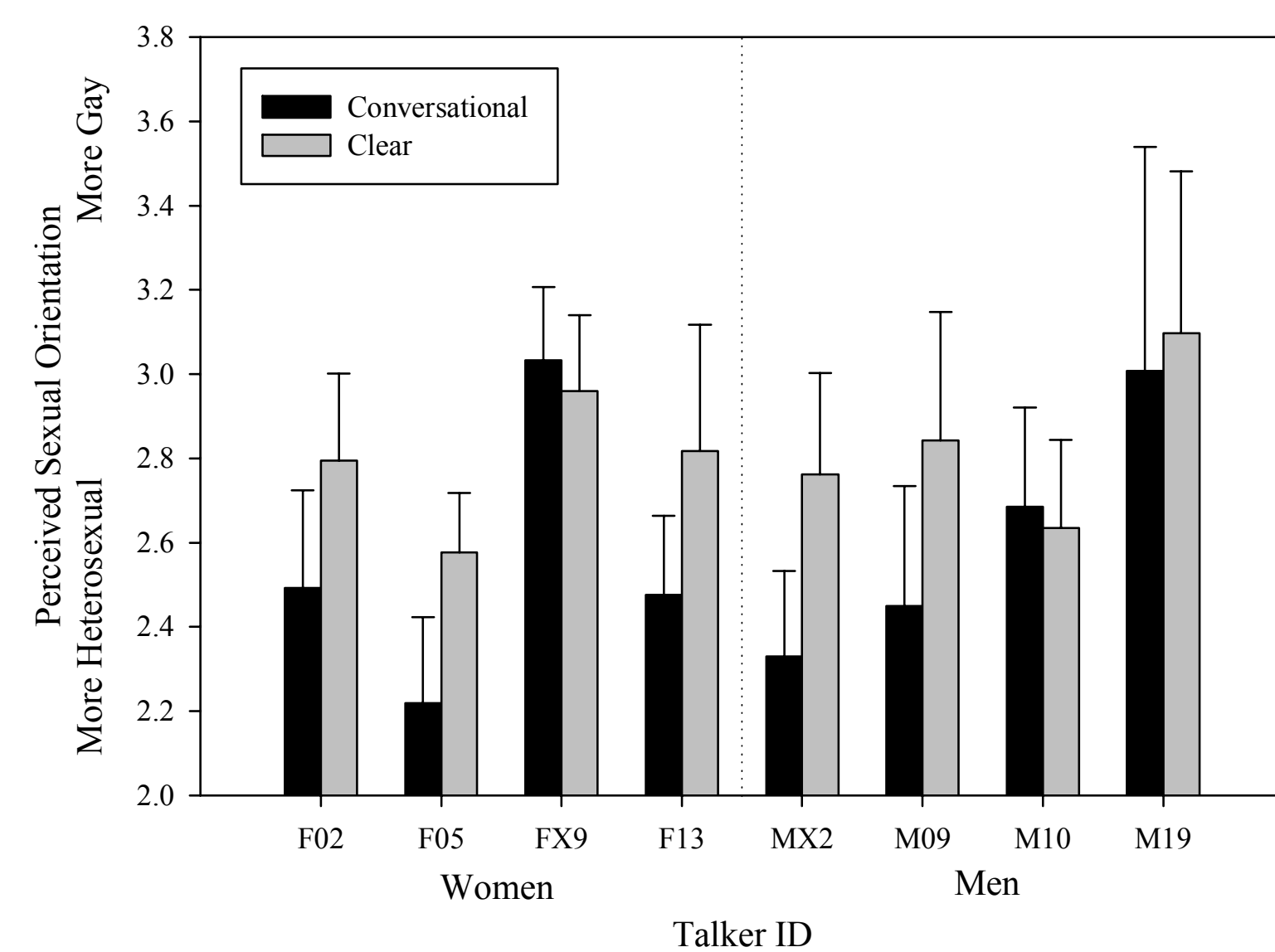


Figure 5 (right): Average perceived sexual orientation, separated by talker and speech style

## Regression Analyses

- Subjective Clarity ratings (taken from Ferguson & Kerr, 2008) were used as independent variables in a series of regressions predicting average PSO. While both regressions were significantly, only 8.1% of the men's PSO and 9.4% of the women's PSO was accounted for by subjective clarity.

