

Comparing Vocal Health and Attitudes to Voice care in Primary Teachers and Voiceover Artists – A Survey Study Using the Health Belief Model

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Summary: Objectives. A range of professions experience high demands on their voices and are potentially at risk of developing voice disorders. Teachers have been studied extensively in this respect, while voiceover artists are a growing professional group with unknown levels of voice training, voice problems and voice care attitudes. To better understand profession-specific voice care requirements, we compared voice training, voice care habits and self-reported voice problems of these two professional groups and measured attitudes to voice care, informed by the Health Belief Model (HBM).

Study design. The study was a cross-sectional survey study with two cohorts.

Methods. We surveyed 264 Scottish primary school teachers and 96 UK voiceover artists. Responses were obtained with multiple-choice and free-text questions. Attitudes to voice care were assessed with Likert-type questions that addressed five dimensions of the HBM.

Results. Most voiceover artists had some level of voice training, compared to a minority of teachers. Low numbers of teachers reported regular voice care, compared to over half of voiceover artists. Higher numbers of teachers reported work-related voice problems.

Voiceover artists reported greater awareness for vocal health and perceived potential effects of voice problems on their work as more severe. Voiceover artists also saw voice care as more beneficial. Teachers perceived barriers to voice care as substantially higher and felt less confident about voice care. Teachers with existing voice problems showed increased perceptions of voice problem susceptibility and severity and saw more benefit in voice care. Cronbach's alpha was below 0.7 for about half of the HBM-informed survey subsets, suggesting that reliability could be improved.

Conclusions. Both groups reported substantial levels of voice problems, and different attitudes to voice care suggest that the two groups require different approaches to preventative intervention. Future studies will benefit from the inclusion of further attitude dimensions beyond the HBM.

Key Words: Voice care—Teachers—Voiceover artists—Health belief model—Voice problems—Occupational voice users.

INTRODUCTION

It is well established that some occupations with high vocal demands are associated with higher than average levels of voice problems. A number of risk factors have been identified, including high intensity voice use over background noise, insufficient voice rest, work-related stress and poor workplace ventilation.^{1–3} Professions that are recognized as being at particular risk of voice disorder include teachers, salespeople, singers, and factory workers.^{4–6}

Teachers, in particular, have been found to experience voice disorders at a rate three times higher than in the general public⁷ and are substantially over-represented in treatment-seeking populations.^{5,8} Despite this, most teachers still receive little or no meaningful voice care input during their training. This is important to note, as there are suggestions that lack of knowledge about voice care contributes to a high prevalence of voice problems.⁹

The risk of voice problems and disorders in other groups of occupational voice users has received less attention in the literature. Voiceover artists comprise one such group and are of considerable interest as this is a rapidly growing population who face high vocal demands and rely completely on their voices in order to work. A call to action for research has been recently made for video game voice actors specifically, as an emerging group of occupational voice users underrepresented in the literature.¹⁰ A recent survey of UK voiceover artists¹¹ drew attention to the occupational conditions of this professional group and the introduction of “Uber-like business models” (p. 2) due to the large potential of remote commissioning through online market places.

While voiceover artists may be comparable to actors when it comes to training, voice use and modulation, there

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are striking differences related to the physical and environmental constraints of working with a microphone under studio conditions. Voiceover artists typically work in isolation in home recording studios, with limited opportunities for postural adjustment and the added stress of tight deadlines.

The current study was motivated by a view that provision of effective and targeted approaches to voice care requires a fuller understanding of the needs of each professional group. To develop this understanding, we need information about the prevalence of voice problems in each profession as well as about voice care education, voice care behavior and attitudes to voice care specific to those professions.

Understanding better the particular pain points in maintaining a healthy voice, and the potential barriers to maintaining a good voice care routine should support the development of voice care strategies that better meet the specific needs of different professions.

The decision to focus initially on teachers and voiceover artists was based on a number of factors. Both groups experience high levels of vocal demand but show marked divergence in some other relevant areas. In particular, as discussed below, differences in voice care education and vocal training are expected to influence awareness of factors affecting vocal health.

This study may act as a stepping-off point for future research using this methodology to provide more fine-grained comparisons of the specific needs and attitudes of different groups of vocal performers (eg, voiceover artists vs. singers of various genres, stage actors, etc) or teachers (eg, teachers of music, physical education and other subjects where vocal demands may differ).

Theoretical framework: the health belief model

As a theoretical framework for assessing attitudes to voice health and voice care, we used the Health Belief Model (HBM). To our knowledge the HBM has not been applied to voice health issues before, but it has the potential to guide the design of voice care campaigns in an evidence-based manner.

The Health Belief Model (HBM)^{12,13} was developed in the 1950s as a reaction to problems with effectiveness of public health campaigns in the US. It aims to identify factors that make it more or less likely that an individual will change behavior relating to a potential health problem. The original HBM proposed four dimensions,¹⁴ with a fifth dimension (Self-efficacy) added at a later stage when more complex health interventions were considered.¹⁵ The five dimensions can be described as follows:

1. *Perceived susceptibility (Susceptibility)*. This dimension describes to what extent a person believes that they are at risk of developing or contracting a certain health condition. The model predicts that higher perceived susceptibility will lead to increased uptake of health-related behavior.
2. *Perceived severity of ill-health (Severity)*. This dimension describes a person's feelings about the seriousness of the health condition in question. The model predicts that higher perceived severity will lead to increased uptake of health-related behavior.
3. *Perceived benefits of behavior change (Benefits)*. This dimension describes a person's beliefs about whether a recommended health action is effective or not. The model predicts that a person will only perform a health-related action if they believe that the action is effective.
4. *Perceived barriers to action (Barriers)*. This dimension describes a person's assessment of factors that may impede the recommended health actions (eg, financial or time barriers, potential side-effects).
5. *Perceived ability to take a recommended action (Self-efficacy)*. This dimension describes a person's confidence in their own ability to perform or adhere to the recommended health-related actions. Stretcher and Rosenstock¹⁵ theorize that this aspect was added to the HBM when its application moved from one-off actions with relatively simple behaviors (like participating in a screening test) to more long-lasting lifestyle changes with more complex behaviors (eg, changes in eating, drinking or exercise).

Dimensions three and four are closely connected and likely to influence each other. Stretcher and Rosenstock¹⁵ refer to "a kind of nonconscious cost – benefit analysis" (p. 114) in this context. Benefits need to be sufficiently high and barriers sufficiently low for a person to act.

In our view, the HBM lends itself well to a systematic analysis of attitudes to voice care in different professions, as it can uncover profession-specific barriers and therefore help to target voice care intervention appropriately.

We have created a new survey tool that is designed to tap into the five HBM dimensions. This comprises a battery of voice-care related questions that address each of these dimensions, with three to four questions per dimension. The wording of the questions, and their number, was informed by previous studies using the HBM for other domains.^{16,17}

Voice problems and attitudes to voice care in the teaching professions

Given the wider pressures on education, teachers taking frequent sick-leave or even considering leaving education are worrying trends from both public health and societal perspectives. Teachers are more likely to miss work due to voice problems than other occupational groups.^{18–20} In fact, teachers in the UK are reported as almost ten times more likely to take time off work due to voice problems than non-teachers.²¹ In addition to increasing absenteeism, voice disorders among teachers have been linked to decreases in job performance,³ job satisfaction,¹⁹ overall communication ability, and social life.²² Regular or chronic episodes of vocal dysfunction may cause teachers to seek

alternative employment.⁵ In a study by Smith et al,²³ 4.2% of teachers reported a voice problem significant enough to consider a change of occupation. In general, teachers who accumulate more sick days per year are also at higher risk of retiring early due to ill health.²⁴ The consequences of voice disorder go beyond simple absenteeism, though. Voice disorder has been associated with overall health status and quality of life²⁵ and there is some evidence that children process information less well when it is presented in a dysphonic voice.²⁶

The implications of voice disorder, alongside the high prevalence of voice disorder within the teaching profession, warrants research that will inform prevention and intervention strategies. The HBM framework is suitable for considering attitudes to voice care, but there are no existing studies utilizing the framework for the purpose. In the following we summarize a range of studies that have addressed attitudes to voice care in teachers, and aim to relate them to the dimensions of the HBM.

