

Collegiate Choral Singing and Perceived Health Benefits

An Interactive Qualifying Project
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Abstract

The objective of this project was to investigate the perceived influence of choral activities on human health. Based on the analysis of related published research papers, the group created a survey for the student members of Worcester Polytechnic Institute Choral Association. By analyzing survey results and comparing the collected data from the survey with data from background research, the group assessed the perceived benefits of choral singing and human health.

Table of Contents

Abstract	2
Introduction.....	4
Background	5
Methodology.....	11
Conclusion	24
Appendix A – Survey.....	25
Appendix B - Choral Singing & Human Health Reference.....	28

Introduction

According to Chorus America, 32.5 million adults sing in choirs, up by almost 10 million over the past six years since 2007 (*Horn, S. (2013, August 16). Singing Changes Your Brain | TIME.com. Retrieved April 18, 2015*)¹ This data shows that almost one tenth of the American population sings in chorus. Published research indicates that people, after participating in choral singing, perceive positive social, physical and mental effects.

To begin a coherent research strategy to understand how choral singing affects human health, both mentally and physically, the team researched all known published projects and research papers related to choral singing and health issues. It appears that under some specific conditions, choral singing did have perceived positive effects on mental and physical conditions according to surveys completed by singers.

The team next prepared a questionnaire for the WPI Choral Association that was based on their research they conducted. The team designed a survey to collect data from the WPI Choral Association and compared the results with the previous research results.

One important application of this research could be the use of singing in stressful environments, in order to improve human health and well-being.

Background

1. Mental Health

Choral singing is an activity that is performed worldwide. The team found eight research papers about choral singing's benefit to mental health. All of the research led to the same conclusion: choral singing can enhance human psychological wellbeing.

There is one research paper that suggested that choral singing could be a cost-effective way to enhance human wellbeing. It says that the experience of people using their voice to make music might be enhanced when they feel part of a cohesive social group, which advocates the conclusion that choral singing is good for human wellbeing. Other research listed some details of the benefits of choral singing: people could discover how to listen carefully, how to monitor their sound, get the chance to work on social skills and work on reducing their performance anxiety by singing with a group. As for the benefit of reducing anxiety, there is research that shows that singing in a choir is linked to decreased levels of anxiety, which also indicated benefits to mental health.

Another interesting piece of research was done in prison. Researchers did two experiments to investigate influences of performing in a prison choir. The primary purpose was to compare wellbeing measurements between prison choristers and inmates who were not part of the chorus. Researchers used the Friedman Well-Being Scale (FWBS) as the dependent measurement. They took measurements before and after performances of two prison-based choirs: an inmate-only group that performed in the correctional facility (experiment one) and another inmate-volunteer group that performed outside the correctional facility (experiment two). Results indicated no significant differences between the experimental and control groups in composite wellbeing scores

in both experiments. In experiment two, they found four significant differences in emotional stability, sociability, happiness, and joviality. By analyzing data from those experiments, they reached the conclusion that choral singing may enhance inmates' wellbeing. Participation in choral singing performances, particularly performing outside of the correctional facility, benefited inmates' perceived wellbeing.

There was also a study that explored the personal experiences of the choir members. In this study, semi-structured interviews were conducted with twenty-one members of the choir at three points in time: at the inception of the choir, after six months, and after twelve months. This research found three content themes after this study: the first aspect is the subjective impact. It is found that people with "choir" experience have many positive emotions, better emotional regulation and better spiritual experience. The second apparent difference is in social influence. Choir members seem to have an advantage in connectedness with other people. The last main difference is about functional outcomes. Choir members have better health and a higher employment rate than those who do not take part in a choir. Consequently, choral singing benefit mental health.

2. Physical Health

The team investigated ten publications relating physical health to choral singing. Five publications investigated the idea of choral singing as a kind of treatment for some kinds of diseases such as Parkinson. Three of the publications investigated how singing influences some specific parts of human body like the brain and heart in normal choral singing. One investigated the overall physical effects of choral singing.

