THE USAGE OF HEALTHY SINGING VOICE AMONG COMPREHENSIVE SCHOOL STUDENTS IN ESTONIA

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Abstract
A significant level of musical knowledge and skills can be obtained through use of our voice and teachers can play a major role in ensuring that students in all age groups are aware of the most appropriate way to use their voice; this is especially the case if individuals use their voice frequently, and for prolonged periods of time in a range of choral activities which are above and beyond their musical life in school. This paper explores the responses obtained by questionnaire from 332 students and 9 experienced choral educators. Our results suggested that the level of knowledge of how best to achieve, and maintain good vocal health was limited in both of our research populations but the desire to learn more was consistently present.
Keywords: *singing, choir singing, voice, student, music teacher*

Backgrounds

In contemporary education, the teaching and learning of music can be of major importance to young people and children in terms of developing their emotional intelligence (Kaschub, 2002; Resnicow et al., 2004; McGinnis, 2017) given that music is known as the language of emotions (Davies, 1983; Schellenberg, 2011). Nowadays, we are all consumers of different music styles and in particular, the worldview of young people is frequently defined by the music they listen to, identify themselves with, and musically, they frequently imitate, and emulate the way of singing exhibited by their favourite artists. The easiest tool to access for making music has always been the human voice. In music lessons teachers undoubtedly know how important it is to skillfully engage all different student voices together as a whole.

Of utmost importance when working with young peoples' voices is the ability to notice the students' use of their voice, and teaching students how to use a healthy singing voice

during their time in the comprehensive school, can provide them valuable knowledge and skills which can be of use throughout their entire life span. Jahn (2013) has described that singing at a high level can be learned in the same way as other skills through developing, and gaining a conscious awareness and control over what begin as unconscious and reflexive actions, such as movements of the larynx and breathing. Chipman (2008, 2017), for example, argued that if a singer is more aware of how to keep open the back space of the vocal box and to use the optimal amount of energy for breathing, then the tone generated can fill all the open resonance areas which in turn can amplify and project it. Hoch and Lister (2006) pointed out that in vocal production the particularly important features are respiration, phonation and resonance whilst Dimon (2018) highlighted how breathing can actually increase the space within the chest cavity by altering the size of the chest, rather than changing any particular quality or characteristic of the air.

Additionally, the physical fitness of the singer and the tone of the body are also linked to vocal health and have been shown to impact in a significant way on the sound which the singer is producing (McHenry & Evans, 2016). Currently, research studies into voice quality have frequently discovered the relative importance of the physical preparation side of the singer (Kiik-Salupere & Ross, 2012; Leborgne & Rosenberg, 2014; Friedlander, 2018).

Of singular importance for music teachers is the knowledge and ability to recognize the difficulties which students experience in their singing during the period of adolescence when their voice is changing. The knowledge, guidance and advice of teachers regarding healthy voice use during this period cannot be underestimated (Baressi, 2000), and is equally applicable to both male and female students (Hollien, Green & Massey, 1994; Williams, 2013; Fisher, 2014; Sweet, 2018). Scearce (2016) has argued that taking care of the voice is of utmost importance for optimizing vocal health for anyone, and this is especially the case for singers. Similarly, Freer (2009) reported on the fact that students who understand some of the basic concepts of vocal physiology possess invaluable information which can help them musically through their life, whilst Kiik-Salupere and Marshall (2017) in their investigation with singing students in non-formal studios reported that solo singing was primarily studied in order to develop vocal technique and gain a confidence to overcome performance anxiety.

Singing has a firm role in music lessons in general comprehensive secondary schools in Estonia, and it is essential to provide students with the correct level of vocal tuition with regard to healthy voice use from the very beginning of their singing studies. In addition to the school music lessons, many young people wish to sing in a choir or as soloists. It is therefore important for teachers and choir conductors to pay attention to the vocal health of their singer. Since the voices of young people are still at the stage of development, and their voice perception may rapidly change during puberty, it is essential to observe and take note of students' voice use, and should the need arises, teachers need to competently and promptly advise them. Using the singer's voice with excessive tension may cause long-term vocal problems. Given that the voice, as an instrument, is always with us and always 'at hand' to make music, teachers should definitely provide students with knowledge about the healthy functioning of the voice and how to keep their voice in a good working order and in good health.