Susceptibility

A study by Kovačić⁹ suggested that most teachers are aware that their voices are at risk due to their profession.

Severity

There is limited data available about the perceived severity of voice problems in teachers, but there is evidence that teachers only seek help for voice problems when the number of symptoms is high rather than when preventative action is required.²⁷ Many teachers seem to see voice problems as a normal part of their job. Costa et al,²⁸ surveyed 237 teachers and reported that 30% concluded that “hoarseness is normal for teachers” (p. 72). This suggests that “Perceived Severity” of the problem is commonly rather low.

Benefits

We have not identified any studies that report on teachers’ attitudes towards effectiveness of voice care, and the perception of benefits of remedial action will probably interact with knowledge about the details of this remedial action (cf. ‘Self-efficacy – Dimension 5). In general, teachers’ knowledge about voice care seems to be relatively low,^{9,29} which is not surprising as only a minority of teachers seem to have received voice training. Van Houtte et al,²⁹ report that under 30% of surveyed teachers had received voice training, and only around 14% received this during their teacher education.

Barriers

There is very little information on the percentage of teachers regularly engaging in preventative voice care activities, but studies of treatment-seeking behavior have looked at barriers for access to doctors and voice therapy. These findings may not be transferable across countries and health care systems. For example, lack of health insurance is a barrier

to voice care access in some countries,²⁸ but not in others, and this seems to affect uptake.²⁹ Not surprisingly, time pressures are also mentioned frequently, albeit more in the context of therapist and doctor’s visits than with regards to preventative voice care activities.

Self-efficacy

Costa et al,²⁸ reported that 82% of their 237 survey respondents felt in control of their voice problems, 68% reported that they understood what they should do to avoid voice problems, and only 13% reported that they thought nothing could be done for their voice problem. However, only 49% reported awareness of voice therapy and medical support and only a third of teachers with a (self-diagnosed) voice disorder sought professional help.

In summary, the existing body of research suggests that while many teachers experience voice problems and thus might have some idea of their own susceptibility, they seem to be less aware of the potential consequences of on-going voice damage, and thus perceived severity is relatively low. Many teachers seem to think that voice problems are a normal part of their job, and only a minority seek help for their voice problems. Furthermore, most teachers have not received any voice training and are thus relatively unaware of what type of behavior would help to alleviate or avoid voice problems. This in turn will influence their Self-efficacy, that is their confidence in their own ability to look after their voices.

While not directly related to teachers’ attitudes to voice care, it is worth noting that there is good evidence in the literature that voice education and regular voice exercises are beneficial for teachers. In a review of ten studies on the effects of voice training in teachers and other occupational voice users, Hazlett et al,³⁰ reported positive effects for all 10 studies. Ilomäki et al,³¹ showed vocal improvement after direct voice intervention with respect to teacher self-report, selected acoustic measures and auditory evaluation by experts.

Voice problems and attitudes to voice care in voiceover artists

We have found few studies that have focused on voiceover artists as a professional group, even outside the domain of voice care (see Phatak et al,³² for one of the few exceptions). Video game voice artists have rightfully received acknowledgment in the literature as a growing group of professional voice users requiring research attention.^{10,33} A pilot study by Reid and Mckenna³⁴ recently sought to investigate the impact of Vocal Combat Technique (VCT) on vocal symptomatology in this population with positive preliminary results. Voiceover artists have also been the subject of research evaluating the suitability of neck surface accelerometer wearable devices for voice health monitoring.³⁵

The paucity of research into vocal issues in voiceover artists and voice acting more general has been highlighted by Švelch & Švelch,³⁶ although there is some limited

evidence of relatively poor vocal health and voice care habits in actors. D'haeseleer et al,³⁷ reported that 50% of their (relatively small) sample of theatre actors reported regular or occasional vocal complaints after performing, 35% reported vocal complaints in general, and 23% reported vocal fatigue. Fewer than 30% of these actors performed vocal warm-up routines before performances, and almost 90% never performed vocal cool-down routines. Fifty per cent reported regular or occasional vocal complaints after performing, and 35% reported vocal complaints in general, and 23% reported vocal fatigue. This seems somewhat surprising, given an expectation that trained actors and voiceover artists might have greater insight into the value of voice care, and suggests that even this relatively well-informed group might benefit from enhanced vocal health strategies.

Voiceover artists are of particular interest because the voiceover industry is undergoing significant changes which have major implications for vocal health. In the past, most voiceover artists came from an acting background and would therefore be expected to have had vocal training that provided some protection from occupational voice problems but this may no longer be the case.

In a study from 2019, Pavis et al,¹¹ report that 55% of UK voice over artists have an acting background. Demand for voiceover artists has mushroomed in recent years,³⁸ and the Covid-19 pandemic has acted as an additional catalyst for this increase.³⁹ Business insiders in the UK have commented on the development in the following way: "*During covid, we had a surge in actors entering the VO industry along with many amateur VAs armed only with passion, aspiration and a mic.*"⁴⁰ Although reliable data is scarce, there are thus indications that an increasing proportion of new voiceover artists attracted by this demand may not come from acting backgrounds. As a result, they may not have had any voice training, making them less well prepared for the vocal demands of the work and even more susceptible to voice problems.

Aims of the current study

This study builds on existing research into voice problems in teachers by exploring attitudes to voice care and potential barriers to maintaining a voice care routine. It also extends the scope of research into occupational voice problems and disorders to include voiceover artists, who have so far received little attention.

The current study had three main aims:

The first aim was to compare and contrast the levels of voice training and self-reported voice problems in a sample of Scottish primary school teachers and UK-based voiceover artists. Scottish primary teachers were selected as (a) some reports suggest that primary teachers are even more at risk of voice disorders than secondary teachers,^{41,42} (b) population size of Scottish primary teachers is well documented through government records, and (c) most Scottish primary

teachers are active in a popular Facebook group, which made recruitment relatively easy.

As there are hardly any reliable statistics about voiceover artists in the UK or world-wide, this population could not be surveyed in a similarly targeted fashion. We worked on the assumption that Scottish primary teachers had less voice training than UK-based voiceover artists, reflecting the general lack of voice training in teacher education programs, compared to the training many voiceover artists would have received as part of their acting training.^{43,44} Based on the high prevalence reports for voice problems and disorders in the teaching profession, we also expected that primary teachers would report higher prevalence of voice problems and disorders, and higher frequency and longevity of such problems.

The second aim of the study was to establish attitudes to voice care in primary school teachers and voiceover artists using the framework of the Health Belief Model (HBM). We expected that differences in training would probably result in differing attitudes for at least some of the dimensions of the HBM. There was a specific expectation that values for Self-efficacy would be lower for primary teachers than voiceover artists.

The third aim was to evaluate our new HBM-based survey tool in terms of its ability to reliably measure the five different dimensions of the HBM. This involved an analysis of the internal consistency of the battery of questions for each dimension.

It is important to note that our focus in this study was on preventative voice care. As outlined below, we mainly surveyed participants from the two professional groups that had not reported any past or present voice problems, and only included a comparison of attitude differences between those without and those with voice problems for the teacher group. Compared to remedial action, preventative action has received less attention in the voice care literature. Martins and colleagues reported on publications about voice disorders in teachers in the early 2000's and concluded that there were around 60-80 publications on the topic per year.⁷ On the other hand, a very recent systematic review on prevention of voice disorders in teachers⁷⁶ could only identify 26 articles on this topic between 2001 and 2022.

