5-29-13

Ms. Ref. No.:  JVOICE-D-13-00079
Title: Factors Associated with Singers' Perceptions of Choral Singing Wellbeing
Journal of Voice

Dear Dr. Sataloff,

Thank you for the opportunity to revise the above-noted manuscript. This letter contains our point-by-point response to Dr. Solomon and the other outstanding reviewer. We very much appreciate the critiques provided and have incorporated all requested modifications and suggestions into this revised manuscript including further data analysis.

**Reviewer 1**

1. **The introduction is interesting and compelling.  I conducted a review of the literature (for my own purposes) and found some newer, additional papers on the topic.  I copied a few titles at the end of this review, but please note that I have no idea if they are useful because I didn't read them! Still, the literature summarized in this paper is excellent.**

*Thank you very much for suggesting these additional resources. Two of the articles1,2 are now cited in the first paragraph of the “Improving general wellbeing” section.*

1. **Survey/Definitions:  The investigators cleverly took advantage of a large international gathering of people interested in choir singing to collect IRB-exempt survey data.  Unfortunately, the copy of the manuscript uploaded for review is missing the Appendix (mentioned on page 7), so I was unable to see the survey.  This is important because this study did not use a standardized survey and the operational definitions of the topical terms used in this study hinge on the survey questions.**

*We apologize for this inconvenience. The Appendix should now be submitted along with the revisions. It can be found at the end of the document.*

1. **The definitions for the main topical areas (currently in Results, but should be moved to Introduction) do not match my understanding of some of these terms.  In particular, questions about being "drained" or "tired" after choir rehearsal pertain to overall fatigue, but not necessarily to vocal fatigue.  The more specific term usually refers to an increase in perceived vocal effort with prolonged voice use.  After an extensive review of the literature, I offered the following definition of vocal fatigue:  "Vocal fatigue is a perception by the voice user, manifested primarily as a sense of increased vocal effort that increases over time with voice use, and subsides with voice rest." (Solomon, 2008, p. 263).  General lassitude may contribute to the sense of increased effort (not specific to voice), but does not define vocal fatigue, even if it is related to singing.**

*The definitions of main topical areas are now included in the Introduction. The definition for vocal fatigue is now included in the first paragraph of the “Suboptimal Vocal Behaviors in the Choral Setting” section; a description of vocal warm-ups is now included in the second paragraph; the definition for wellbeing is now included in the first paragraph of the “Improving General Wellbeing” section. Additionally, main topical areas defined by specific questionnaire items are now included in the Method section, second paragraph under “Questionnaire Development.”*

*We agree that our previous definition of vocal fatigue, which appeared to include overall fatigue, is incorrect. Our new definition is based on the definition offered in your review.*

1. **Were any questions included that would indicate a change in voice quality or other aspects of vocal production after choral singing?**

*Question 28, “My voice is often tired after singing with the choir,” is the most relevant to vocal production after choral singing. This question was used to assess reported vocal fatigue. However, question 30, “Choir rehearsals physically fatigue or drain me,” was also included in our original analysis of vocal fatigue. Based on our new definition, this inclusion of question 30 was incorrect because it does not address vocal fatigue. Therefore we reconfigured all statistical analyses involving vocal fatigue (please reference the uploaded Table of r and p Values, Table 1) using the new definition that includes only item 28 to define vocal fatigue. Though many correlation coefficient values were affected, the main findings in this study remain intact.*

1. **The authors make a strong attempt to convince the reader that singing too quietly can be deleterious, but this is unintuitive and difficult to accept.  While it is true that singing quietly can be challenging and require extraordinary control, it is unlikely to be harmful.  Perhaps "suboptimal" vocal use is a more appropriate construct.**

*We agree and have furthermore replaced all use of the term “deleterious” with “suboptimal” vocal behaviors throughout the manuscript.*