Hereby, in this current study, we will highlight the usage of the healthy singing voice particularly through the lens of students, and on the other hand, through the commentary of the music teachers who have significant levels of expertise in the field.

The current study had two main aims:

1) To investigate how young singers perceive the usage of healthy voice and to clarify what knowledge they had of their own voice;
2) To explore the level and type of knowledge which expert music teachers possessed, and to better understand their perspective.

In response to our first research aim, our participants were students who engage intensively in choral and solo singing in addition to the school music lessons.

Research questions were:

- *How do young singers actually assess their voice usage?*
- *What singing-related knowledge do they have?*
- *How do these students assess their individual need for voice-related knowledge?*

Methods

The two studies were conducted in March 2018 in Estonia and employed a combination of quantitative research and qualitative content analysis. The first study involved students from local comprehensive schools who were active singers in choirs or active as a soloist. Our participants were 332 comprehensive school students aged 11-19. The research population consisted of 54 males and 278 females from 15 different counties in Estonia. This investigation aimed to highlight students approach to their singing voice, to clarify how they are aware of voice healthy functioning and what kind of difficulties they perceive according to singing.

Our data collection method employed an Internet-based Google survey form for students. Prior to the questionnaire being distributed, a pilot study was carried out with seven comprehensive school students active in singing. This enabled us to clarify the intelligibility of the questionnaire. As a result of the pilot study, a number of changes were made in the order of questions within the questionnaire, making the questionnaire topics clearer. Some minor issues in the wording of questions were also carried out to remove a number of possible ambiguities and misunderstandings. Overall, feedback from the pilot suggested that the questionnaire was clear and user-friendly. In total, the original questionnaire consisted of 60 questions and divided into seven topics concerning the voice. Overall, the questionnaire consisted of 52 statements, three multiple choice questions, one yes/no question and one open ended question. Additionally, there was space for free comments on the subject. The 52 statements employed a five-point Likert Scale for responses. In this study, we analysed 15 statements from the questionnaire which focused on the students' use of a healthy singing voice. The quantitative data was analysed by Google Forms spreadsheets, whilst our qualitative data employed text analysis by categorization, comparison and analysis.

In addition, written interviews were carried out with nine experienced music teachers in order to gain their individual perspectives. Our research population consisted of nine

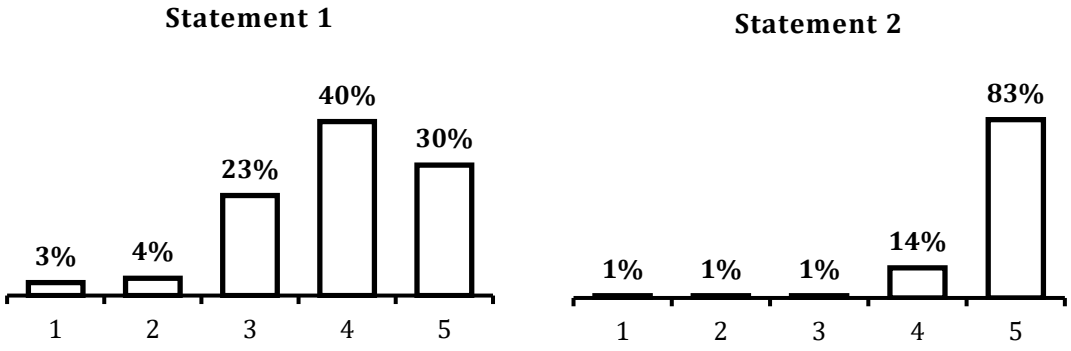
music teachers who were all experienced in their field, with significant levels of practical experience as a school choir conductor, and guide of solo singing. The number of teaching years in schools amongst our participants ranged from 26 to 46 years. Interviews were carried out following the analysis of the student questionnaires, and interview questions were developed out of the results of the questionnaires. The questions for music teachers consisted of 12 questions on a range of topics including: the music teachers' general knowledge of voice; approach to breathing exercises, necessary singing exercises; and the identification and assistance with problems associated with young voices. Further questions related to choir rehearsal techniques, planning for important performances, and keeping young voices fresh.