It is very interesting that in a naturalistic design, the choral member's saliva was taken before, after rehearsal and during performance of Beethoven's *Missa Solemnis*. The measurements show that the mean levels of secretory immunoglobulin A, which is corresponding to improvement of immune system, increased significantly. Immunoglobulin A improves 150% during rehearsals and 240% during the performance. Cortisol concentrations, which are a stress hormone, decreased 30% during rehearsal and increased 37% during performance. It indicates that "the best multiple regression model for performance level of immunoglobulin A ($p < .0015$) included seven emotional, cognitive, and evaluative variables generally associated with choral singing"(Beck, R., Cesario, T., Yousefi, A., & Enamoto, H. (2000). Choral Singing, Performance Perception, and Immune System Changes in Salivary Immunoglobulin A and Cortisol. *Music Perception: An Interdisciplinary Journal*, 18, 87-106.) during rehearsals and performance, members could have a improved emotional state. Those feelings affect some indicators of human system such as immunoglobulin A, cortisol concentrations increase or decrease. Thus, it benefits the human immune system. It appears that singing has the power to influence human physical health as singing reduces anxiety, and a regulated emotional state would bring some positive effects to physical health. The research also indicates that choral singing has some indirect positive effects to human health while people are actually singing.

There is one publication *Voice and choral singing treatment: a new approach for speech and voice disorders in Parkinson's disease* (P. DI BENEDETTO , M. CAVAZZON, F. MONDOLO, G. RUGIU, A. PERATONER, E. BIASUTTI.) that describes a treatment for patients with Parkinson's disease that is called voice and choral singing treatment.

This treatment includes twenty hours of speech therapy and twenty-six hours of choral singing each week. The pre- and post-treatment assessment included many physical aspects of human body such as neurological evaluation, voice acoustic analysis and respiratory function evaluation. The results show that there are significant improvements of functional residual capacity (FRC%), maximum inspiratory pressure(MIP), maximum expiratory pressure(MEP) and maximum duration of sustained vowel phonation(MDPH) of those patients. In this case, the research indicates that choral singing is a possible way to directly improve human physical health as a treatment.

3. Statistical study

Statistical study also shows the perceived benefits of choral singing. This type of study is usually conducted by an organization that sent a survey to hundreds of participants. Overall, the team read four papers using this type of researches.

The research, *Choral Singing and Psychological Wellbeing*, surveyed over six hundreds choral singers drawn from English choirs. They completed the WHOQOL-BREF (the short form of the World Health Organization Quality of Life Questionnaire) to measure physical, psychological, social, and environmental wellbeing. The questionnaire surveyed four dimensions of life quality: physical (e.g. How much do you need medical treatment to function in your daily life?), psychological (e.g. How much do you enjoy life?), social (e.g. How satisfied are you with the support you get from your friends?), and environmental (e.g. How satisfied are you with the conditions of your living place?), with high levels of reliability and validity. Based on the results from the research, it was found that high average scores were found a high degree of consensus emerged on the positive

benefits of choral singing. Another major find is that women who perceived positive effects of singing more strongly than men.

In 2002, due to concerns of the previous study, the Research Centre for Arts and Health conducted the same survey to more than one thousand choral singers in Australia, England and Germany. The findings from the WHOQOL-BREF also demonstrate that a large majority of singers rate their quality of life as good or better. The results confirm previous findings from Clift and Hancox (2001) that a majority of choristers experience singing as beneficial for wellbeing.

With respect to positive benefits identified by choral singers, four areas stand out most clearly: the effects on breathing and lung function; posture and body control; relaxation and stress relief and physical activity and energy. Analysis of choral singers' answers has helped to suggest some of the hypothetical mechanisms at work that link the activity of singing to aspects of physical health. From the research, they found that choral singing is associated with strong immediate well-being effects. Positive emotional states increased and negative emotional states decreased significantly. These results confirmed previous studies on wellbeing benefits from choral singing.

The last research paper read by the team is that *How Children, Adults, and Communities Benefit from Choruses* conducted by Chorus America. Based on their research, chorus participation appears to make singers better team players, and chorus members also volunteer more frequently than the general public. Moreover, children who sing in choruses obtain significantly better grades in school than children who have never been part of a chorus. Parents credit chorus participation for these qualities in their

children, because they report that their child has many other qualities conducive to learning and development than parents of children who don't sing.

Although the team was only able to select limited research for this paper, there are some similar statistical studies conducted by different organizations worldwide. The common element is that wellbeing benefits from choral singing. From our the thorough background research from these three aspects, there is solid research for our project which will help prepare the team's survey and clarify the goal of this paper.

Methodology

1. Decision of the project

The Jazz History Database and Research project about choral singing & human health with which our team started. The first research objective was to determine if the project was a viable project to research and to make a decision about the final project.

Two of the team members started to research the jazz history database by collecting materials such as news, published articles and research reports in the school library and on the Internet. The group found one book, seven news articles and fourteen research publications that related to the project. After several weeks of researching the Jazz History Database, the team concluded that this project had limited potential development. There was not enough research to support the team's interests in the Jazz History Database research. The group found that this database had already been fully developed. For the Jazz History Database itself, there is already a complete system of obtaining information and collecting data. It only needs people to operate, which is not the original goal of this project.