1. **Also, the rewording of question 10, redefining "rejuvenated" as "relaxing" was surprising.  I interpret "rejuvenated" as "refreshed" or "reenergized" - practically the opposite of relaxing.  It would be prudent to compare the results from the first 50 surveys using the original wording to the remaining 146 surveys to see if the distribution of responses differed markedly. Unfortunately, it seems that there was a rush to deploy this survey because of the conference, so there was not an opportunity to beta-test the questionnaire for construct validity.**

*We agree with the reviewer regarding the meaning differences resulting from the change in wording of this item. Responses to question 33 were compared to determine if responses to the reworded question were similar. Mean responses for the “rejuvenated” wording were significantly higher (Kruskall-Wallis test p=.0001) at 2.7 (SD=.76) than for the “relaxing” wording which yielded a mean score of 1.8 (SD= 1). Therefore, responses from the first 50 questionnaires were excluded from statistical analysis whenever question 33 was examined.*

*Additionally, we decided that the reverse score of question 30 should be considered a question pertaining to wellbeing. We reconfigured all statistical analyses involving wellbeing (please reference Table 1) using the new definition. Again, though many correlation coefficient values were affected, the main findings in this study remain intact.*

1. **Statistical analysis:  This section of the manuscript is unclear and seems incomplete.  First, it implies that averages were calculated and then Pearson correlation coefficients were run, but correlations depend on scatter in the data.   I don't understand how averages were used to look at relationships.  In addition, the results section mentions chi-square results, but this statistic is not mentioned in the statistical analysis section.**

*The “Statistical Analysis” section now includes (1) a more comprehensive description of how average scores were used, and (2) a description of the Chi-square analysis used.*

1. **It would be helpful to include a table with r and p values. A figure with a scatterplot illustrating the most important finding would be nice as well.**

*A table with r and p values is included in Table 1. A figure with a scatterplot illustrating the correlation between suboptimal vocal behaviors and vocal fatigue is included in Figure 1. A figure with a scatterplot illustrating the correlation between suboptimal vocal behaviors and wellbeing is included in Figure 2.*

1. **Primarily because of definitions and writing style, the interpretations of significant correlations seem overstated.  Also, whether a correlation is significant is less meaningful than the strength of the correlation. (On that point, please note that the interpretation of a small r-value is usually called a "weak" correlation, not a "small" correlation.)  For example, stating that "deleterious vocal behaviors were significantly correlation with vocal fatigue" could more cautiously be written as "reports of suboptimal vocal behaviors were moderately correlated with fatigue."**

*The writing style was adjusted. Adjustments reflect the example provided in your review. Please see the Results.*

1. **Please reframe the results and discussion more conservatively by generously using the phrase "reported that" or similarly terminology that reminds the reader that these are just the singers' perceptions (for example, "51% of participants sing too loudly" may not be true, but 51% of participants reported that they sing too loudly).**

*The Results and Discussion have been reframed in this way.*

1. **On page 11, the authors correctly point out that "other unmeasured variables . affect vocal fatigue and singing wellbeing" - it would be helpful to readers to explain how this conclusion was derived.  Specifically, you can state that the moderate correlation (r = .39) between reports of suboptimal vocal behaviors and fatigue indicates that these variables only explain 15% of the variance in the data.**

*Unmeasured variables and correlation strength are now explained in the first paragraph of the “Suboptimal singing behavior and vocal fatigue” section, located in the Discussion. The last paragraph of the “Singing and Wellbeing” section, located in the Discussion, includes similar descriptions pertaining.*

1. **In the discussion about vocal warm-up exercises and vocal fatigue, it might be interesting to note that these results are consistent with those we reported previously (Milbrath & Solomon, 2002), that warm-up exercises did not systematically mitigate vocal fatigue in untrained singers who reported symptoms of vocal fatigue.**

*This has been noted in the third paragraph of the “Suboptimal singing behavior and vocal fatigue” section, located in the Discussion.*

**Reviewer 2:**

1. **I congratulate you on your vision to use the singular opportunity provided by the World Choir Games in your area for the collection of research data on a timely topic.  The perceptual data will be useful for a variety of purposes.  Unfortunately, I did not find the appendix with the questionnaire or the statistical data attached to the article you submitted.  This material would help the reader understand your discussion and conclusions.  The article concludes with a "bibliography" that would be better identified as "references".**