Results and Discussion

The students' responses to the 15 statements of the questionnaire were as follows.

1. Statement "Breathing exercises are useful before the singing"

The Statement "Breathing exercises are useful before the singing" was rated highly (see Figure 1). 232 respondents (70%) positively agreed with this statement, whereas 76 students remained uncertain, whilst 8% of the respondents did not consider breathing exercises useful. We therefore concluded that students who actively engaged in singing, considered it beneficial to do breathing exercises before singing. This attitude towards breathing exercises chimes significantly with professional singers who find such exercises to be of importance, for example, as they contribute to their instrument perception and general wellbeing.



Figures 1-2. Distribution of ratings to statements 1 and 2 (N=332)

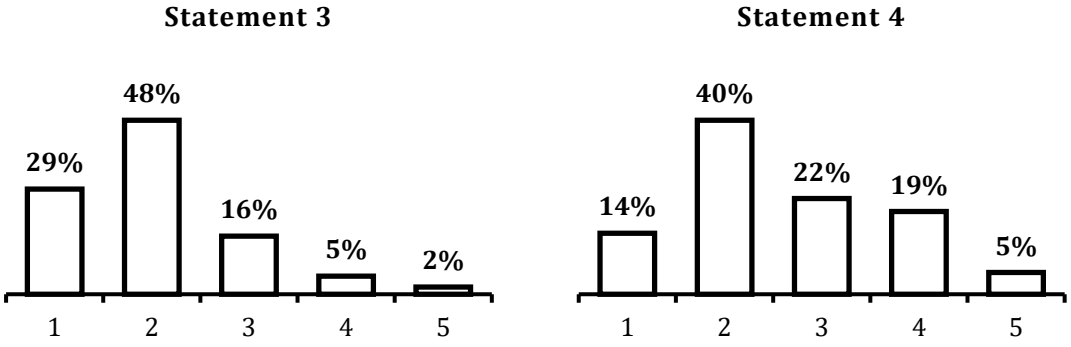
2. Statement "Vocal exercises are important before singing"

97% of the participants agreed with the second statement, of which 'completely agree' accounted for 83% and 'mostly agree' for a further 14% (see Figure 2). The remaining respondents neither agreed or were indecisive. Vocal exercises before singing are necessary in order to develop and shape the singer's instrument perception. Vocal exercises can give singers the added confidence of knowing that their voice sounds freely and resonates as expected, and can be compared to the warm-up exercise in which athletes are required to partake. The aim is to also gradually warm up muscles and optimise their perception. Therefore, the music teachers who teach singers need always to be alert to their students being attentive to the wellbeing of their voice, and

the gradual achievement of the freedom of sound while 'warming up their muscles'. People do not immediately have freedom of sound, but it can be achieved through vocal exercises.

3. Statement "After singing warm-ups my voice is always tired"

Figure 3 highlights the issue of vocal fatigue. Our purpose was to explore the students' attitude towards the effect of vocal exercises from the point of view of voice health. The majority of our respondents tended to disagree with statement 3, with 77% of the respondents reporting feeling no fatigue in their voice, while 52 respondents were undecided and 7% agreed with this statement. Appropriate and well executed voice warm-up exercises should definitely not have a tiring effect on voice, and students who report some sense of vocal fatigue may well be engaging in inappropriate or damaging vocal activity.