The other member of the team did the research for Choral Singing & Human Health by locating five articles and three research publications, founding that most research in this area is still in theory. Though many people think that choral singing intuitively benefits one both mentally and physically, since singing makes people feel good, there is not enough experimental data to prove it. Comparing to the Jazz History Database project and project of Choral Singing & Human Health, the team decided to start research on Choral Singing & Human Health, since it had more unknowns to explore, which means it has greater research value.

2. Archival Research

After it decided to work on the Choral Singing and Human Health project, the group started the archival research to discover more information about the project topic. To find professional publications, the team used the WPI library website and Google scholar to search the research publications by searching keywords, for example: *choral singing benefits*, *choral physical health*, and *choral singing human*. In the end, nineteen academic research publications about choral singing benefits related to human health were found. Those research papers helped the group to learn about previous academic accomplishments and understand the background knowledge of this field.

To select useful papers for the project from those found publications, the group categorized these papers in three types: choral singing for mental health benefits, physical health benefits, and statistical research. Seven research papers about choral singing related to mental health, seven papers about choral singing related to physical health, and five papers about the statistical study of choral singing and human health were found.

Secondly, each of the team members started to read the papers from one of each category, and screened out the irrelevant papers to the project. The standard we applied for choosing papers was whether the research included the survey or scientific data needed for this project. If any one of the conditions were met, the paper would be selected; purely theoretical analysis publications were immediately removed. Finally, two papers were selected from each type to enable us to study the background knowledge of the project and develop our future work for the project.

In the end of the archival research, the conclusion was that choral singing promotes positive physical condition for physical health, and positive emotional states for

mental health. In addition, statistical studies also prove that choral singing benefits human health. These three key points from these publications helped the team to design the next stage, questionnaire, for the project.

3. Questionnaire Design

After finishing the archival research, the group designed the questionnaire, which would show how choral singing benefits singers both mentally and physically. The group designed a survey to use with the WPI Festival chorus, with the intent to design a questionnaire that contained a degree of certainty and specificity needed for the samples.

To make an effective and objective survey, the team had to choose the appropriate object of the survey. By suggestion, members of WPI Festival chorus were selected as respondents of the questionnaire, who have twice weekly rehearsals. WPI is an engineering college, which do not have music major. Students in the chorus are graded by attendance. There is no such competitive pressure of WPI Festival Chorus as those students who taking chorus as a career. So, this characteristic of the sample will guarantee the effectiveness of the survey. The first step was to decide the type and number of questions in the survey. People want to finish the survey as quickly and easily as possible. The group simplified the survey, so that it only had nine multiple-choice questions. The next step was to design the survey questions, to insure the effectiveness and objectiveness of the survey.

The questionnaire has four parts with nine questions in the survey. The first question determined the gender of the test subjects for more completed statistical analysis. The second question (e.g. Are you taking choral singing for credit?) determined if people were willing to participate in choral singing without any academic motivation. The third

question (e.g. Do you have any health conditions that affect your singing?) identified the health conditions of the test subjects.

In order to assess the feasibility of a potential experiment, which would propose to test the relationship between choral singing and physical health among these specific test objects, we designed questions four (e.g. If you are enrolled in a choral program for academic credit, would you consider participating in an academic research project in any given term?) and five (e.g. If you are enrolled in a choral program for academic credit, would you consent to a blood sample (pin-prick) taken before and after rehearsals in any given term?). The purpose of questions six (e.g. After rehearsal, do you feel better physically?) and seven (e.g. After performing in a concert, do you feel better physically?) was to collect data on the relationship that students felt between choral singing and their health. Questions eight (e.g. Do you think choral singing improves your academic ability?) and nine (e.g. Do you think that participating in the choral singing program at WPI helps you to release academic pressure?) asked if singer perceived that choral singing can help students with academic life.

The result should provide a general understanding of the relationship between human health and choral singing. The questionnaire was designed and published on “Qualtrics”. It was given out through group email to WPI Festival Chorus members at Dec 10th 2014. Most students responded immediately, and some of them finished the survey a few days later. The total responds are forty-nine students. Most of the surveys were finished within one minute. For further research could be done by designing experimental studies to discover the impact of choral singing to human health based on the results from the survey. In the future, a comparative survey such as taking samples of conservatory students could also be done to draw a more complementary conclusion.

Results

The questionnaire was designed and published on “Qualtrics”. It was given out through group Email at Dec 10th 2014. Most students responded immediately, and others finished the survey a few days later. The total responds are forty-nine students. Most of the surveys were finished within one minute.