In our view there is therefore a need for studies that aid our understanding of how healthy voices can be protected against damage in different occupational settings, and how attitudes might help or hinder the implementation of preventative action programs.

METHODS

Participants

Voiceover artists were recruited through various professional online forums between May and October 2018. Although the main target group was British voiceover artists, the international nature of the voiceover artist community made it impossible, and probably undesirable, to restrict participation to UK residents only. Country of

residence was not surveyed, but most respondents stated British English or similar as their native accent.

As mentioned above, statistics about the number of voiceover artists in the UK are difficult to obtain, but “Gravy for the Brain,” a major representative organization for voiceover artists has 20,000 UK members. The survey of voiceover artists resulted in 96 responses, suggesting that the collected data represents approximately 0.5% of their members.

For the teacher cohort, Primary School teachers were recruited between November and December 2020 through social media, predominantly through Twitter and Facebook. A paid Facebook ad was used to target people in Scotland with an interest in primary education, and the survey was also advertised in the Facebook interest group “Scottish Primary Teachers,” which had 27,719 members in October 2020. The survey received 267 responses. In 2020 there were 25,651 registered primary school teachers in Scotland, according to Scottish Government figures.⁴⁵ Therefore, the study participants equate to roughly 1% of the target professional group.

Materials and procedure

The voiceover artist survey consisted of 45 questions and the primary teacher survey consisted of 50 questions. Most questions were multiple choice, some were multiple-answer or free text. The primary teacher survey included an additional section that was part of a separate study into the effects of changes in teaching practice on voice demand and use during the COVID-19 pandemic. The survey data for this additional section are not reported here.

Personal, professional and voice-related background

In both surveys an initial section explored demographic information, including gender, age and accent of English. A “health and lifestyle” section explored general health, smoking/vaping habits and jaw, neck and shoulder pain as well as any other symptoms of tension.

A section about professional characteristics included questions about length of career, type of employment (full time/part time) and main job. Voice-related questions addressed estimated weekly voice use, non-job-related voice activity, and a number of additional questions for voiceover artists regarding the type of voiceover work they are doing.

One question in the primary teacher survey addressed voice care habits, relating to voice exercises and warm-ups. Two questions in the voiceover artist survey enquired about frequency and duration of vocal warm-ups, and one question addressed vocal cool-down exercises.

Participants were also asked whether they had experienced any voice problems during their career. Those who disclosed a history of voice problems then completed a section on the details of their voice problems (frequency, actions taken, intervention received, symptoms, duration and timing).

HBM-informed voice care attitude questions

Only voiceover artists without a history of voice problems were asked the HBM-informed voice care attitude questions as we were mainly interested in attitudes of those voiceover artists that viewed voice care as a preventative action and not as a remedy for voice problems they had experienced in the past or present.

However, all primary teacher respondents were asked the HBM-informed voice care attitude questions. The rationale for this was that previous estimates of voice problems in the teacher population have been as high as 58%²⁸ so there was a risk that exclusion of those reporting voice problems would result in very little data being collected. This disparity was managed by including only those participants that did not report voice problems in the cross-profession comparisons of attitudes to voice care. A separate comparison was performed for primary teachers with and without reported voice problems.

The HBM-informed voice care attitude questions consisted of Likert-scale questions with an identical answer format (five options from “completely agree” to “completely disagree,” and a sixth “prefer not to say” option). As explained earlier, these questions aimed to tap into the five dimensions of the HBM (Susceptibility, Severity, Benefits, Barriers and Self-efficacy). Initially, four questions were included for each dimension, but two questions concerning vocal warm-up routines were thought to be too specific for teachers and were therefore dropped from their survey and not analyzed further for cross-profession comparisons. [Table 1](#) provides the full list of the HBM-informed questions and associated HBM dimensions.

The construction of the questions was informed by the expertise of the authors (three authors are qualified speech and language therapists, one author is a voiceover artist with over 20 years’ experience in the industry, most authors have been involved in delivering voice care training to primary teachers and/or voiceover artists), as well as a review of HBM surveys in various domains. Our review revealed that a range of published HBM-based survey studies have not disclosed their survey questions.^{46–49} We opted for a relatively small set of questions per domain as survey length affects completion rate in online surveys.⁵⁰ Sets of three to eight questions per HBM domain are commonly seen in studies applying the model.^{51–53}

Descriptive analyses (see below) revealed that response numbers for some scale levels in the HBM section were rather low, especially the “completely agree” and “completely disagree” categories. For example, for primary teachers without voice problems, the option “completely agree” had less than five responses in 50% of the HBM related questions, and the option “completely disagree” had less than five responses in 77% of cases. Compared to that, “agree” was chosen five times or more in 94% of cases, “neither agree or disagree” was equally chosen five times or more in 94% of cases, and disagree was chosen five times or more in 50% of the cases.

TABLE 1.
HBM-informed Questions Designed for VOA and Teacher Surveys, with Associated HBM Dimensions

	VOA	Teachers
Susceptibility	Voiceover artists are at risk of developing voice problems and disorders I am worried that my work might negatively affect my voice I am aware that some voiceover artists have problems with their voice	Teachers are at risk of developing voice problems and disorders I am worried that my work negatively affects my voice I am aware that some teachers have problems with their voice
Severity	I think a lot about the health of my voice My voiceover work could seriously damage my voice Work-related voice problems might mean that I miss out on jobs or bookings Work-related voice problems could force me to change career Compared to other problems in life, voice problems are not serious	I think a lot about the health of my voice Teaching could seriously damage my voice Work-related voice problems might mean that I have to take time off work Work-related voice problems could force me to change career In general, compared to other problems in life, voice problems are not serious
Benefits	Voice care can keep my voice healthy Practizing voice care will increase my chances for job bookings Voice care is important for Voiceover Artists Voice care can help me with the sound of my voice	Voice care can keep my voice healthy Practizing voice care will enable me to use my voice more effectively at work Voice care is important for teachers Using voice-care strategies can help improve the sound of my voice
Barriers	Finding time for voice care and exercises is difficult Voice exercises are boring (I often forget to warm up my voice) I rarely think about voice care	Finding time for voice care and exercises is difficult Voice exercises are boring I rarely think about voice care
Self-efficacy	I know what I can do to protect my voice from damage (I know how to do a vocal warm-up routine) I actively avoid behaviors that could damage my voice I know what I can do if my voice does not feel exactly right	I know what I can do to protect my voice from damage I actively avoid behaviors that could damage my voice I know what I can do if my voice does not feel exactly right

Low cell counts constitute a problem for certain statistical procedures. Expected cell counts above four are a requirement for chi-square tests of homogeneity. As the low counts in the two extreme categories lead to frequent violations of this condition, we reduced response categories from five to three categories for all HBM-related questions. This approach of collapsing categories for Likert-type scales with sparse categories has also found support in statistical modelling studies.⁵⁴ Therefore, “Completely agree” and “agree” were merged into a single “agree” category; similarly “disagree” and “completely disagree” were merged into a single “disagree” category. The “neither agree nor disagree” remained as a mid-point neutral category.

Statistical analysis

Analyses were quantitative, using standard statistical approaches to survey data - one-way tables and their visual equivalents, and two-way and higher dimensional tables to

uncover relationships between answer categories. Chi-square (χ^2) tests of homogeneity were used to test the significance of distribution differences in HBM-informed voice care attitude questions between the two professional groups, and between teachers with and without a reported history of voice problems. If expected cell counts were below five even after collapsing categories as described above, Chi-square tests for homogeneity were replaced by Fisher’s exact tests.