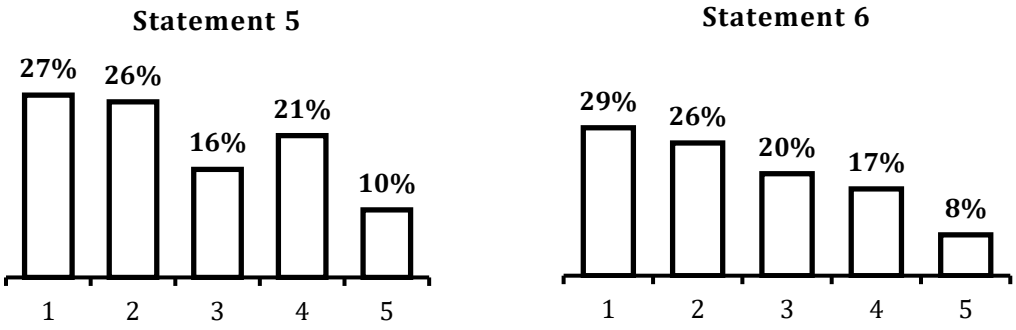
Figures 3-4. Distribution of ratings to statements 3 and 4 (N=332)

4. Statement "After singing my voice is always tired"

More than half of the 332 respondents (54%) disagreed with this statement, which is a good sign (see Figure 4). On the other hand, totalling up the remaining responses showed that nearly half of the respondents actually agreed with the statement, with 24% of the respondents agreeing and 22% not giving a definite answer; a response which should cause teachers to increase the level of attention to the way in which their pupils are singing.

5. Statement "I continue singing even feeling sore in the throat"

In response to this statement (see Figure 5), 53% of the respondents did not agree with the statement, with the remaining half either agreeing, or remaining undecided. Further research would need to explore this issue further to determine the precise reason for this phenomenon. Inappropriate planning of repertoire requiring constant and significant levels of singing at high volume, or simply taking part in too many vocal activities are problematic for vocal health and need to be addressed swiftly those in charge.



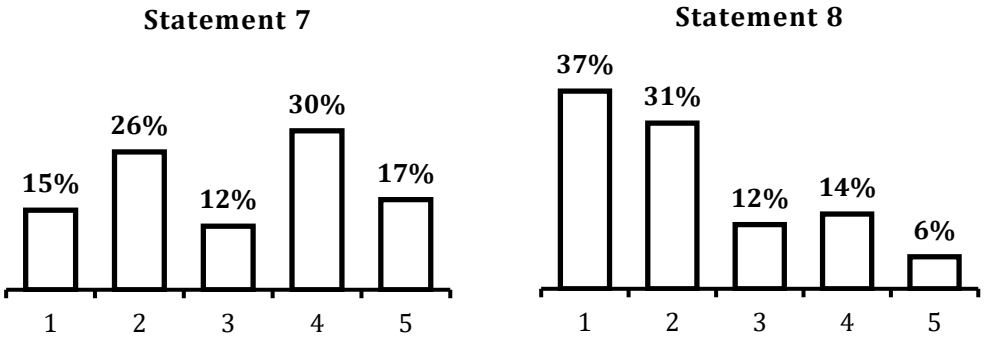
Figures 5-6. Distribution of ratings to statements 5 and 6 (N=332)

6. Statement "Singing loudly is often difficult"

25 % agreed with the statement (see Figure 6), 20% were undecided whilst 55% of the respondents did not see a problem in singing loudly.

7. Statement "Singing in the high vocal range is often difficult"

In response to this statement (see Figure 7), 47% of the respondents completely agreed, whilst 12% were doubtful and 15% reported having no difficulty at all with high notes, while the rating for 'mostly disagree' was given by 26% of the respondents. It is often the case that in singing high notes, the novice singer has a tendency to raise their larynx and therefore involuntarily limiting the inner vocal tract space, where actually the resonance has occurred. According to the laws of physics the singer must generate the optimal openness in the throat in order to allow the tone to resonate. This is a question of singers' subjective inner perception.



