THE EFFECT OF METAPHORIC-IMAGE, MOTION, AND A DUAL MODALITY APPROACH ON THE PERCEPTION OF VOCAL TONE

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DISSERTATION ABSTRACT

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The use of imagery and movement to affect vocal tone has long been a part of choral pedagogy. These often used, yet little explored tools, are employed by choral directors on all levels. The present study sought to determine if the use of imagery, metaphor, motion, and a combination of the three, as pedagogic tools to affect vocal tone, could be perceived by outline listeners. Three singers - an untrained singer, an undergraduate in choral music education, and a graduate student in vocal performance - were asked to perform a melody under a control and three research conditions: metaphoric-image, motion, and dual modality (a combination of metaphoric-image and motion). Participants were randomly assigned to listen to one of the three singers. Participants were asked to rate each condition on tone color, tension, and preference and were directed to ascribe a color to the tone they heard for each condition.

Results indicated that respondents could indeed perceive a difference in tone over the different conditions. For the metaphoric-image condition, the singers were asked to "sing the line as if it were yellow." Overall, respondents rated this tone brighter than any others across singers and conditions. The majority of respondents also ascribed the color yellow to the metaphoric-image tone across singers and conditions. Overall data

indicated that respondents rated the dual modality condition as darkest and most relaxed while the metaphoric-image condition was rated as brightest and most tense. These results were consistent with the expected pedagogic intent of the conditions as well as the researcher's hypothesis. A chi-square test performed on the color ascription data revealed statistical significance in the expectation of response. The data seem to indicate that specific color ascription to vocal tone is consistent across respondents and conditions.

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TABLE OF CONTENTS

Chapter Page

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

The use of imagery and movement to affect vocal tone has long been a part of choral pedagogy. These often used, yet little explored tools, are employed by choral directors on all levels (Jacobsen, 2004). "Breathe from your toes," "Sing from your eyes," and "Pretend there is an egg in the back of your throat," are a few phrases used by conductors during choral rehearsals. Even though breathing from the toes is physiologically impossible and the eyes do not emit sound, directors still choose to use these images. It is through imagery, metaphor, and motion that pedagogues attempt to build a scaffold of vocal pedagogic knowledge. The use of imagery, metaphor, and motion allow conductors to call on knowledge singers already possess and relate that foreknowledge to a voice physiology concept that singers may not be able to grasp through technical terms. These tools allow teachers of voice to, in a way, make the voice tactile.

An informal survey of 10 choral faculty members at academic institutions in the Pacific Northwest and the Southeast indicated that choral pedagogues would argue students do need to know the physiology of the singing process, however there must be a framework in place to support physiological concepts. This framework is built through the use of imagery and movement activities in rehearsal. Students are asked to call upon past experience and prior knowledge through the use of imagery, metaphor, and motion.

Anecdotal evidence would suggest this use of imagery and movement to affect vocal tone enjoys much success in the choral rehearsal. Empirical data suggests this is

likely when applied to teaching expression in musical performance (Woody 2002, 2003, 2006), but how the use of imagery, metaphor, and motion effect vocal tone and vocal development has yet to be examined empirically. Of further interest is the perception of the effects of imagery, metaphor, and motion on vocal tone and timbre. Though qualitative data suggests an effect is evident (Davidson & Correia, 2001; Davidson, 1989; Hibbard, 1994), researchers have yet to quantify the perception of the effect. In short, can the effect of the use of imagery, metaphor, and motion used as a pedagogic tool be discriminated by an outside listener/observer?

The findings of this study can inform the teaching of appropriate vocal technique, the use of creative thinking in the classroom, rehearsal effectiveness and efficiency, and imagery, movements, or the combination of the two being judged as appropriate or useful. The findings of this study substantiate with empirical data what has been a trend in choral music pedagogy for more than thirty years. The current literature even goes so far as to suggest that not only the director, but the students should be allowed to contribute to the use of imagery, metaphor, and motion in the classroom (Haack, 1982; Tait, 1992). This could have implications on student ownership of their own music making as well as pedagogic ideas taught in methods classes to future choral music educators. The same could be said for the methodologies taught concerning rehearsal effectiveness, efficiency, and the teaching of vocal pedagogy.

CHAPTER II

REVIEW OF LITERATURE

The Use of Imagery in the Choral Rehearsal

Choral pedagogues acknowledge that imagery and movement are used in choral rehearsals as tools to influence vocal tone, elicit expression, and foster appropriate vocal technique (Apfelstadt, 1985; Barten, 1998; Carter, 1993; Funk, 1982; Hibbard, 1994; Sheldon, 2004). Many respected pedagogues in music education advocate for this use of imagery and movement in rehearsal as well (Haack, 1982; Tait, 1992; Woody, 2002). Skadsem (1997) suggests "developing a wide vocabulary of metaphors, gestures, and exercises can help the conductor describe musical ideas to students."

Researchers have found that within choral rehearsals the use of creative verbal imagery plays an important role in the learning process (Funk, 1982). In the same study, Funk hypothesized that because music and verbal imagery share many characteristics, the latter could be a helpful rehearsal technique in the choral setting. It was observed that the use of verbal imagery pervaded all aspects of the rehearsal activity. This led to a theorization that because literal characterization of musical meaning is often impossible, figurative language becomes vital. Jacobsen (2004) identified thirteen categories of verbal imagery: articulation/articulators, breath management, diction, intonation, lifting the palate, posture, projection, resonance, tone quality, vibrato, volume, vowel formation. Funk also noted that musical style did not seem to be a limiting factor in the relation to the use of verbal imagery.

In a similar study, Barten (1998) concluded, "…metaphor does more than relay information. It also serves a clear rhetorical function, insofar as the instructor tries to

influence or persuade students through capturing their attention and imagination, making the experience memorable, and possibly getting students to accept the directive through humor." Barten compares music teachers to poets, encouraging them to speak "eloquently to each student's imagination." Woody (2002) suggests this use of figurative language that Barten advocates is "pedagogically effective because it can help students understand the music at a broader functional level."

Choral directors do not always seem to be aware of their use of verbal imagery during rehearsals though (Jacobsen, 2004). Nor does there seem to be a concrete method behind determining whether or not the use of verbal imagery was successful. Jacobsen reported, "…if an image elicited the tonal response the director desired, it was deemed useful and appropriate." Given a lack of empirical data, this raises the question: Is the imagery used actually eliciting a change in vocal tone or is the director simply perceiving a change given that he or she already has an idea of the sound the image is intended to produce? Kosslyn (1994) calls imagery an integral part of how perception operates. It is also this idea of perception of the function of an intangible (the vocal mechanism) that is at the core of using imagery in the choral rehearsal. Directors search for as many tools as possible to help singers understand the vocal mechanism, and for many, the use of verbal imagery seems to be a successful device.

This success is attributed, according to Sheldon (2004), to the brevity of using figurative language. Information can be communicated through imagery rather than lingo specific, complex physiological explanations. Sheldon also cites students' prior figurative language experience in non-music venues, as well as the opportunities for problem solving and transfer skills as key points to the perceived success of the use of

imagery in the choral classroom. Tait (1992) corroborates Sheldon's theory directing the choral pedagogue to call on students' own personal and past experiences by using a teaching vocabulary that makes use of imagery, metaphors, and analogies.

Along with the use of verbal imagery, the use of movement as a tool to affect vocal tone and to teach vocal technique has become quite prominent in choral rehearsals (Apfelstadt, 1985; Briggs, 2011; Hibbard, 1994). Hibbard's case study led to a grounded theory concerning the use of movement as an effective pedagogical tool in the choral rehearsal. The researcher found that movement is effective when: specific movements are developed that express the instructional purpose; promote rehearsal efficiency; provide a nonverbal communicative outlet; employ multi-model instruction; are properly performed by the majority of singers in order for the perceived effect to be successful. The researcher does contend that "it is beyond the scope of this research" to postulate as to why the use of movement seems to be an effect pedagogic tool in choral rehearsals and indicates that this is an area that needs further research consideration.

Other researchers have also investigated the importance of movement and kinesthetic imagery in rehearsals. Carter (1993) found that amongst a select group of professional singers the use of kinesthetic imagery was a common link in rehearsal pedagogy and the performance process. The author also reported that auditory and visual imagery were used in the teaching of singing and respondents reported the use of a combination of visual and kinesthetic imagery most frequently.

Imagery and Musical Expression

In recent years, researchers have taken up the task of qualifying and quantifying the pedagogy involved in teaching expression in music. Their investigations sought to reveal the best practices in teaching students how to perform expressively as well as defining expression itself. A common theme that has emerged from this research is the use of imagery, metaphor, and motion in the teaching of musical expression. Davidson's (1989) observation of a *yang ch'in* (a type of hammered dulcimer) lesson in China found that metaphor is "a necessary part of teaching musical performance." He notes that teaching expression through modeling alone is almost impossible and does not allow for the musical growth of the student. Combining pedagogies (modeling and metaphor) Davidson says, "…helps the student attain a multidimensional grasp of the music." Advocating using the modalities concurrently, the author suggests that this can create an "affective state within which the performer can attempt to match the model." Davidson notes time and time again how the instructor uses metaphor to elicit a more expressive performance from the student, calling it "critical to the lesson."

Most prolific in the research on music and expression has been the work of Robert Woody (see Woody, 2002 for an extensive review of literature concerning expression in music and the ways in which expression is taught and achieved during performance). Woody acknowledges a lack of research on expressive pedagogy and proposes that is may be the result of an aversion on the part of musicians and music pedagogues to the scientific study of emotion, expression, and aesthetics and how they are used and taught during the rehearsal process. Though this research seems to be spare, the data that has

been collected indicates that imagery, metaphor, and motion are an integral part of teaching musical expression (Woody, 2002).

Concerning the use of figurative language Woody states, "…such an approach is often promoted as more effective in eliciting musical expression from students than direct verbal strategies, which focus on the physical sound properties of performance." Though this approach is "often promoted" there seems to be little research to show that it is a more effect way of teaching expression in music. Of the studies cited, the only significant different was found in style (direct instruction or figurative language) preference among participants. Participants seem to favor the use of figurative language. Woody suggests this is because figurative language "helps students understand the music at a broader functional level."

Again, citing the limited research in this area, Woody states that this lack of study leaves a void in the understanding of how music teachers use movement and imagery in their teaching. One could argue that Woody's own research shows "how" teachers use movement and figurative language in a rehearsal setting and Woody cites many other studies on expression in music that document the use of movement and figurative language to achieve a musically expressive goal. What is not known, however, is whether or not the achieved objective can be perceived by a listener who has not experienced the movement or imagery used to "achieve" said goal.