As we calculated a relatively high number of significance tests (34 in total), we used Benjamini-Hochberg correction⁵⁵ to protect against false discovery rate (FDR), with an accepted FDR of 5%. This led to the rejection of one result that would have been accepted as statistically significant otherwise.

Reliability evaluations were performed by calculating Cronbach’s Alpha for each dimension and subgroup for five response categories, that is before response categories were reduced to three for further evaluation.

Research ethics

The study was approved by the Research Ethics Panel of Queen Margaret University Edinburgh. All participants provided informed consent to the use of their responses for research purposes as part of the online survey submission routine.

Potential implications of the Covid19 pandemic

It is worth mentioning that the voiceover artist survey reported in this paper was completed before the Covid-19 pandemic, while the data for the primary teacher survey were collected during the Covid-19 pandemic. For the teacher survey this paper only reports the parts of the survey that probed pre-pandemic patterns. Reported voice use patterns during the pandemic will be disseminated in a separate publication.

RESULTS

Valid responses

As stated earlier, the voiceover artist survey received a total of 96 responses and the Scottish primary teacher survey had 267 responses. Question 8 of both surveys asked about the respondent's profession, ie, "How long have you been a primary teacher/voiceover artist?" which included the options "I am not a primary teacher/voiceover artist" and "Prefer not to say." Participants who chose either of these two options were excluded, leaving 264 responses from teachers (two contributions were labelled as "I am not a primary teacher" and one as "prefer not to say"). All 96 voiceover artist respondents self-identified as voiceover artists and were therefore included in the analysis.

Demographics and work patterns

Ninety-six percent of the primary teacher respondents were female, whereas there was an almost even gender split amongst the voiceover artists (49 females and 47 males). The surveys captured a similar age distribution for the two professional groups with 78% of teachers and 74% of voiceover artists aged between 30 and 60 years.

Ninety-nine percent of the teachers reported primary teaching as their main job, compared to 62% of voiceover artists reporting voiceover work as their main job. Sixty-four percent of the teachers had been a teacher for more than 10 years, compared to 42% of voiceover artists reporting more than 10 years of voiceover experience.

The two groups also showed similar response distributions for background health, with 94% of teachers and 93% voiceover artists reporting as non-smokers, and 80% of teachers and 89% of voiceover artists describing their general health as good or excellent. Reports of frequent or regular pain/tension in neck, shoulder or jaw areas were slightly more common in teachers (52%) than in voiceover artists (42%), which may reflect the postural adjustments that have to be made in primary classroom settings.

The survey responses showed a difference in distribution of work hours and professional voice use between the two groups. Seventy-six percent of voiceover artists reported ≤ 20 hours a week of voice use in voiceover work, whereas 66% of teachers reported 20–40 hours a week of teaching voice use.

The two professional groups reported a similar distribution of time spent on vocally demanding activities outside of relevant professional work (recreationally or in other part-time roles), with 60% of voiceover artists and 51% of teachers reporting ≤ 20 hours a week on these activities.

Voice training

Seventy-four percent of voiceover artists reported having some voice training experience; this is in sharp contrast to the teacher group where only 14% reported having some form of voice training or education.

In order to gain more detailed insight into the level of voice training for both professions, we performed an additional analysis of the free-text answers given to the voice training questions (see [Appendix A](#) and [B](#)). The answers were categorized into three experience levels based on the following criteria:

- Minimal: introductory voice training or a one-off session with a Speech and Language Therapist.
- Intermediate: a series of vocal training sessions or singing lessons.
- Substantial: degree level or equivalent acting or singing training.
- Unclear: answers of 'prefer not to say' and those who did not specify level of training in free-text answer.

For teachers, the most frequent category after "none" was "minimal," which still constituted less than 10% of answers (see [Figure 1](#)). In comparison, the voiceover artists reported substantially more training, with almost 30% having received voice training at degree level.

Prevalence of past or present work-related voice problems

Seventy-three percent of teachers and 57% of voiceover artists reported that they had a work-related voice problem at some point during their career, while 35% of teachers and 22% of voiceover artists reported that they were currently experiencing a voice problem at the time of the survey.

Responses from those who reported a history of voice problems were analyzed further to explore any inter-group differences in severity, frequency and longevity of the problems.

Severity of voice problems

In both groups, those with a reported history of voice problems commonly described symptoms relating to strain, hoarseness and a need to clear their throat. 58% of teachers with voice problems reported complete loss of voice, by contrast with only 13% of voiceover artists.

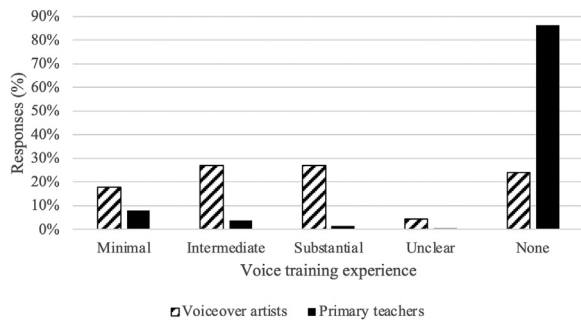


FIGURE 1. Comparison of voice training/education experience reported by Voice-Over Artists (VOA) and Primary Teachers.

Frequency of voice problems

For the purposes of this analysis, frequency responses were combined to create a smaller number of categories as follows:

- “daily” + “weekly” responses were coded as “frequently”;
- “monthly” + “quarterly” responses were coded as “occasionally”;
- “twice a year” + “once a year” responses were coded as “rarely.”

As [Figure 2](#) shows, frequency of experienced voice problems were relatively similar across both professional groups, with the majority experiencing them rarely or occasionally. Frequent experience of voice problems occurred between 15% and 20% in both groups.

Longevity of voice problems

As for frequency, a smaller number of longevity categories was derived from responses as follows:

- “Resolve overnight” = short term.
- “a few days” + “a week” = intermediate
- “a few weeks” + “more than a few weeks” = long term

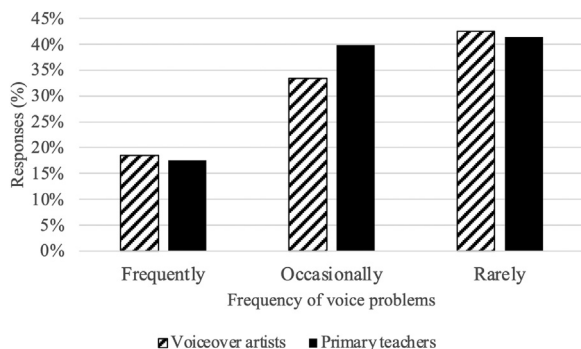


FIGURE 2. Comparison of voice problem frequency between voice-over artists (VOA) and primary teachers reporting a history of voice problems.

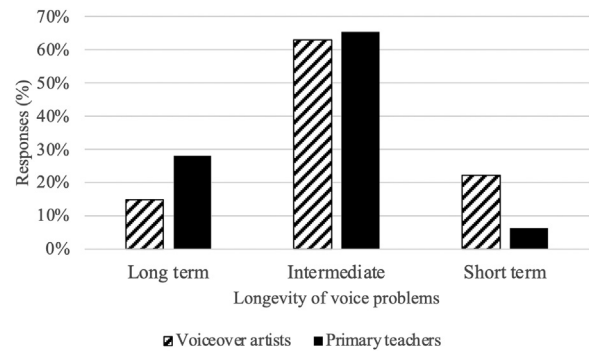


FIGURE 3. Comparison of voice problem longevity between voice-over artists (VOA) and primary teachers reporting a history of voice problems.