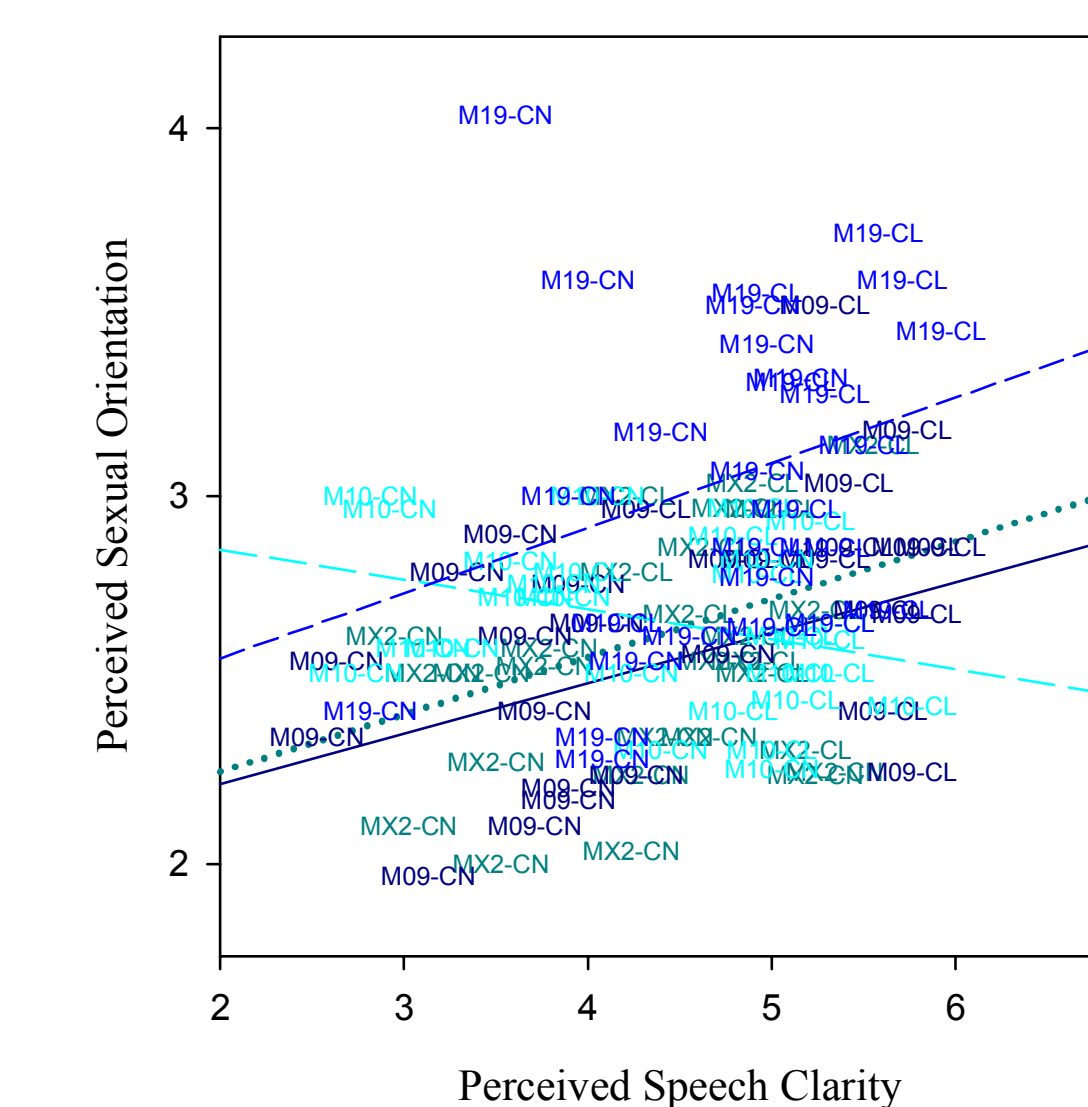
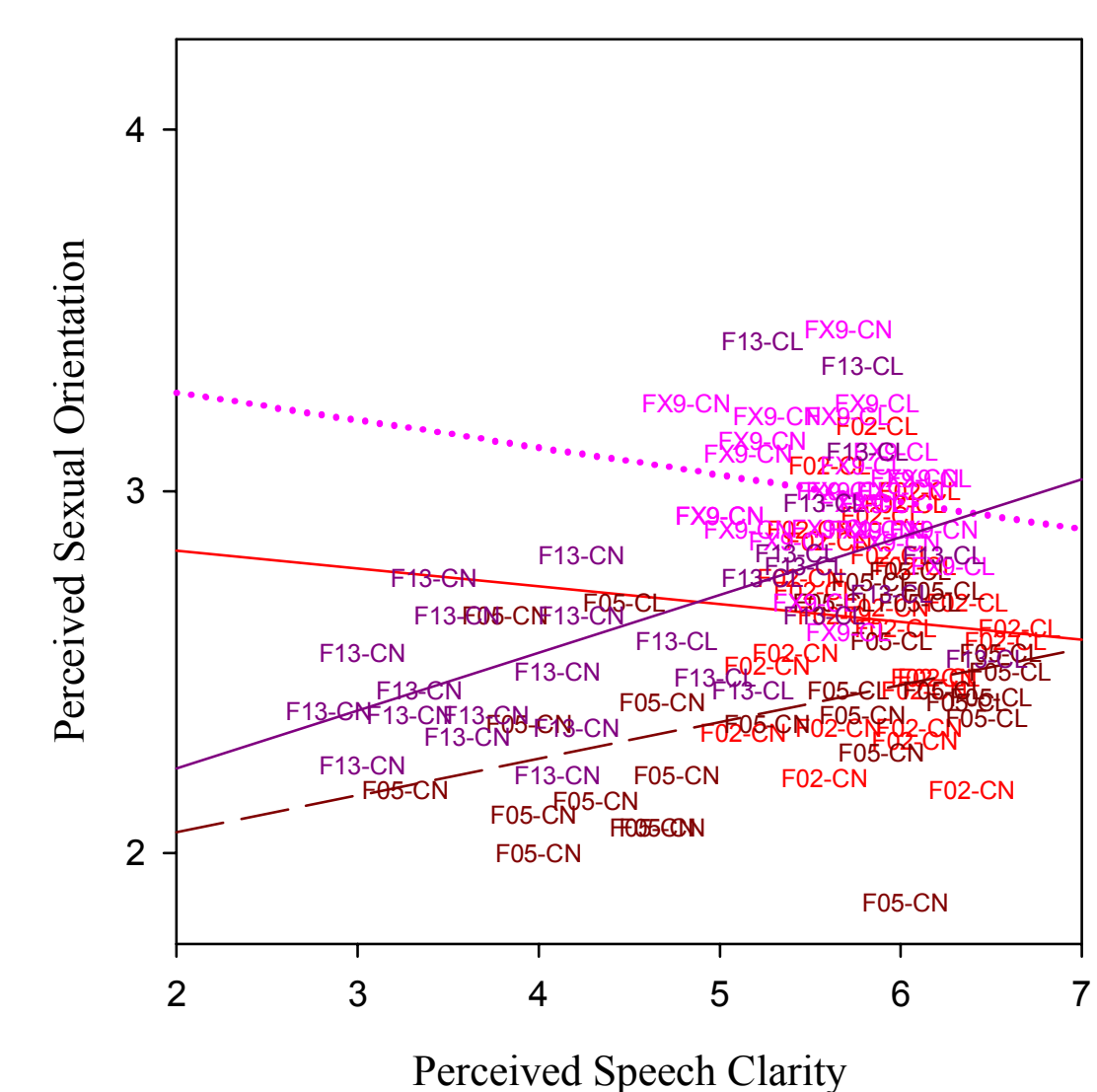


Figure 6 (left) and 7 (right): The relationship between subjective clarity measures and perceived sexual orientation for individual sentences spoken by the four male talkers (Figure 6) and female talkers (Figure 7). Each talker's sentences are plotted with a different color.



## Conclusion

- This investigation provided only mixed support for the hypothesis that there is a relationship between perceived sexual orientation and speech clarity. A relationship was found for men in the expected direction, but it was very small, and a relationship was found for women in the *opposite-than-expected* direction.
  - One limiting factor was that there was a very small range of PSOs in the talkers and sentences used in this study.
- These findings suggest that objective differences in clarity alone cannot account fully for the differences between LBG and heterosexual people's speech in Munson et al.

This poster is available online at <http://www.tc.umn.edu/~munso005>

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