The team designed the survey to obtain information of WPI chorus. The first three questions are to determine the test populations' background. As the tables and graphs showing, there are nineteen males and twenty females participating in the survey. Twenty-six people are taking the choral singing for credit and twenty-five people do not. And eight people have health conditions that affect their singing. Forty-one people do not have any problems, which affect their singing. The test data shows the overall picture of our test population.

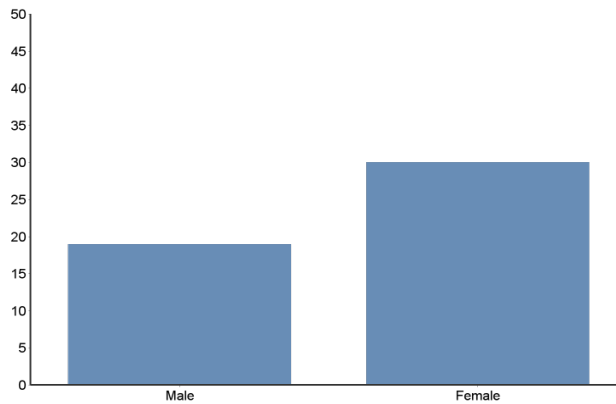


Figure 1: Gender

#	Answer	Bar	Response	%
1	Male	<div style="width: 38.78%; height: 10px; background-color: #4F81BD;"></div>	19	38.78%
2	Female	<div style="width: 61.22%; height: 10px; background-color: #4F81BD;"></div>	30	61.22%
	Total		49	100.00%