Longevity responses showed a larger difference between groups than frequency responses, with a tendency for voice problems to be more persistent in the teacher group.

Although the majority response for both groups was “intermediate,” there were marked differences for the short and long term categories. 28% of teachers experiencing voice problems reported long term voice issues, compared with 15% of voiceover artists; 22% of voiceover artists reported short term problems compared with 6% teachers (see [Figure 3](#)).

Voice care habits

Comparison of responses relating to voice care behavior in the two professional groups showed that 78% of primary teachers reported never warming up their voice or doing exercises, whereas only 7% of voiceover artists never warm up their voice. When using warm-ups, 77% of voiceover artists reported spending ≤ 10 minutes on these exercises. Only 19% of voiceover artists reported use of “cool down” exercises, and 15% of voiceover artists reported that they did not know what “cool down” exercises were.

HBM-informed attitudes to voice care: primary teachers vs. voiceover artists without past or present work-related voice problems

Susceptibility-related questions

As [Table 2](#) shows, substantially more primary teachers (69%) than voiceover artists (38%) thought that their profession was at risk of voice disorder. This difference was significant. Regarding personal susceptibility, only 14% of voiceover artists and 24% of primary teachers were worried that their work might negatively affect their voice. The differences between the professional groups did not reach significance for this question. The majority of both professions (71% for voiceover artists and 75% for primary teachers) were aware that other members of their profession had voice problems. Differences between professions were small and not significant. There was a clear difference regarding reflection on voice health in the two professional groups. Sixty percent of voiceover artists reported that they thought a lot

TABLE 2.
Susceptibility Attitude Comparisons for Voiceover Artists and Primary Teachers without Voice Problems (VP). Significance Test with χ^2 -test or Fisher's Exact Test

Question	Profession	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
[Voiceover artists/teachers] are at Risk of Developing Voice Problems and Disorders	VOA (no VP)	38%	55%	7%	Fisher	$P = 0.004$
	PT (no VP)	69%	28%	3%		
I am worried that my work might negatively affect my voice	VOA (no VP)	14%	31%	55%	$\chi^2 = 4.67$	$P = 0.097$ (ns)
	PT (no VP)	24%	41%	34%		
I am aware that some ... have problems with their voice	VOA (no VP)	71%	21%	7%	$\chi^2 = 0.17$	$P = 0.919$ (ns)
	PT (no VP)	75%	18%	7%		
I think a lot about the health of my voice	VOA (no VP)	60%	17%	24%	$\chi^2 = 28.19$	$P < 0.001$
	PT (no VP)	13%	25%	62%		

about the health of their voice, but only 13% of primary teachers reported this. This difference was highly significant.

Regarding internal consistency of the question set, responses of primary teachers (without voice problems) reached a Cronbach's alpha of 0.79. For the voiceover artists, the value was lower (0.61).

Severity-related questions

Regarding perceived severity of voice problems (Table 3), there was a clear difference between the two professional groups in terms of perceived threat. Only a minority of voiceover artists (2%) thought that their work could seriously damage their voice, compared to about a third (31%) of primary teachers, a significant difference. This is somewhat in contrast to opinions about the potential effects of voice problems on their work. Three quarters (74%) of voiceover artists would assume that voice problems could mean that they would miss out on jobs, while only 42% of primary teachers saw similar effects for their profession. In both professions, potential career changes as a consequence of voice problems were considered by a third (voiceover artists) and a fifth (primary teachers). These differences were not significant. In both professions, only about a quarter (24% vs. 28%) agreed with the notion that voice

problems were not serious. The small difference between groups was not significant.

Internal consistency analysis of the question set (with a reversed scale for the last question) showed a Cronbach's alpha of 0.61 for the teacher group, and 0.44 for the voiceover group.

Benefits-related questions

As Table 4 shows, a majority of participants in both groups considered voice care as being effective for maintaining a healthy voice. This majority was however much more pronounced in the voiceover artist group, where agreement reached almost 90%, compared to 56% in the teacher group. This difference was significant. Disagreement with this notion was absent in both groups.

In terms of increased job effectiveness, around 60% in both groups believed in these effects. Differences surfaced in the frequency of disagreement with this notion. Almost a fifth of voiceover artists were not convinced that voice care would increase their job effectiveness. Teachers showed less active disagreement (1%) and more ambivalence about this (almost 40%). These differences were significant.

Hardly anybody in both groups rejected the notion that voice care was important for their profession. Again, this conviction was more pronounced in the voiceover group

TABLE 3.
Severity Attitude Comparisons for Voiceover Artists and Primary Teachers Without Voice Problems. Significance Test with χ^2 -test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
[Voiceover work/teaching] Could Seriously Damage My Voice	VOA (no VP)	2%	24%	74%	$\chi^2 = 30.38$	$P < 0.001$
	PT (no VP)	31%	46%	23%		
Work-related voice problems might mean [job loss/time off work]	VOA (no VP)	74%	7%	19%	$\chi^2 = 12.64$	$P = 0.002$
	PT (no VP)	42%	32%	25%		
Work-related voice problems could force me to change career	VOA (no VP)	33%	31%	36%	$\chi^2 = 3.61$	$P = 0.164$ (ns)
	PT (no VP)	18%	32%	49%		
Compared to other problems in life, voice problems are not serious	VOA (no VP)	24%	31%	45%	$\chi^2 = 1.47$	$P = 0.480$ (ns)
	PT (no VP)	28%	38%	34%		

TABLE 4.
Benefits Attitude Comparisons For Voiceover Artists And Primary Teachers Without Voice Problems. Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
Voice care can keep my voice healthy	VOA (no VP)	86%	14%	0%	Fisher	$P = 0.002$
	PT (no VP)	56%	44%	0%		
Practicing voice care will increase [bookings/job effectiveness]	VOA (no VP)	62%	19%	19%	Fisher	$P = 0.001$
	PT (no VP)	61%	38%	1%		
Voice care is important for [voiceover artists/teachers]	VOA (no VP)	93%	5%	2%	Fisher	$P = 0.002$
	PT (no VP)	69%	30%	1%		
Voice care can improve the sound of my voice.	VOA (no VP)	71%	21%	7%	Fisher	$P = 0.002$
	PT (no VP)	48%	51%	1%		

TABLE 5.
Barriers Attitude Comparisons for Voiceover Artists and Primary Teachers Without Voice Problems. Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
Finding time for voice care and exercises is difficult.	VOA (no VP)	36%	26%	38%	$\chi^2 = 28.54$	$P < 0.001$
	PT (no VP)	77%	20%	3%		
Voice exercises are boring.	VOA (no VP)	36%	38%	26%	$\chi^2 = 15.17$	$P = 0.001$
	PT (no VP)	26%	70%	4%		
I rarely think about voice care.	VOA (no VP)	38%	12%	50%	Fisher	$P < 0.001$
	PT (no VP)	83%	7%	10%		

(over 90%), compared to around 70% in the teacher group. This difference was significant.

A large majority of voiceover artists (71%) believed that voice care could improve their voice. Teachers were more ambivalent about this, with about half of them agreeing with that notion, while the other half neither agreed nor disagreed. Explicit disagreement was low in both groups. Overall, differences were significant across groups for this question.

Internal consistency analysis showed a Cronbach's alpha of 0.87 for the teacher group, and 0.88 for the voiceover group in this section.

Barriers-related questions

As Table 5 shows, the factor "time" was considered more of a barrier by primary teachers than voiceover artists. Almost 80% of primary teachers agreed that it is difficult to find time for voice care, compared to less than 40% of voiceover artists. More than a third of voiceover artists also explicitly disagreed with the notion that time was a factor, compared to only a small percentage of teachers. Group differences for this question were significant.