In a continuation of his research concerning expressivity in music, Woody (2003) concludes that automatically applied performance conventions along with a specific, goal oriented performance plan, which included an imagery model "explained large proportions of the variance in performance [expressivity]." Woody goes on to state

findings of music psychologists who advocate for the use of imagery in the music classroom suggesting that it "allows aspiring musicians to develop the necessary cognitive skills or mental representations that support high-quality expressive performance." Woody's own research seems to indicate expressive performance is indicative of a performer's "explicit mental image of the desired performance."

Woody (2006) later went on to examine "…the extent to which musicians translate imagery into explicit plans for the sound properties of music." He found a curvilinear pattern that seemed to indicate imagery-based instructions elicited a more expressive performance from beginning musicians and experienced musicians, yet those in the middle tended to need more concrete descriptions. Regarding student preference, this study also found that over half (55%) of those studied preferred imagery- or metaphor-based instruction while only 8% indicated a preference toward direct instruction.

An earlier study (Lindström, E., Juslin, P. N., Bresin, R., and Williamon, A., 2003) seems to corroborate Woody's finding concerning preference. In asking students to rank which strategies they thought were most effective in teaching expression, the researchers found "use of metaphors" was ranked highest by 42% of the students, followed by 39% ranking "felt emotion" highest, and finally 25% ranking "aural modeling" the highest.

Imagery, Movement, and Pedagogy

According to Alexander Truslit's 1938 article *Gestaltung und Bewegung in der Musik* "inner motion" is the most essential characteristic of both music and music

performance. Trulit's article explores the "parallelism" between musical and bodily processes. The author's argument is that motion is the element that music has in common with all other experiences and living things. He calls this phenomenon *Bewegungsvorgiinge.* Trulit says, "Every *crescendo* and *descrescendo,* every *accelerando* and *decelerando,* is nothing but the manifestation of changing motion energies, regardless of whether they are intended as pure movement or as expression of emotion." He goes on to propose a system of whole body movement exercises to enhance the musical performance; exercises which he says should be used in the context of rehearsal but not in performance.

Almost thirty years later Brody (1953) theorized why it is that movement is so critical to learning music. The author outlines a 10-step system involving motion and body-awareness for parents to follow when teaching music to children. When singing or chanting, Brody says, the child is aware of his or her body movements; feeling tension, pressure, resistance or relaxation. This consciousness forms the basis of the awareness of different tones - high or low, loud or soft, clear or breathy, and resonant or strident the author says. "Soon the child not only feels the movements his body makes when he sings, but he begins to hear (beginning of conscious awareness) the sounds which those movements also make." In other words, the awareness of his or her body movements is what eventually makes the child aware of the "music" he or she is creating. Brody points out that infants make sounds, pitches, coos, and the like before they have the cognitive ability to imitate them. She proposes that this is because of the child's awareness of his or her on body movements. It is only after the child is aware of his "movement-sound" patterns that he or she begins to organize his or her movement-sounds to fit the patterns

of others (imitation). The child becomes aware of pitch through his or her own "body-movement-feelings," through seeing the muscle movements of his or her own body and those of others, and through hearing. Throughout this process, the author states, body movement awareness is crucial.

One cannot speak of movement and music pedagogy without referencing the work of Émile Jaques-Dalcroze. Though Dalcroze himself never did any empirical research on his method, many researchers and pedagogues after him have undertaken that task. In a review of the research on "…the bodily and brain basis of musical expression..." Seitz (2005) concludes "…Dalcroze was onto something essential to musical thought and expression" [referring to the Dalcrozian method of expressing music physically through movement]. Seitz traces this movement-music connection to infancy, citing Papousek's (1981, 1996) bodily-linguistic-musical matrix that links parent-infant interactions using bodily gesture that emerges into speech and musical sounds. These findings give credence to Brody's (1953) theory and are applicable to the work of Dalcroze, giving justification for the underlying structure of the Dalcrozian method: "…musical and bodily exercises serve to connect the hands, voice, limbs, and body with all of [the] core elements of music."

Seitz then turns his discussion toward current research on how music is processed in the brain. According to his own 2000 study, music activates the cerebellum, a motor structure, as well as other cognitive domains. He goes on to discuss other research that seems to indicate that there is no central music-processing center in the brain. There are, it seems, "…various areas of the brain [that] form a set of rings that process musical sound." Seeking to draw a connection between music and movement, the research of

Halpern (2001) is cited that says, “Recent evidence indicates that the supplementary motor area (SMA) may be the cerebral substrate for musical imagery indicating the close connection between music and movement.”

This current scholarship seems to confirm the validity of the pedagogic processes already being undertaken by music teachers and choral conductors. Carter (1993) found that “Kinesthetic imagery was found to undergird all aspects of training, performance, and teaching of singing.” Carter also reports that respondents frequently employed a dual modality of visual and kinesthetic imagery. Ebie (2004) gives empirical credence to this dual modality of teaching expression saying that vocal modeling, kinesthetic, and audio-visual treatments are “effective techniques for instructing students to perform melodies with appropriate emotional expression.” A Davidson and Correia (2001) case study seems to indicate that a performer’s awareness of his or her own body movements elicits a more expressive performance. Concerning the use of movement, the researchers conclude “…[the performer] could only really formulate a meaningful interpretation by finding out how the music felt within his body and how he related to it. He understood the nature of the musical language better for having felt the piece within his moving body.”

Efforts have even been made to incorporate movement exercises into undergraduate conducting curricula for the purpose of “developing the expressiveness of conducting students’ movements and gestures” (Orzolek, 1995). It was concluded that the incorporation of the experimental exercises did not detract from the experimental group's learning of basic conducting skills and may have enhanced the learning of basic skills by these subjects. Also, the researcher found that students perceive these exercises

as useful in terms of benefiting their own conducting skills and expressive ability. Research has also shown that employing a kinesthetic strategy to aid in the memory retention of musical excerpts significantly affected achievement (Taylor, 1989).

Imagery Research in Fields Outside of Music

Areas outside of music have also shown a great interest in the use of imagery, motion, and the dual modality of imagery-motion based instruction. In a study addressing flat-race horse jockey confidence, Callow and Waters (2005) found that "…because motor preparation/execution and kinesthetic imagery involve the same motor representation systems, then the experiences of an actual movement, and the kinesthetic imagery of that movement, have the potential to be similar." In a related study (Callow & Ross, 2010), researchers in the area of psychology of sport and exercise report "…experimental research has demonstrated the efficacy of imagery for the acquisition and performance of motor skills." They go on to cite empirical data that shows the factors that moderate this effect: the modality of the image, the visual imagery perspective used, and imagery ability. Also concluded is that imagery preference and imagery ability are strongly related. (Those who prefer the use of imagery for the acquisition of motor skills are also the ones who indicate a strong ability to imagine motor skill functions.) Data also shows that when performers are experienced at a task, the use of visual and kinesthetic imagery produced skill acquisition and retention benefits above those gained by visual imagery alone (Hardy & Callow, 1999).

The development of visuo-motor behavior rehearsal (VMBR) (Suinn, 1976) and its implementation have been shown to improve performance in free throw shooting,

karate, and pistol marksmanship (Onestak, 1997). Onestak, citing Suinn says "…VMBR training consists of three stages: (1) relaxing the athlete's body by means of a brief version of Jacobson's (1938) progressive relaxation technique; (2) mental practice related to the demands of the athlete's sport; and (3) using imagery to mentally practice a specific skill in a lifelike stressful environment." Of VMBR Suinn states, "I have also extended it to be applicable to talented normal people who wish to improve musical or athletic skills."

Imagery and the Brain

How the brain processes imagery and why it seems to have an effect on cognition and physical performance is a question that researchers have long studied. A relationship between brain activity and imagery has been established. Edmund (1932) found that when a subject was asked to imagine flexing the right forearm a galvanometer "ceases its steady course and engages continually or intermittently in relatively large swings" and then ceases to do so once the subject has been instructed to relax. Edmund found this to be true for the twenty subjects that were tested. In a related experiment subjects were asked to imagine lifting a ten-pound weight. Here too, electrical fluctuations of the biceps were detected. Though Edmund's methods have since come into question (Hall, 2001), it does not negate the fact that Edmund detected a neuromuscular response during subject imagination.

Imagery, as defined by Hall (2001), "…evokes the physical characteristics of an absent object that has been perceived in the past or may take place in the future." He goes on to cite research that seems to imply the notion that people have a "relatively good

understanding" of what imagery is and through an extensive review of literature on the matter, Hall discusses four different theories of how imagery works: Symbolic Learning theory (SLT), Psychoneuromuscular theory, Bioinformational theory, and Dual Coding theory. Symbolic Learning theory states "…actions are symbolically encoded as 'mental blueprints;' imagery strengthens the mental blueprint, enabling actions to become more familiar and possibly automatic." Addressing the problems of SLT Hall says that while it may account for the benefits of the use of imagery among novice performers, it does explain the relationship between imagery and improved performance...in experienced performers who have already mastered the skills…". Psychoneuromuscular theory, according to Hall, "…posits that imagined actions produce low levels of impulse through the nerves from the brain to the muscles, similar in nature to those produced during the actual physical execution of actions." However, Hall cites researchers who have suggested that these studies have lacked appropriate controls for the weaknesses in EMG testing. Hall says bioinformational theory may be the strongest explanation of how imagery works. "[This] theory holds that an image contains information about stimulus propositions and response propositions. The former transmit information about the imagined environmental stimuli; the latter relay information regarding behavioral activity. Because response propositions are modifiable and represent how an individual may react in a real-life situation, imaged response propositions can have a potent impact on subsequent overt behavior." Dual Coding theory's "…basic tenet…is that encoding information in both the action and language systems should produce better learning than encoding information in only one of the systems. As an example, a verbal mediator may prompt, via imagery, the performance of an action otherwise not remembered." (See Hall,

2001 for an extensive review of literature on each of these theories.) Each theory is presented here in limited detail in an effort to show that how the brain processes imagery is not yet understood, but each of these theories could have implications in the choral music classroom.

It has been shown that the use of imagery activates multiple parts of the brain (Handy, 2004). There is also evidence to suggest that imagined and executed actions share, to some extent, the same patters of activation for central structure in the brain, with variations resulting from differences in the complexity and type of motor sequences employed (Williamson, J. W., McColl, R. , Mathews, D., Mitchell, J. H., Raven, P. B., and Morgan, W. P., 1996). Wesp, R., Hesse, J., Keutmann, D., & Wheaton, K. (2001) provides a link between imagery and the use of movement to aid in recall. They found that participants gestured more when describing a picture from memory than when the picture was present at the time of description. The researchers argue "…spatial imagery serves as short-term memory function during lexical search and that gestures may help maintain spatial images."

