



The Effect of Various Left hand Conducting Gestures on Perceptions of Anticipated Vocal Tension in Singers

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Abstract

The purpose of this study was to determine the effect of a videotaped model of a conductor, utilizing various left hand conducting gestures, on singers' anticipated inappropriate vocal tension levels, given the meaning interpreted from a gesture. Specifically, the potential of left hand conducting gestures to generate or prevent perceptions of inappropriate vocal tension was examined.

A stimulus tape was created including a control conducting condition (left hand, no change) and five experimental conducting conditions: (a) left hand, fisted gesture; (b) left hand, palm up; (c) left hand, palm down; (d) left hand stabbing gesture; and (e) left hand, sideways, phrase-shaping gesture. Participants (N=192) selected to evaluate the stimulus tape were members of university choral ensembles. Prior to evaluating the stimulus tape, participants were given a characterization of inappropriate vocal tension.

Results indicated that the mean anticipated tension levels for the fisted (M=6.35, SD=2.11) palm down (M=5.63, SD=2.35), and stabbing (M=6.00, SD=2.11) conducting conditions were greater than the mean anticipated tension level for the no change condition (M=4.11, SD=2.47). Results also indicated that the mean anticipated tension level for the sideways, phrase-shaping condition (M=3.01, SD=1.97) was significantly lower than the mean

anticipated tension level for the no change condition (M=4.11, SD=2.47). There was no significant difference between anticipated tension levels for the palm up and no change conducting conditions.

According to interview data collected by Blades-Zeller (1993), the characteristics of a "model" vocal pedagogue include (a) the ability to diagnose vocal problems and prescribe effective solutions, (b) the ability to assess student needs and clearly communicate information to the student, (c) the wisdom to treat each student as an individual. Research studies have attempted to explicate characteristics of effective teaching and conducting. In particular, the areas of musical competency, personality traits, instructional delivery, and conducting skills, appear pervasively in the effectiveness literature.

The act of conducting is nonverbal in nature. It includes such elements as facial expression, eye contact, body position and posture, and conducting gesture. There are extensive bodies of extant literature on conducting gesture, vocal pedagogy and choral singing. Empirical research addressing the vocal product of conducting gesture, however is more scarce.

The issue of inappropriate vocal tension, labeled in numerous ways, appears in virtually all of the vocal and choral pedagogical literature. Thus, investigating the ability of choral conductors to use conducting gesture effectively in maintaining a sense of well-being and health among singers may be needed.

According to Love (1993) nonverbal communication comprises “gestures, body movements, the use of interpersonal space, facial expression, touch, posture, paralanguage, gaze, eye contact, in addition to physical appearance and personal habits” (p. 4944). Many such facets of nonverbal communication would appear to be intricately related to the nature of conducting gesture. Ideally, 100% of a conductor’s communication is nonverbal in performance. In an analysis of expressive movement and conducting gesture, Bengé (1996) concluded: (a) conducting is a type of nonverbal communication; (b) there is a universality to the language of conducting; (c) specific gestures and movements are generally interpreted in the same way; and (d) conducting gestures of expressive conductors communicate a vast array of expressive and stylistic information.

Conducting gesture is one nonverbal element of communication utilized by the choral conductor in rehearsal and performance settings. Julian (1989) quotes Edward Sapir in defining conducting as “an elaborate code that is written nowhere, known by none, and understood by all.” (p. 49) This communication is characteristically nonverbal and is demonstrated by both intentional and unintentional behaviors. A conductor communicates through “body language that includes eye contact, body orientation and posture, facial expression, movement of feet, torso, and head, in addition to the expected hand gestures.” (Julian, 1980, p. 64). Such nonverbal communication may result in various responses from the singers.

Few studies have examined student responses to specific conducting gestures. Skadsem (1997), investigated the effect of four instructional conditions on dynamic responses in singers. The four conditions were (a) conductor verbalization, (b) dynamic markings in the score, (c) conductor gesture, and (d) choir dynamic level. Results showed that verbal instructions given by the conductor invoked the most significant changes in the dynamic responses of singers. Fuller (2000), examined the effect of various conducting gestures on choral singers’ precision and expressiveness at phrase punctuation points. He sought to ascertain the effectiveness of managed preparatory gestures,

subdivided patterns, and metric conducting patterns as gestural approaches to short spaces between phrases.

