If you can't sing it, you can't play it: Vocalizing in instrumental ensembles

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Introduction

Director of Concert Bands at the University of Washington, Professor Timothy Salzman begins each rehearsal by asking students of his wind ensemble to tune to the principal tuba player immediately following a short warm-up on a Bach chorale. After the tuba plays a concert F, each section slowly layers in and tunes starting from the lowest voiced instruments to the highest, until each instrument has successfully blended into the collective sound of the ensemble. However, similar to the popular childhood game of telephone, errors typically accumulate in the retellings of that concert F as it gets passed from one section to the next. Possibly due to the anxiousness or impatience of ensemble members, or simply caused by the lack of pitch internalization, the note gets altered to the point where the concert F heard in the woodwind sections is significantly sharper than the one originally played by the low brass. After hearing the waves of pitch discrepancy, Professor Salzman stops his students and asks them to start again, this time humming the pitch before they enter on their instruments. The students repeat the process with this adjustment, which results in a much more in tune and well-blended concert F. Professor Salzman knows from experience that this improvement did not happen due to an act of magic or sorcery, but rather, having students physically hum the pitch before playing it on their instruments allowed them the tools they needed in order to prime themselves to play in tune.

The adage, “If you can’t sing it, you can’t play it,” is one of Professor Salzman’s favorite phrases to use after one of these scenarios, and is also often heard in other wind ensemble rehearsals across the globe after students are asked to sing their parts before playing it on their instruments. This technique of singing before playing is commonly

referred to as vocalization. Expert teachers use vocalization in order to improve phrasing, balance, and intonation issues among their ensembles, but often at the dismay of instrumental students with little vocal experience who feel uncomfortable with the process of singing. For this reason, teachers often feel uncomfortable forcing their students to partake in this activity and decide to completely leave this strategy out of their instruction.

Unfamiliarity or discomfort with the process of singing is not the only reason for neglect of vocalization use within instrumental classrooms. Time limitations of the typical school music class often forces teachers to concentrate instruction on the mechanical aspects of performance such as correct fingerings, embouchures, and hand positions (Elliott, 1974), rather than on intonation and ensemble blend. As a result, students' tonal accuracy and sense of pitch gets neglected and suffers. In fact, research shows that wind instrumentalists overall show less aural acuity in comparison to string players and pianists (Stecklin & Aliferis, 1957). Part of this can be attributed to the fact that intonation is controlled by the sensitivity that the string performer's ear has on the placement of their fingers (Elliot, 1974), whereas wind players often fall into a misguided "button-pushing" mentality that suggests playing in tune requires simply pulling the instrument to the correct length and fingering the right note (Wolbers, 2002). By neglecting to address this issue and spending the bulk of rehearsal time on other aspects of musicality, teachers allow students to fall behind in gaining the skills crucial in becoming well-rounded and independent musicians. Although teachers have commonly agreed that singing can be an effective rehearsal strategy to remediate these issues, employment of this strategy is rare (Burton, 1986). The purpose of this article is to

identify the physiological and psychological processes and benefits of vocalizing in instrumental rehearsals to generate awareness and provide suggestions for teachers for further use.

Physiological Processes

The Instrumentalist's Anatomy

Although instrumental playing and choral singing seem to be two disparate areas of music performance, the mechanics behind sound production in both practices are not mutually exclusive. Research shows that laryngeal engagement causes movements of the tongue and throat during instrumental performance, and that vocal folds serve primarily to assist in controlling airflow (Trollinger & Sataloff, 2016). Wind players have also been shown to achieve fine pitch adjustment by raising or lowering the tongue (Wolfe et al., 2003). These anatomical parts, along with others, make up what is known as the vocal tract (see Figure 1). Additional endoscopic research has provided evidence that different parts of the vocal tract are directly engaged when producing sound on a wind instrument (Jordheim, 2009; Pool, 2004; Rydell et al., 1996).