*Again, we apologize for this inconvenience and the Appendix should now be submitted along with the revisions. The concluding section is renamed “References.”*

1. **The study states that solo and choral singing styles represent two very different approaches to singing. The reference to "flow phonation" in sentence 3 of the paragraph implies that flow phonation is a solo technique.  In fact, flow phonation requires a proper balance of subglottal pressure and adductory efforts at the level of the vocal folds for all singing.  In sentence 5, it is suggested that solo singing is "easier and more natural for the vocal mechanism" than group singing.  If this is true, a reference would be required to confirm it. The demands of solo and choral repertoire do differ in the ways you hoped to study.  In my reading, I believe you are observing that choral singing frequently requires venturing into unfamiliar vocal ranges, dynamics and voice quality. It is your contention that solo singing does not demand such effort. Perhaps, that is what is meant by "easier and more natural" - if so, it should be stated more clearly.**

*The reference to “flow phonation” has been removed. The unclear passages about solo and choral singing technique have been clarified via further review and more detailed interpretation. Please see the bolded paragraphs in the “Choral vs. Solo Singing” section, located in the Introduction (paragraphs 2-4).*

1. **The study investigates the perceptions of a large demographic, namely, singers aged 10 to 70.  At either end of the age spectrum, there are myriad reasons why singers would prefer choral singing over solo singing.  The youngest singers in the study may have little opportunity for solo performance.  The older singers may not be vocally able to qualify for solo performance.**

*We agree, and have noted this in the third paragraph of the new “Limitations” section.*

1. **Your criteria for evaluation (extremes of range, dynamics and voice quality) assume a standard prevalent in the American choral tradition.  The subject pool encompasses amateur singers from 64 countries.  Is it possible that the choral sound ideal in some of the countries is very different from the one deemed appropriate in the American choral tradition?  For example, in Eastern European countries such as Bulgaria, the optimal choral sound ideal is one that uses minimal vibrato and maximal nasality. For such singers, the creation of a straighter tone is effortless, due to their training.  The Scandinavian choral sound ideal is an ultra-blended choral tone, taught from infancy to singers.  Those singers might not find it difficult to surrender their voices to achieve a blended choral sound. In the questionnaire, are the questions general enough to accommodate such diversity of choral singing tastes?  The diversity of choral sound ideal could be included as an aspect of your article.**

*We agree, and noted this in the second paragraph of the “Suboptimal singing behavior and vocal fatigue” section, located in the Discussion. These suggestions have also been noted in the third paragraph of the new “Limitations” section.*

1. **Page 2, first full paragraph, 2nd sentence might be revised to read: One of the greatest challenges (rather than "The greatest challenge") in monitoring loudness is balancing the need to hear one's own voice with (instead of "and") the need to blend with other voices.
Deleterious Vocal Behaviors in the Choral Setting**

*Done.*

1. **First sentence, change "enforce" to "cause" Fourth sentence, change "cords" to "folds".**

*Done.*

1. **In this section of the article, vocal warm-ups are described in the broadest sense.  The reader does not know what constitutes a "good" vocal warm-up.  There is a great deal of literature regarding warm-ups for choral singing.  The purposes, principles and practices could be discussed here.  There is nothing in the literature, however, that would indicate that professional choral conductors are better equipped to create a vocal warm-up than amateur choral conductors are.  In line 41, you state that choral conducting training does not always include vocal pedagogy or vocal hygiene instruction.  These sentences need to be rewritten to define the role of the choral conductor as a voice builder.  For a practical understanding of the issue, you might search the "On the Voice" column of Choral Journal in 2012-13.  You will find two major articles on the topic. The information found there would inform the paragraphs on pg. 3 of your article.  Perhaps your questionnaire defines a proper warm-up procedure or accounts for the elements deemed significant for the achievement of choral well-being?**