Decety (1996) operationally defines the term "motor imagery" as "…a dynamic state during which a subject mentally simulates a given action." Decety goes on to say that this type of experience "…implies that the subject feels himself performing a given action." After assessing three sources of information (chronometric studies, rCBF, and autonomic measurements), it was concluded that the data was sufficient to support the idea that "…motor imagery shares the same neural mechanisms that are involved in motor control of actual actions." The author goes on to cite evidence that motor imagery has a significant effect on motor skill learning.

Kosslyn, perhaps the foremost authority on mental imagery gives this operational definition of mental imagery: "…in our usage, a mental image occurs when a representation of the type created during the initial phases of perception is present but the stimulus is not actually being perceived; such representations preserve the perceptible properties of the stimulus and ultimately give rise to the subjective experience of perception." Kosslyn (2006) serves as justification for the notion that the brain depicts representations literally. Kosslyn (1994) argues that "…imagery is an integral part of how perception operates." It is the idea of perception of the function of an intangible (the vocal mechanism) that is at the core of using imagery in the choral rehearsal.

Metaphor: Philosophy, Research, and Clinical Usage

The present study uses aspects of how imagery is processed in the brain and the philosophical argument for the use of imagery and metaphor as it occurs in everyday life. In their book Metaphors We Live By, George Lakoff and Mark Johnson argue "metaphor is pervasive in everyday life." This pervasiveness goes beyond our use of language and extends into our thoughts and actions, according to Lakoff and Johnson - perhaps the foremost researchers and philosophers on the use of metaphor today. "[M]etaphor," they say, "pervades our normal conceptual system. Because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (the emotions, ideas, time, etc.), we need to get a grasp on them by means of other concepts that we understand in clearer terms (spatial orientations, objects, etc.). This need leads to metaphorical definition in our conceptual system." This idea of making the abstract clearer is at the heart of the research project at hand. In an attempt to make the abstract

mechanism of the voice clearer, conductors use metaphoric-images (this term is detailed below) to help singers "grasp" concepts of the singing process that are not tactile. "...[M]etaphor is not merely a matter of language. It is a matter of conceptual structure. And conceptual structure is not merely a matter of the intellect -- it involves all the natural dimensions of our experience, including aspects of our sense experiences: color, shape, texture, sound, etc. These dimensions structure not only mundane experience but aesthetic experience as well."

Turning to metaphors "outside our conventional conceptual system," (i.e. those used in the choral rehearsal) Lakoff and Johnson say, "[These] metaphors are capable of giving us a new understanding of our experience. Thus, they can give new meaning to our pasts, to our daily activity, and to what we know and believe." The philosophers label these metaphors as "imaginative" and "creative." These "imaginative" and "creative" metaphors used in the choral rehearsal are thought to help singers connect conventional conceptual systems with the more abstract reality of the singing process. Concerning this connection, Lakoff and Johnson say, "...metaphor is, in general, not based on similarity...Instead, it is typically based on cross-domain correlations in our experience, which give rise to the perceived similarities between the two domains within the metaphor."

These ideas about the pervasiveness of metaphor in everyday life have been developed into a form of psychotherapy. “Metaphor Therapy describes a theory and method that identifies metaphor as a powerful source of insight and change in psychotherapy.” (Kopp, 2001) This system of therapy allows clients to “use their imaginations for creative problem solving;” the same issue at hand in making the voice

tactile. Kopp argues that metaphors integrate two cognitive modalities: propositional/syllogistic cognition and imaginal/sensory-affective processing – the same cognitive modalities that Robert Woody cites in his research on the expressive performance of music. For a review of research literature on the metaphor and cognition, see Kopp, 2001.

According to Siegelman (1990) metaphor making is "the imaginative act of comparing dissimilar things on the basis of some underlying principle that unites them – [it] is one of the ways we construct new reality. By its very nature, metaphor combines what is already known in a new way to produce a new thing not yet fully understood." In defining important characteristics of metaphor usage Siegelman states, "[Metaphors] combine the abstract and the concrete in a special way, enabling us to go from the known and the sensed to the unknown and symbolic."

Combining Siegelman's working definition of metaphor, Lakoff and Johnson's philosophical writings on the subject, and an in-person interview with Mark Johnson, the term "metaphoric-image" (see *Definitions* below) was chosen to best describe the type of imagery usage that goes on in a choral rehearsal. Arguing for metaphoric-image transfer in an analysis of Lakoff and Johnson (1980), Schmitt (2005) states, "As a rule metaphors transfer their image structure from straightforward and *gestalt*-like experiences (e.g., height and depth) to complex, taboo, or new subject matters…The sources of these images are often physically experienced dimensions or simple courses of events whose elementary parts can be used as models." A synthesis of the ideas of Lakoff and Johnson, Siegleman, and Schmitt lead to the operational definition of metaphoric-image used in the present study.

CHAPTER III

RESEARCH QUESTION AND DEFINITIONS

What is the effect of selected metaphoric-image and movement prompts on perceptions of vocal tone among musicians? Specifically, this study examined if musical examples produced under varying metaphoric-image and movement conditions affect perceptual ratings, preference, and discrete color associations among musicians.

This investigation sought to uncover if an effect on vocal tone could be perceived after a metaphoric-image, movement, or dual modality (a combination of a metaphoric-image and movement) treatment condition has been applied.

A second research question sought to investigate the extent to which respondents could correctly identify the color (yellow) used during the metaphoric-image experimental condition: Can respondents perceive the color yellow when ascribing colors to the tone heard during the metaphoric-image condition? The researcher's hypothesis states that the respondents would perceive the tone color as "yellow" during the metaphoric-image condition.

Definitions

Motion - any movement, performed by the singer, to elicit a change in vocal tone or timbre. The term *kinesthetic* implies an awareness of the body in relation to motion.

Mental image - "…a mental image occurs when a representation of the type created during the initial phases of perception is present but the stimulus is not actually being perceived; such representations preserve the perceptible properties of the stimulus and ultimately give rise to the subjective experience of perception." (Kosslyn, Thompson, & Ganis, 2006)

Metaphoric-image – a metaphoric-image attempts to combine an image, more specifically previous knowledge, with a metaphor. This statement is then juxtaposed with a more abstract concept - vocal pedagogy/vocal physiology - in an effort to relate the two, thus producing an affected vocal tone.

ex. This phrase is yellow. Would you sing it that way?

Image – the color yellow

Metaphor – ascribing a color (yellow) to a music phrase

Abstract concept – the manipulation of the vocal mechanism such that a bright tone is produced.

Dual Modality - The use of a metaphoric-image along with a physical movement to affect vocal tone or achieve a vocal pedagogic purpose.

CHAPTER IV

METHODOLOGY

In order to examine the conditions under consideration (i.e. – the effect of metaphoric-image, movement, or dual modality on vocal tone), stimulus recordings were prepared using three singers: a graduate student in vocal performance, an undergraduate choral music education major, and an untrained singer from a major university in the Pacific Northwest. Each singer was a baritone to control as much as possible for timbral effect. Each singer was asked to sing a passage under three experimental conditions: imagery, motion, and dual modality, as well as a control condition. To account for retention effect, the order in which the conditions were applied was randomly varied. This design was carried out three times for a total of 12 different stimulus recordings with three different singers. See Figure 1.

		C O N D I T I O N S			
		Control	**Metaphoric-Image**	**Motion**	**Dual Modality**
S I N G E R S	**GRADUATE**	C_G	I_G	M_G	D_G
	UNDERGRAD	C_U	I_U	M_U	D_U
	UNTRAINED	C_T	I_T	M_T	D_T

C=Control, I=Metaphoric-Image, M=Motion, D=Dual Modality
G=Graduate Singer, U=Undergraduate Singer, T=Untrained Singer

Figure 1 - Stimulus Recordings

The three singers, chosen because they had not previously worked with the researcher, were taught, by a research assistant, the opening eight-measure solo line of "Homeward Bound" arranged by Jay Althouse (1996). This solo was chosen based on the recommendation of three choral music pedagogues, who deemed the solo line of appropriate technical merit to showcase the vocal tone quality of both trained and untrained singers. Solo singers were chosen rather than a choral ensemble in an effort to eliminate certain confounding variables. As it is difficult to measure each singer's level of response to a given directive in a corporate setting, solo singers were used to make the stimulus recordings for this study. It would have been impossible for the researcher to determine with any certainty as to whether or not the research conditions or the

surrounding variables: other singers, rehearsal space distractions, ability to understand the directive, were causing any change in tone.

The initial teaching of the melody was devoid of imagery, metaphor, or motion terminology. The session served to teach the notes and rhythms to the singers in a controlled environment. After learning the pitches and rhythms of the melody, singers were escorted, one at a time, into a recording studio. A research assistant was present in the recording studio to record each participant's response to given directives. Singers were recorded in a sound proof room using a Zoom® digital audio recorder. Responses to the following directives were recorded:

Control: Singers read the following statement:

> Please read the entire directive before performing any part of it.
>
> After giving yourself the starting E, please sing the opening solo of "Homeward Bound."
> Repeat the previous step.

Metaphoric-Image: Singers read the following statement:

> Please read the entire directive before performing any part of it.
>
> After giving yourself the starting E, imagine that the opening solo of "Homeward Bound" is the color yellow. Keeping that in mind, sing the opening solo.
>
> Sing the line again, still imagining it to be yellow.

Motion: Singers read the following statement:

> Please read the entire directive before performing any part of it.
>
> After giving yourself the opening E, raise your arms perpendicular to your body at chest level. As the melody rises, move your arms outward. As the melody falls, move your arms inward. From this position, sing the opening solo to "Homeward Bound."

> Sing the passage again, this time imagining the motions you just performed but not physically performing them.

Dual Modality: Singers read the following statement:

> Please read the entire directive before performing any part of it.
>
> After giving yourself the opening E, imagine you are standing in front of a very large tree. Wrap your arms and one leg around this tree. While holding the tree, sing the opening solo of "Homeward Bound."
> Sing the passage again, this time imagining the motions you just performed but not physically performing them.

From the singers' second attempt responses, stimulus recordings were made using Audacity sound editing software:

Recording I – C_G, I_G, M_G, D_G
Recording II - C_U, I_U, M_U, D_U
Recording III - C_T, I_T, M_T, D_T

Second attempts were chosen because the motion condition required that singers perform first while executing the described motion (see above) then again while imagining performing the motion. In an effort to keep each of the testing conditions consistent, singers performed each condition twice and both attempts were recorded. The second attempt was used in creating the stimulus tapes.