Fuelberth (2003b) examined the same left hand conducting gestures utilized in the present study for their effect on vocal tension. Singers ($N=103$), of varying levels of expertise, performed a musical selection while responding to a videotaped model of a conductor using a variety of left hand conducting gestures including: (a) left hand, no change; (b) left hand, fist gesture; (c) left hand, palm up; (d) left hand, palm down; (e) left hand stabbing gesture; and (f) left hand, sideways, phrase shaping gesture. Experienced choral conductors analyzed the videotaped performances for inappropriate vocal tension level. Results showed that there were significant differences in vocal tension ratings, as evaluated by experienced vocal and choral music educators, for all conducting conditions except the palm-down conducting condition. The same videotaped model of a conductor implementing the six aforementioned conducting gestures was used in the present study. In the present study, as in the Fuelberth (2003a) pilot study, singers’ perceptions of anticipated vocal tension levels while observing the conductor on the tape without vocally responding are measured.

Patterson (1984) categorized conducting gestures used by high school choral directors. Gestures used for analysis included (a) gestures suggested by choral conducting texts, (b) gestures used by choral conductors in performance to achieve selected technical qualities such as balance, tone quality and diction, (c) gestures used by choral conductors to achieve legato, staccato and marcato conducting styles, and (d) gestures used by choral conductors to achieve expressive elements such as crescendo, diminuendo. Conducting texts suggest various purposes of the left hand in conducting gesture. In general, the authors of these texts (Garretson, 1998; Green, 1992; Kaplan, 1992; Hylton, 1995) are in agreement about the role of the left hand. Specifically, the left hand is primarily used to generate an expressive response from singers. Left hand gestures give emphasis to the instructions given by the right hand. Further, the left hand may be used for cues and releases, dynamics, crescendos and diminuendos, accents and phrase shaping.

Choral musicians vary greatly in level of experience. Within the same choral ensemble, there may exist a new chorus member with no previous vocal training and an experienced singer with extensive years of private study. Often, the choral

conductor is the singers' only voice teacher. Extant choral conducting texts suggest that the choral conductor be knowledgeable about the voice as well as possess conducting ability (Garretson, 1998; Heffernan, 1982; Hylton, 1995; Kaplan, 1985; Roe, 1983). Roe suggests the principal goal of the conductor should be good singing. Characteristics of good singing include attractive tone quality, accurate intonation, musical interpretation, flexibility, excellent breath support, and relaxed jaw and confidence. Poor intonation, breathiness, tension in the throat, and lack of phrasing are choral vocal problems that require the attention of choir and conductor (Hylton, 1995). Smith and Sataloff (2000) suggest the "tools" of healthy, artistic choral singing include posture, relaxation, breathing and resonance. They emphasize that the conductor should be clear and purposeful about each vocal technical detail. This clarity and sense of purpose is manifested not only through nonverbal communication in the form of conducting gesture, but also through meaningful and effective verbal instruction.

In order to analyze singer response to conducting gesture, there must first exist a working definition of inappropriate vocal tension. Many voice pedagogues and conductors have sought to define inappropriate vocal tension using specific visual or audible characteristics. According to Miller (1996a), the tongue, the neck, and the jaw are the three major sources of inappropriate vocal tension, which work both together and separately. Miller (1996b) further implies that tension in one muscle group often affects another muscle group. McKinney (1994) characterizes visual vocal faults as "postural rigidity, collapsed chest, tight jaw, furrowed brow, raised shoulders, tilted head, white knuckles, knees locked back, shaking legs, heaving chest and so on" (p. 18).

Kitch and Oates (1994) sought to define vocal tension from a performer's point of view. The muscular tension areas explored were the throat, jaw, neck, tongue, and chest. These researchers report that vocal fatigue was associated with each performer's self-reported perceptions of muscular tension. Bunch (1993) suggests absence of vibrato was an indicator of strain on the voice. Six visually observable areas of inappropriate tension included overly active facial muscles, position and movement of the lower jaw, rigidity of the tongue, tension in the neck, tension in the chest, and emotional tension. In addition, Bunch proposes that noisy breathing and a strident vocal sound were both audible indicators of muscular tension.

