

The Phonetic Microvariation of Trans and Cis Speakers: Identity vs. Socialization

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Research shows that listeners can identify speaker gender from isolated /s/ segments, and that the measure of center of gravity (COG) varies along sex/gender lines in the production of /s/. COG is the mean frequency of energy produced during fricative production and inversely correlates with the size of the oral cavity anterior to the point of constriction (Shadle 1991) (i.e., a smaller cavity produces a higher COG). Generally, higher COGs are produced by women and lower COGs by men. It is claimed that this difference is due to sex differences in the vocal tract, with males having larger/longer vocal tracts and females having smaller/shorter vocal tracts (Schwartz 1968). On one hand, research on sex differences in the vocal tract suggests that the greatest sex differences occur posterior to the constriction (Fitch & Giedd 1999) and so do not affect COG. On the other hand, Fitch & Giedd (1999) also found a significant difference in lip tube measures with males having slightly longer lip tubes than females, which could affect COG production. However, evidence of intra-group variation in terms of sexual orientation (Munson et al. 2006) and class (Stuart-Smith et al., 2003) suggest that physiology alone cannot account for these differences. This suggests that microvariation may be partially acquired, for example during socialization into macro-level gender or class roles.

In this study, we compared the /s/ COG produced by trans and cis speakers (N=20) and found that speakers who identify as men (i.e., cis and trans men) produced significantly lower COGs than cis women. Trans women produced COGs in the “men’s” range. However, the exclusion of two speakers in the trans women’s group who produced lower COGs in the “men’s” range, increased the group COG. It was no longer significantly different than the COG mean of cis women, and was significantly higher than the COG mean of cis men. Excluded trans women were a speaker who had not transitioned, and another who transitioned in her mid-forties, suggesting that transition status and age of transition are important factors.

These results suggest that speakers have the ability to produce /s/ in line with their gender identity, possibly bypassing childhood socialization processes. The production of identity-based COGs by trans speakers supports the view that COG microvariation is learned and operates as part of an indexical system. Further, if physiology is the whole story, we would expect trans women and cis men to pattern together, as they have the same vocal tract physiology (i.e., both the oral/pharyngeal ratio and a longer lip tube), and cis women and trans men to pattern together, as they also have the same vocal tract physiology. Our findings make clear that vocal tract sex differences can be overcome.