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Voice Self-Assessment in the Light of Acoustic Analysis – Case Studies

Samoocena głosu w świetle analizy akustycznej – studia przypadków

Keywords: Voice Handicap Index (VHI), VHI-POL, voice self-assessment, objective voice assessment, voice and speech training, voice pedagogy

Słowa kluczowe: Skala Niepełnosprawności Głosu (VHI), VHI-POL, samoocena głosu, obiektywna ocena głosu, kształcenie głosu i mowy, pedagogika głosu

Abstract

The article aims to compare the results of the subjective and objective assessment of the voice of students of Postgraduate Studies of Voice and Speech Training at the University of Social Sciences and Humanities in Warsaw. The research material consists of recordings of students' voices and the Voice Handicap Index (VHI) questionnaires obtained at the beginning and at the end of the study. Five case studies were selected: three female students who were subjected to long-term follow-up (two or three semesters of study) to show the different relations between subjective and objective evaluation, and two female students for whom the results of the VHI questionnaire were compared, where the interval between measurements was three weeks. A comparison of the results of subjective and objective evaluation indicated a different degree of compatibility between them. In case 2 particular, the results of voice self-assessment increased by almost 100% after three semesters of study while the acoustic analysis did not reflect such a change. The discrepancies between the results obtained by the two methods lead to the conclusion that the objective and subjective assessment tools should be used together, preferably with other voice testing methods so that its evaluation is as comprehensive as possible. When interpreting the results of the VHI questionnaire, the influence of psychological factors should be taken into account. Increased consciousness that follows in the process of teaching voice production coupled with perfectionism and criticism can lead to a deterioration in the examinee's perception of voice quality.

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Streszczenie

Celem artykułu jest porównanie wyników subiektywnej i obiektywnej oceny głosu studentów podyplomowych studiów Kształcenie głosu i mowy Uniwersytetu SWPS w Warszawie. Materiał badawczy składa się z nagrań głosów studentów oraz kwestionariuszy *Voice Handicap Index* (VHI) uzyskanych na początku i na końcu nauki. Wybrano pięć studiów przypadku: trzech studentek, które zostały poddane obserwacji długoterminowej (dwa lub trzy semestry nauki), tak by pokazać różne układy zależności zachodzące między oceną subiektywną a obiektywną, oraz dwóch studentek, dla których porównano wyniki kwestionariusza VHI, gdzie odstęp między pomiarami wynosił trzy tygodnie. Zestawienie wyników oceny subiektywnej i obiektywnej wskazało różny stopień ich zgodności. W szczególności w przypadku nr 2 suma punktów w VHI wzrosła po trzech semestrach nauki o niemal 100% (co oznaczałoby dużą niesprawność głosu i kwalifikowało osobę do pilnej konsultacji foniatrycznej), podczas gdy analiza akustyczna nie odzwierciedliła takiej zmiany. Rozbieżności między wynikami uzyskanymi za pomocą obu metod prowadzą do wniosku, że narzędzia obiektywnej i subiektywnej oceny powinny być stosowane łącznie, najlepiej z innymi metodami badania głosu, tak by jego ocena była możliwie kompleksowa. Przy interpretacji wyników kwestionariusza VHI należy brać pod uwagę wpływ czynników psychicznych. Wzrost świadomości następujący w procesie nauczania emisji głosu w powiązaniu z perfekcjonizmem i krytycyzmem może prowadzić do pogorszenia postrzegania jakości głosu przez badanego.

Subject

The aim of this paper is to compare the results of the objective acoustic analysis of recorded voices of students of the Postgraduate Studies of Voice and Speech Training at the SWPS University in Warsaw[1] who self-assessed their voices using the Voice Handicap Index (VHI) questionnaire at the beginning and end of their studies. During the study, the state of the students' voice (as well as the teaching process) is subject to various forms of documentation and evaluation. The VHI questionnaire, the Vocal Tract Discomfort (VTD) scale, the Voice-Related Quality of Life (V-RQOL), audio recordings and video camera recording serve these purposes. The article was inspired by the observations of the discrepancies between the results of the VHI questionnaire and the acoustic evaluation of recordings taken as a point of reference and objectification. Otherwise, in some cases, one of which will be referred to in the article, on the basis of the data from the questionnaire alone, the voice could be considered eligible for urgent phoniatric consultation after one year of classes[2].