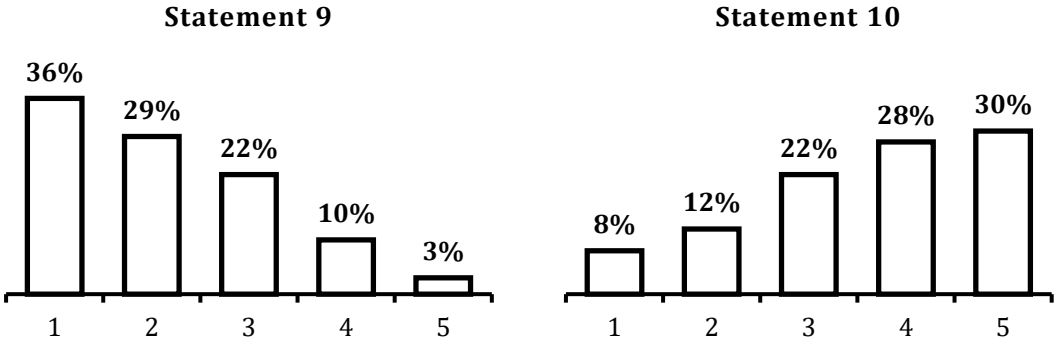
Figures 7-8. Distribution of ratings to statements 7 and 8 (N=332)

8. Statement "Singing in the lower vocal range is often difficult"

The majority of the singers reported that they did not experience any problems with singing in a low tessitura and the statement received mainly negative ratings, with 68% of the respondents reporting not experiencing any difficulties in singing low notes (see Figure 8). We are also aware that while singing low notes, our vocal cords are more relaxed whilst the opposite is true for high notes as the vocal cords tighten. Therefore, if low notes do not sound, the problems are often acoustical but in the worst case scenario, this could indicate more serious problems with that the vocal folds.

9. Statement "I have a poor vocal technique"

65% of the students did not agree with the statement which suggests that the majority view their vocal skills as being good (see Figure 9). Nevertheless, 13% assessed their vocal skills as low and 22% were undecided.



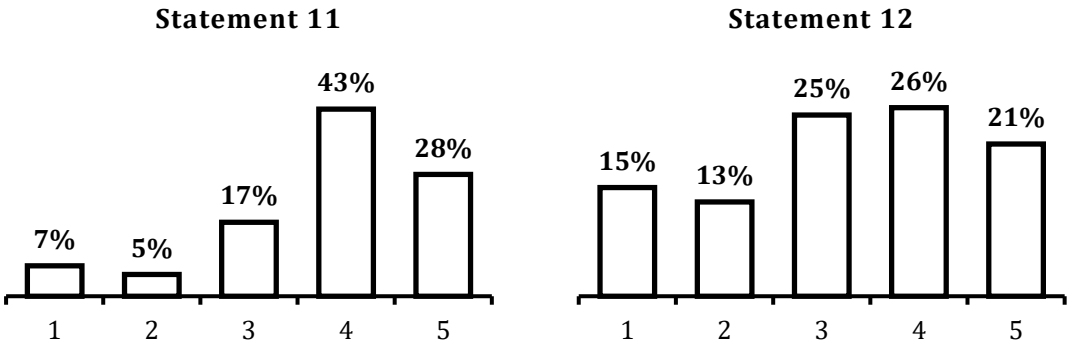
Figures 9-10. Distribution of ratings to statements 9 and 10 (N=332)

10. Statement "I would like to get more vocal tuition"

In spite of the relatively good ratings of their skills, students tended to agree with this statement with 58% wishing for more knowledge, whilst 20% did not feel the need for additional knowledge, and 22% were not certain (see Figure 10). Again, further research could delve further into this response in order to better understand in a more precise way if some individuals feel their current level of vocal knowledge is adequate and appropriate to their needs and wishes, or if they simply wish to disengage from more formal vocal education.

11. Statement "I know how the vocal cords work"

We can consider it a good outcome that the majority of the respondents agreed with the statement (see Figure 11) and only 12% did not know about the functioning of vocal cords, and 17% doubted their knowledge.



Figures 11-12. Distribution of ratings to statements 11 and 12 (N=332)

12. Statement "I know how the diaphragm functions"

47% of the respondents agreed with this statement (see Figure 12), but still 82 students out of the 332 respondents were not certain about their knowledge and 92 students admitted to having very limited knowledge.