Miller (1996b) discussed the relationship between proper vocal technique and longevity in singing. He contended that maintenance of physical condition, a healthy lifestyle, and proper technique in singing contribute to long-term voice use. Miller also suggested that voice category can also be a factor in longevity. Sundberg (1987) indicated that improved technique could inhibit functional disorders of the voice. Sundberg identified two types of voice disorders: functional disorders, which stem from inappropriate use of the voice, and organic disorders, which stemmed from changes in the vocal tissues. Cook-Koenig (1995) examined causes of vocal fatigue and strain in choral singers. They cited the importance of vocal technique, as taught by voice teachers and choral conductors.

Changes in vocal function can be traumatic for singers and professional voice users. The teacher/conductor seeks not only to recruit singers into the choral program, but also to retain them over time. Sapir (1993) examined vocal attrition in voice students. Students who reported voice problems were more likely to be anxious about their voice and were more likely to discontinue singing. Symptoms of vocal problems included hoarseness, reduced pitch range, voice fatigue, a sensation of tightness, and pain or discomfort in the throat.

Although those instructed in proper use of the vocal mechanism should theoretically care more diligently for their voices, the converse can be true. A survey by Galloway and Berry (1981) examining vocal problems among voice performance and vocal pedagogy majors from the same university ($N=40$) revealed that 56% of participants in the survey exhibited symptoms of voice disorders. These symptoms included problems with articulation, voice quality, and resonance problems associated with voice abuse, voice misuse, and pathological conditions. Almost all of the respondents complained of vocal fatigue and sore throats after choral rehearsals.

The purpose of this study was to determine the effect of a videotaped model of a conductor, utilizing various left hand conducting gestures, on singers' anticipated inappropriate vocal tension levels, given the meaning interpreted from a gesture. In order to further focus the direction of the study, the following research questions were developed:

1. Given a definition of inappropriate vocal tension, how will singers perceive possible inappropriate vocal tension while viewing a videotaped model of a conductor?

2. What reasons will singers give for their evaluations of possible inappropriate vocal tension?
3. Where will the visual focus of the singer be as they view the stimulus tape?

Methods and Procedure

One hundred ninety two undergraduate and graduate students participated in this study. These students were choral ensemble members attending a mid-west university. The experience levels of the

participants varied greatly from less than one year to more than ten years of choral singing experience.

A ten measure excerpt of the folk song, "Turtle Dove" (Figure 1), was selected as the musical example in this study. The excerpt begins and ends on the tonic pitch. The same musical example was used in a previous study examining actual vocal response to the conducting gestures utilized in the present study (Fuelberth, 2003a). The same piano accompaniment, including melodic line, was used for each of the six conducting conditions. No vocal model was provided on the stimulus tape.

The image shows a musical score for the folk song "The Turtle Dove". It consists of two staves of music in a single system. The first staff is a vocal line in treble clef with a common time signature (C). The lyrics under the first staff are: "Fare thee well my love, I must be gone, and leave you for a while. But though I roam I'll". The second staff is a piano accompaniment line, also in treble clef, starting with a measure rest marked with a '6'. The lyrics under the second staff are: "come back a - again. Though I roam ten - thou - sand miles my dear. Though I roam ten - thou - sand miles." The music is written in a simple, folk-like style with a mix of quarter and eighth notes.

Figure 1. Musical Example "The Turtle Dove."

Four stimulus tapes were created including six conducting conditions. The six conditions were placed in a random sequence on each of the four tapes to control for order effect (Figure 2).

Throughout each of the conditions the conductor maintained a legato four pattern in the right hand. The conductor used a baton in the right hand for the experiment. A tempo of m.m. quarter note = 72 was chosen for each excerpt. The first four measures of each example served as a baseline. During these four measures the conductor conducted using only the right hand beat pattern. The following six measures served as experimental measures.

During the experimental measures, six conducting conditions were utilized: (a) left hand, no

change; (b) left hand, fisted gesture; (c) left hand, palm up; (d) left hand, palm down; (e) left hand, stabbing gesture; and (f) left hand, sideways phrase-shaping gesture. Two experienced music educators viewed the videotape to confirm the changes in conducting gesture.