Responding on the enjoyment factor of voice exercises, answers of voiceover artists were relatively evenly distributed across the three answer options. Slightly more than a third of voiceover artists agreed that voice exercises were boring, and slightly less than a third disagreed with that

notion. Teachers were mostly undecided about this topic, 70% neither agreed nor disagreed. For the remaining 30%, most agreed that voice exercises were boring. Group differences for this question were significant.

In addition, actively thinking about voice care was a differentiator between the two groups. Half of voiceover artists disagreed that they rarely thought about voice care, compared to 10% of teachers. A large majority of teachers (83%) confirmed that they rarely thought about voice care, compared to just below 40% of voiceover artists. Group differences for this question were significant.

Internal consistency analysis showed a Cronbach's alpha of 0.30 for the teacher group, and 0.59 for the voiceover group in this section.

Self-efficacy-related questions

As Table 6 shows, the groups significantly differed for all questions in this section. Half of voiceover artists agreed that they know how to protect their voice, compared to around a fifth of teachers. Most teachers (72%) confirmed that they do not know how to protect their voice, compared to a quarter of voiceover artists. Over half of voiceover artists (55%) reported avoiding voice-damaging behavior, while only a minority of teachers (8%) did so, and 61% of teachers disagreed with the statement that they avoided voice-damaging behaviors.

TABLE 6.
Self-Efficacy Attitude Comparisons for Voiceover Artists and Primary Teachers Without Voice Problems. Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
I know what I can do to protect my voice from damage.	VOA (no VP)	50%	26%	24%	$\chi^2 = 24.50$	$P < 0.001$
	PT (no VP)	18%	10%	72%		
I actively avoid behaviors that could damage my voice.	VOA (no VP)	55%	24%	21%	$\chi^2 = 31.32$	$P < 0.001$
	PT (no VP)	8%	31%	61%		
I know what I can do if my voice does not feel exactly right.	VOA (no VP)	62%	17%	21%	$\chi^2 = 20.77$	$P < 0.001$
	PT (no VP)	24%	11%	65%		

Voiceover artists were also more confident in their knowledge about behaviors relating to issues with their voice. The two professional groups had a reversed pattern of responses in relation to knowing how to address minor voice patterns. Sixty-two percent of voiceover artists reported that they knew what they can do if their voice does not feel exactly right, however 65% of primary teachers *disagreed* with this statement.

Internal consistency analysis showed a Cronbach's alpha of 0.71 for the teacher group, and 0.85 for the voiceover group in this section.

HBM-informed attitudes to voice care: primary teachers with and without past or present work-related voice problems

The previous section reported that primary teachers thought less about their voice, saw voice care as less beneficial, perceived more barriers to voice care, and felt less confident about performing any voice care routines or protecting their voice, compared to voiceover artists.

The following section analyses if there are attitude changes in primary teachers with a history of voice problems, compared to those without. As data for the latter group is reported in the tables in section 3.6 above, only the responses for the teachers with a history of voice problems are shown in the tables in this section, alongside the statistics and *P*-values for the comparison between these two groups.

Susceptibility attitudes in teachers with and without voice problems

Teachers who have had experience with voice problems viewed the risks for their profession as even greater than those without voice problems (Tables 2 and 7). There was also a substantial increase in the assessment of personal risk. Only about a quarter of teachers without a voice problem were worried about the effects of their profession on their voice, compared to almost 70% of teachers with voice problems.

Furthermore, general awareness of colleagues with voice problems increased in the group of teachers with voice problems, reaching over 90% (compared to 75% in those without voice problems).

Active thinking about vocal health also substantially increased in teachers with voice problem experience, reaching 39%, compared to 13% in the group without voice problems.

All differences in this section were significant.

Internal consistency analysis showed a Cronbach's alpha of 0.78 for the teacher group with voice problems.

Severity attitudes in teachers with and without voice problems

Tables 3 and 8 show that more teachers with voice problems thought that their work could seriously damage their voice, compared to those without voice problems (56% vs. 31%). This difference was significant. Furthermore, the perceived

TABLE 7.
Susceptibility Attitude Comparisons for Primary Teachers With and Without Voice Problems (VP). Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test statistic	P-value
Teachers are at risk of developing voice problems and disorders	PT (VP)	89%	10%	1%	Fisher	$P < 0.001$
I am worried that my work might negatively affect my voice	PT (VP)	69%	23%	8%	$\chi^2 = 47.18$	$P < 0.001$
I am aware that some teachers have problems with their voice	PT (VP)	93%	5%	3%	Fisher	$P < 0.001$
I think a lot about the health of my voice	PT (VP)	39%	30%	32%	$\chi^2 = 23.54$	$P < 0.001$

TABLE 8.
Severity Attitude Comparisons for Primary Teachers With and Without Voice Problems (VP). Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
Teaching could seriously damage my voice	PT (VP)	56%	32%	12%	$\chi^2 = 13.51$	$P = .001$
Work-related voice problems might mean time off work	PT (VP)	61%	15%	24%	$\chi^2 = 11.12$	$P = 0.004$
Work-related voice problems could force me to change career	PT (VP)	20%	22%	58%	$\chi^2 = 3.19$	$P = 0.203$ (ns)
Compared to other problems in life, voice problems are not serious	PT (VP)	34%	30%	36%	$\chi^2 = 1.84$	$P = 0.398$ (ns)

potential of having to take time off work was increased in teachers who had experienced voice problems (61% vs. 42%). Again, this difference was significant. The potential of a career change due voice problems was judged at a similar level in both groups. Around a fifth in both groups considered that an option, and no significant differences were observed for this question. There was not much consensus in either group whether voice problems were serious compared to other problems in life or not. Each option (agree, neutral, disagree) was chosen by roughly a third of participants, and no significant differences to teachers without voice problems were observed.

Internal consistency analysis showed a Cronbach's alpha of 0.77 for the teacher group with voice problems.

Benefits attitudes in teachers with and without voice problems

Tables 4 and 9 show that teachers with voice problems have a tendency to agree more with the notions that voice care can keep their voice healthy and increase their job effectiveness, although these differences failed to reach significance (significance for the first question was rejected based on Benjamini-Hochberg correction – see above). A larger number of teachers with voice problems agreed that voice care is important for teachers (85% vs. 69%), and more teachers with voice problems supported the notion that practicing voice care can improve the sound of the voice (67% vs. 48%).

Internal consistency analysis showed a Cronbach's alpha of 0.84 for the teacher group with voice problems in this section.

Barriers attitudes in teachers with and without voice problems

As Tables 5 and 10 indicate, teachers with voice problems had similar perceptions regarding time being a problem for voice care, compared to teachers without voice problems. Over 80% agreed with this notion, and the difference to teachers without voice problems was not significant. There were also similar views regarding the notion that voice exercises are boring. The majority in both groups of teachers (around 70%) had a neutral perspective on that and no significant differences were observed. Fewer teachers with voice problems agreed with the notion that they rarely think about voice care (61% vs. 83%), and this difference was significant.

Internal consistency analysis showed a Cronbach's alpha of 0.26 for the teacher group with voice problems in this section.

Self-efficacy attitudes in teachers with and without voice problems

None of the questions in the self-efficacy section showed significant differences between the two teacher groups (Tables 6 and 11). Figures regarding knowledge about protective measures for the voice sit at around 20% in both groups.