Following on from this statement, respondents were offered the opportunity to respond to the open-end question: *"Describe in your own words what the phrase "singing with support" means to you?"* This question received a large number of significantly varied responses:

- Student 1 (female, 15 years old, a member of a girls' choir for 3 years) stated: *"For me singing with support means that I don't sing only through my throat but I have appropriate and informed breathing to support it, which is the basis of healthy voice usage";*
- Student 3 (female, 14 years old, 6 years in a children's choir) simply responded with *"Supported by the piano";*
- Student 17 (female, 14 years old, a member of a girls' choir for 4 years, has been singing as a soloist) wrote: *"Holding you up with the muscles";*
- Student 227 (male, 16 years old, 10 years in a boys' choir) responded with *"The teacher sings along";*
- Student 231 (male, 18 years old, 3 years in a mixed choir) felt that supported meant: *"Feet firmly on the ground, but no tension in the body";*
- Student 310 (female, 17 years old, 10 years in a mixed choir, has been singing as a soloist for 12 years) responded with *"Not singing with your voice but singing with your stomach";*
- Student 8 (male, 17 years old, 10 years in a mixed choir, boys' choir and as a soloist) said: *"When singing with support, the voice is firmly in place and it is easier to control it";*
- Student 9 (female, 15 years old, 8 years in a mixed choir, has sung as a soloist) reported: *"The voice is raised, no pain, helps to hold the right note"*.

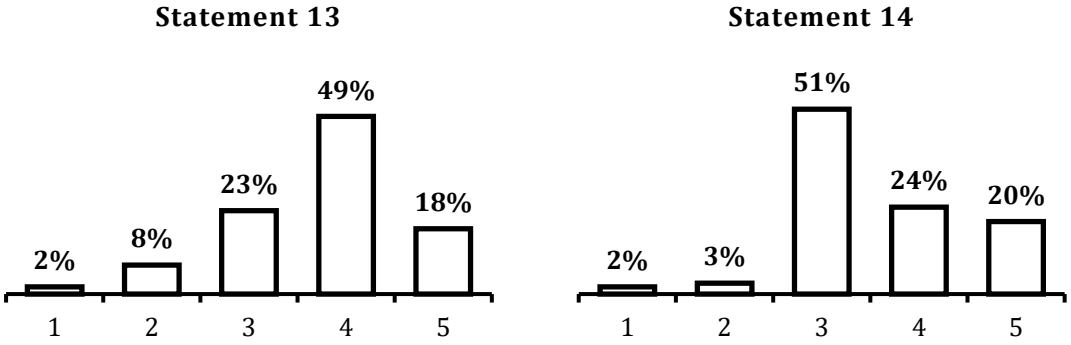
Other comments on the subject included: *"I don't know", "I haven't heard", "I cannot explain", "When accompanied by an instrument", "The head is straight, and I'm breathing more with my stomach than with my chest", "It is correct to use the diaphragm", "Stomach is tense", "When air does not pass through you", "You feel relaxed and are not tense".*

From these responses, we can conclude that the students' knowledge about singing with support (*appoggio, appoggiare* in Italian) varies widely and is often of relatively little help to their singing. *Appoggio*, translated into English and Estonian, means 'leaning' and is actually a confusing term. What is it one needs to lean towards? The famous 19th century Italian singing teacher Giovanni Battista Lamperti, as did many other well-known singing pedagogues, viewed the term *appoggio* in the way that contained the whole perception of the 'singer's instrument'; that in addition to deep breathing and perceiving the air and muscles while singing, it also included the open throat and nasal cavity, and a certain internal sense of resonance, which allowed the desired acoustic outcome to be achieved. Thus, for singing 'with support', we should develop the whole body, the optimum perception of air and resonators, an optimum tone in our muscles without slackness or excessive tension. The same applies to athletes, who are expected to perform without slackness or excessive tension, but with optimum tone. The aim would be for the singers to achieve the maximum richness in sound with minimal muscle effort. That is the reason why the development process of

classical and acoustic singers is so long, they need to fine-tune and develop their instrument perception until they achieve the optimum sensation for the desired outcome. Confusion is created when in order to translate the term *appoggio* an effort is made to use a short phrase or one word only to describe this perception that consists of many components and is necessary for outcome, for as though 'effortless' and sonorous singing.