The videotaped examples framed the conductor's upper and lower torso. During the experimental measures, the video camera zoomed in to isolate the conductor's hand motions and downplay facial expression. The conductor was asked to wear a black turtleneck and dark slacks for the videotape session. The conductor was asked to maintain a neutral facial expression throughout each of the six examples.

<i>Tape 1</i>	
Example 1	Fisted Gesture
Example 2	Palm Down
Example 3	No Change
Example 4	Palm Up
Example 5	Stabbing Gesture
Example 6	Sideways, Phrase -Shaping Gesture
<i>Tape 2</i>	
Example 1	Sideways, Phrase -Shaping Gesture
Example 2	No Change
Example 3	Stabbing Gesture
Example 4	Palm Up
Example 5	Fisted Gesture
Example 6	Palm Down
<i>Tape 3</i>	
Example 1	No Change
Example 2	Palm Up
Example 3	Sideways, Phrase -Shaping Gesture
Example 4	Palm Down
Example 5	Fisted Gesture
Example 6	Stabbing Gesture
<i>Tape 4</i>	
Example 1	Stabbing Gesture
Example 2	Palm Down
Example 3	Fisted Gesture
Example 4	Sideways, Phrase -Shaping Gesture
Example 5	Palm Up
Example 6	No Change

Figure 2. Random Order of Conducting Conditions on the Four Stimulus Tapes.

Singers viewed one of the four stimulus tapes while completing Part 1 of the questionnaire (Figure 3). Subjects were asked to circle a number on six separate 10 point Likert scales. Each rating was to correspond to the level of inappropriate vocal tension that would be generated by each conducting example. Rating scale descriptors were “minimum inappropriate vocal tension” to “maximum inappropriate vocal tension.” Prior to viewing the videotape, singers were given the following characterization of inappropriate vocal tension in verbal and written form:

For the purpose of this study, inappropriate vocal tension is the audible or visible presence of tension in the vocal mechanism. Visible characteristics include muscular tension involving the face, jaw, neck, shoulders, arms, hands, torso, and legs. Audible characteristics include fluctuation in intonation, difficulty in executing higher pitches, and harsh tone quality.

This characterization was established for the purposes of this study and was confirmed by four experienced voice teachers and choral conductors. The characterization was developed based on results of a previous research study (Fuelberth, 2000) and on previously published pedagogical literature (Bunch, 1993; McKinney, 1994; Miller, 1996b; Smith & Sataloff, 2000; Sundberg, 1987). Following the viewing of the videotape, subjects were asked to complete a questionnaire indicating where the subject's visual focus was while viewing the stimulus tape. Demographic information was also collected, including years of ensemble experience, number of conducting courses taken and college major.

Part 1: Please read the following characterization of inappropriate vocal tension:
 For the purpose of this study, inappropriate vocal tension is the audible or visible presence of tension in the vocal mechanism. Visible characteristics include muscular tension involving the face, jaw, neck, shoulders, arms, hands, torso, and legs. Audible characteristics include fluctuation in intonation, difficulty in executing higher pitches, and harsh tone quality.

Please circle a number that corresponds to the level of inappropriate vocal tension level that would be generated by each conducting example. After circling the number, please state the reason for your rating.

Example 1

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Example 2

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Example 3

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Example 4

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Example 5

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Example 6

1 2 3 4 5 6 7 8 9 10
 minimum inappropriate vocal tension maximum inappropriate vocal tension
 Reason: _____

Part 2: Please respond to the following:
 Where was your visual focus while responding to the videotape?

Please circle your response to the following:
 How many years have you participated in choral ensembles (Grade 8 and later)?
 Less than 1 1-2 3-5 6-10 More than 10

Choral voice part: Soprano Alto Tenor Bass

How many years have you participated in instrumental ensembles (Grade 8 and later)?
 Less than 1 1-2 3-5 6-10 More than 10

Years of private vocal study: Less than 1 1-2 3-5 6-10 More than 10

Year in school: Freshman Sophomore Junior Senior Graduate

Number of college conducting classes:
 Undergraduate: 0 1 2 More than 2
 Graduate: 0 1 2 More than 2

College Major (please fill in the blank): _____

Figure 3. Questionnaire.