To account for order effect, each recording had four different derivations. See Figure 2.

	Recording I (Graduate Singer)	Recording II (Undergraduate Singer)	Recording III (Untrained Singer)
Track Order 1	C_G, I_G, M_G, D_G	C_U, I_U, M_U, D_U	C_T, I_T, M_T, D_T
Track Order 2	I_G, D_G, M_G, C_G	I_U, D_U, M_U, C_U	I_T, D_T, M_T, C_T
Track Order 3	D_G, M_G, C_G, I_G	D_U, M_U, C_U, I_U	D_T, M_T, C_T, I_T
Track Order 4	M_G, C_G, I_G, D_G	M_U, C_U, I_U, D_U	M_T, C_T, I_T, D_T

C=Control, I=Metaphoric-Image, M=Motion, D=Dual Modality
G=Graduate Singer, U=Undergraduate Singer, T=Untrained Singer

Figure 2 – Stimulus Recordings by Track Order

Students who participated in courses taught at the University's music school were recruited to participate in the study. The researcher solicited participation from the university's large choral ensembles (n = 5), the university's large instrumental ensembles (n= 2), and from graduate and undergraduate courses taught during the Spring term (n = 4).

Large choral ensembles consisted of the University's 100-voice, non-auditioned, SATB chorus, a 35-voice, SATB, lab chorus for graduate students in conducting, the University's top undergraduate, auditioned, SATB ensemble of fifty-five voices, the auditioned Women's Choir, and the University's most elite auditioned, SATB ensemble of twenty-nine voices. Instrumental ensembles included the University's orchestra and wind ensemble. Participation was also solicited from students enrolled in the undergraduate choral methods, voice techniques, and music fundamentals courses. Students in graduate courses in conducting, research in music, and a Renaissance music history survey course were asked to participate in the study as well. The researcher also

requested participation from the members of two local church choirs made up of volunteer singers.

Each ensemble director and classroom teacher was contacted and a request to speak to the students enrolled in each course, during class time, to recruit participants for the study was made. Upon approval, the researcher spoke to each ensemble/class in an effort to recruit participants for the research study. The researcher explained that participation in the study would only take about five minutes. It was also explained that participation in the study did not positively or negatively affect the participant's grade. Potential respondents were told they would be listening to a few recordings and giving opinion responses to each. They were assured that respondents' personal or identifying information would not be associated with their answers and rules of complete anonymity would be followed. A sign-up form was then left with each ensemble/class and then collected by the researcher. Emails were sent to interested participants to schedule a lab appointment.

Respondents ($N = 120$) entered a research lab free of noise distractions. Each was randomly assigned a stimulus recording (see Figure 2) to which to listen. In an effort to ensure random assignment, the researcher printed one hundred twenty copies of the Respondent Data Form (RDF) (see Appendix A). Each was coded with a specific recording and track. To ensure equal numbers, forty RDFs were coded for each recording and then ten RDFs from each recording were coded for each of the four track orders for each recording. After coding, the RDFs were shuffled by the research assist such that they were in random order. This random assignment ensured that each respondent only heard one singer (the graduate singer, undergraduate singer, or untrained

singer) under each of the conditions (control, metaphoric-image, motion, and dual modality) and that forty respondents were assigned to each singer. Of the forty respondents assigned to each singer, ten listened to each of the four track orders for the singer to which they were assigned. Respondents were given the RDF on the top of the shuffled stack in the order in which they entered the lab. After reading and verbally agreeing to a statement of informed consent (see Appendix B), respondents sat at a desk and were directed to listen to the following script as read by the researcher:

> You are going to listen to a recording that has a total run time of just over three minutes. On the recording, there are four tracks. Each track is approximately 28 seconds long and there are 25 seconds of silence after each track. Using this response form, please respond to each track. Using a Likert-type scale, you are rating each track on tension, tone color, and preference. You will also be ascribing a color to each tone that you hear. The prompt is the same for each track. Once I have started the recording you may not stop it nor may you listen to any track more than once. There will be a verbal prompt before the beginning of each track. Do you have any questions?

Respondents were instructed to put on the headphones and were shown volume adjustment controls. AKG K-99 Natural Sound headphones were used. Recordings were in Mp4 format and played on an iMac computer using the QuickTime Player version 10.1 (501.5). The researcher started the recording and allowed the respondents to listen and respond to each track. After submitting the completed RDF, numeric and color answers were compiled in SPSS statistics software.

Research Instrument

In order to solicit responses to variables as stated in the research questions, the investigator created a form that included statements accompanied by Likert-type and discrete measure of response. To ascertain participants' perceptions of tone color, the statement "After listening to each track, rate the following aspects of vocal tone: Tone Color," was listed along with a Likert-type scale ranging from one (dark) through ten (bright). Respondents were then asked to rate "tension" on a Likert-type scale from one (tense) through ten (relaxed). To ascertain color ascription data, respondents were asked, "Which of the following colors would best describe the vocal tone heard? Choose One: Red, Blue, Yellow, Green, Purple, Orange, Other _____." It was explained to respondents that they could enter another color of their choosing in the blank beside "Other" should they so choose. Respondents were then asked to rate their preference for the tone on a Likert-type scale from one (did not like) through ten (liked). This process was repeated for all four tracks. Primary and secondary colors were chosen to remain consistent with research in the fields of color association, perception, and preference (Birren, 1978; Madden, et. al., 2000; Schaie, 1961).

Additionally, demographic variables were solicited from each participant. Respondents were asked if they were enrolled in the University, and if so, to indicate their status – graduate or undergraduate. They were also asked to indicate where or not they were a music major. Years of private voice study was also a collected data point, as well as whether or not the respondent had ever participated in a choir. Age and sex data were also collected under an "optional" heading.

CHAPTER V

RESULTS

The subsequent section includes results from analyses of all variables assessed in the questionnaire. First, demographic data is presented, followed by means and standard deviations for Likert-type responses for questions dealing with perceptions of tone color, tension, and preference among respondents. This section is followed by frequency as well as inferential analyses of data relating to discrete color associations given by respondents under various conditions. Finally, inferential analyses are provided for means and standard deviations associated with perceptions of tone color, tension, and preference in respect to singers' experience level as well as sequence of stimulus presentation.

Demographics

Participants (N = 120) in this study included 46.7% males (n = 56) and 52.5% females (n = 63), 94.2% (n= *113)* of whom had participated in choir and 52.5% (n = 63) that had taken voice lessons. 61.7% (n = 74) of the participants were undergraduates. Participants' ages ranged from 18-53 years with a mean age of 24 and a mode of 21. All demographic data is included in Table 1.

Table 1

Demographic Data for Participant Sample (*N* = 120)

Category	*N*	Percentage of Sample
Academic Status		
Graduate	34	28.3%
Undergraduate	74	61.7%
Not Applicable	8	6.7%
No Reply	4	3.3%
Major		
Music	79	65.8%
Other	41	34.2%
Voice Study		
Yes	63	52.5%
No	57	47.5%
Choir Participation		
Yes	113	94.2%
No	7	5.8%
Gender		
Female	63	52.5%
Male	56	46.7%
No Reply	1	0.8%

Descriptive Results of Likert-type Responses

Means and standard deviations of participants' responses for questions dealing with perceptions of tone color, tension, and preference were calculated for each group of

singers (untrained, undergraduate, and graduate) by condition (control, imagery, motion, and dual modality). A summary of the analysis is included in Table 2.

Means for the untrained singer indicated that the highest value was for the metaphoric-image condition (M = 7.80) and the lowest value for the dual modality (M = 3.23) on a 1 (darkest) – 10 (brightest) Likert-type scale. For the untrained singer, respondent data indicated that means for the dual modality condition were highest overall, reflecting the "more relaxed" end of the proposed spectrum (M = 7.05). Overall means for preference were highest during the dual modality condition (M = 7.10) for the untrained singer.

The highest mean for brightness for the undergraduate singer was during the metaphoric-image condition (M = 5.94), but only slightly brighter than the control condition (M = 5.59). Tension means for the metaphoric-image condition for the undergraduate singer were also rated highest (M = 5.75) than the other conditions. Descriptive analysis also showed that the means for preference during the dual modality condition was highest for the undergraduate singer (M = 7.55).

For the graduate singer, means for brightness were highest during the motion condition (M = 5.70), while the metaphoric-image condition had the highest tension rating (M = 4.53). Respondents rated the motion condition slightly higher (M = 5.91) for the graduate singer.

Table 2

Overall Means and Standard Deviations for Perceptions of Tone Color, Tension, and Preference by Singer (Untrained, Undergraduate, Graduate) and Condition (Control, Imagery, Motion, Dual Modality)

Singer	Control		Imagery		Motion		Dual Modality	
	M	SD	M	SD	M	SD	M	SD
Untrained (n = 40)								
Tone Color	6.13	1.65	7.80	1.76	5.75	1.06	3.23	1.23
Tension	5.20	1.98	5.33	2.38	6.00	1.62	7.05	1.89
Preference	4.93	1.99	4.50	2.42	6.08	1.56	7.10	2.39
Undergrad (n = 40)								
Tone Color	5.59	1.53	5.94	1.42	4.79	1.45	4.50	1.60
Tension	6.25	1.75	5.75	1.60	6.28	1.87	6.50	1.84
Preference	6.60	1.75	6.04	1.40	6.96	1.67	7.55	1.40
Grad (n = 40)								
Tone Color	4.20	1.52	5.28	1.63	5.70	1.96	4.95	1.91
Tension	5.40	1.75	4.53	1.62	5.70	2.02	5.18	2.13
Preference	5.10	2.00	4.29	1.55	5.91	1.87	5.51	2.17

Analyses of Color Associations

The subsequent section is an analyses of means and standard deviations for Likert-type responses that includes overall frequency data, followed by inferential analyses of color ascription data by singer using a chi-square.

Overall color frequency data indicated that yellow was chosen most often for the metaphoric-image condition (n = 28) with orange chosen the second most often (n = 26) across all three singers. Bright colors (red, yellow, orange), overall, were chosen 54% of the time (n = 65) across all three singers in the metaphoric-image condition. 69% of the time, respondents chose a darker color (green, blue, purple) for the dual modality condition (n = 83) across singers. Table 3 shows all responses to the color ascription prompt.