For those who are well versed in wind instrument performance, knowledge of vocal tract engagement may not come as a surprise; however, some might argue that the way in which the vocal tract is used for wind instrument performance is not the same as in singing. This can be negated through evidence that wind players configure their vocal tracts to resemble exact vowel formations found in singing (Chen, et al., 2011; Fritz & Wolfe, 2005). Trollinger and Sataloff (2016) also offer a strong argument that this notion is false by providing evidence that wind instrumentalists can develop vocal damage due to vocal tract usage that is similar to singing when playing. Thus, wind instrumentalists

can be identified as professional voice users just like singers. Even though vocalizing and playing an instrument may involve different performance experiences for musicians, they are directly related in that they utilize the same physiological mechanisms of the human anatomy.

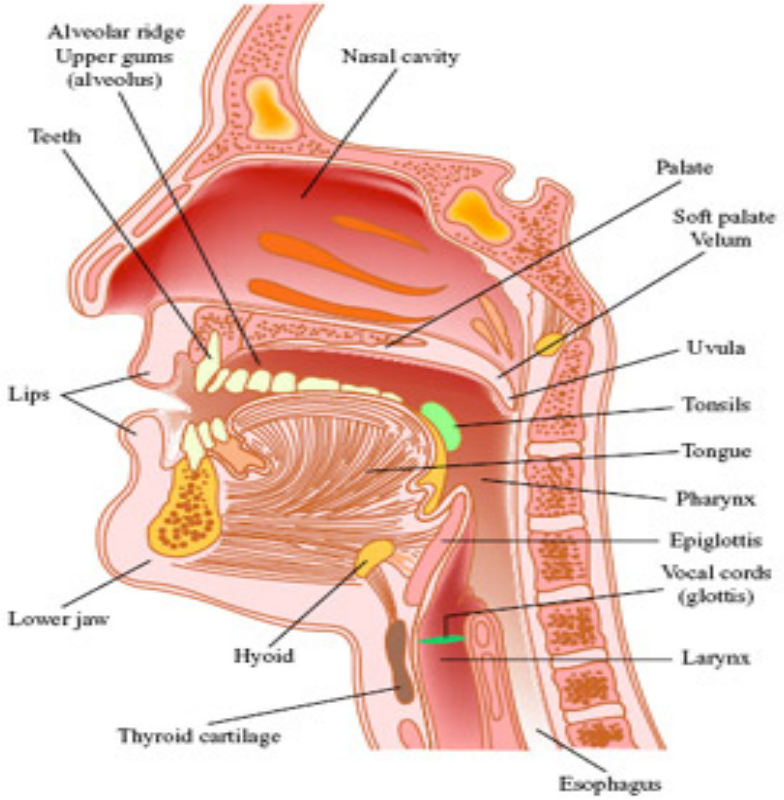

Figure 1. Diagram of vocal tract (from Jordheim 2009, Retrieved from https://www2.lawrence.edu/fast/jordheis).

What is Voicing?

As previously noted, proper manipulation of the vocal tract can have a significant role in improving the intonation of wind instruments; however, it also plays a role in the very basic mechanics of sound production on wind instruments as well. Donald Sinta

(1992), former Professor of Saxophone at the University of Michigan, and the author of *Voicing: An Approach to the Saxophone's Third Register*, presents the following idea as a solution to the issue of mechanical setbacks:

> Recall, as a beginner, how difficult it was to produce the octave "G": Even with the proper fingering, a good embouchure, and an adequate reed, the note frequently wants to sound either in the lower octave or as both notes simultaneously. This effect is attributed to the compromised placement of the saxophone's first octave vent. To compensate for this mechanical inadequacy, the player must learn to stabilize the note with the assistance of a new and different oral cavity configuration by using the tongue as an "octave key." Frequently, this initial control is arrived at unconsciously as the body discovers the necessary manipulation through kinesthetic muscle memory (p. 6).

