

Vibrato Changes Following Imagery

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Summary: Objectives. This study investigated acoustic change in singers' vibrato following imagery and non-imagery tasks.

Study Design. The study used a fully randomized cross-over (six conditions \times two times) block design, in which each singer received each intervention in random order. Data were analyzed using the general linear model (GLM). Main effects for time and condition and interaction effects (time \times condition) were calculated for each dependent measure.

Methods. Six classically trained female singers recorded an 8-bar solo before and after three nonvocal, 25 minute tasks. Each singer performed the tasks in a different randomized order in a single sitting. Task 1 involved imagery of the breath directed up and down as far from the larynx as possible; Task 2 used Braille music code, enabling the singer to engage in tactile, kinesthetic and visual imagery related to music but unrelated to breath function; Task 3 was a non-imagery activity requiring the completion of a cloze passage about breath function. From the 11 longest notes in each solo, spectrograms of the partials were produced and assessed for pre- to post-test changes in vibrato rate, vibrato extent, and sound pressure level (SPL).

Results. Only the breathing imagery task produced significantly more moderate and regular vibrato rates. Vibrato extent was not responsive to any intervention.

Conclusions. Findings indicate that breathing imagery regulates singers' vibrato in a manner consistent with that of a more proficient, warmed-up voice.

Key Words: Breathing–Imagery–Vibrato–Warm-up–Tone quality–Classical female singers.

INTRODUCTION

Singers trained in the Western classical tradition often use indirect techniques as an aid to soliciting the complex and often subconscious physiological coordinations that produce optimal vocal results. Mental imagery is one such technique, and indeed “the discipline of singing and vocal pedagogy ... has consistently and historically used mental imaging techniques to achieve its objectives.” (p. 41)¹ Although Cleveland¹ noted the need to extend voice research into the science of mental imagery, his call has largely been ignored to date.

Imagery used by singers often draws on the aural, visual, and proprioceptive senses.^{2–4} It may or may not be text-based or represent some aspect of physiology. However, because “sensation in the larynx means lack of freedom in the larynx,” (p. 154)⁵ and the voice tends to be more artistically acceptable if it feels to the user as although it were produced in almost any other region of the body than the throat,^{3,6–9} much of the imagery traditionally practiced as an aid to technical control focuses the vocalist's attention away from the throat in a manner that does not represent reality. Such images have played an important role in voice teaching for at least five centuries¹⁰ and include those in which sensations of the breath or the tone are directed far from the larynx and even to some point outside the body.^{10,11}

Imagery of the breath upholds the teachings of the Italian school of singing, that “the focus of the tone (the placement) and the control of the breath are considered to be one action.” (p. 80)¹² That is, the bodily sensations the singer focuses on remain the same regardless of whether the singer is breathing in or singing out.¹² Giovanni Battista Lamperti taught: “The desire to feel the ‘touch’ of the ‘point’ of tone, becomes the objective guide to the breath” (p. 70)¹³— a maxim sometimes paraphrased as “Breathe where you sing. Sing where you breathe.” (p. 10)¹⁴

However, vocal training is generally required to apply such a concept to advantage. The singer with an inefficient, poor quality voice senses the voice solely at vocal fold level,¹⁵ whereas the accomplished singer's perception of a resonant voice involves sensations throughout the body.^{6,16} Baritone Thomas Quasthoff reports: “It is very important to feel the breathing inside your entire body, and not only in a separated part of your body. The whole human being is the instrument, not only the larynx.” (p. 264)¹⁷

To aid the perception of sensations associated with an accomplished resonant voice, singers are sometimes presented with imagery such as that in Figure 1 drawn by the singer and teacher Richard Brünner.⁶ Figure 1 shows a typical beginner singer on the left, who is aware of breathing only in the throat and the chest, and a more accomplished singer on the right, who imagines the breath being taken much deeper into the torso and up to the top of the head.

Extending this concept, the sensations of the breath or the tone are sometimes imagined projecting beyond the head and torso. The singer Lilli Lehmann¹⁸ wrote of the need to always have an inner picture of the stream of breath that directs the highest notes to a place above the head as though shooting into the air. To counterbalance upward sensations, singers may also use downward-directed images of the breath going to the pelvic floor, the knees, the soles of the feet, or into roots

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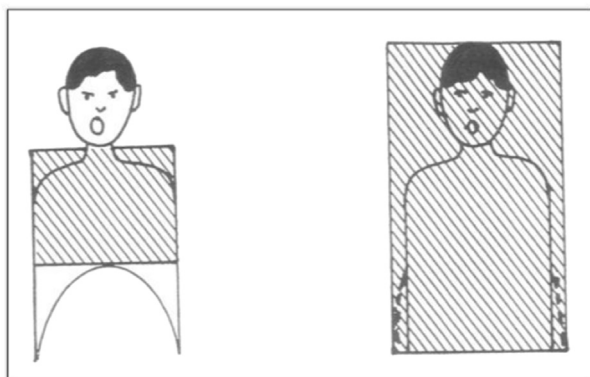


FIGURE 1. Imagery to aid perception of sensations. (Brünner R. *Gesangstechnik*. Regensburg: Feuchtinger and Gleichauf; 1993:p. 90. Reprinted with permission).

below the stage floor. Brünner⁶ writes that a good singer strikes broad, deep roots “into the earth” (p. 24) ... “like a powerful tree” (p. 91).