Table 1: Gender

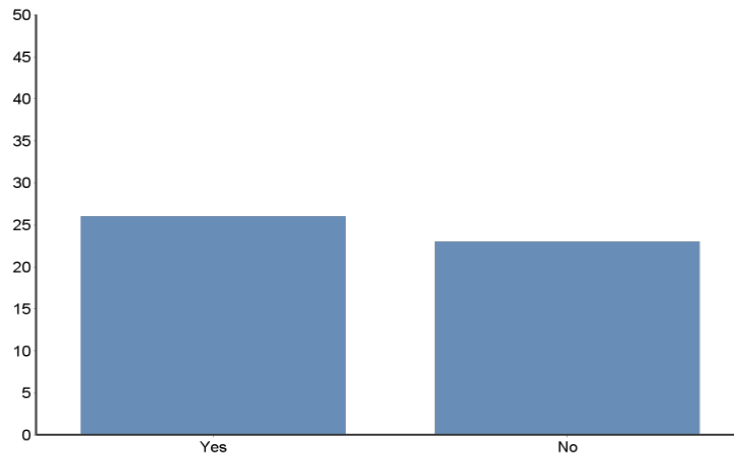


Figure 2: Taking for credits or not



#	Answer	Bar	Response	%
1	Yes		26	53.06%
2	No		23	46.94%
	Total		49	100.00%

Table 2: Taking for credits or not

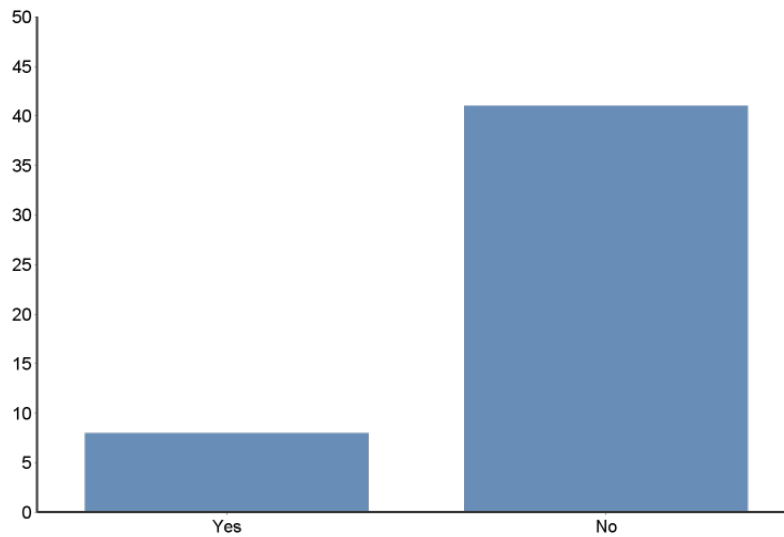


Figure 3: Have health conditions affect singing or not



#	Answer	Bar	Response	%
1	Yes		8	16.33%
2	No		41	83.67%
	Total		49	100.00%

Table 3: Have health conditions affect singing or not

Table 4, Figure4, Table 5 and Figure 5 shows the results of problem "If you are enrolled in a choral program for academic credit, would you consider participating in an academic research project in any given term?" and " If you are enrolled in a choral program for academic credit, would you consent to a blood sample (pin-prick) taken before and after rehearsals in any given term? " From the data, the team could obtain results that thirty-four people agree to participate in research project. The number of people agrees with blood taken is twenty-eight. The percentage of students who agree with participating in the academic research is 73.19%. And the percentage of students who agree with participating in the blood sample taken is 60.87%. Which the samples are large enough that there could be a further experiment to test blood before and after rehearsal to check if there are any indicators that are different to check if rehearsal actually has effects to human physical health. Also the number of students who agreed decreased. It may be for the reason that students regard blood taken as an invasion of privacy. There could be an alternative test such as saliva test, which may apply to more students.

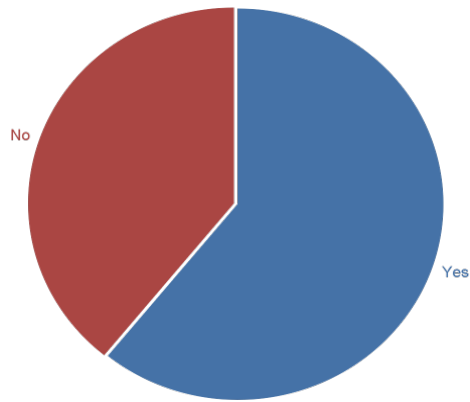


Figure 4: If you are enrolled in a choral program for academic credit, would you consider participating in an academic research project in any given term?

#	Answer	Bar	Response	%
1	Yes	<div style="width: 73.91%; height: 10px; background-color: #336699;"></div>	34	73.91%
2	No	<div style="width: 26.09%; height: 10px; background-color: #993333;"></div>	12	26.09%
	Total		46	100.00%

Table 4: If you are enrolled in a choral program for academic credit, would you consider participating in an academic research project in any given term?

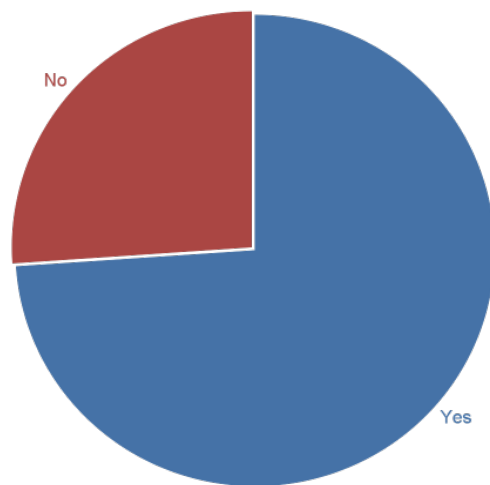


Figure 5: If you are enrolled in a choral program for academic credit, would you consent to a blood sample (pin-prick) taken before and after rehearsals in any given term?



#	Answer	Bar	Response	%
1	Yes		28	60.87%
2	No		18	39.13%
	Total		46	100.00%

Table 5: If you are enrolled in a choral program for academic credit, would you consent to a blood sample (pin-prick) taken before and after rehearsals in any given term?

Table 6, Figure 6, Table 7 and Figure 7 are the result of questions "After performing in a concert, do you feel better physically" and "After performing in a concert, do you feel better physically?". The results show that all students do not get negative feelings after rehearsal. Eight students feel much better. Twenty-seven students feel better and fourteen feel about the same. It could be possible to conclude that in the point view of students who participate in choral singing feels choral singing have positive effects on their physical health. After performing in a concert, five students feel much better, twenty-eight feels better and eleven students feel about the constant, five students feel worse. Comparing with the results of table 6, there are around five students shifted from much better to worse. Which may caused by the high pressure of performing in concert. Since this is a survey, it is not clear that whether students feel that choral singing have positive effects on their physical health because they actually feel good or they feel good mentally so that makes them thinking choral singing has decisive effects physically. It still needs some experimental data to prove it.

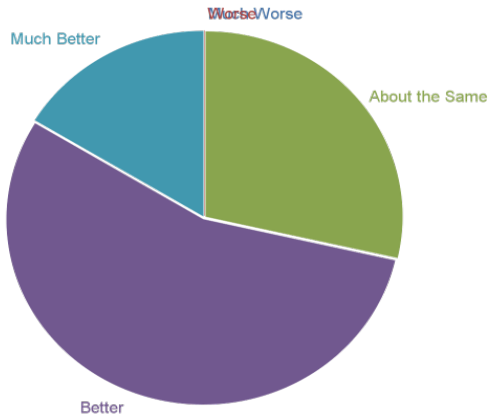


Figure 6: After rehearsal, do you feel better physically?