This kinesthetic muscle memory of which Sinta speaks can be further defined as an awareness and control of the muscles and soft flexible tissue in the oral cavity and vocal tract (Sinta & Dabney, 1992), otherwise known as the process of voicing. Voicing is essential to producing any sort of sound on a wind instrument, but expert musicians also use voicing in order to gain control over range, timbre, dynamics, and intonation. We utilize voicing in everyday conversation in order to vary inflection to verbally communicate thoughts and ideas to others; however, novice musicians struggle to utilize voicing in the same way during instrumental playing due to the sudden presence of a mouthpiece.

One of the major limitations when teaching is that neither the teacher nor the student has the ability to directly view the vocal tract when voicing on an instrument. Ideas can become convoluted when teachers try to provide verbal descriptions for the technical aspects of voicing. Describing technical processes to students, such as raising the soft palate, opening the throat, and pointing the tip of the tongue downward, may confuse students further and often result in improper and unhealthy use of the vocal tract.

Although it might be useful for the teacher and the student to have an awareness of what specific muscles are being put to use and how, it is not quite so feasible to teach in the everyday classroom. As a result, the concept of voicing rarely shows up in an instrumental classroom, and students' overall intonation suffers because of it.

Although not quite a panacea, teachers might try using vocalization as a rehearsal strategy in order to address this issue of voicing. Dalby (1999) noted that singing frees students from the mechanical demands of their instruments, making it easier to direct attention. Since voicing on an instrument involves the same physiological manipulations of the vocal tract as singing, students have the opportunity to discover the physical manipulations while singing that they need in order to make playing adjustments without over-analyzing it. Students should be encouraged to play exactly as they sing, because the physiological processes of the two activities are almost identical.

What We Sing Matters

Considerations for Timbre and Intonation

If we follow the theory that playing an instrument involves the same physiological manipulations as singing, then what we choose to have our students sing when vocalizing matters. It almost seems like common sense to choose "da da da" over "ta ta ta" when singing a legato phrase; however, what about the decisions we make over specific vowels? It is common knowledge in choral pedagogy that unified vowel placement is necessary in achieving desired ensemble intonation (Demorest & Ross, 2003), and this concept is key in achieving desired intonation when vocalizing in an instrumental ensemble as well. It is essential to provide students with a clear vocal model before

having them vocalize their parts in order to achieve the desired timbre. The singing does not have to be perfect on the teacher's part; the real purpose of this model is simply to make sure students are using the same syllables and vowels in order to achieve a unified sound.

It is often surmised that specific vowels produce different timbres. For instance, [i] sounds (as in "see") produce more narrow and nasal tones, whereas as [o] (as in "row") produces rounder tones. Ware (1998) suggests that this is due to the implied imagery of vowels; the vowels described as light or acute are perceptually higher, and those described as dark are perceptually lower (see Figure 2). Further, as Figure 2 suggests, these perceptions are partially due to the physical shape the larynx takes on when pronouncing these vowels. For example, to produce the [i] vowel, the tongue and larynx must both be raised, which in turn produce a higher and more brilliant timbre. This information might be useful to teachers who want to use vocalization as a method to influence timbre. For example, to get trombonists to play a phrase with a darker tone, the teacher might have them first sing their phrase using a "doo" syllable before playing it on their instruments. This specific syllable can result in automatic adjustment of the vocal tract in order to lower the tongue and larynx to achieve the desired timbre. The trombonists can feel this specific manipulation while singing and make this fine adjustment when they go back to playing the phrase on their instrument.

Vowel Characteristics	[i]	[e]	[a]	[o]	[u]
Pitch perception	highest (forward)	.....	.....	.....	lowest (back)
Timbre	brilliant	.....	medium	.....	dark
Tongue (and larynx) position	raised	.....	slightly raised	.....	lowered

Figure 2. Summary of vowel characteristics (from Ware 1998, p. 161)

Vowel choice also goes deeper than simply affecting timbre. Research suggests that each vowel has specific intonational tendencies. Sundberg (1987) described that when singing a single pitch, shifting from a closed vowel to a more open vowel resulted in lowering the pitch. Contrastingly, shifting from an open vowel to a more closed vowel caused the pitch to rise. With this in mind, teachers should consider the exact needs of the ensemble before jumping straight into vocalization. Are the clarinets playing a phrase consistently too flat? Try having them sing the phrase on a neutral syllable that contains a more closed vowel (such as "dee") in order to get them to slightly raise their tongues and sharpen the pitch.