*The purposes, principles, and practices of vocal warm-ups are now described in the bolded paragraphs of the “Suboptimal Vocal Behaviors in the Choral Setting” section, located in the Introduction (paragraphs 1-3). We have removed all sentences indicating that professional choral conductors are better equipped to create a vocal warm-up than amateur choral conductors. We have also removed the statement in line 41 (indicated above). In short, we have removed any previous discussion on the role or training of the choral conductor.*

*As described in the first paragraph of the “Limitations” section, our questionnaire included open-ended questions regarding certain topics, including specific vocal warm-ups. Though the questionnaire did not define a proper warm-up or account for the elements deemed significant for the achievement of choral wellbeing, it did inquire about the types of vocal warm-ups performed for the participants’ individual choir. However, responses were unspecific and proved impossible to analyze. Instead of attempting to objectively determine whether individual vocal warm-ups were “proper,” vocal warm-ups were considered “effective” when the subject indicated feeling vocally warmed-up for choir rehearsals and concerts on the Likert response questions (items 27 and 28). This modified definition of vocal warm-ups (now excluding questions 24 and 25) made it necessary to reconfigure all statistical analysis involving vocal warm-ups (reference Appendix B). Again, though correlation coefficient values were affected, the findings in this study remained intact.*

1. **Your article places considerable weight on the vocal warm-up as the means of managing vocal health during a rehearsal.  There are some other issues that might be significant factors, such as discipline within a rehearsal, level of musicianship skills among the singers, and acoustical circumstances of the rehearsal space.  It might be important to mention that your study did not/could not control for these factors.**

*Sentences placing weight on vocal warm-ups as means of managing vocal health have been clarified, via paragraphs 1-3 of the “Suboptimal Vocal Behaviors in the Choral Setting” section, located in the Introduction. The reviewer’s suggestions have been noted in the above-mentioned paragraphs, in the first paragraph of the “Suboptmial singing behavior and vocal fatigue,” and the last paragraph of the “Singing and Wellbeing” section, both located in the Discussion.*

1. **Pg. 5, line 19, it might be better to write out S-IgA and then, shorten it when used again.  You are expecting your reader to recognize it or to leave the narrative to find it in the references.**

*Done.*

1. **At line 49, you add to your objectives the preference for solo versus choral singing.  Could this be stated earlier?  Do you make a clear case for the solo singer preferring solo singing over choral singing?  I assume that you believe that a solo singer knows how to adapt to a choral setting?  Does your questionnaire ask the question specifically? Are you saying that solo singers would prefer always to sing alone while choral singers prefer always to sing in a group?**

*This addition to the objectives is now addressed and clarified earlier, specifically in the last paragraph of section “Choral vs. Solo Singing,” located in the Introduction. We have data that supports the hypothesis that solo singers prefer solo singing (please see the” Choral singing and solo singing” section, located in the Results, as well as the “Choral singing and solo singing” section, located in the Discussion). We examined solo singer’ perceptions of differential solo versus choral technique via question 22, “Is your technique in choir different from solo performance?”. We are not, however, hypothesizing that solo singers would always prefer to sing alone while choral singers would always prefer to sing in a group. This is not addressed in our study.*

1. **Here, you restate the objectives.  Much of this material has appeared previously, using the same language.  Perhaps you could consolidate your writing to have the purpose and the objectives appear once in concise, clear form. At line 26, it is stated that the data was analyzed to determine if choral singing is the preference of amateur singers in a choral group.  Did this data explain the attitudes of solo singers in a choral setting?  I did not find the answer to that question in the article.  I did understand that solo singers prefer singing alone.**

*The writing has been consolidated. This sentence has been removed.*

1. **Methods, Participants, Procedure, Statistical analysis are clear.**

*Main topical areas defined by specific questionnaire items are now included in the Method section, second paragraph under “Questionnaire Development” for further clarification.*

1. **2nd sentence - "vocal fatigue was defined as a drained or tired feeling" - do you mean "vocally drained and tired"?  Singers could be mentally or physically exhausted.  Does your questionnaire specify vocally fatigued?  If so, it should be stated more clearly here. At the end of the paragraph, the reader finds that 31% of participants reported feeling vocally fatigued.  This makes the paragraph a bit confusing at first reading.**