13. Statement "I know what is useful for the voice"

The statement received positive ratings from 67% of the respondents, and 23% stated they were uncertain about their knowledge(see Figure 13). Thus for teachers, here would certainly be a possibility for giving and adding additional knowledge about the subject.



Figures 13-14. Distribution of ratings to statements 13 and 14 (N=332)

14. Statement "Lack of sleep affects the voice negatively"

We were also eager to know how singing students assess the need for sleep in relation to their voice (see Figure 14). 60% of the respondents agreed with the statement, which suggests that the students considered sufficient sleeping time to be linked to, and to be beneficial for their singing voice. However, 33% were undecided. It is also known among the professional singers that sufficient and effective sleep is certainly the primary remedy for voice by offering peace and recuperation. Too little sleep often causes the feeling of dryness and fatigue in a singer's voice. Sleep also affects the general tone of the body.

15. Statement "Sportive lifestyle influences the voice in a positive way"

By including this statement (see Figure 15), we hoped to understand better how young people relate an athletic lifestyle to singing. 44% of the respondents gave a positive rating, and yet 51% of respondents were not certain about their assessment. A sporting lifestyle most certainly benefits singing, because the general physical wellbeing of a person has also an effect on the voice as part of the whole. What is good for a singer's body, is also good for their voice. It is possible that teachers may have to explain further to singing students in a greater detail how physical wellbeing is related to the wellbeing of their voice, and to clarify that their voice is not a standalone phenomenon but is directly affected by the body's state of health.

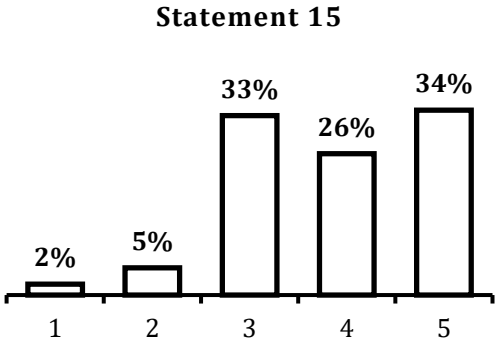


Figure 15. Distribution of ratings to statements 15 (N=332)

The survey revealed that the main vocal problems which students engaged in choral or solo singing experienced, were problems with their vocal cords not closing properly, inflammations of vocal cords, severe voice mutation in girls (which has received limited discussion) and a frequent loss of voice after excessive strain on vocal cords.

The most common answer to the question about the methods of treatment used to recover the damaged voice was drinking warm tea. The most popular foods used to improve voice were honey, lemon, ginger and garlic. The use of throat lozenges and throat sprays was mentioned as well as inhaling hot steam; all of which are good remedies for immediate help, and of further interest was the fact that singers first and foremost used natural medicines. As is well known, non-natural medicines can sometimes cause undesirable side effects such as dryness of the mouth and affect even whole singers' perception.

The second investigation which was conducted with nine expert music teachers provided a range of different and sometimes inconsistent answers. All music teachers reported that they were aware of the condition of their students' voices and the type of guidance and advice to give, based on a healthy approach to singing. However, they also pointed out that much of their knowledge had been gained primarily from their vocal training of choirs. For instance, all participants reported on how they had gained knowledge of a variety of new and exciting breathing and voice exercises, but they understood far less and were unable to explain the precise reason as to why such exercises were beneficial, and for what reason particular exercises were effective.

The music teachers in our population appeared to be well aware of the issues surrounding the changing voices in adolescent boys, and the topic was far more familiar to them. In contrast. problems or other issues related to the voice changing in adolescent girls and any knowledge of how to address any such problematic issues, was less well known. Though, some music teachers admitted the need of in-service training on the topic, whilst others claimed to have sufficient knowledge already.