Another thing to consider is whether or not to use neutral syllables or specific words when approaching vocalization. In a thorough literature review, Bernhard (2002) synthesized previous research that suggested tonal-verbal singing is more helpful to student learning. Tonal-verbal singing is a method that bonds discrete musical pitches with corresponding syllables, numbers, or letters to emphasize relationships among individual tones, such as in moveable-do solfege. Bernhard (2002) further claims that using neutral syllables, lyrics, and humming do not have direct verbal correlates to specific musical tones, and are less desirable when vocalizing. This is supported by Gordon (in Mark, 1996), who states that,

> "Without verbal association, students find it increasingly difficult to discriminate among additional patterns they need to learn. When more and more patterns are learned with a neutral syllable, the patterns begin to sound alike to the students unless they can organize them by syllable names." (p. 172)

Thus, choosing to use a solmization system is preferred when using vocalization within the instrumental classroom. However, the same principle of vowel intonation mentioned previously still stands. Neuerburg (2012) provides an in-depth analysis on the specific

vowels used (according to the International Phonetic Alphabet) in each syllable of moveable-Do solfége, shown in Figure 3. This chart specifically details the intonational tendencies of each syllable, which can be used to make judgments for when to use specific solfége syllables according to the needs of the situation. For example, Figure 3 shows that the solfege syllable "mi" contains the IPA [i] vowel. When comparing this to the properties described in Figure 2, we know that our tongue and larynx must be physically raised to create this sound, which also causes the perceptual quality of greater height. Thus, Figure 3 explains that the collective impact of the IPA vowel [i] of this solfege syllables a significantly raised sound overall.

Solfège Syllables	IPA	Functional Tendencies	Physiological Tendencies	Perceptual Qualities	Additional Consideration	Collective Impact
Do	[oʊ]	Neutral	Moderately upward	Moderately low	Diphthongal destabilization	Neutral, with destabilization
Sol	[oʊ]	Neutral	Moderately upward	Moderately low	Diphthongal destabilization	Neutral, with destabilization
Ti	[i]	Significantly upward	Significantly upward	Significantly high	–	Maximally upward
Fa	[ɑ]	Moderately downward	Significantly downward	Slightly low	–	Significantly downward
La	[ɑ]	Neutral	Significantly downward	Slightly low	–	Moderately downward
Re	[eɪ]	Slightly downward	Moderately upward	Moderately high	Diphthongal destabilization	Moderately upward, with destabilization
Mi	[i]	Neutral	Significantly upward	Significantly high	–	Significantly upward
Ri	[i]	Significantly upward	Significantly upward	Significantly high	–	Maximally upward
Fi	[i]	Significantly upward	Significantly upward	Significantly high	–	Maximally upward
Si	[i]	Significantly upward	Significantly upward	Significantly high	–	Maximally upward
Di	[i]	Significantly upward	Significantly upward	Significantly high	–	Maximally upward
Li	[i]	Moderately upward	Significantly upward	Significantly high	–	Significantly upward
Te	[eɪ]	Moderately downward	Moderately upward	Moderately high	Diphthongal destabilization	Slightly upward, with destabilization
Me	[eɪ]	Moderately downward	Moderately upward	Moderately high	Diphthongal destabilization	Slightly upward, with destabilization
Le	[eɪ]	Moderately downward	Moderately upward	Moderately high	Diphthongal destabilization	Slightly upward, with destabilization
Ra	[ɑ]	Significantly downward	Significantly downward	Slightly low	–	Maximally downward

Figure 3. Summary of vowel impact on pitch (from Neuerberg 2012, p. 44)