*This has been corrected (please see response to comments 3-4 from Reviewer 1). The paragraph has been reworded (paragraph 1 in “Suboptimal vocal behavior and vocal fatigue,” located in the Results).*

1. **Singing "healthily"?  Would "Healthy singing was defined." be clearer?**

*The concept of “singing healthily” was omitted from the manuscript and replaced with the concept of “absence of suboptimal vocal behavior,” which more accurately describes the data. This phrase was located under the “Suboptimal singing and wellbeing” section, located in the results. It is now completely reconstructed.*

1. **Line 56 "good well-being" might be rewritten as "a sense of well-being"**

*Done.*

1. **Well-being was defined as feeling relaxed after the rehearsal.  Do you mean "vocally" relaxed?  A good choral rehearsal is also a good social event.  Singers leave with the sense of accomplishment and the satisfaction of team work.  Please define what you mean.  Also, the last sentence of the paragraph is constructed in a way that confuses.  "There was a small negative relationship between singers with good well-being from choral singing and singers with vocal fatigue."  Please rethink the meaning and the syntax.**

*We have incorporated these suggestions into our definition of wellbeing. The definition is now located at the end of the first paragraph in the “Improving general wellbeing” section, located in the Introduction. The definition is also mentioned in the second paragraph of the “Questionnaire Development” section, located in the Method. The wording of the paragraph has been corrected (see “Suboptimal singing and wellbeing” section of the Results).*

1. **I would like to suggest that you mention that "cool downs" were not a part of this study.  Cool-downs are arguably as important to the vocal health of choral singers as warm-ups are.  It would be important to state that the use of cool downs lies outside the scope of this study.**

*This is now included in the last paragraph of the “Limitations” section.*

1. **As expected, this demographic, especially during the World Choir Games, was found to prefer choral singing over solo singing.  The meaning of the last line of the paragraph ("These values describe the study population.") is unclear.  Is this a summary statement or a new idea?**

*This sentence has been removed.*

1. **Line 48  "lowered" choral singing well-being - needs better syntax**

*“Lowered” was changed to “reduced.”*

1. **Pg. 11, line 4 "unmeasured variables aside" - It would be helpful it you stated the nature of those variables.**

*Unmeasured variables and correlation strength are now explained in the first paragraph of the “Suboptimal singing behavior and vocal fatigue” section, located in the Discussion. The last paragraph of the “Singing and Wellbeing” section, located in the Discussion, includes similar descriptions pertaining. Some unmeasured variables are also mentioned and explained in the “Limitations” section.*

1. **Here, I was expecting to read evidence of the specific deleterious vocal habits defined earlier in the article such as singing out of range, singing too loudly or too softly, and singing with limited vibrato.**

*We have completed additional statistical analysis to answer this question, examining the relationship to vocal fatigue of each suboptimal vocal behavior individually. This statistical analysis yielded interesting results, summarized in the second paragraph of the “Suboptimal vocal behavior and vocal fatigue” section located in the Results. These new findings are now thoroughly addressed in the “Suboptimal singing behavior and vocal fatigue” section, located in the Discussion. These new data allowed us to construct a fully-developed Discussion section, which the original manuscript had lacked.*

1. **At pg. 11, line 26, the discussion moves to "singing with the vocal folds too far apart or too close together" - this will need much more explanation - or it should be omitted.**

*This sentence has been omitted.*

1. **Pg. 11, line,41: In general, research in aspects of choral singing has proven to be challenging.  Your statement that no studies have addressed the relationship between deleterious singing behavior and vocal fatigue is a bold one.  Are you sure "no studies" have been conducted? Pg. 11, line 46, if this study is the first self-reported assessment of the relationship between vocal fatigue and deleterious singing behavior, this sentence should appear much earlier in your article.**

*To our knowledge, this is the first study of its kind. However, this sentence has been adjusted and relocated to the last paragraph of the “Choral vs. Solo Singing” section, located in the Introduction (bolded).*