#	Answer	Bar	Response	%
1	Much Worse		0	0.00%
2	Worse		0	0.00%
3	About the Same	<div style="width: 28.57%;"></div>	14	28.57%
4	Better	<div style="width: 55.10%;"></div>	27	55.10%
5	Much Better	<div style="width: 16.33%;"></div>	8	16.33%
	Total		49	100.00%

Table 6: After rehearsal, do you feel better physically?

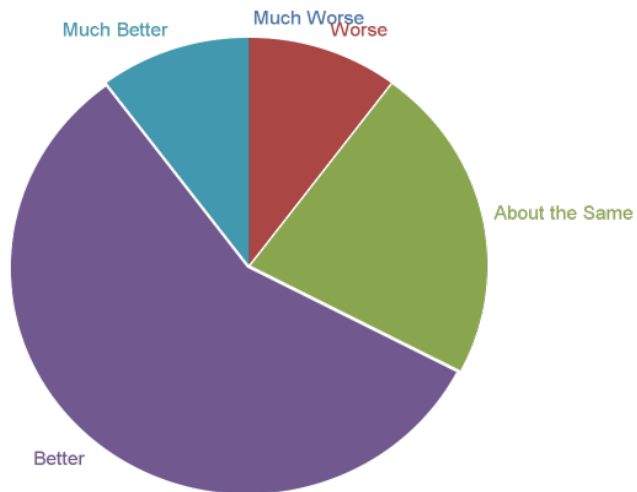


Figure 7: After performing in a concert, do you feel better physically?

#	Answer	Bar	Response	%
1	Much Worse		0	0.00%
2	Worse		5	10.20%
3	About the Same		11	22.45%
4	Better		28	57.14%
5	Much Better		5	10.20%
	Total		49	100.00%

Table 7: After performing in a concert, do you feel better physically?

Table 8, Figure 8, Table 9 and Figure 9 are the results for questions " Do you think choral singing improves your academic ability?" and " Do you think that participating in the choral singing program at WPI helps you to release academic pressure?" There are five students think participating choral singing does not help with improving academic ability and three students think participating choral singing does not help with releasing academic ability. 24.49% students think that choral singing helps them with academic ability a lot. 59.18% students think that choral singing helps releasing their academic pressure a lot. The result shows choral singing can help most students to release their pressures. And most students think choral singing has some benefits to their academic life.

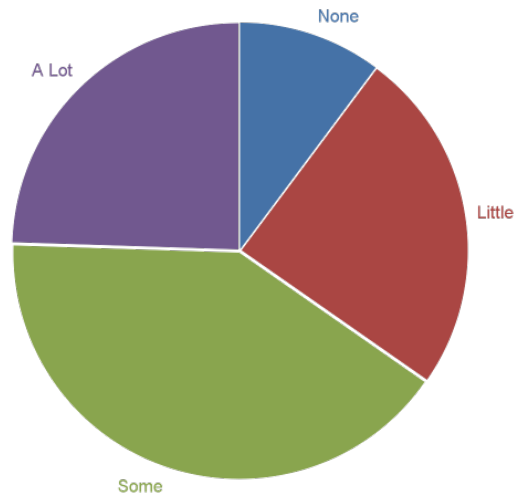


Figure 8: Do you think choral singing improves your academic ability?

#	Answer	Bar	Response	%
1	None	<div style="width: 10.20%;"></div>	5	10.20%
2	Little	<div style="width: 24.49%;"></div>	12	24.49%
3	Some	<div style="width: 40.82%;"></div>	20	40.82%
4	A Lot	<div style="width: 24.49%;"></div>	12	24.49%
	Total		49	100.00%

Table 8: Do you think choral singing improves your academic ability?

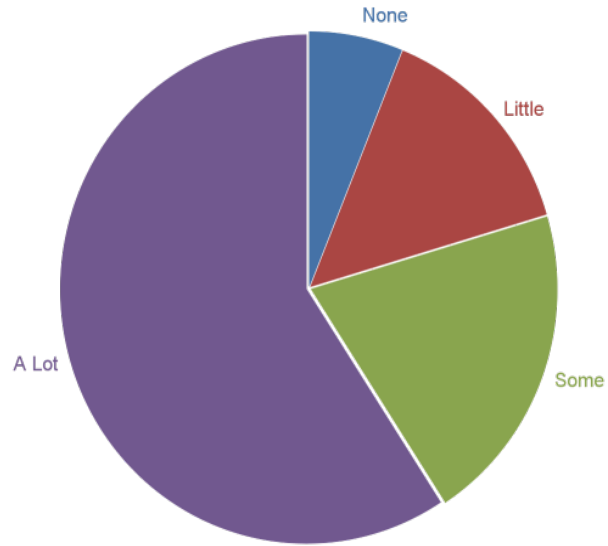


Figure 9: Do you think that participating in the choral singing program at WPI helps you to release academic pressure?