In reality, the breath or the voice cannot be directed to some focal point or points of sensation as the images suggest. Consequently, not all singing authorities support the use of such imagery.¹⁹ Yet, the vocal coach, Sergius Kagen, although decrying images which “put to shame the most fantastically-minded surrealist poet,” (p. 82)²⁰ nevertheless concedes that particularly gifted singers appear to respond to them. What the singing literature significantly fails to note is that the practice of such imagery is not restricted to the discipline of singing.

Similar imagery has a long history of use in Eastern meditation and in Chinese traditional healing²¹ where the ability to focus the mind, for example on the breath, serves to calm anxiety and assist with the body’s stress related responses. More recently, it has been documented in the practice of Western physiotherapy^{21,22} and performance disciplines other than singing.^{23–28} As reported by a professional dancer:

“Sometimes when you’re learning a new skill, you become bogged down by the physics of the movement. And sometimes it takes someone to say to you ‘try and just let the air come out of the top of your head’. And suddenly you’re not so much worried about your foot but you’re focusing on some other part of your body, and that will just allow the leg to do what it needs to do.” (p. 407)²⁸

It has been suggested that breathing imagery serves not only as a distraction from negative self-talk, but also improves spinal alignment^{6,27,29} and diaphragmatic breathing,^{6,21} which in turn assists with the management of stress and relaxation levels,²¹ panic attacks and performance anxiety.^{23,30,31} Although the vocal literature is generally devoid of references to performance anxiety management, it does suggest that such imagery may assist with balancing the upward and downward forces in the stylopharyngeal muscle complex,³² that it raises the soft palate, lowers the larynx,^{8,9,33} and maintains larynx stability.³⁴ These actions are linked to the freeing of laryngeal constriction, obtaining an “open throat”^{9,33,34} and improved tone quality.^{8,12} However, for singers the freeing of laryngeal constriction is linked to the elimination of one of the most

detrimental symptoms of performance anxiety — the word “anxiety” stemming from Greek and Latin words meaning “constriction”, “pressing tight” and “strangling.”³⁵ The literature for the spoken voice adds that if breathing imagery is used pre-performance, it serves as a silent warm-up by creating a mental blueprint for the sound.^{24,25}

Adding credence to the theory of a mental blueprint, the discovery of the mirror neuron system supports claims that imagery activates neural responses, triggering physical adjustments that are often beyond conscious control.^{36,37} Furthermore, mirror neurons show greater activation the more the individual has a strong sense of the goal to be achieved^{38,39}; and pedagogical wisdom suggests imagery of sensations directed both upward and downward, far from the larynx, presents the singer with a proprioceptive goal linked to skilled performance and optimal vocal tone quality. Thus, Hurley⁴⁰ proposes that the presence of mirror neurons may account for why musicians often report that imagining a skilled performance in music improves performance.

In the tradition of Western classical singing, skilled performance requires optimal vocal tone which possesses as much brilliance and mellowness as possible.⁸ Vennard writes that the singer’s sensations which appear to be directed up and forward are related to a bright brilliance of tone and those directed down and back are related to a darker mellowness of tone, and for a “chiaroscuro” ideal balance of brilliance and mellowness, both of these directionally opposing sensations must occur simultaneously.⁸ Thus, according to Vennard, if imagery is used optimally then vocal tone quality improves.

This suggests that breathing imagery may affect singers’ vibrato, because it has long been observed that vocal color is determined above all by vibrato,⁴¹ and that the faster or slower the vibrato, the brighter or darker the tone.¹² Furthermore, in music where a “chiaroscuro” beauty of tone is of primary importance, the more highly trained and skilled the singer, the more moderate and regular the vibrato rate.^{42–46}

Excessively fast and unstable vibrato rates are often found in students at the commencement of vocal training,^{46,47} but are also typical acoustic indicators of muscular hyperactivity that occur in situations of high stress, excessive force, and performance anxiety, irrespective of singer level.^{5,8,48,49} In addition to producing a very bright, sometimes shrill quality, fast vibrato rates in the 6–8 cycles/second range may sound like a bleat,⁴⁸ with those in the 7 or 8 cycles/second range associated with tremolo.³² Slow vibrato is typical where lethargy or poor muscle tone is present.^{5,46} Generally, vibrato rates below 5 cycles/second are considered unacceptably slow,⁴⁵ produce a particularly dark tone quality, and tend toward a wobble.⁵⁰ Vibrato near 4 cycles/second clearly undulates rather than creating the impression of a constant pitch.^{45,48}

An acceptable tone color may vary depending on the repertoire, and so too may the vibrato rate. Exceptionally fast and exceptionally slow vibrato rates appear to be important when particularly intense emotions or extreme psychological states are portrayed.^{48,49} For example, Maria Callas has recorded vibrato rates as fast as 7.1 cycles/second in the mad scene from Donizetti’s opera “Lucia di Lammermoor,”⁵¹ where the

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