TABLE 9.
Benefits Attitude Comparisons for Primary Teachers With and Without Voice Problems. Significance Test With χ^2 Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
Voice care can keep my voice healthy	PT (VP)	69%	29%	2%	Fisher	$P = 0.045$ (ns)
Practicing voice care will increase job effectiveness	PT (VP)	74%	25%	2%	$\chi^2 = 4.42$	$P = 0.109$ (ns)
Voice care is important for teachers	PT (VP)	85%	15%	1%	Fisher	$P = 0.010$
Voice care can improve the sound of my voice.	PT (VP)	67%	32%	1%	Fisher	$P = 0.012$

TABLE 10.
Barriers Attitude Comparisons for Primary Teachers With and Without Voice Problems. Significance Test With χ^2 test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
Finding time for voice care and exercises is difficult.	PT (VP)	82%	16%	2%	$\chi^2 = 0.66$	$P = 0.720$ (ns)
Voice exercises are boring.	PT (VP)	22%	68%	10%	$\chi^2 = 2.18$	$P = 0.337$ (ns)
I rarely think about voice care.	PT (VP)	61%	20%	19%	$\chi^2 = 11.64$	$P = 0.003$

TABLE 11.
Self-Efficacy Attitude Comparisons for Primary Teachers With and Without Voice Problems. Significance Test With χ^2 -Test or Fisher's Exact Test

Question	Group	Agree (%)	Neutral (%)	Disagree (%)	Test Statistic	P-value
I know what I can do to protect my voice from damage.	PT (VP)	21%	14%	65%	$\chi^2 = 1.22$	$P = 0.543$ (ns)
I actively avoid behaviors that could damage my voice.	PT (VP)	20%	26%	54%	$\chi^2 = 5.12$	$P = 0.077$ (ns)
I know what I can do if my voice does not feel exactly right.	PT (VP)	28%	15%	57%	$\chi^2 = 1.44$	$P = 0.486$ (ns)

There is a clear tendency for more avoidance of voice-damaging behaviors in the group with voice problems (20% vs. 8%), but the difference failed to reach significance. Knowledge about ways to deal with smaller voice problems is equally relatively low in this group, with almost 60% disagreeing that they know how to do that.

Internal consistency analysis showed a Cronbach's alpha of 0.81 for the teacher group with voice problems in this section.

DISCUSSION

Levels of voice training and self-reported voice problems in voiceover artists and primary teachers

As expected, the two professional groups differed substantially in the amount of voice training they had received. Almost 90% of the surveyed primary teachers did not report any form of voice training as part of their education, which is probably in line with trends in the sector and adds evidence that teachers are not sufficiently prepared for the daily vocal demands their voices have to endure.

For voiceover artists, the situation looks somewhat better, but even in this group less than 30% reported voice training at a substantial level, and around a quarter have not received any voice training. Whether this is representative of the profession as a whole is unclear, but it definitely points towards training deficits in a group that was expected to have higher levels of voice training.

The differences in training are probably also reflected in the differences in voice care habits. The large majority of

teachers report never doing any voice exercises, while the majority of voiceover artists report using them regularly.

Both groups reported quite substantial levels of work-related voice problems; more than half in the case of voiceover artists and almost three quarters in the case of the teachers. Surveys like the one reported here are always prone to self-selection bias, and prevalence in the population might thus be lower, but for teachers, various studies have reported life time or career prevalence of voice problems of over 50%.^{1,19,29,56} We are not aware of any comparable studies with voiceover artists, our preliminary data will have to await confirmation from a larger sample.

The frequency of voice problems in both groups was relatively similar. About a fifth of participants with voice problems experience these frequently (that is daily or weekly), which in our view would be an indicator that intervention is required. A sizeable proportion (30%-40%) report monthly or quarterly problems, a frequency that suggests that a review with a health care professional would be beneficial.

In terms of problem longevity there is some indication that teachers suffer from longer episodes of voice problems. Almost a third of teachers with voice problems reported that they lasted a few weeks or more. Relating this figure to the total sample, around 20% percent of the teachers surveyed experience long-term voice problems, a worryingly high figure. For the voiceover artists, 8% of all participants reported long-term problems. Although this is a much lower proportion of the sample, it still represents a substantial number of people if extrapolated across this growing profession. Given that most voiceover artists are self-employed⁶²,

the potential impact of finding it difficult or impossible to work for long periods of time should not be underestimated. Given that the expansion of the voiceover market seems to attract a growing number of people with less voice training, we anticipate that the proportion of voiceover artists with long-term voice problems could grow over time.

Attitudes to voice care in both professional groups

The main focus of our study was on attitudes to voice care in both professional groups. As explained earlier, to mitigate effects of self-selection bias on reported voice care attitudes (we assumed that people who had encountered voice problems would be more inclined to answer our surveys), we surveyed only those voiceover artists for attitudes to voice care who had not experienced previous voice problems. As we expected a high number of voice problems in the teacher cohort (which was confirmed), all teachers were surveyed for voice care attitudes and then the results were analyzed in two steps. First, we compared attitudes in voiceover artists and teachers that did not report voice problems, and then we compared attitudes in teachers with and without voice problems.

We expected differing attitudes in teachers and voiceover artists without voice problems, and this expectation was confirmed for all HBM dimensions. Most differences were in the expected direction.

Voiceover artists saw their profession as less susceptible for voice problems than teachers. This may in parts reflect different prevalence rates in both professions, but also awareness of different levels of voice training within each profession. Worries about their own voice and awareness of voice problems in other people within the same profession were at similar levels, but both professions differed in how much they thought about their voice. Voice health awareness seems to be higher in voiceover artists than in teachers.

More teachers than voiceover artists were concerned that their work could cause serious damage to their voice, while the prospect of missing work was a bigger issue for voiceover artists. The latter might reflect differing effects of illness on self-employed people and employees. Working self-employed often means immediate income loss with even short-term illness. The prospect of career change and the general seriousness of voice problems was judged relatively equally in both professions.

Differences between the groups emerged in the Benefits section. Both groups saw voice care as mostly beneficial, but levels of agreement were substantially higher in the voiceover group for most questions.

Even clearer differences were seen in the Barriers section. Lack of time and remembering voice care was a much bigger issue for teachers. On the other hand, boredom was not a major issue in either profession, although there was a sizeable minority in both professions that considered that an issue. Making voice exercises more interesting might thus have positive effects for both professions.

As expected, Self-efficacy differed greatly between the groups. Voiceover artists felt more confident about voice protection, indicated avoidance of voice-damaging behavior in higher numbers and felt more confident to deal with minor voice problems.

In summary, while there was some indication that teachers saw themselves and their profession as more susceptible to voice problems compared to voiceover artists, and might even consider them more serious, they saw voice care as somewhat less beneficial, experienced greater barriers to voice care and felt much less confident about voice care.

It is tempting to relate some of these differences to a lack of voice training in teachers. The comparison of attitudes between teachers with and without a history of voice problems may shed more light on this.

The experience of a voice problem clearly increased perceptions of susceptibility in teachers, as well as perceptions of severity, especially regarding serious damage to the voice and the prospect of having to take time off work due to voice problems. Perceptions of benefits of voice care were also improved, especially regarding general importance of voice care and positive effects on the sound of the voice. Regarding Barriers, lack of time for voice care was still seen as a major problem for teachers with voice problems, and while fewer teachers with voice problems agreed that they rarely thought about voice care, numbers were still high (61%). Our data did not indicate that the experience of voice problems changed perception of Self-efficacy in teachers to a large extent.

Thus, the experience of voice problems seems to increase perceptions of susceptibility and severity in teachers, and they also find voice care more beneficial. Attitudes towards Barriers and Self-efficacy do not seem to change substantially, however. This is interesting, as those two dimensions showed the greatest differences for the inter-professional comparison. Not only are Barriers and Self-efficacy the two dimensions where the two professions differed most, but they also seem to be unaffected by the experience of voice problems. Given that the Barriers dimension has been shown to be the strongest predictor of behavior in other contexts,⁵⁷ it seems reasonable to propose that strategies to improve the overall vocal health of teachers should focus first on these two dimensions: how can we remove barriers to voice care in teaching professions and how can we increase the self-efficacy of teachers when it comes to voice care?