1 The degree programme is designed for both people who want to learn how to use their voice properly, as well as for professionals and, since 2013, also for future voice teachers.

2 The training effectiveness was confirmed in perceptual and objective analyses. Some of the recordings of one of the yearbooks were assessed by a phoniatrist using the GRBAS scale. As the study participants are essentially healthy individuals, the assessment of their voices requires more subtle measurement tools; nevertheless, the use of the GRBAS scale indicates an improvement in voice quality

The following research is part of a discussion on methods to reliably measure voice quality and learning outcomes by voice production teachers conducting classes at universities and elsewhere.

Material and method

Five case studies were selected for the purpose of the article: three female students of Voice and Speech Training who were subjected to a long-term follow-up (two or three semesters of study) and two female students for whom the experiment was carried out comparing the results of the VHI questionnaire where the interval between measurements was three weeks.

The research material was collected at the beginning and end of the study and consisted of voice self-assessment questionnaires (VHI) completed by students, as well as a recorded text passage they read. The recordings were made at the university under the best possible conditions using Digital Audio Recorder Zoom Hn4 equipment placed at a 45-degree angle at a distance of approximately 15 cm from the mouth. The recording parameters were: sampling rate 96 kHz, *wav* format, stereo 32 bit, SNR > 25 dB. The script prepared by M. Igras-Cybulska extracting more than 30 parameters including mean F0, F0 range, energy, jitter, shimmer, NHR, HNR [Majdak, Igras, Domeracka-Kołodziej, 2014] was used for acoustic analysis.

Schematically and in the most general terms, various types of relationships are possible between subjective voice assessment and its objective analysis: a) both self-assessment results and acoustic analysis of recordings indicate improvement in voice quality; b) self-assessment results deteriorate, voice quality analysis improves; c) both self-assessment and voice quality parameters deteriorate; d) self-assessment of voice improves, voice quality analysis deteriorates; e) self-assessment results improve, voice quality analysis remains unchanged in most parameters; f) self-assessment results deteriorate, voice quality analysis remains unchanged in most parameters.

The material was selected to illustrate the different patterns of relationships between the two assessments, particularly highlighting the cases where self-esteem had significantly deteriorated, while the acoustic analysis did not reflect such a change.

in those cases where it is applicable. Regarding the acoustic analysis of students' voices in this yearbook, the majority (64%) had a decrease in the fundamental tone of the voice (F0), almost all (86%) had a decrease in *jitter* and 72% also had a decrease in *shimmer*; the voice became less trembling and more confident; the NHR decreased in 77% of the speakers, resulting in a clear-toned, better-sounding voice [Majdak, Igras, Domeracka-Kołodziej, 2014].

Subjective and objective voice assessment tools

The Voice Handicap Index [Jacobson et al., 1999] acknowledges and emphasises the importance of the patient's subjective assessment of the voice. It consists of 30 questions, 10 for functional, physical and emotional subscales respectively. For each statement, one in five answers can be indicated, which are scored on a scale of 0–4. An answer *never* gives 0 points, *almost never* – 1, *sometimes* – 2, *almost always* – 3, *always* – 4 points. The total VHI score indicates the degree of voice impairment. A score of 0–30 is defined as a slight or no voice disorder, 31–60 points is a medium voice disorder, a score of 61–120 points means severe voice disorder and the need for urgent phoniatric consultation [Śliwińska-Kowalska, Niebudek-Bogusz, 2009, p. 16; Niebudek-Bogusz et al., 2010, p. 56]. In 2004, the VHI questionnaire was translated into Polish [Pruszewicz et al., 2004] and has been repeatedly discussed in the literature and used in voice analyses. According to the researchers, it is undemanding, comprehensive, well standardised, and can also be used in the process of teaching voice production [e.g. Kaźmierczak, 2016, pp. 128, 136], not without some reservations though. In 2022, the VHI was again translated into Polish and subjected to validation tests by a team of Polish phoniatrists and published as VHI-POL [Miaśkiewicz et al., 2022]. In this form, it will now become the recommended tool for voice self-assessment testing.