RESULTS

Preliminary analyses. An analysis of variance (ANOVA) was carried out to compare the mean anticipated inappropriate vocal tension levels of groups of participants viewing the four random ordered stimulus tapes. There were no significant differences between groups viewing the four tapes ($F(23)=1.46, p<.05$). An analysis of variance was also carried out to compare the mean anticipated tension scores of participants by voice part and again, by conducting experience. No significant differences were found between sopranos, altos, tenors and basses ($F(23)=.08, p=.05$) or between conductors who have taken zero, one or two conducting classes ($F(17)=.32, p=.05$). Table 3 contains a summary of the mean scores of these groups.

As previously stated, the primary purpose of this study was to determine the effect of a videotaped model of a conductor on singers' anticipated inappropriate vocal tension levels, given the meaning interpreted from a gesture. Upon listening to a characterization of inappropriate vocal tension and viewing the stimulus tape, singers were asked to rate each example for its potential to generate tension. A one-way within-subjects ANOVA was conducted with the factor being left hand conducting conditions and the dependent variable being anticipated vocal tension levels. The means and standard deviations for the tension ratings are reported in Table 1. The results for the ANOVA indicated a significant conducting condition effect, Wilkes's $\lambda=.319, F(5,187)=80.01, p<.05$, multivariate $h^2=.68$. Five follow-up pairwise comparisons were conducted to test for differences between fist, palm up, palm down, stabbing, and sideways phrase-shaping experimental conducting conditions and the control condition (left hand, no change). Four of the five pairwise comparisons were significant, controlling for familywise error rate

across the five tests at the .05 level, using a Bonferoni adjustment. Results indicated that the mean anticipated tension levels for the fist ($M=6.35, SD=2.11$), palm down ($M=5.63, SD=2.35$), and stabbing ($M=6.00, SD=2.11$) conducting conditions were greater than the mean anticipated tension level for the no change condition ($M=4.11, SD=2.47$). Results also indicated that the mean anticipated tension level for the sideways, phrase-shaping condition ($M=3.01, SD=1.97$) was significantly lower than the mean anticipated tension level for the no change condition ($M=4.11, SD=2.47$). A summary of the pairwise comparisons can be found in Table 2. Table 3 shows anticipated inappropriate vocal tension ratings according to group, vocal part, and conducting experience.

Table 1

Perceived Possible Inappropriate Vocal Tension Ratings by Choral Singers Including Mean and Standard Deviations

<i>Experimental Conducting Conditions</i>	<i>M</i>	<i>D</i>
<i>Sideways, Phrase-Shaping Gesture</i>	<i>3.01*</i>	<i>.98</i>
<i>Palm Up</i>	<i>3.68</i>	<i>.77</i>
<i>No-Change</i>	<i>4.11</i>	<i>.46</i>
<i>Palm Down</i>	<i>5.63*</i>	<i>.35</i>
<i>Stabbing Gesture</i>	<i>6.00*</i>	<i>.12</i>
<i>Fisted Gesture</i>	<i>6.35*</i>	<i>.11</i>

Table 2

Pairwise Comparisons of the 5 Experimental Conducting Conditions and the Control (No Change) Condition

Paired Samples Test

	Paired Differences					t	df	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 FISTED-CONTROL	-.15	2.891	.209	-.56	.26	-.724	191	.470
Pair 2 PALMD-CONTROL	.14	2.448	.177	-.21	.48	.767	191	.444
Pair 3 PALMU-CONTROL	.35	3.234	.233	-1.1	.81	1.495	191	.137
Pair 4 STABBING-CONTROL	2.15	2.872	.207	1.74	2.55	10.351	191	.000
Pair 5 SIDEWAYS-CONTROL	.83	3.304	.238	.36	1.30	3.495	191	.001

Table 3

Perceived Anticipated Inappropriate Vocal Tension Ratings by Group (Stimulus Tapes 1-4)

Conducting Condition	All	Tape 1	Tape 2	Tape 3	Tape 4
Fisted Gesture	6.35*	5.09	6.35	7.21	5.85
Palm Down	5.63*	4.36	5.75	6.57	4.50
No Change	4.11	3.18	5.00	4.14	3.75
Palm Up	3.68	3.05	3.78	3.95	3.80
Stabbing Gesture	6.00*	6.18	5.33	6.83	4.10
Sideways, Phrase-Shaping	3.01*	1.84	3.16	3.71	2.45

