Words Are in the Mouth—Quality is in the Throat

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Conductor: "*Choir, echo me [s, s, s]*"

Choir: "*[s, s, s]*"

Conductor: "*Great, now with more energy!*"

What are the possible goals of this basic exercise? Perhaps the goal is for students to be able to connect sound with breath, create more audible unvoiced consonants, or energize the body to prepare for the rehearsal. No matter the goal, what are the potential flow-on effects? In other words, what else might we inadvertently be teaching along the way? How does this correspond to a dynamic marking above a phrase? Does a forte apply to all consonants and vowels in each word equally? Which consonants are louder than others? How loud does a consonant have to be to match the dynamic level of a vowel? In order to answer these questions, let's reflect on the title of this article. What does "Quality is in the Throat" mean? We first need to understand the distinction between speech sounds (vowels and consonants) and voice quality.

Kim Steinhauer et al. suggest that "speech sounds are produced primarily in the mouth or oral cavity; voice quality is produced by what is happening in the throat within the larynx and pharynx."[1] Voice quality can be thought of as the overall characteristic sound of the voice regardless of frequency, loudness, or speech sounds. Basically, this means that the sound is not going to change its overall color even when pitch, overall amplitude, or vowel and consonants shift. This is important because speech sounds have the potential to influence the resonance, or color, of a particular voice quality.

Vowels tend to get the greatest attention because voice quality can be most apparent when sustaining a vowel sound. Vowels can, however, be bright, dark, or somewhere along the continuum depending on various changes of voice structures. This occurs when structures change placements, causing different energy boosts of harmonics, which we perceive as brighter or darker qualities.

For example, an [i] vowel, which is commonly perceived as a brighter vowel, can be made darker by lowering the larynx, or even brighter by narrowing the epilaryngeal space via the aryepiglottic sphincter as in the childhood taunt "nyae, nyae, nyae." This demonstrates the potential independence between voice structures in the throat and speech sounds made with the mouth (i.e., tongue and lips). Consonants can have just as much influence on voice quality. Care should be taken to understand the common consonant interactions with vowels and voice quality.

Consonants are constrictions or obstructions along the vocal tract and can be voiced or voiceless. Voiced consonants occur with vibration of the true vocal folds due to the interaction of air flow. Voiceless consonants occur with

air flow through the vocal tract without the true vocal folds set into vibration. Within these exist common consonants named by the manner of articulation: plosives, fricatives, affricatives, nasals, liquids, and glides (Table 1).

Table 1.
Consonant Chart Categorized by the Manner of Articulation

Manner	Voicing	Common Consonant Examples
Plosive	Voiceless	"p, t, k"
	Voiced	"b, d, g"
Fricative	Voiceless	"f, th (thin), s, sh, h"
	Voiced	"v, th (these), z, zh (pleasure)"
Affricative	Voiceless	"ch" (choice)
	Voiced	"j" or dg" (judge)
Nasal	Voiced	"m, n, ng"
Liquids	Voiced	"l"
Glides	Voiced	"w" or "y" (yellow)

What follows are a few possible interactions between consonants and voice quality. Conductor-teachers should keep these in mind when working with consonants in order to develop consistency in desired voice qualities.

Consonants and Airflow/ Subglottic Pressure

Conductors-teachers should be aware of the level of subglottic pressure in voiced consonants and the level of constriction and airflow rate in voiceless consonants, which can be adjusted with training. For example, when conductor-teachers ask singers for louder voiceless fricatives (e.g., "s"), the constrictive behavior in the throat will likely increase and the abdominal muscles will contract abruptly. Is this the goal? If that bodily behavior is maintained into the subsequent vowel, or if students anticipate this instruction too early while singing the preceding vowel, it can negatively impact the sustainability of those sounds. The likely result will be a constricted voice quality, breathy voice quality, or pressed (over-adducted) voice quality due to the interaction of the voice quality and the high airflow rate of the "s."

Another example might be when asking for a stronger initial "g" as in the word give. This could cause a larger build-up of subglottic pressure below the closed vocal folds causing a pressed sound to occur on the subsequent vowel. Therefore, care should be taken to avoid flow-on effects of consonants to preceding and subsequent vowels. Students can learn to sustain stopped voice plosives, such as "b" and "d," with a reduction of the constriction and subglottal pressure. Have singers explore the sensation by singing successive "b's" and "d's" as quickly as possible.

Consonants and Onsets

There are three vocal onsets that can occur at the true vocal folds: glottal, aspirate, and smooth (simultaneous or balanced). These can be performed at various effort levels of vocal fold closure and rates of airflow. Voiceless consonants do not have an onset since the vocal folds are not set into vibration and can therefore intentionally or unintentionally cause a change in a subsequent vowel onset. For example, sing the word happy on a comfortable pitch. If you sustain the initial "h" with a high airflow rate and then proceed to sing the [a] vowel, the vowel quality of the [a] will either be breathy from an aspirate onset or pressed from an effortful glottal onset. Both could have been caused from the high level of airflow in the initial "h." Singers should be trained to perform any desired onset regardless of how the preceding consonant is produced.

Voiced consonants all have an initial onset, which can have a direct effect on the voice quality as well, although these can be adjusted with training. For example, an aspirate onset, with air starting before vocal fold closure will likely produce a voiced consonant with a breathy quality. This may be advantageous for certain pop styles that use a microphone. A low effort glottal onset may help produce a closure of the vocal folds prior to airflow, which will likely produce a louder dynamic result. This can be due to the interaction of glottal onsets thus helping to achieve a thicker vocal fold body-cover or chest register voice quality.

