The Phenomenon of the Voice: A Comparison

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Let me begin with an anecdote. A dear friend, who is a fine instrumentalist, recently recounted to me the following experience. He was working with some instrumentalists and some singers. At one point in the rehearsal, he said something like, "Let's begin with the *musicians* and then we'll have the *singers* . . ." Too late, he recognized his mistake and had to spend the rest of the rehearsal trying to make the singers believe that he had meant to say "instrumentalists" rather than "musicians." It is to all of us singers who have had similar experiences that I dedicate this paper.

To paraphrase another , the human singing voice is, in several important respects, (a) like all other musical instruments, (b) like some other musical instruments, and (c) like no other musical instrument on earth (Reimer, 1995). In this paper I will compare and contrast the complexities of the voice with other musical instruments from these three vantage points, concentrating on the characteristics that make the singing voice a unique phenomenon.

Vibration and Resonance

Like all acoustical musical instruments, the singing voice initiates the vibration of a column of air to create a musical tone. The voice can be used in many diverse styles of music, and can be a part of various performance combinations such as solo, chamber, ensemble, accompanied, or unaccompanied. All acoustical instruments have a resonating chamber.

The voice is most like a brass instrument in how sound is initiated, with the vocal cords performing in a way similar to the vibration of a brass player's lips. Now, the resonating chamber in a typical instrument is a fixed space. Imagine the tubing of a trumpet from the mouthpiece to the end of the bell. The trumpet player learns to play the instrument in the way that will best use this fixed resonating chamber to produce a fine tone.

The resonating chamber of the voice includes the space in the vocal tract from above the vocal cords to the lips (including some resonance properties in the nasal passages). With each syllable and each pitch, even each breath and swallow, the size and shape of the vocalist's resonating chamber fluctuates as the vocal mechanism, the soft palate, the tongue, the jaw and the lips move. The focus of the tone for resonance shifts as one rises in pitch and changes vowel sounds. Even the lips become part of the resonating chamber, forming a bell of different size and length as needed.

I suppose that the manufacturing techniques for vocal instruments (i.e., human procreation) have changed little over the course of human history. The result is that, unlike advances in other instruments, the overall quality of human singing voices is varied at best, and seemingly haphazard in some cases. I know of families where parents unable to carry a tune spawn offspring with enormous vocal talent. At the other end of the spectrum, I know of parents with sizable vocal prowess whose children are seemingly tone deaf. Other families have a string of good voices from generation to generation, while siblings from the same family may range from vocally gifted to vocally challenged, all with the same gene pool at work. Obviously, quality control for human voices does not exist!

Variety of Technique and Tone

Although there are basic techniques for every instrument, a wide variety of approaches to the finer points of technique exist, and a variety of tone qualities are valued by different groups. The same is true with singing. Vocal production can range from Bel Canto to the German approach, from Broadway belt to Country Western. There is probably more variety in desirable tone qualities among singers than any other instrument, especially when non-western cultures are included.

Location of Instrument

No matter what vocal style is being taught, vocal instruction presents a unique difficulty. How does one work with an instrument that cannot be seen directly? All other musical instruments are played exterior to the body or only partially inserted into the mouth. There is some exterior form of mechanical manipulation that can be explored when teaching how to play the instrument. Fingerings can be demonstrated. Proper playing technique can be observed. Hand position can be modelled and compared. True, wind instruments share the need for breath control with vocalists, but for winds the sound is produced by an *exterior* source; for the vocalist, sound is produced literally *inside* the body.

Absent the ability to hold and demonstrate the proper playing of the vocal instrument outside the body, teaching proper vocal production becomes quite problematic. You can't say, "You hold the vocal cords like this."

Since observation of the vocal mechanism is unavailable as a teaching tool, teachers often resort to teaching vocal production by metaphor. Some of the following metaphors may sound familiar to singers. "Sing like you are a vacuum cleaner, sucking in air as you sing." "Pretend you have a golf ball in the back of your throat." "Think of a hollow vertical tube inside your neck." "Sing like you are an ice cream sundae with hot fudge dripping down the sides." Or, my personal favorite from one of my former teachers, "Pretend your diaphragm is an ice rink in front of your body, and every time you begin to sing, a little angel comes down from heaven and lands on the rink, twirling as fast as she can — make your voice sound like that." Is it any wonder that young instrumentalists are often more advanced than young singers, at least as far as technique is concerned?

While metaphors may be appropriate and valuable in some cases, they do not serve as a substitute for understanding efficient vocal production. There are some choral directors and vocal teachers who teach without this understanding. For some,

it is because they are teaching in the way they were taught and do not have a clear understanding of what is involved. For others, they opened their mouths when they were younger and this wonderful vocal sound poured out naturally and without much instruction, so they never needed to pull apart, analyze, and understand the details of the vocal production process. Without such understanding, it is difficult to teach others effectively.