For instance, music teacher 1 responded to the question *"Name three breathing and vocal exercises that you usually do, and please explain why they are beneficial*" as follow: *"The foremost breathing exercise is hissing ss-ss-ss-ssssh, then secondly sudden breathing in while looking forward and exhaling briefly when turning the head to the right, and then again breath in when looking forward and breathing out when turning face on the left. That exercise must be done several times. That is quite good one. And third one that is*

good for children is during breathing in, you raise your hands above your head really high and yawing on the same time, and after that lower your hands and relaxing. As the vocal exercises I use consonants kk-pp-tt, it makes mouth bit dry, but it is beneficial when singing songs. Exercises on the vocals I'm using on three notes 1-2-3-2-1 la-la-la (la-like in Italian language), in sequences 1-3 -5-3-1 oi, oi, oi (oi-like in Italian language) and scales."

Music teacher 3 described the benefits of vocal exercises as follows: *"They help direct the voice, develop skills of listening to each other's voice, develop gaining to whole choir smooth and even tone, hit a right note, widening the range of the voice and diction improvement."*

As can be seen, the music teacher appeared to be unable to explain to their singers, why those particular exercises were beneficial and appropriate. Nor could they explain the precise purpose of using those exact exercises. The objective was seen as being to listen to each of the other voices, and focusing on the even quality of the tone. Whilst this may well be a laudable aim for the choir, it does not help to develop the singer's own perception as to how to consciously direct the voice in a better way. If a singer is surrounded by other naturally good singers, this can be a favourable environment for each of the singers, but in the other case when one is not supported or surrounded with good singers, then this situation can be rather difficult to keep a free and sonorous tone quality without tension.

The music teachers reported having significantly heavy workloads in each school and one teacher mentioned that parents were not very interested in the condition of their child's voice. Thus, it was felt that as a teacher, they did not have time to take note of, and deal with children who were experiencing voice problems.

For example, music teacher 5 stated: *"Unfortunately, parents do not consider children's voice issues to be very important. Music teachers who usually teaches approximately 500 children a week, there is not always time and opportunity to notice children with voice problems."* Music teacher 7 added to this: *"I think that how to keep the voice in a good condition and how to use it wisely, should be talked more often and this should start already in kindergarten. I do it myself."*

Theoretically, all music teachers were aware of what is beneficial and appropriate for a voice and what should be avoided. For example, music teacher 8 pointed out: *"Consciously singing, the right way of breathing, body alignment, and knowhow how to produce a sound."* Music teacher 9 stated: *"Beneficial for the voice is a rest time and singing without tension."*

In terms of harmful factors which may affect the vocal health and quality of voice, music teachers brought up most frequently: shouting, smoking and imitating pop artists with false vocal techniques.

Additionally, interviews with music teachers revealed that teachers themselves had a voice problem because of the great load place on their voice every day, and all participants expressed an interested in acquiring more knowledge about the health care of the voice and admitted that more training would be beneficial to topics voice of adolescent boys and girls.

Conclusions

1. Music education is, and has been intertwined with vocal music, with children song singing from the beginning of their school years and continuing as an adolescent throughout their years of study. Music teachers are the authorities in this educational field, thus, it becomes vital to investigate how current students feel about topics concerning the voice, about their prime and most available musical 'instrument' and how to access knowledge from contemporary music teachers with significant levels of experience.
2. Outcomes from this study suggested that students did not have a clear understanding as to how their voice worked, or necessarily how to look after it. Young singers appear to need more guidance from teachers, and help to learn how to look after, and effectively treat their voice as a subject, and acquire the necessary skills to adjust their voice accordingly. Information from all our respondents suggested that most of them would like more knowledge about healthy voice usage. Most frequently, students claimed problems with voices such as the sore throat caused by straining the voice during singing and voice hoarseness caused by common viral infections such as colds or flu. Most common is a cough which affects the voice and foremost the vocal chords making the singing difficult.

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