#	Answer	Bar	Response	%
1	None	<div style="width: 6.12%;"></div>	3	6.12%
2	Little	<div style="width: 14.29%;"></div>	7	14.29%
3	Some	<div style="width: 20.41%;"></div>	10	20.41%
4	A Lot	<div style="width: 59.18%;"></div>	29	59.18%
	Total		49	100.00%

Table 9: Do you think that participating in the choral singing program at WPI helps you to release academic pressure?

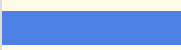

Conclusion

In this project, the group conducted analysis of 19 papers regarding the effects of choral singing on mental health, physical health and human health. The group concluded that choral singing was beneficial for both mental and physical health, which was also supported by the results from the questionnaire. The group also made a conclusion from the questionnaire that even in WPI, an engineering school with less humanity aspect, half of the students took choral singing without credits needs. This conclusion also supported that students were able to benefit from choral singing and choral students were willing to participate researches. On the other side, most students felt better physically after rehearsals, which indicated choral singing had positive effects on students in academic life.

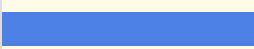

Further research could be done by designing experimental studies to discover the impact of choral singing to human health based on the results from the survey. In the future, a comparative survey such as taking samples of conservatory students could also be done to draw a more complementary conclusion.

Appendix A – Survey



1. What is your gender?

#	Answer		Response	%
1	Male		19	39%
2	Female		30	61%
	Total		49	100%

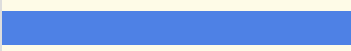

2. Are you taking choral singing for credit?

#	Answer		Response	%
1	Yes		26	53%
2	No		23	47%
	Total		49	100%

3. Do you have any health conditions that affect your singing?

#	Answer		Response	%
1	Yes		8	16%
2	No		41	84%
	Total		49	100%

4. If you are enrolled in a choral program for academic credit, would you consider participating in an academic research project in any given term?

#	Answer		Response	%
1	Yes		34	74%
2	No		12	26%
	Total		46	100%

5. If you are enrolled in a choral program for academic credit, would you consent to a blood sample (pin-prick) taken before and after rehearsals in any given term?

#	Answer		Response	%
1	Yes		28	61%
2	No		18	39%
	Total		46	100%

6. After rehearsal, do you feel better physically?

#	Answer		Response	%
1	Much Worse		0	0%
2	Worse		0	0%
3	About the Same		14	29%
4	Better		27	55%
5	Much Better		8	16%
	Total		49	100%

7. After performing in a concert, do you feel better physically?

#	Answer		Response	%
1	Much Worse		0	0%
2	Worse		5	10%
3	About the Same		11	22%
4	Better		28	57%
5	Much Better		5	10%
	Total		49	100%

8. Do you think choral singing improves your academic ability?

#	Answer		Response	%
1	None		5	10%
2	Little		12	24%
3	Some		20	41%
4	A Lot		12	24%
	Total		49	100%

9. Do you think that participating in the choral singing program at WPI helps you to release academic pressure?

#	Answer		Response	%
1	None		3	6%
2	Little		7	14%
3	Some		10	20%
4	A Lot		29	59%
	Total		49	100%

Appendix B - Choral Singing & Human Health Reference

Tonneijck, H., Kinébanian, A., & Josephsson, S. (n.d.). An exploration of choir singing: Achieving wholeness through challenge. Journal of Occupational Science, 173-180.

This qualitative study explored the experience of choir singing as an example of a leisure occupation.

Cohen, M. (2009). Choral Singing and Prison Inmates: Influences of Performing in a Prison Choir. Journal of Correctional Education, 60(1), 52-65.

The purpose of these two experiments was to compare well-being measurements between a group of prison inmates singing in a choir and prison inmates not singing in a choir.

Beck, R., Cesario, T., Yousefi, A., & Enamoto, H. (n.d.). Choral Singing, Performance Perception, and Immune System Changes in Salivary Immunoglobulin A and Cortisol. Music Perception: An Interdisciplinary Journal, 87-106.

the purpose of this study was to determine whether choral singing is associated with physiological changes in the immune system.