Perceived Anticipated Inappropriate Vocal Tension Ratings by Voice Part

Conducting Condition	All	Sopranos	Altos	Tenors	Basses
Fisted Gesture	6.35*	7.16	6.00	5.92	6.49
Palm Down	5.63*	6.33	5.08	5.50	5.62
No Change	4.11	3.88	3.95	4.41	4.04
Palm Up	3.68	3.44	3.47	3.84	3.85
Stabbing Gesture	6.00*	6.09	5.50	5.95	6.38
Sideways, Phrase-Shaping	3.01*	3.09	2.74	2.98	3.17

Table 3, continued

Perceived Anticipated Inappropriate Vocal Tension Ratings by Conducting Experience

<i>Conducting Condition</i>	<i>All</i>	<i>No Cond</i>	<i>1 Course</i>	<i>2 Courses</i>
Fisted Gesture	6.35*	5.92	7.00	7.35
Palm Down	5.63*	5.28	6.10	6.55
No Change	4.11	4.07	4.02	4.55
Palm Up	3.68	3.74	3.49	3.80
Stabbing Gesture	6.00*	5.80	6.35	6.30
Sideways, Phrase-Shaping	3.01*	2.90	3.12	3.35

Table 4

Reasons for Maximum Inappropriate Tension Ratings

<i>Reason</i>	<i># Responses</i>
Muscular Tension	175
Harsh Movements	112
Rigid Posture	109
Lack of Emotion	88
Facial Expression	27
Confusing Gesture	24

Reasons for Minimum Inappropriate Tension Ratings

<i>Reason</i>	<i># Responses</i>
Flowing, relaxed	120
Little Muscular Tension	35
Easy to Follow	24

Participants were asked to give a reason for their rating. Reasons for maximum inappropriate

tension ratings ($n > 5$) were tabulated into the following categories: rigid posture, muscular tension, lack of emotion, harsh movements, confusing gesture and facial expression. Reasons for minimum inappropriate vocal tension ratings ($n < 5$) were tabulated into the following categories: flowing and relaxed, easy to follow, and little muscular tension. Table 4 contains a summary of singer reasons for minimum and maximum tension ratings.

The third research question sought to determine the visual focus of the subjects as they viewed the videotape. All responses were tabulated into the following categories: hands and/or arms, left hand gesture, conducting gesture, baton/beat hand, face and/or neck, facial expression and whole body. Where multiple areas of focus were indicated, the investigator included each area in the tabulation. The areas of focus most cited were the hands and/or arms, left hand gesture, and face and/or neck ($n = 71$, $n = 70$ and $n = 38$, respectively). Areas of focus less frequently cited were facial expression, baton/beat hand and whole body ($n = 18$, $n = 16$, $n = 13$, respectively).

DISCUSSION

The vocal mechanism requires a certain amount of tension to be present in the body for energetic singing; however, inappropriate tension can hinder healthy vocal production. Creating an atmosphere conducive to good vocal health benefits both conductor and singer.

The ability to create a positive learning environment appears to be a desirable trait among conductors and teachers. In an attempt to develop a

model and assessment instrument, Gumm (1993) identifies ten dimensions of choral music teaching styles. One dimension, positive learning environment, involves teacher sensitivity to student fatigue and frustration. Another dimension, nonverbal communication, includes relying "primarily on conducting gesture to communicate with students." Various conducting gestures may be related to creating a positive learning environment.

Participants in this study had a wide array of varied choral experience. With this varied experience comes a certain set of pre-determined expectations and resultant evaluations of any choral conductor. Significant differences were found between the perceived anticipated inappropriate vocal tension ratings of the fist ed gesture, stabbing gesture and palm down conducting conditions. Perhaps the potential of these conducting gestures to generate perceptions of tension could cause conductors to reevaluate their effectiveness in performance and rehearsal settings. It is also interesting to note that results indicated that the mean anticipated tension level for the sideways, phrase shaping condition was significantly lower than the mean anticipated tension level for the no change condition. This finding may indicate that a function of the left hand may also be to relieve inappropriate vocal tension.

