

Ingo Titze, Associate Editor

Have Workplace and Beautiful Teeth Changed Female Voice Characteristics?

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ONE OF THE BENEFITS OF HAVING BEEN AROUND for the better part of a century is one's ability to assess long term cultural changes. A change that strikes me as interesting is the sound of today's young female voices. When I attended high school in the late fifties, high school girls had soft voices, sometimes on the breathy side. In register terminology I would say the voices were in a light mixed register. The use of thyroarytenoid muscle activity to achieve a male-like chest register was rare, in my recollection.

If there is indeed a trend for young female voices to adopt lower average pitches, to be less "swoopy" in their intonation, and to use more thyroarytenoid-driven vocal fold adduction, there are perhaps two explanations. Both are socially based. Competition with males in school and the workplace may be one explanation. To be equally and fairly treated, one's speech must conform to a model that conveys success, competence, and power. Stark differences in voice quality between males and females, which may be useful for sexual attraction in pursuit of a mate, are not ideal for job competition where physical and mental skills are not gender adjusted. For example, radio and television personalities, as well as politicians and executives competing for offices formerly held by men, are finding that traditional female voice qualities may be a handicap.

A more subtle explanation might be the desire to appear friendly and engaging by showing off a beautiful set of teeth. Fifty years ago, orthodontics and dental cosmetics were just emerging. A toothy smile was not necessarily a focal point of attraction. Now, the white of the teeth must match the white of the eye.

But how can a rack of pearly whites affect voice? Many young women have altered their vowel structure to accommodate a perpetual smile, drifting from lip-rounded vowels to lip-spread vowels. This leads to a generally higher first formant (F1) for most vowels. Source frequencies align differently with vocal tract resonance frequencies. For example, the second harmonic of the voice source stays mostly below F1, especially if the "swoopy" intonation in speech is also avoided. By being below F1, the second harmonic can be strengthened relative to the fundamental. This has always been the case for males; in females, however, it leads to the percept of a "squawky" or "quacky" duck-like voice when compared to the male voice. Allow me to explain further.

Many years ago, Dr. Brad Story and I began to contrast male and female voices by synthesis. We could transform a male voice into a female voice by doing

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three things: (1) raising the pitch by about 60%, (2) shortening the vocal tract by 10–20%, primarily in the pharynx, and (3) lightening up on vocal fold adduction. The lightening up of adduction was controlled by changing the opening quotient of the glottis from about 0.5 to 0.9 or more. This produced a strong fundamental and relatively weak second harmonic. Synthesizing today's emerging young female voice no longer requires much of step 3, the softening of adduction. In addition, by lowering their mean speaking pitch, women are reducing the male-female difference even further.

The impact on teaching singing may be quite profound. With the use of more male-like speech, regis-

tration problems are becoming similar in male and female voices. Females are beginning to have more trouble finding a mixed registration because it is not naturally cultivated in their speaking voices. I have seen reports of clinical cases where young adult females have no internal reference to “mixed register” adduction, either by feel or by sound. As we know now, semioccluded vocal tract exercises (straw phonation, lip trills, humming, etc.) help to correct this problem. A question remains, however: Are the social pressures to develop a uni-sex voice greater than the pressure we can apply through clinical and pedagogical wisdom of what constitutes a healthy female voice? Time will tell.



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