Considerations for Articulation

Another reason to incorporate vocalization in instrumental rehearsals is to address specific concerns about articulation. While vowel choice is pertinent in addressing timbre or intonational qualities, articulation is more influenced by consonants and syllables. For example, one might choose to use "too" instead of "loo" in order to convey a crisp articulation. A fascinating way to approach this idea is to flip the situation around by examining the way language characteristics and music interacts through vocal jazz improvisation, otherwise known as "scat." Scat singing is simply vocal improvisation with nonsense syllables in place of real words. Scat singers typically strive to emulate the technical accuracy and facility offered by the valves and keys of mechanical instruments (García, 1990), thus proving to have more similarities to instrumental playing than regular singing. By examining scat characteristics, it is clear that there is a parallel between the articulations in music and the natural word stresses that occur in normal conversation (Weir, 2015). Because the mechanics of articulation are similar between scat singing and instrumental playing, wind players can learn a lot from the common tendencies of scat. As an example of this, Weir (2015) points out that when approaching consecutive eighth note melodic lines, it is best to use paired syllables such as "doo-ya" to allow for a more fluid articulation, as opposed to singing singular syllables such as "doo doo doo," which would cause an awkward and sluggish attack (see figure 4). Some remedies for this issue are described in Figure 4 according to how a professional scat singer might articulate some sample rhythms. For example, to achieve a greater accent on the second of two eighth notes, one might choose to sing "da-ba." In contrast, if a more

legato articulation is desired for this same rhythm, a scat singer might choose the syllables “dee-va.”

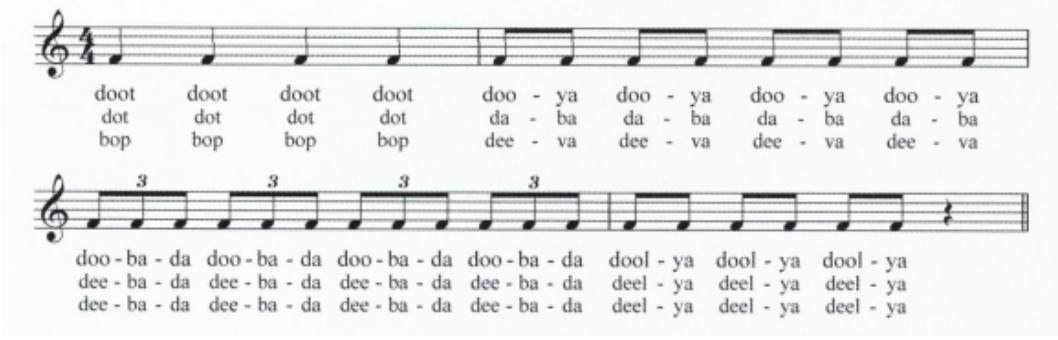

Figure 4. Example of scat syllables (From Weir 2015, p. 32)

García (1990) actually proposed a scat-inspired curriculum for jazz instrumentalists in which students are instructed to scat everything before they play it. His reasoning is that virtually all instrumentalists crave the lyricism and fluidity of vocal style, and the best way to emulate this is by simply experiencing it firsthand. Even outside of jazz pedagogy, the principles used by scat singers transfer well to improving articulation in any genre, and reflect the same vowel characteristics as previously mentioned. The difference is that in this scenario, vowels can affect articulation and note lengths as well. For example, the [I] vowel is used in the syllable “dit,” a common scat syllable. This conveys a significantly shorter note value than “bop” (which utilizes the [a] sound), which is also shorter than the commonly used “doo” (which uses an [u] vowel). With all of this in consideration, teachers must consider what specific consonants, syllables, and vowels to use when asking their students to sing before playing according to specific learning needs.