It is interesting to note that standard deviations greater than 2.00 occurred for the no change ($SD=2.46$), palm down ($SD=2.35$), stabbing ($SD=2.11$), and fist ed ($SD=2.11$) conditions. These four conditions also resulted in the highest perceived tension levels. Because no left hand gesture was present in the no change condition, the higher standard deviation may indicate that participants were unsure of how to rate an example without left hand gesture. It may also indicate a level of discomfort or tension that may arise when the left hand is apparently giving no expressive instruction whatsoever.

While no significant differences were found between the four groups of singers viewing the four different stimulus tapes, it is interesting to note that the singers who viewed Tape 4, rated only one condition, the fist ed gesture, over 5.00. The overall lower anticipated tension ratings could be due to the fact that the no change condition was presented last on the stimulus tape, therefore in all previous conducting segments, the conductor model used both hands throughout each of the first five conducting examples. It is also interesting to note that participants who had taken 2 courses in conducting had the highest mean score for five of

the six conducting conditions. This finding would suggest that training and experience in conducting leads to greater sensitivity to conducting gesture and to greater awareness of tension.

Most findings in the present study are similar to a study in which student vocal responses to these gestures were actually videotaped and analyzed (Fuelberth, 2003). Two exceptions to these similarities involve the palm up and palm down conducting conditions. In the Fuelberth (2003) study, analysis revealed higher tension levels for the palm up condition than the no change condition, while the present study contradicts that finding. One reason for this contradiction might be a difficulty in differentiating between louder dynamic levels and higher tension levels in singers. Because the palm up gesture typically is used to elicit a crescendo on the part of the singer, the aural/visual tension rating from the earlier study may be higher than the perceptual rating in the present study. Additionally, higher ratings for the palm down condition in the present study may indicate that vocal tension is not as easily observed when singers are singing at a quieter dynamic level. The palm down gesture is typically used to generate a quieter dynamic level on the part of the singer. In the Fuelberth (2003) study, the palm down gesture generated the lowest tension rating of all conducting conditions. This finding may mean that singers may perceive higher levels of tension when presented with that particular gesture, but because of the dynamic level, conductors may not observe the higher level of inappropriate vocal tension.

Participants gave specific and non-specific responses when asked to state a reason for their evaluations. Muscular tension and a lack of muscular tension were frequently reported as reasons for higher or lower perceived tension ratings, respectively. The descriptors flowing and relaxed were frequently used following a low tension rating. Muscular tension or relaxation on the part of the conductor may generate a similar response on the part of the singer.

The overall picture of the conductor includes body position and posture, right hand gesture, left hand gesture and facial expression. Therefore, the focus of the singer while viewing the stimulus tape is very important. In an effort to isolate left hand gesture and the experimental condition, the video camera zoomed in to capture the conductor's hands at the center of the screen. The areas of focus most cited were the hands and/or arms and left hand gesture ($n=71$ and $n=70$). Areas of focus less frequently cited were facial expression, baton/beat

hand and whole body ($n=18$, $n=16$, $n=13$, respectively). Such responses suggest that the videotape was effective in isolating the hand gestures of the conductor.

Although the conductor maintained a neutral facial expression throughout, 38 participants cited the face and neck, and 18 participants cited facial expression as a point of focus. Many respondents indicated their discomfort with the neutral facial expression, stating that they relied heavily on the conductor's face for guidance. Certainly, the conductor is responsible for clearly indicating musical and expressive intent not only through the gestures indicated through the beat hand and the expressive hand, but through intentional and unintentional use of facial expression and body tension or movement. The left hand was selected in this study as a starting point for exploring singer response to gesture and specifically to the expressive intent generally portrayed through the left hand. Since an attempt was made to maximize focus on hand gestures and minimize focus on facial expression, it is important to note that the conductor's face or neck and facial expression still drew the attention of 56 participants.

Further research is needed to examine singer's visual focus while in rehearsal and performance settings. Further research in this area could be beneficial in determining the effect of conductor intention, function, verbal/non-verbal effectiveness, left and right hand conducting gesture, body position, and facial expression on inappropriate vocal tension in singers.

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