A smooth onset can help achieve a softer dynamic. Try to first practice these onsets with a vowel of your choice, such as [i]. Then have students sustain the vowel and then

close to a voiced consonant such as [z]. As the change from vowel to consonant occurs, have students try to maintain the overall quality of the sound. Then have singers attend to these onsets starting on a voiced consonant instead of a vowel.

Consonants and Coarticulation

While singing the previous "happy" exercise, you may have noticed the phenomenon known as coarticulation. This occurs when production of one speech sound influences a surrounding speech sound. For example, the [a] vowel in the happy exercise influenced the "h" quality. Try to sustain the "h" in the word "hoot" and then sustain the "h" in the word "happy." You will notice that the "h" sound is simultaneously influenced by the tongue position and, maybe even more importantly, the larynx position of the following vowel. These elements may be desirable in a more contemporary commercial styling such as pop or jazz but need to become independent of one another in a typical classical voice quality. Remember, however, that the overarching goal is to train independence of speech sounds from voice quality.

Another example of coarticulation occurs when a nasal consonant such as the "n" in the word "hand" causes the preceding vowel [a] to become nasalized. In a classical context, singers typically desire to remove this coarticulation. This takes training and is not suitable for vernacular styles such as pop. In order to make a pop style sound more authentic, singers can allow the ending of the [a] vowel to become nasalized with a lowering of the velum (soft palate) before transitioning into the "n."

Consonants and Pitch

Voiced consonants occur with vocal fold vibration. It can be advantageous for singers to match the pitch of the voiced consonant with the pitch of the subsequent vowel, especially on an ascending interval. For example, sing the word "singing" with the first syllable "sing" on a C3 or C4 and the next syllable "-ing" on a G3 or G4, respectively. Be sure to sing the "ng" on a G3 or G4 pitch. Now keep the "ng" on the lower pitch, and you might notice the difficulty.

Consonants can also influence the pitch of a subsequent vowel. If singers are required to sing louder-voiced consonants such as "z," they may use the same subglottic pressure in the subsequent vowel. This can cause a raising of the pitch or sharpening to occur after the consonant. If the subglottic pressure and airflow are allowed to change as needed to produce a similar quality on each speech sound, the change in pitch frequency will not occur.

Figure 1 depicts an acoustic spectrogram image of three different sustained consonants transitioning into a vowel. All three vowels were sung at the same frequency for each example. The first example, [z] to [i], was performed by trying to maintain the same subglottic pressure when transitioning into the vowel. The pitch fluctuated at the transition and momentarily sharpened.

The second example, [s] to [i], was performed trying to maintain the same amount of airflow when transitioning into the vowel. Again, the pitch raised at the onset prior to coming back to the intended pitch.

The third example, [z] to [i], was performed with adjustments to subglottic pressure and airflow to maintain the same pitch and voice quality during the transition from consonant to vowel. The pitch did not shift.

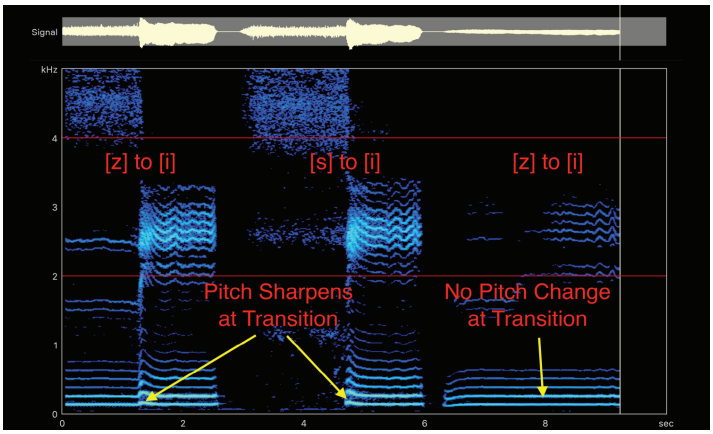

Figure 1. Spectrogram image of the relationship between consonants and pitch

Consonants and Dynamics

Consonants are perceived softer than vowels, so if a consistent legato is desirable, it can be advantageous to make the consonants louder, especially voiced consonants. Fred Waring's book, *Tone Syllables* (1945), focused on equalizing the dynamics of consonants to vowels but did not specifically discuss voice quality interaction. Since dynamics are a result of changes in the vocal mechanism, it is important to consider voice quality in this equation. For example, if singing the word, "sing," in a classical style, the initial "s" can be made louder by maintaining more constriction in the

throat and a higher larynx position. Then the voice quality needs to quickly adjust to a moderately-low larynx with no constriction in the throat and a reduction of airflow from the "s" to the subsequent vowel.

The last speech sound, "ng," will need to be louder than the preceding vowel sound in order to match the perceived intensity of the vowel. This can be accomplished by singing the vowel in a thin fold, or more head voice, and then the "ng" in a thicker vocal fold body-cover, or more chest voice. Another option could be to narrow the aryepiglottic sphincter to add intensity in the "ng." Sometimes the answer is also to make the consonant longer in duration.

Conductor-teachers can begin to incorporate these ideas into score preparation and the choir's daily warm-up. Eventually a scaffolded process can be developed to integrate these concepts in varied voice qualities. This can help conductor-teachers move toward a more comprehensive approach to teaching voice quality. It can help singers explore expressivity from a more holistic view. These ideas can easily be incorporated into in-person or online teaching. Visit www.brianwinnie.com to learn more about the integration of these concepts into a choral rehearsal. For further professional development in voice science, visit estillvoice.com or voicescienceworks.org. These websites include a wonderful list of additional resources. CT

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NOTES

[1] Kim Steinhauer, Mary Klimek, and Jo Estill, *The Estill Voice Model: Theory and Translation* (Pittsburgh, PA: Estill Voice International, 2017), 146.