Let me address some other unique characteristics of the voice.

Text

An aspect encountered by vocalists that has no counterpart in instrumental music is the addition of text. If a singer only had to sing on the same open vowel all the time, the process would be simplified greatly. Nineteen English vowel sounds were listed in one dictionary I consulted, each with it's own requirements for formation in the vocal tract. If you sing in a foreign language, the vowel requirements may be simplified (as in Spanish) or compounded (as in French). Consonants add their own difficulties. Inserting a hard "g" (as in "gate") closes the vocal tract at the back of the throat; adding a secondary consonant to the first, such as adding an "r," increases the difficulty (as in "great"). Not only that, but one is expected to keep the musical line flowing appropriately while keeping the text intelligible, a difficult task for anyone. And, in the case of performing the notes at upper limits of a singer's range, certain vowels and consonants are extremely hard to sing in tune and intelligibly, necessitating the modification of some vowels and some loss of text clarity.

Stage Presence

In spite of all this complexity, there is one additional task that is usually not expected of instrumentalists. In addition to singing well and intelligibly, a singer is expected to communicate the feelings of the text effectively, physically portraying the appropriate feeling of the piece, especially facially. Now, no one complains if a pianist does not smile or if a violinist's face does not look appropriately impassioned, or if a percussionist looks a little stiff; it is the music that counts. For a singer, stage presence is a must and appropriate emoting is expected. A singer will be criticized if perceived as too stiff, and made fun of if too animated, no matter how well one sang. Not only that, in opera and music theater, singers are expected to act and even dance as they sing. How many instrumentalists are asked to perform while grovelling on the ground and passionately performing a note at the top of their instrument's range?

Use Outside of Making Music

Musical instruments were designed to, what else, make music. After the music making is over, a musical instrument is put aside, often in a safe place, even into a specially designed protective carrying case, abandoned until next needed. You won't see a flute being used as a coat hanger or a tuba being used as a planter. The voice, however, continues to be used, for a variety of purposes, even after the music making is done.

proper vocal production and respiration, acid reflux, massed lesions, upper/lower respiratory infections, performance anxiety, and more (e.g., Westermann-Gregg, 1990; Sataloff, 1991; Lin, 1991; Cornut & Bouchayer, 1989; Wolf, 1989). Suffice it to say that, unlike any other musical instrument, the health of the body is crucial for a singer. As the condition of the body varies from day to day, even from moment to moment, the vocal mechanism is affected and must adjust.

One can only wonder what an instrumentalist's reaction would be if, for example, his piano changed many of its attributes day by day, where some days it was only well enough to sound the middle octaves, some days only the lowest notes would sound, and there were even times when nothing came out but a squeak. What level of expertise would be reached under such conditions?

Note Reading

I suppose that all instruments can be played by ear. There are myriad people who can play instruments to varying degrees without ever having had the benefit of formal instruction. Certainly billions of people on our planet have sung without the benefit of formal vocal instruction.

This brings us to a common perception that singers are, as a whole, less able to read music than other musicians; in many cases this appears to be true. There are many who have participated in formal vocal music experiences, such as private voice instruction or vocal ensembles, who still "play by ear" as it were, not acquiring the skill of being able to read and perform rhythms and pitches from notation, or at least not to a level usually required of a so-called "musician." Why?

Most formal instrumental instruction is rooted in a method book of some kind (methods such as Suzuki's being an exception). Reading and performing from notation is usually addressed within the first few lessons, if not from day one. Instrumental ensemble rehearsals are usually note-based—each player is given sheet music for a new piece representing that player's particular musical line. Without the benefit of a full score, one must carefully count and play the correct notes with faith that it will fit into the whole musical fabric well. Note reading is implicit in much instrumental instruction.

Vocal music in the schools does not always support the goal of note reading. Songs are usually taught by rote from the youngest ages, at times supplemented by pictures and icons. Many times, school budgets do not support the purchase of vocal music, especially when so much has been accomplished without it in the past. By the time music is put into children's hands, they may have become dependent on learning melody and rhythm by rote; in such a case, the music becomes only a fairly expensive way to provide the text for the students, and one can make a poster to do that at a fraction of the cost.

In the voice studio, some teachers vocally model each piece, phrase by phrase, for their students. Through modeling, students learn text, pronunciation, diction, musical line — in fact, initial groundwork outside of the lesson is sometimes frowned upon because students may learn the piece "wrong," that is, differently than the accepted performance style. "No, no, no, no, no," the teacher may say. "Sing it like this . . ." Why learn to read music if each piece will be spoon fed to you at your lesson?

Many singers become adept listeners. How many vocalists have you heard say, "I can't read music, but if I hear it once, I pretty much have it." There is also a

sort of badge of honor for some who achieve vocal success and boast that they can't read a note of music.