1. **Pg. 11, line 54 - please include "the subjects reported" no relationship between 'feeling warmed up.  "There was no relationship."is vague.**

*Done.*

1. **Pg. 12, line 9 "inadequate vocal WU" should be defined - do you mean that the WU was not long enough, not well-formed, not appropriate to the age and size of the singers?**

*Instead of attempting to objectively determine whether individual vocal warm-ups were “proper,” vocal warm-ups were considered “effective” when the subject indicated feeling vocally warmed-up for choir rehearsals and concerts on the Likert response questions (items 27 and 28). This definition is now explained in the second paragraph of the “Questionnaire development” section, located in the Methods. Additionally, a description of commonly accepted vocal WU is included in the second paragraph of the “Suboptimal Vocal Behaviors in the Choral Setting” section, located in the Introduction.*

1. **Here there is a leap to the issue of patients and eventually, terminally ill patients.  The study has been about healthy singers participating in an international choral festival.  If it is your intention to discuss the use of singing for the therapeutic purposes, a much larger context must be created.  There are many studies as well as reports in popular media regarding the value of the arts (visual art, dancing, singing, and writing) for myriad holistic purposes. This topic cannot be tossed lightly into this study.  I would suggest you develop it or omit it.**

*Comment was omitted.*

1. **Pg. 12 line 51 and again, pg. 13, line 36, you define unhealthy singing habits as "a mediator or moderator" of singing related well-being.  I do not completely understand what you mean in either context. Bad habits do not seem to me to be useful mediators or acceptable moderators in the achievement of vocal well-being.  Maybe you mean something else by the phrase?**

*Specific comment was omitted. Further explanation of this concept is included in the last paragraph of the “Directions for Further Research” section.*

1. **This is a restatement of material that appeared on pg. 10 at line 16.  Perhaps you wish the restatement to confirm the results of the data?  As it stands, it would appear to be new material.  The reader will recall it from the previous passage.  This might be a place to make the writing a little more concise.**

*This restatement has been clarified and condensed. See first paragraph of “Choral singing and solo singing” section, located in the Discussion. A discussion of the limitations involved with this aspect of the study is now included in the second paragraph of this section.*

1. **Directions for further research:** **If the use of perceptive analysis would be useful for investigating singing as a therapeutic activity, this might be the place to suggest it.**

*We no longer address this issue.*

1. **Pg. 13, line 34, what is meant by the phrase "and at greater extremes"?  Do you mean at higher dynamic levels, over longer periods of times?**

*This phrase has been removed.*

1. **Pg. 13, line 39, what is meant by "under increased demands and expert knowledge".under expert knowledge, does not follow.  Rewrite and be more specific.**

*This phrase is now clarified in the first paragraph of the “Directions for further research” section (bolded).*

1. **The conclusion is clear to me.  Is it clear to the author that singers in a choir do not have to sing every note, while solo singers must perform every note of a given piece?  It might be important to mention that fact.**

*This is an interesting topic that we have left outside of the scope of this manuscript.*

1. **Also, some of the "deleterious" vocal behavior of choral singers may not be defined by inadequate warm-up or unusual expectations from the podium.  The amateur choral singer may choose to sing out of range as a personal adventure or may try to sing louder or softer than is healthy out of a lack of knowledge.  Being tired after a rehearsal may not be based on the directives of the ocnductor.  Monitoring the vocal behavior of every amateur or professional singer in a choir would be an impossible task, should a choral conductor wish to do so.  You may wish to consider these facts and account for them.  The article seems to imply that the conductor is ultimately responsible for the vocal fatigue of each singer.**

*We have removed all implications that the conductor is ultimately responsible for the vocal fatigue of each singer. We now believe that our manuscript impartially comments on the relationship between reported suboptimal vocal habits and vocal fatigue.*

We again wish to express our gratitude to the reviewers for their time and commitment in reviewing this work. Their contributions have resulted in a much better paper. We hope that they are satisfied with our responses and revisions.

Sincerely,

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References

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