Table 3

Overall Frequency of Respondent Color Choice (N = 120)

Color	Control	Imagery	Motion	Dual Modality
Red	7	11	6	11
Orange	15	26	17	9
Yellow	24	28	22	9
Green	23	19	21	14
Blue	22	21	25	34
Purple	21	10	22	35
Other	8	5	7	8

A χ^2 analysis of overall color frequency data revealed a statistically significant difference in expectation of frequency of response in all conditions. However, the dual modality condition carried the highest chi-square value in the analysis. Table 4 shows the χ^2 results for the overall frequency of color response for each condition. This data shows that the distribution of responses was not as expected making it statistically unlikely that the color association values were randomly distributed. For the metaphoric-image

condition, the condition in which the singer was asked to sing the line yellow, respondents chose yellow most often. The majority of responses, across singers, in this condition are centered around the brighter colors of yellow and orange.

Table 4

χ^2 for Overall Frequency of Color Response

Condition	χ^2	*df*	*p* =
Control	18.13	6	.006
Metaphoric-Image	26.30	6	.000
Motion	20.47	6	.002
Dual Modality	50.57	6	.000

Color frequency data analyzed by singer indicated that, for the graduate singer, orange was chosen 28% of the time (n = 11), while yellow was chosen 8% of the time (n = 3) for the metaphoric-image condition. Brighter colors (red, orange, and yellow) were chosen 45% of the time (n = 18), while darker colors were chosen 53% of the time (n = 21) for the same condition. Results were equally as divided for the motion and dual modality condition responses. Table 5 shows the frequency of respondents' color choices for the graduate singer.

Table 5

Frequency of Respondent Color Choice (N = 40) for the Graduate Singer

Color	Control	Imagery	Motion	Dual Modality
Red	4	4	5	4
Orange	3	11	6	6
Yellow	1	3	10	7
Green	10	6	6	3
Blue	8	9	3	10
Purple	10	6	7	8
Other	4	1	3	2

A χ^2 analysis of color responses for the graduate singer indicated only a slight statistically significant difference in the control condition ($\chi^2 = 13.55$, $df = 6$, $p = .035$). In all other conditions, a χ^2 analysis revealed no statistically significant differences in expected frequency of responses. As with the overall results, the data for the metaphoric-image condition clusters around brighter colors, in this case, orange, a color closely related to yellow.

Color response data for the undergraduate singer during the metaphoric-imagery condition showed that yellow and orange were chosen by the same number of respondents (n = 7). Yellow only accounted for 17.5% of responses while brighter colors were chosen 50% of the time (n = 20). Blue (n = 12) and purple (n = 10) accounted for 55% of the responses for the motion condition while darker colors (green, blue, purple) (n

= 30) accounted for 75% of responses under the dual modality condition. Table 6 shows the frequency of respondent color choice for the undergraduate singer.

Table 6

Frequency of Respondent Color Choice (N = 40) for the Undergraduate Singer

Color	Control	Imagery	Motion	Dual Modality
Red	1	6	0	5
Orange	4	7	4	2
Yellow	12	7	9	1
Green	5	12	5	6
Blue	10	5	12	14
Purple	6	2	10	10
Other	2	1	0	2

A χ^2 analysis revealed statistically significant differences in expected frequency outcomes for the all conditions. For the undergraduate singer, metaphoric-image data clustered around the color green while the control condition had clusters around yellow and blue indicated that while expect results were statistically significant, they did not conform to the researcher's hypothesis that respondents could perceive the color yellow within the metaphoric-image condition with the undergraduate singer. Table 7 shows the χ^2 results for the frequency of color response for the undergraduate singer for each condition.

Table 7

χ^2 for the Frequency of Color Response for the Undergraduate Singer

Condition	χ^2	*df*	*p* =
Control	17.05	6	.009
Metaphoric-Image	13.90	6	.031
Motion	23.65	6	.001
Dual Modality	24.05	6	.001

Respondent color choice data for the untrained singer reveal that 45% of respondents (n = 18) chose the color yellow for the metaphoric-image condition. 70% of respondents chose a brighter color for that same condition. For the dual modality condition, 42.5% of respondents chose purple (n = 17) and 80% of respondents (n = 32) chose a darker color. Table 8 shows the frequency of respondent color choice for the untrained singer.

Table 8

Frequency of Respondent Color Choice (N = 40) for the Untrained Singer

Color	Control	Imagery	Motion	Dual Modality
Red	2	2	1	2
Orange	8	8	7	1
Yellow	11	18	3	1
Green	8	1	10	5
Blue	4	6	10	10
Purple	5	2	5	17
Other	2	3	4	4

A χ^2 analysis revealed statistically significant differences in expectation of frequency of respondent color choice in the metaphoric-image and dual modality conditions. For the untrained singer this statistical significance clusters around the color yellow. Table 9 shows the χ^2 data for the frequency of color response for the untrained singer.

Table 9

χ^2 for the Frequency of Color Response for the Untrained Singer

Condition	χ^2	*df*	*p* =
Control	12.15	6	.059
Metaphoric-Image	37.35	6	.000*
Motion	12.50	6	.052
Dual Modality	36.30	6	.000*

Inferential Analyses of Perceptions by Track Order and Singer Experience

The subsequent analyses take into account possible interaction effects between means associated with each perceptual condition in relationship to each singers' experience level as well as order of stimulus presentation. Several repeated measures factorial analyses of variance tests were conducted, yielding a number of significant interaction effects. The results are presented below.

The effect of track order and singers' experience level (graduate, undergraduate choral music education major, and untrained singer) on the perceptions of tone color under four conditions (control, metaphoric-image, motion, and dual modality) was examined. A 4x3 repeated measure factorial ANOVA revealed that sphericity assumptions were violated, so Greenhouse-Geisser corrections were used for further analysis. Testing revealed significant interaction effect between singer and tone color, Greenhouse-Geisser adjusted $F(5.58,301.49) = 20.653$, $p < .05$, $\eta_p^2 = .227$. Also found was a significant interaction between track order and tone color, Greenhouse-Geisser adjusted $F(8.375, 301.49) = 2.88$, $p < .05$, $\eta_p^2 = .074$. All other analyses did not yield significant differences.

Concerning interactions between singer and tone color, noticeable interactions occurred for perceptions of tone color between the three singers. For the imagery and control conditions, means were higher for both the undergraduate and untrained singer compared to the graduate singer. For the dual modality condition, means were relatively low overall, but decreased noticeably for both the undergraduate and untrained singer compared to the graduate singer. Finally, means for motion were relatively similar for the graduate and untrained singer, but lower for the undergraduate singer. See *Figure 3*.

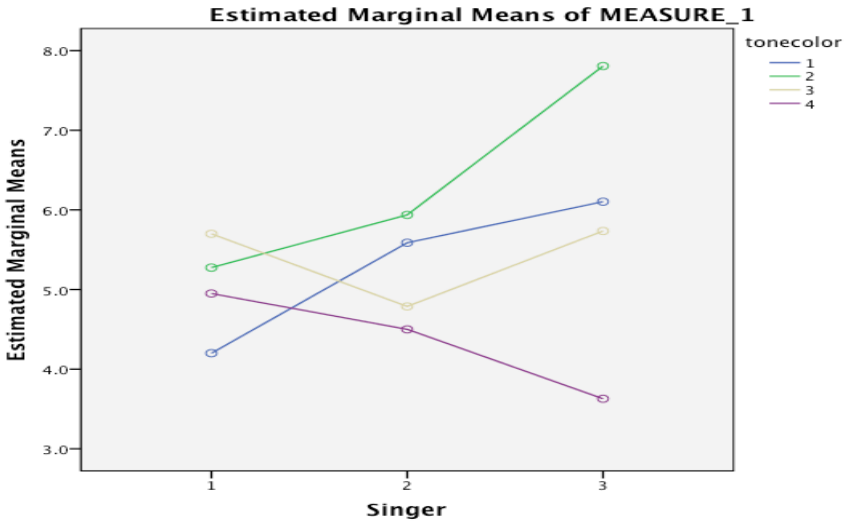

Figure 3 – Interactions between Singer and Tone Color

Interactions between track order and tone color revealed that no matter the track order, overall means for the imagery conditions were higher (brighter) than over all means for all other conditions. The overall means of the dual modality condition were consistently rated lower (darker) than all other conditions. Overall means for the motion and the control conditions were relatively similar across track order.

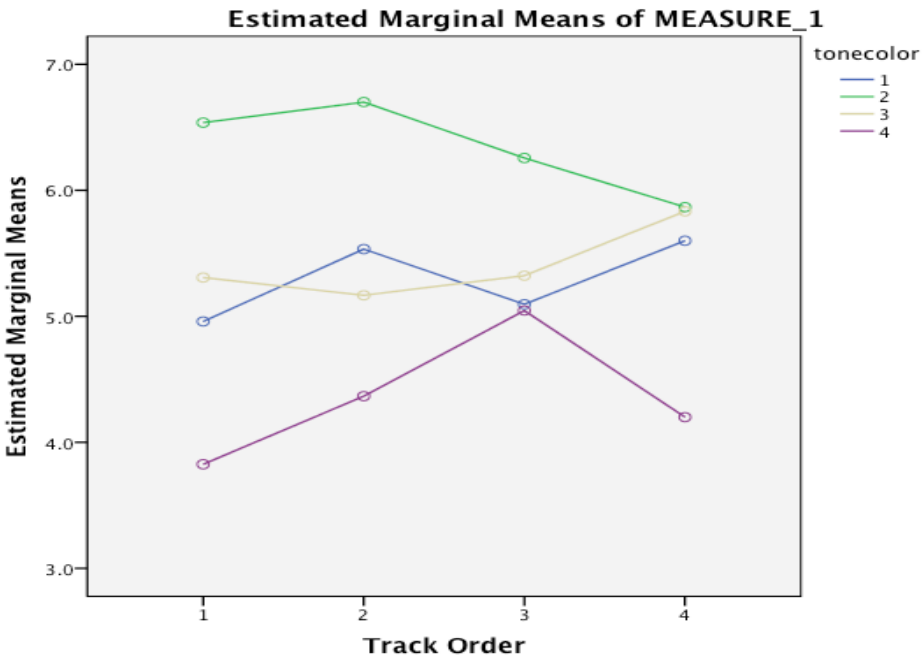

Figure 4 – Interactions between Track Order and Tone Color

The effect of track order (N = 4) and singers' experience level (graduate, undergraduate choral music education major, and untrained singer) on the perception of tension under four conditions (control, metaphoric-image, motion, and dual modality) was examined using a 4x3 Repeated Measures Factorial ANOVA. Testing revealed that sphericity assumptions were violated, so Greenhouse-Geisser corrections were used for further analysis. Significant interactions effects were found between singer and tension, Greenhouse-Geisser adjusted $F(5.52, 295.54) = 2.89$, $p < .05$, $\eta_p^2 = .051$. All other analyses did not yield significant differences.