Our survey analyzed lack of time, difficulties in remembering voice care and lack of motivation (“voice exercises are boring”) as potential barriers. To address these issues, practitioners need to prioritize more time-efficient approaches to voice care, new ways of providing well-timed reminders about voice care and the use of novel approaches to make voice care more motivating. Effective implementation of such strategies may also require cooperation from employers, to ensure that adequate support and time is available to facilitate more active engagement with voice care.

When it comes to Self-efficacy, it seems likely that availability of more relevant training and resources would improve Self-efficacy, but here, too, time constraints need to be taken into account. Development of confidence in self-management is key but may be inhibited by time limitations if teachers are hesitant about taking part in voice training because they do not feel that they have enough time to learn and implement voice-care activities effectively. Again, employers might have a role here, but an explicit focus on confidence-building strategies within accessible, time efficient voice care training may be of prime importance.

While our data suggest that voiceover artists have better training and engage in more voice care, a substantial proportion (57%) report past or present voice problems related to their work. Even if self-selection bias might inflate numbers somewhat, voice problems seem to be a quite common occurrence in voiceover artists, and for some of them (8%, see above), the problems are frequent and persistent. There is thus room for improvement and a clear requirement for more and better training. It is also noteworthy that only a small number of voiceover artists without voice problems consider negative effects of their work on their voice or see the risk of serious damage. Further education on severity and susceptibility might be helpful here.

Face-to-face voice care training has been viewed in the past as a “gold standard” but this may be changing with the huge advances in development of resources for on-line learning and health care management. There are major advantages in resources that can be accessed as and when relevant for the individual, but their effectiveness is dependent on the engagement of the user. This research highlights some important factors that need to be considered when tailoring voice care resources for specific user groups in order to maximize engagement and hence efficacy. To take one example, incorporating specific strategies for building confidence in self-management may be especially important for teachers, but less important for voiceover artists.

Evaluation of the new HBM-based survey tool

Our preliminary findings suggest that the current version of our novel HBM survey will benefit from a review of the questions comprising the subscales, especially for Susceptibility, Severity and Barriers, in order to improve the internal consistency of these subscales and the general validity of the survey.

Inconsistent answers for a specific subscale suggest that not all questions measure the same underlying construct. For Susceptibility, Cronbach's Alpha revealed inconsistencies for the voiceover artists. The distributional patterns of answers suggests that being mindful of one's vocal health does not necessarily imply “worries,” and the awareness of particular instances of voice problems in voiceover artists does not necessarily translate into a general perception that voiceover artists as a profession are at risk, or that the individual sees themselves at risk. There is clear evidence that wording of perceived susceptibility questions, eg, judging

personal vs. general risk, has substantial effects on ratings.⁵⁸ Careful re-wording of survey questions might improve construct validity here.

Similarly, it needs to be further assessed if our questions cover all aspects of perceived susceptibility and if all the current survey questions should be part of this dimension. Especially “I rarely think about voice care” might be part of a different concept. These types of questions (“I rarely think about...,” “I often think about ...”) have been used for “general health motivation,”⁵⁹ or “health consciousness.”⁶⁰

For Severity, the patterns of answers suggest that there might be a difference in the perception of more transient effects (missing out on jobs, taking time off) and more permanent effects (serious damage to voice, requirement of career change). This could indicate that the “Severity” construct needs to be viewed as having more than one dimension.

For Barriers, the “boredom” question (Table 1) seems to attract differing responses from the other two questions, especially in the teacher group, where this question resulted in many “neutral” responses. Questions about boredom are common in HBM barrier survey sections,⁶¹ but might be confounded by general knowledge about the specific procedure targeted. Somebody who does not know any voice care routines might have difficulty in assessing whether they would be boring or not. As an anonymous reviewer has pointed out to us, our Barriers set of questions might be incomplete and thus have poor content validity. It is worth mentioning that our main intention was to measure barriers to preventative voice care in this study, and thus did not measure barriers to health care access (which could be financial and institutional and might differ greatly between health care systems), but access to information or practitioners who can teach preventative voice care is likely to be an important part of Barriers and should be measured. Given the importance of barriers as a potentially strong predictor (see above), further exploration of this area is indicated.

Limitations of the current study and future directions

As discussed earlier, self-selection bias is a problem for surveys of this type, as it is likely that a history of voice problems will make people more motivated to respond. We have tried to mitigate this by evaluating some questions separately for respondents with and without voice problems, but we recognize that the survey was more likely to attract responses from people who already have an interest in vocal health, for any reason. Therefore, it may not be an accurate reflection of the circumstances in the respective professional populations.

Another factor that limits our ability to gauge the representativeness of the two groups is the availability of statistical data relating to each group. The Scottish government regularly publishes detailed statistical data about Scottish primary teachers on their website, including overall numbers, gender split and age distribution. There are, on the

other hand, hardly any reliable figures about the voiceover artist profession in Scotland, the UK, or elsewhere. Reliable population data would support more precisely targeted surveys in the future, but this may always be difficult to secure in a profession with a preponderance of freelancers⁶² and no specific professional body representation.¹¹

As discussed earlier, the current version of the HMB-based survey tool requires further refinement, and this should be seen in the context of a wider discussion about the Health Belief Model. Our study has been a first attempt to apply the Health Belief Model in the context of voice care, and there is certainly more work required to improve the reliability of the survey. These types of analyses are not necessarily common-place in HBM-informed studies, but there are good examples, for example in the context of breast cancer screening.^{63,64}

Besides reliability, validity of the approach also needs to be considered further. The Health Belief Model itself has been criticized for poor predictive power. The primary variables have been shown to be significant predictors of health related behavior in many studies but their effect sizes are usually small,^{65,66} suggesting that the model needs further development. It should be noted that at least some of this criticism was raised before the Self-efficacy dimension was introduced and this has resulted in more accurate predictions.⁶⁷

Nonetheless, there are still some interesting avenues to explore that could strengthen the power of the Health Belief Model and aid our understanding of engagement with voice care in different professions. Researchers working on other areas of health care have suggested that the model could be enhanced by the inclusion of additional dimensions such as “Individual Understanding,”⁶⁸ “Stigma,”⁶⁹ “Consideration of Future Consequences,”^{70,71} “Self-Identity”⁷¹ and “Concern for Appearance.”^{71,72} Further research is needed to explore the application of these to voice-related health behaviors, but it seems likely that these dimensions could be relevant for voice care. Finally, some studies have highlighted connections between the Health Belief Model and personality traits,⁷³ and this remains an important area of future exploration. There are clear indications that voice problems in teachers correlate with certain personality traits,⁷⁴ and personality concepts like ‘locus of control’ have been identified as predictors for engagement in preventative health care.⁷⁵

CONCLUSION

This study adds to evidence that professional voice user groups have differing experience of voice training, voice problems and attitudes to voice care. Primary teachers are less likely than voiceover artists to have received voice training and are more likely to have prolonged episodes of voice problems.

Voiceover artists and primary teachers have different attitudes to voice care and this suggests that the two groups require different approaches to intervention. Teachers feel

less confident in voice care than voiceover artists and perceive more barriers to voice care routines. This indicates a greater need for voice care education in the teaching population, that addresses concern over time and effort required for efficient voice care.

CONFLICT OF INTEREST

Authors Janet Beck, Tess Whittaker and Felix Schaeffler are directors and shareholders in two enterprises that promote vocal health and voiceover work. The remaining authors have no interests to declare.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at [doi:10.1016/j.jvoice.2023.02.005](https://doi.org/10.1016/j.jvoice.2023.02.005).

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