Where formal instrumental music instruction has a goal of note reading, the goal of vocal music is sometimes only performance, no matter how you get there. There are some programs in the United States where students may go through an entire vocal music program, K-12, and never be required, let alone taught, to read music, or they become contour readers who can get the outline of the melody but must have help with the details. Any music program that does not have an explicit goal to teach students to read music has an implicit goal to keep students dependent on others for learning new music in the future. It is difficult for me to imagine a vocal teacher saying that it is not important to teach note reading. Then why are there programs that do not do so?

Effect of Performance Requirements

The effect performance requirements have on a choral program or voice studio may be a large part of the reason. Sometimes the pressure to prepare for performance after performance precludes taking time to teach sightsinging and other important musical concepts that enable students to become well-rounded, independent musicians. And it does take time to teach note reading and other concepts. But in the long run, mastering such skills and understandings saves time and expands students' ability to perform in the future.

Pitch

I think that there is another more complex reason for those who choose not to teach sight singing to their vocal students. Pitch is a purely mental construct for a singer. With the exception of those few persons with perfect pitch, there is no fixed pitch resource for the singer. Think about it. A violin has an open 'A string.' A wind instrument can usually find concert B flat. A keyboard's notes are all fixed. There are properties of these instruments that bring you exactly or close to a certain pitch. The sound is produced outside your body, and your ears can listen and adjust. But, as the saying goes, a vocalist can "sing any song in any key, and even change keys without trying." Tell a student to go home and practice the alto part; without training in sight singing, and if no fixed pitch source is available at home, practice may be more harmful than helpful.

There is no outside mechanical manipulation to aid in the process like there is on other instruments. No hand manipulation of the instrument is available to the singer. In fact, I can think of no other instrument that does not use the hands for playing in some way. Does hand movement assist with learning pitch or even rhythm? Is body memory engaged differently or more effectively when the hands and arms are involved than when only the small muscles of the laryngeal system are used? Is that why the use of Curwen hand signs in the teaching of singing is often effective? These are questions begging for more research.

In addition, the sound is produced inside the head, making it impossible to sort out the sound resonating through tissue and orifice from the sound that is perceived after it is projected beyond the mouth. When singing is tape recorded and played back to the singer, the sound is often perceived as eerily different than what

he hears inside his head as he sings. Add what was discussed before about the constant shifts in the size and shape of a singer's resonating chamber, and that makes the process all the more complex.

Performing Parts

If singing a melody in tune is a challenge, it is even more difficult to sing a harmony part. In a choral situation, girls that can only sing melody and cannot hear a part may be able to sing soprano. However, *all* boys must learn to sing a part to be in a mixed choir. If they have not learned part singing before the voice changes, coping with the concomitant problems of voice change *and* learning to sing a harmony part often prove too discouraging to continue.

Conclusion

It has not been my purpose to indicate that mastering a musical instrument is a simpler task than learning to sing well. Each instrument has its challenges and complexities, as others more knowledgeable than I on each instrument can surely point out. Rather, my intent has been to show that singing is far a more complex phenomenon than supposed by some. Indeed, given the foregoing, it is my belief that a voice joyfully raised in song is a complex human achievement, one that is nearly miraculous in nature. And I, for one, am grateful for such miracles.

Reference List

Arbitol, J. (1989). Does a hormonal vocal cord cycle exist in women.? Study of vocal premenstrual syndrome in voice performers by videostroboscopy-glottography and cytology on 38 women. *Journal of Voice, 3*(2), 157-162.

Chisolm, G. (1990). Premenstrual anxiety and depression: Comparison of objective psychological tests with a retrospective questionnaire. *Acta Psychaitr Scand, 81*, 52-57.

Cornut, G., & Bouchayer, M. (1989). Phonosurgery for singers. *Journal of Voice, 3*, 269-276.

Kaufman, J., & Blaylock, D. (1988). Vocal fatigue and dysphonia in the professional voice user: Bogart-Bacall syndrome. *Laryngoscope, 98*, 493-498.

Lin, P-T. (1991). Risk factors and management of vocal cord hemorrhages: An experience with forty-four cases. *Journal of Voice, 5*, 74-77.

Reimer, B. (1995). Gender, feminism, and aesthetic education: Discourses of inclusion and empowerment. *Philosophy of Music Education Review, 3*, 112.

Sataloff, R. (1991). *Professional voice: The science and art of clinical care*. New York, NY: Raven Press.

Verdolini-Marston, K.. (1990). Changes in phonation threshold with induced conditions of hydration. *Journal of Voice, 4*, 142-151.

Westermann-Gregg, J. (1990). Some new observations on pitch problems. *The NATS Bulletin*, January, 34-52.

Wolf, M. (1989). Correlates of adaptive and maladaptive musical performance anxiety. *Medical Problems of Performing Artists, 4*, 49-56.