Across conditions, overall means were higher (more relaxed) for the undergraduate singer than for the graduate or trained singers. The dual modality condition's over all means were highest for the undergraduate and untrained singers while the motion condition's overall means were highest for the graduate student. Overall means of the imagery condition revealed a perception of the most tension from

the graduate and undergraduate singers during that condition. However, overall means for the untrained singers showed relatively little difference between the imagery and control conditions.

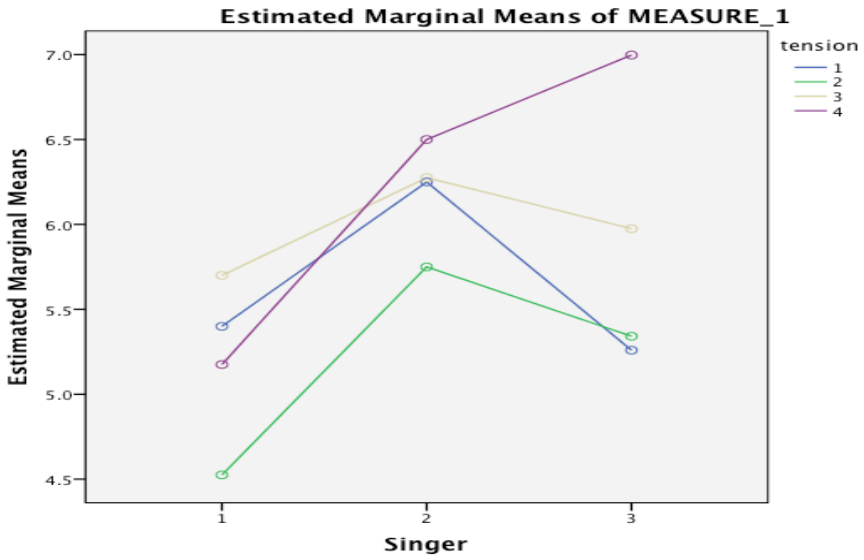

Figure 5 – Overall Means based on Condition and Singer

The effect of track order (N = 4) and singers' experience level (graduate, undergraduate choral music education major, and untrained singer) on the perception of preference under four conditions (control, metaphoric-image, motion, and dual modality) was examined using a 4x3 Repeated Measures Factorial ANOVA. Testing revealed that sphericity assumptions were violated, so Greenhouse-Geisser corrections were used for further analysis. Significant interactions effects were found between track order and preference, Greenhouse Geisser adjusted $F(7.89, (?)) = 1.97$, $p < .05$, $\eta_p^2 = .053$. All other analyses did not yield significant differences.

Overall means were highest in all conditions for the undergraduate singer. Overall means were lowest during the imagery condition for all singers and highest during the dual modality condition for the undergraduate and untrained singer.

Preference means were slightly higher under the motion condition for the graduate singer. The graduate singer, under the imagery condition had the lowest mean, while the undergraduate singer, under the dual modality condition, had the highest mean.

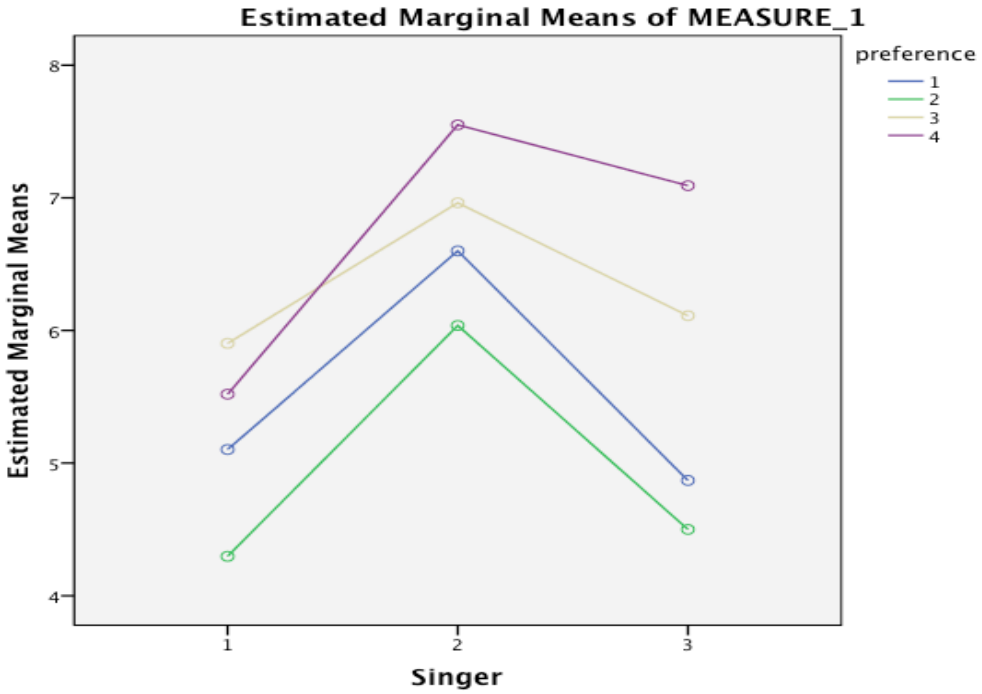

Figure 6 – Interactions between Track Order and Singer Experience Level

Data indicated a track order effect for the rating of preference. For track order 1 (control, imagery, motion, dual modality) and track order 2 (imagery, motion, dual modality, control) overall means indicated that the undergraduate singer was rated higher in all conditions than the other two singers. Relatively little difference in means were found for the control, motion, and dual modality conditions for the undergraduate singer in both track orders 1 and 2. For tracks 1, 2, and 3, the undergraduate singer received the lowest overall means for the imagery condition. However, in track 4 the undergraduate received the lowest overall means for the control condition. Overall preference means

were consistent across track orders 1, 2, and 3 (motion, dual modality, control, and imagery) for the untrained singer. Track 4 (dual modality, control, imagery, motion) had relatively little difference in means for the control and dual modality conditions with the highest mean being the motion condition for the untrained singer. For the graduate singer, the lowest overall preference mean (imagery) in track 3 was higher than the highest overall preference mean (motion) in track 1. Preference means were reactively consistent over tracks 1 and 2. Track 3 saw very little change in conditional means between the graduate and undergraduate singers, while the means for the untrained singer were more consistent with those of tracks 1 and 2. Track 4 showed the narrowest difference in mean between conditions for the untrained singer, while the difference in means for each singer under each condition was more consistent for tracks 1, 2, and 3. See Figures 7, 8, 9, and 10.