Psychological Benefits

Mind Body Awareness

Much emphasis has been placed on the physiological adaptations that take place when instrumentalists vocalize; however, the psychological benefits of vocalization are equally as important when considering implementing this strategy into instruction. In a study by Wallace (2014), instrumental students were tasked with joining a choral ensemble and comparing the experience to that of their normal instrumental ensemble rehearsals. Almost every student commented on how singing directly affected their approach to playing their instruments because it offered a heightened awareness of the physicality of music making. Wallace (2014) noted that classical instrumental music is often thought of as "cerebral" or "intellectual" music in that it tends to exist more in the mind than in the body. The results of this study indicated that the embodied experience of choral singing developed an increased sensitivity to the physical sensation of music making, which was directly transferable to instrumental playing.

Though helpful, regular participation in vocal ensembles outside of band is not a necessity in order to achieve its beneficial effects (Elliot, 1974). Vocalizing within the instrumental class can make just as much of a difference. Through developing more of an awareness of the physical aspects of instrumental music performance, including air support, good posture, and vocal tract manipulation, singing can provide students with a more holistic approach to music making. It further aids in developing more independent musicians, because students learn how to self-monitor their performances. In fact, by

comparing what they play to what they previously sang, students can recognize their own pitfalls in performance and gain direct physical feedback about what they need to do to make individual improvements.

Audiation

Lehmann, Sloboda, and Woody (2007) describe that expert teachers guide their students in a diagnostic process called goal imaging: the ability to mentally represent what a piece of music should sound like. Students use these mental representations to enable themselves to execute the physical responses needed to play their instruments, and to know how those movements feel (Lehmann, Sloboda, & Woody, 2007). One way that teachers like to provide opportunities for goal imaging is by modeling specific concepts for their students before they play, often by singing. This way, students have a mental representation for which to base their sound. However, when you ask the students to engage in vocalizing a specific concept themselves, the aural model shifts from the teacher to the student in a beneficial way. In order to properly execute the desired vocalization, students must come up with their *own* representations of what the musical concept should sound like. Furthermore, they are forced to mentally imagine what it would physically feel like (Keller, 2012). This specific type of goal imaging is known as audiation; the process of mentally hearing and comprehending music when sound is not physically present (Gordon, 1994). Audiation allows students to concentrate on the pitch they hear in their minds without being led astray by the physical characteristics of their instruments or limitations in technique (Dalby, 1999), which is possibly one of the most important and convincing arguments for vocalizing.

Some might argue that internalizing music is really the only benefit of vocalization; therefore, all students really gain from this process is audiation. If this were the case, students would receive the same benefit of listening to their teacher model parts for them as when having to sing it themselves. This is simply not true, because vocalization adds another process in addition to the process of audiation: it allows students to mentally hear the note before playing it, and *then* they can practice the physiological adaptations needed to make the note happen before actually attempting to play it on their instruments. This minimizes the need for trial and error practice, which in turn mimimizes the probability of developing encoding errors, or learned bad habits. In turn, learning becomes much more student-centered, and musicians develop an overall greater sense of autonomy.

Conclusion

With the majority of activity happening inside the body while performing, wind instrumentalists are at an extreme disadvantage when it comes to physiological control because they lack the ability to physically see the mechanisms they use to produce sound. As a result, wind instrumentalists often fall blind to the inner workings of the human body, restricting aural skill development and intonational accuracy. As teachers, it is our role and responsibility to make sure our students learn the skills necessary in becoming complete well-rounded and independent musicians. An easy way for us to remediate these common issues is by using vocalization as a strategy within the instrumental rehearsal. By using this practice strategy, students develop aural skills through audiation, physiological adaptations through voicing, heightened mind body awareness, and self-monitoring skills through mindfulness. Further, the skills acquired through vocalizing

will undoubtedly aid the wind instrumentalist in improving tone quality, intonation, and overall control of the instrument. Teachers might consider getting students to vocalize in simple ways to supplement rehearsals such as humming a tuning note, singing a Bach chorale, scatting a jazz lick, or chanting neutral syllables. Rehearsal time does not have to be wasted through inefficient rehearsal strategies with increasingly poor intonation as students layer their sounds in to tune a simple concert F. Regardless of the format, vocalization can be used in any way in order to avoid a nasty game of musical telephone.

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