Clift, S., Hancox, G., Morrison, I., Hess, B., Kreutz, G., & Stewart, D. (2007). Choral singing and psychological wellbeing: Findings from English choirs in a crossnational survey using the WHOQOL-BREF.

The present paper reports some preliminary findings from the English arm of the study.

Clift, S., Hancox, G., Morrison, I., Hess, B., Kreutz, G., & Stewart, D. (n.d.). Choral singing and psychological wellbeing: Quantitative and qualitative findings from English choirs in a cross-national survey. Journal of Applied Arts and Health, 19-34.

Recent qualitative studies on the benefits of community singing have shown that diverse samples of singers report a range of social, psychological, and health benefits associated with singing.

Kreutz, G., Bongard, S., Rohrmann, S., Hodapp, V., & Grebe, D. (2004). Effects Of Choir Singing Or Listening On Secretary Immunoglobulin A, Cortisol, And Emotional State. Journal of Behavioral Medicine, 27(6), 623-635.

The present study investigates the effects of choir music on secretory immunoglobulinA(S-IgA), cortisol, and emotional states in members of a mixed amateur choir.

Sandgren, M. (n.d.). Evidence for Strong Immediate Well-being Effects of Choral Singing – With More Enjoyment for Women than for Men.

Choral singing as a leisure activity is associated with increasedwell-being effects.

America, C. (n.d.). How Children, Adults, and Communities Benefit from Choruses The Chorus Impact Study.

The study was conducted by Grunwald Associates LLC (Bethesda, MD), who examined the attitudes, opinions, and activities of more than 2,000 singers in choruses of all kinds, 500 members of the general public, 500 parents, and 300 K-12 educators from throughout the United States using online surveys.

Dingle, G., Brander, C., Ballantyne, J., & Baker, F. (n.d.). 'To be heard': The social and mental health benefits of choir singing for disadvantaged adults. *Psychology of Music*, 405-421.

The aim of this study was to explore the personal experiences of choir members (89% of whom experienced chronic mental health problems, 28% physical disabilities and 11% intellectual disability) in relation to their wellbeing using interpretative phenomenological analysis (IPA).

Clift, S., Hancox, G., Morrison, I., Hess, B., Kreutz, G., & Stewart, D. (n.d.). Choral singing and psychological wellbeing: Quantitative and qualitative findings from English choirs in a cross-national survey. *Journal of Applied Arts and Health*, 19-34.

Over 600 choral singers drawn from English choirs completed the WHOQOLBREF questionnaire to measure physical, psychological, social and environmental wellbeing, and a twelve-item 'wellbeing and choral singing scale'.

Horn, S. (n.d.). *Singing Changes Your Brain.*

When you sing, musical vibrations move through you, altering your physical and emotional landscape.

Gridley, H., Astbury, J., Sharples, J., & Aguirre, C. (n.d.). *Benefits of group singing for community mental health and wellbeing Survey and literature review.*

The aim of the VicHealth-funded project presented here was to explore the mental and social health benefits of singing in groups for both the individual singers and for the community.

Skingley, A., Page, S., Clift, S., Morrison, I., Coulton, S., Treadwell, P., ... Shipton, M. (2013). "Singing for Breathing": Participants' perceptions of a group singing programme for people with COPD. *Arts & Health*, 1-16.

The guide draws upon the experience of COPD patients in a number of well-established community singing for COPD groups as well as musicians with considerable experience of running such groups.

Vella-Burrows, T. (n.d.). *Singing, Wellbeing and Health: Context, evidence and practice Singing and people with Dementia.*

This guide provides an overview of the evidence that group singing can be beneficial for people living with dementia. It also gives examples of setting up singing groups for people living in the community who are affected by dementia.

T., V., & Hancox, G. (n.d.). Singing, Wellbeing and Health: Context, evidence and practice Singing and people with Parkinson's.

This guide provides an overview of the evidence that group singing can be beneficial for people living with Parkinson's.

Morrison, I., & Clift, S. (n.d.). Singing, Wellbeing and Health: Context, evidence and practice Singing and Mental Health.

This guide provides an overview of the evidence that group singing can be beneficial for mental health and wellbeing.

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P. DI BENEDETTO , M. CAVAZZON, F. MONDOLO, G. RUGIU, A. PERATONER, E. BIASUTTI. Voice and choral singing treatment: a new approach for speech and voice disorders in Parkinson's disease

The aim of this study was to propose a new voice rehabilitation program for Parkinson's Disease (PD) patients based on voice and choral singing treatment (VCST).