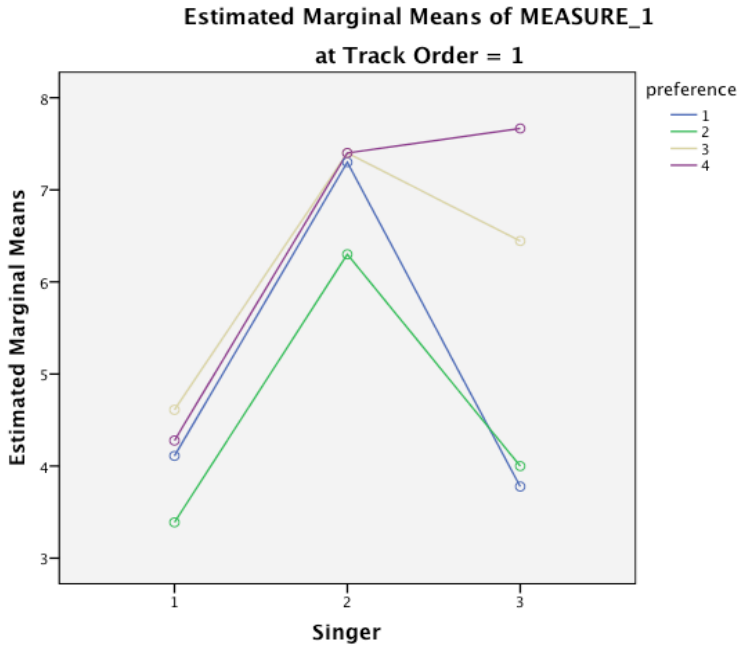

Figure 7 – Interactions between Track Order 1 and Preference

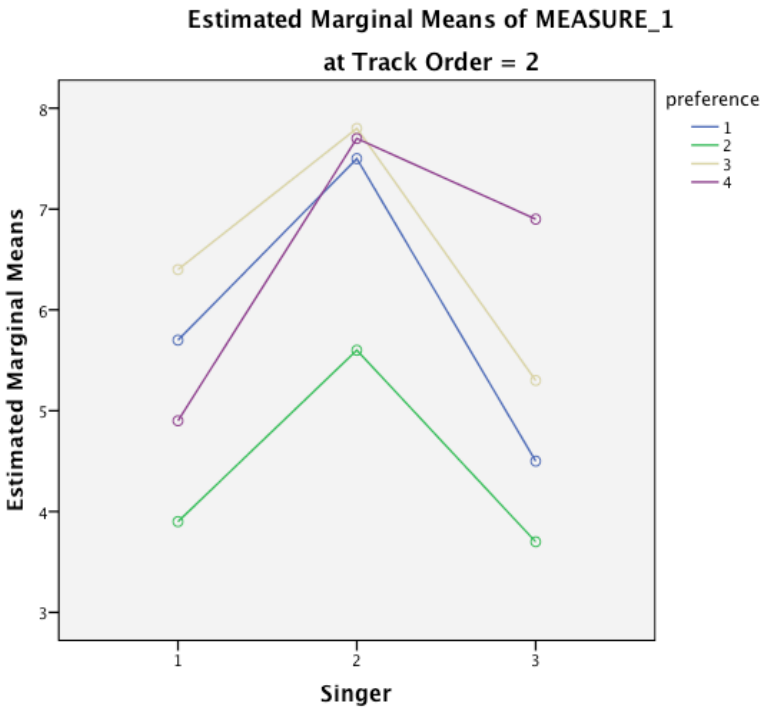

Figure 8 – Interactions between Track Order 2 and Preference

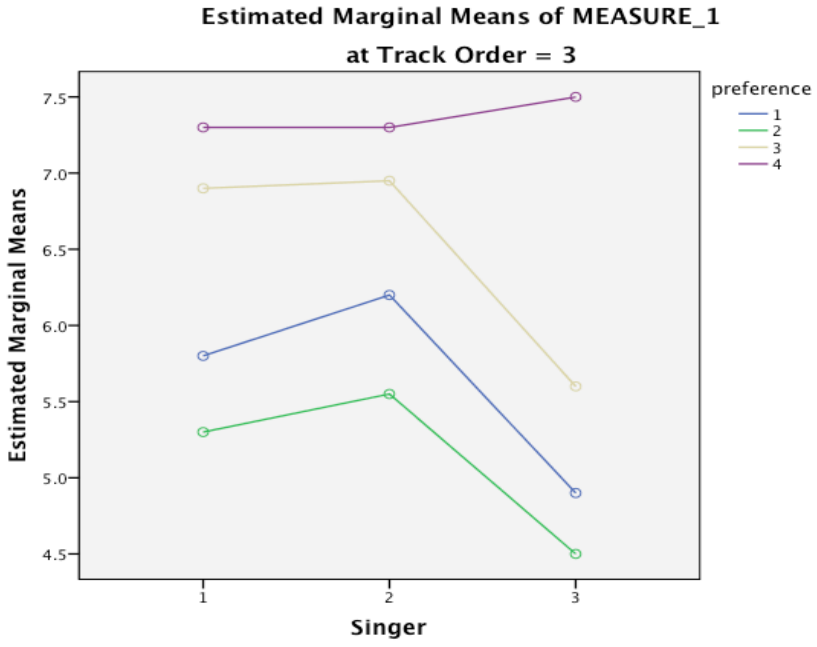

Figure 9 – Interactions between Track Order 3 and Preference

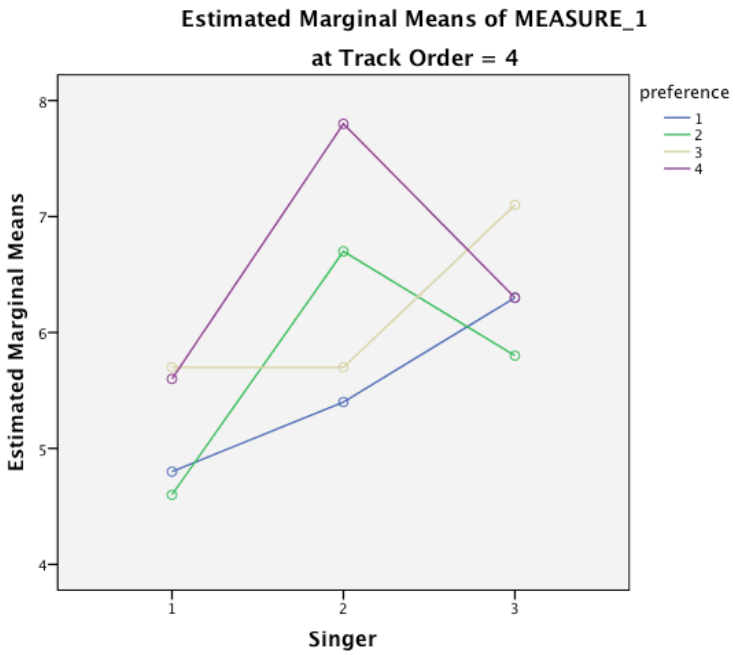

Figure 10 – Interactions between Track Order 4 and Preference

CHAPTER VI

DISCUSSION

Given current writings, workshops, and presentations at conferences, it is assumed that conductors' use of imagery and motion are current trends in the choral rehearsal. Articles from MEJ, The Choral Journal, and Teaching Music show that prominent choral pedagogues have advocated for the use of imagery and motion as pedagogic tools in the choral rehearsal for over thirty years now. The work of Jacobsen (2004) and Hibbard (1994) empirically document the use of such methods. What was not known, however, is if the effect of those techniques of instruction could be perceived by an outside listener. Acknowledging the complexities of the metaphor-based way in which we communicate (Lakoff and Johnson, 1980) and understanding that knowledge-bias can affect perception, an assumption exists that this knowledge-bias may be allowing the pedagogue using imagery and motion techniques to perceive the knowledge-biased sound they expect rather than the sound that actually exists. The determination that pedagogic techniques using imagery and motion do affect the perception of tone will have implications on the way voice, both solo and corporate, is taught.

For the purposes of this study, solo singers were chosen rather than a choral ensemble in an effort to eliminate certain confounding variables. As it is difficult to measure each singer's level of response to a given directive in a corporate setting, solo singers were used to make the stimulus recordings for this study. It would have been impossible for the researcher to determine with any certainty as to whether or not the research conditions or the surrounding variables: other singers, rehearsal space distractions, ability to understand the directive, were causing any change in tone. Overall

findings seem to indicate the use of metaphoric-image, motion, and a dual modality approaches have a perceivable effect on the perception of vocal tone.

In asking each singer to imagine a yellow tone, it was the researcher's expected outcome that that directive would produce a brighter than usual tone. The researcher's hypothesis indicates the researcher believes this brighter tone can be perceived by an outside listener who does not know the tone was described as yellow to the singer. Based on significant interaction results from an ANOVA, it appears that for the untrained singer, this hypothesis is likely. On average, the untrained singer's tone was scored brightest during the metaphoric-image condition. Conversely, the motion and dual modality conditions produced means suggesting that tone during these conditions were not perceived as bright as during metaphoric-image.. Additionally, it should be noted that although these specific variables were not tested in the χ^2 analyses of color associations, the results of those analyses support the general tone color findings from the ANOVAs.

Concerning perception of tension, the motion and dual modality conditions were intended to produce a more relaxed sound; dual modality more so than motion alone. Perception of tension, measured on a Likert-type scale (1-tense, 10-relaxed), revealed that respondents overall means indicated that tension as more relaxed during this specific condition. Mean scores, supported by results from the ANOVAs, showed that respondents rated the motion condition as more relaxed than the control and metaphoric-image conditions and the dual modality condition was rated as the most relaxed.

As previously reported, overall, respondents to the untrained singer rated preference the highest under the dual modality condition. On average, this tone under this condition was rated as darkest and most relaxed (see Table 2). For those who ascribe

to the anecdotal and qualitative (Davidson & Correia, 2001; Davidson, 1989; Hibbard, 1994) data concerning imagery and motion, this result is not surprising. The empirical data here seems to support the findings of Woody (2002, 2003, 2006) who concluded the use of imagery is a tool that can be used to effectively communicate expression in performance. The data also suggest that for the untrained singer, Woody's conclusion that imagery has the biggest effect on performers with less experience was supported. It is important to remember however, that the current study was not using imagery and motion as tools to elicit expressive performance, but rather as pedagogic tools used to affect tone production.

Overall mean data results for the undergraduate singer were consistent with results for the untrained singer. However, the stimuli did not seem to have as pronounced an effect on perception of the undergraduate singer's tone as they did on the perception of the untrained singers tone. This could have been for several reasons: as Woody (2002) suggests, the undergraduate singer has more experience and training in appropriate vocal technique, therefore metaphoric-image and motion do not have as pronounced an affect on the singer's tone, or the timbre of the singer's voice may have affected the perception of tone color, tension, and preference. Results indicate, however, a statistically significant difference in the perception of the undergraduate singer's tone over the four conditions.

Like the untrained singer, the undergraduate singer's tone under the metaphoric-image condition was rated as brightest in relation to the overall mean. Mean data also indicated the undergraduate singer's tone was also rated as darkest under the dual modality condition. The motion condition was also rated as being darker than the control

and metaphoric-image conditions. Again, consistent with the findings concerning the untrained singer, the undergraduate singer's tone was rated as most relaxed during dual modality condition and most tense under the metaphoric-image condition. Overall preference means for the undergraduate singer indicated that respondents rated highest the tone produced under the dual modality condition.

The findings for the graduate singer were not consistent with those of the untrained and undergraduate singers. The motion condition for the graduate singer was rated as brightest and the control condition as darkest in relation to the mean. The metaphoric-image condition was rated as most tense, however, unlike the untrained and undergraduate singer, the motion condition was rated as most relaxed in the graduate singer also in relation to the mean. It was also the motion condition that was rated highest in preference by the respondents who listened to the graduate singer.

This inconsistency amongst the findings for the graduate singer could exist for several reasons. As suggested earlier, the findings of Woody (2002) indicate that the most pronounced effect of imagery seems to be had on less experienced singers. However, Woody (2002) does indicate that singers with many years experience and professional singers use imagery, metaphor, and motion as tools to express emotion with measurable effect. It is interesting to note here that the graduate singer used in this study indicated that throughout his years of study imagery had been used with consistency but motion was rarely, if ever, used as a pedagogic tool by those with whom he studied. Perhaps the motion condition produced a larger mean difference in perception of tone because the technique was new to the singer.

It goes beyond the scope of this research to speculate as to why imagery, metaphor, and motion seem to have an effect on the perception of vocal tone. What can be said with certainty is that communication in the English language is based on metaphor (Lakoff and Johnson, 1980), the same metaphor-based communication that goes on in choral rehearsals. According to Lakoff and Johnson (1980), "We have found...that metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature." The understanding of these metaphors seem to be based on prior knowledge, experience with, or understanding of the pieces that make up the metaphor. The philosophers go on to say, "...metaphor pervades our normal conceptual system. Because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (the emotions, ideas, time, etc.), we need to get a grasp on them by means of other concepts that we understand in clearer terms (spatial orientations, objects, etc.).

Methodology for the Development of Metaphor, Image, and Motion Usage

Because metaphor dominates communicative understanding, these ideas about how we communicate and understand that communication can be generalized to the communication that happens in the choral rehearsal. In an interview with Dr. Mark Johnson, Dr. Johnson confirmed that his and Lakoff's ideas on metaphor and communication could indeed be applied to the rehearsal situation. As Jacobsen (2004) and Funk (1982) showed, this use of metaphor and imagery is well documented. What has not been developed, however, is an understanding of the best ways in which to use

metaphor, imagery, and motion in the choral rehearsal. Using data collected from the study at hand, Lakoff and Johnson's ideas on communication and metaphor, and current literature from the fields of music education, choral conducting, learning theory, and kinesiology, a method will be proposed for the development of appropriate metaphor for the specific situations in the choral rehearsal and debunk a few of the metaphors encountered in current writings on metaphor and imagery

The basic premise of the method is that imagery and metaphor used in rehearsal should 1) contain language to which singers can relate and 2) be transferable to a physiological experience. The idea of language to which singers can relate is based on the Lakoff and Johnson model of metaphor usage and understanding. The philosophers state, "We view language as providing data that can lead to general principles of understanding. The general principles involve whole systems of concepts rather than individual words or individual concepts. We have found that such principles are often metaphoric in nature and involve understanding one kind of experience in terms of another kind of experience." The "understanding of one kind of experience in terms of another" is the critical point of metaphor and imagery usage in the choral rehearsal. The majority of singers do not have enough background knowledge in human physiology and voice science to understand the highly technical terms that would physiologically describe many aspects of correct singing. Metaphor must call on prior knowledge and experience in order to help students make the transfer between one kind of experience (a metaphor) to another kind of experience (understanding of the specific aspects of the physiology of the human voice). Along with being language to which singers can relate, metaphors should be physiologically possible. Though students may not know the highly technical

terms used to describe a physiological process, students are familiar with certain aspects of how the human body works. They are familiar with this, not because of academic learning, rather because of experience. Though they may not understand them on a technical level, singers experience the functions of their own bodies as a product of being alive.

Choral pedagogues have been arguing for the use of imagery and metaphor for quite some time (Barten, 1998; Haack, 1982; Skadsem, 1997; Tait, 1992; Woody, 1992). Skadsem (1997) advocates "developing a wide vocabulary of metaphor." Barten (1998) says metaphor "serves a clear rhetorical function," going so far as to compare music teachers to poets. The findings of Sheldon (2004) corroborate previous research. Sheldon speaks to the brevity of figurative language. The author advocates using imagery rather than lingo specific, complex physiological explanations. Tait (1992) suggests calling on students' personal and past experiences when developing a metaphoric vocabulary. Whether knowingly or not, each of these authors are paying homage to the ideas and philosophical developments of Lakoff and Johnson.

The metaphoric examples used in the research at hand were developed using the parameters set forth by Lakoff and Johnson and advocated for by the sited researchers. (See the *Use of Imagery in the Choral Rehearsal* section of the *Review of Literature* chapter for a more detailed review of imagery advocacy literature.) For the metaphoric-image condition the color yellow was chosen to represent a bright tone. It was the researcher's assumptive belief that the color yellow would induce a brighter tone from the singer. This metaphor not only calls on past knowledge, but requires singers to recall prior experiences associated with the color yellow. Because none of the singers used in

the experiment indicated being color blind, it was assumed that each had knowledge of the color yellow as well as a specific connotation representing yellow based on past experience and knowledge. An informal review of literature designed to teach color to young children showed yellow was most often represented by an image of the sun (Banaschewski, et. al., 2006). Other yellow color associations included images of bananas, lemons, and flowers. Though negative connotations of the color yellow exist – cowardice, illness, aging – singers did not indicate a negative association with yellow.

Respondents were not asked if they identified as being color blind, nor were they quested about their associations with the color yellow. Results indicated that when singers were asked to sing the tone as if it were yellow, mean scores indicated that respondents heard a brighter tone. Respondents also overwhelmingly used bright colors (yellow and orange) to describe the tone they were hearing. As Lakoff and Johnson have indicated, "...metaphor is not merely a matter of language. It is a matter of conceptual structure. And conceptual structure is not merely a matter of the intellect -- it involves all the natural dimensions of our experience, including aspects of our sense experiences: color, shape, texture, sound, etc. These dimensions structure not only mundane experience but aesthetic experience as well." Metaphor goes beyond the scope of simply understanding words, and in this specific example the majority of respondents used their own conceptual structure of "yellow" to makes a cross-domain connection – Yellow is bright. The tone I am hearing is bright. Therefore, the tone is yellow.

The second tenant of this method – should be transferable to a physiological experience – is based on one's own experience with one's own body and immediate surroundings. Prior knowledge can only come from prior experience. Being as such, it is

argued that metaphoric-image must call on bodily experience in an effort to have a connection to the tactile human experience. "… our experiences with physical objects (especially our own bodies) provide the basis for an extraordinarily wide variety of ontological metaphors, that is, ways of viewing events, activities, emotions, ideas, etc. as entities and substances" (Lakoff and Johnson, 1980).

According to Siegelman (1990) metaphor making is "the imaginative act of comparing dissimilar things on the basis of some underlying principle that unites them…" The method presented here argues that comparison cannot be made without prior experience or knowledge. For example, the metaphor "Breathe from your toes" was referenced earlier. Though singers understand the concept of breathe and are more than likely aware of their own toes, there is little connection between these two things. This metaphor seems to adhere to a portion of Siegelman's statement, "comparing dissimilar things." But it stops short of achieving an "underlying principle that unites them." Students might infer that the directive is asking that they "breathe deeply." This is yet another metaphor however. Nothing has been connected to the human experience. What does it mean to "breathe deeply?" Transforming this metaphor into something experiential, something singers have a prior knowledge of may be more effective. "Support the tone by holding a ten pound bowling ball out in front of you." Singers have now been given a metaphor (support), an image (a ten pound bowling ball), and a motion (holding an imagined bowling ball in front of them). The majority of singers have experience holding a bowling ball. And if not, they have the experience of holding a heavy object. This metaphoric-image-motion-prior knowledge connection is expected to have the effect of singers using the intercostal muscles, diaphragm, and other muscles of

the core to support the weight of a ten pound bowling ball, thus connecting the known (holding a bowling ball) to the unknown (the idea of "support"). Of this technique of metaphor-image-motion formulation Lakoff and Johnson say, "Our experience of physical objects and substances provides a further basis for understanding -- one that goes beyond mere orientation. Understanding our experiences in terms of objects and substances allows us to pick out parts of our experience and treat them as discrete entities or substances of a uniform kind."

The informal study referenced in the introduction to this study is worth restating here: …choral pedagogues would argue students do need to know the physiology of the singing process, however there must be a framework in place to support physiological concepts. The concepts and methods suggested by this study are accompanied by the caveat that the researcher also believes that students of singing should know and understand the physiological process of singing. The research at hand is geared toward best practices in building the scaffold and framework of knowledge that allows the singers to understand the physiological process of singing.

CHAPTER VII

RECOMMENDATIONS FOR FURTHER STUDY

The findings of this study have served to add valuable data to the field of best practices in music education as well sparked questions for further study. Of interest are the implications of metaphor and motion usage in rehearsal. What metaphors and images elicit the best vocal tone in a rehearsal setting? Further research into the construction of choral/vocal specific metaphors is recommended. Also of interest is a comparison between the use of metaphor juxtaposed to the use of technical terms only.

An investigation of the principles of the usage of metaphor and imagery in the English language and how those principles translate directly to the choral-vocal setting are recommended as well. As pedagogues teaching a non-tactile phenomenon, we strive to find ways to make the mechanism called "voice" as tangible and concrete as possible. We do so in many different settings and to persons of wide ranging vocal ability and knowledge background. Yet, the use of metaphor seems common amongst pedagogues of all types of vocal/choral instruction (Jacobsen, 2004).

Further research is also warranted in uncovering the "Why?" and "How?" of metaphor and motion usage. Cognitive science has and is developing tools that allow researchers to understand brain functions under certain conditions (Duke, et. al., (2011). Understanding how the brain functions when considering metaphoric constructs could lead to a deepening of our understanding of the usage of these tools in the rehearsal setting.

APPENDIX A

RESPONDENT DATA FORM

Respondent Data Record *Form #*

_____

After listening to each track, rate the following aspects of vocal tone. You will be given 25 seconds to respond after each track.

Track 1 –

Tone Color

1	2	3	4	5	6	7	8	9	10
Dark									Bright

Tension

1	2	3	4	5	6	7	8	9	10
Tense									Relaxed

Which of the following colors would best describe the vocal tone heard?
Choose one:

Red Blue Yellow Green Purple Orange Other _____

Rate your preference for this tone.

1	2	3	4	5	6	7	8	9	10
Did not like									Liked

Respondent Data Record *Form #*

_____

After listening to each track, rate the following aspects of vocal tone. You will be given 25 seconds to respond after each track.

Track 2 –

Tone Color

1	2	3	4	5	6	7	8	9	10
Dark									Bright

Tension

1	2	3	4	5	6	7	8	9	10
Tense									Relaxed

Which of the following colors would best describe the vocal tone heard?
Choose one:

Red Blue Yellow Green Purple Orange Other _____

Rate your preference for this tone.

1	2	3	4	5	6	7	8	9	10
Did not like									Liked

Respondent Data Record *Form #*

_____

After listening to each track, rate the following aspects of vocal tone. You will be given 25 seconds to respond after each track.

Track 3 –

Tone Color

1	2	3	4	5	6	7	8	9	10
Dark									Bright

Tension

1	2	3	4	5	6	7	8	9	10
Tense									Relaxed

Which of the following colors would best describe the vocal tone heard?
Choose one:

Red Blue Yellow Green Purple Orange Other _____

Rate your preference for this tone.

1	2	3	4	5	6	7	8	9	10
Did not like									Liked

Respondent Data Record *Form #*

_____

After listening to each track, rate the following aspects of vocal tone. You will be given 25 seconds to respond after each track.

Track 4 –

Tone Color

1	2	3	4	5	6	7	8	9	10
Dark									Bright

Tension

1	2	3	4	5	6	7	8	9	10
Tense									Relaxed

Which of the following colors would best describe the vocal tone heard?
Choose one:

Red Blue Yellow Green Purple Orange Other _____

Rate your preference for this tone.

1	2	3	4	5	6	7	8	9	10
Did not like									Liked

Respondent Data Record
DEMOGRAPHIC INFORMATION
Please circle one response after each question.
Are you enrolled in classes at [University's name]? Y N
If yes, what is your class status? Undergrad Grad

Are you a music major? Y N

Have you ever studied voice privately? Y N
If yes, how many years? _____

Have you ever sung in choir? Y N

(optional)
What is your sex? Female Male
What is your age? _____

APPENDIX B

INFORMED CONSENT FORM

Informed Consent Documentation

Research Participant:

My name is Webb Parker and I am a graduate student from the Music Department at the [name of institution]. I would like to thank you for considering participation in my research study. This study is about perception of vocal tone and best practices in choral pedagogy.

If you decide to participate in this study, you will be asked to listen and respond to four, 30-second excerpts of solo vocalists. Response items are your opinion and no "right" or "wrong" answer will be assessed. You will not be identified as a participant nor will your response document have any identifying information on it.

Remember, this is completely voluntary. You can choose to be in the study or not. There is no compensation for participation, nor is there any benefit awarded to School of Music and Dance students who choose to participate. If you'd like to participate, we can schedule a time that is most convenient for you. If you need more time to decide if you would like to participate, you may also call or email me with your decision.
Please do not hesitate to contact me with any questions you may have. I can be reached at [email address] or at [phone number].

Thank you.
Webb Parker

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