The VHI questionnaire is included in the diagnostic voice examination protocol recommended by the Committee on Phoniatrics of the European Laryngological Society [Dejonckere, 2001]. The subjective assessment of the voice, performed individually by the patient, is treated (along with perceptual assessment, laryngovideostroboscopy, acoustic analysis and aerodynamic assessment) as one of the five basic tools in the diagnosis of voice disorders, and also recommended as one of the tests in occupational medicine. According to the publication entitled *Zalecenia dotyczące badań profilaktycznych do celów Kodeksu Pracy – materiały dla służby Medycyny Pracy, praca wymagająca stałego i długotrwałego wysiłku głosowego* during a general medical examination one should:

> […] take a history of: vocal complaints […] and work environment – hourly, daily and weekly voice load and a number of years in the profession. It is advisable to determine the Voice handicap index (VHI) and to carry out an assessment of the maximum phonation time (MPT). In case of abnormal test results, more frequent ENT or phoniatric evaluation of the vocal tract than prescribed by law is indicated [*Zalecenia*…, n.d.].

This provision gives voice self-assessment a very high priority. In fact, besides the history and measurement of phonation time, it is the main aspect that determines eligibility for further testing. However, "in functional dysphonies, isolated methods sometimes prove insufficient for the diagnosis, e.g. in psychogenic disorders

the laryngeal picture is often unchanged, and the patient's serious voice problems are evidenced by the VHI scores" [Niebudek-Bogusz, 2007a, p. 7].

> Objective voice assessment, employing, for instance, the acoustic analysis, precludes evaluation of the biopsychosocial impact of voice disorders […]. Therefore, the VHI, which is used to measure the influence of voice problems on one's quality of life, offers unique information for then multidimensional diagnostics of dysphonia […]. Although the VHI is not the most suitable instrument for subjective assessment of professional voice, there is no better tool at this moment [Niebudek-Bogusz, 2010, p. 57].

"Acoustic analysis allows to objectively determine the phonatory function of the larynx as a source of acoustic vibrations" [Wiskirska-Woźnica, Pruszewicz, 2019, p. 135], as well as "correlates well with phoniatric status in normal and pathological voice production" [Świdziński, 2019, p. 137].

The researchers attempted to find correlations between individual questions in the VHI questionnaire and other measurement methods, including acoustic parameters.

> In the literature, opinions on the possible correlation between the objective and subjective parameters of voice assessment differ widely. Some authors showed a relationship between self-perceived voice problems and certain objective acoustic measures of voice […]. In other studies, subjective voice complaints did not correlate with acoustic measurements […] [Niebudek-Bogusz, 2010, p. 57].

In the article [Miaśkiewicz et al., 2022], the authors report on the results of these studies and show that there are various correlations between VHI and acoustic assessment.

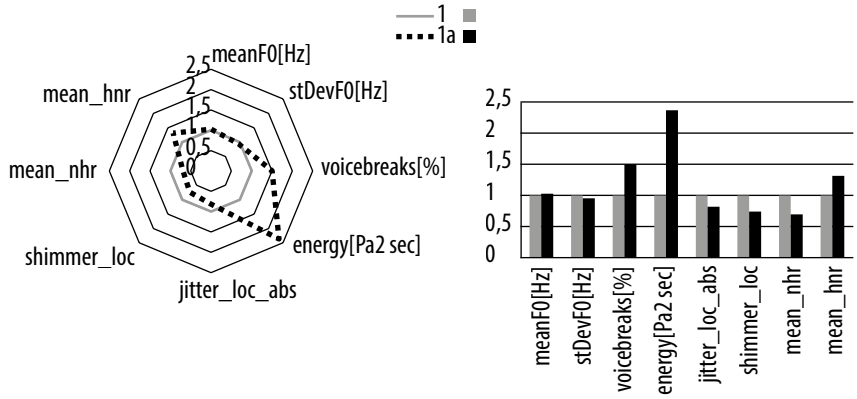
The research presented in this article was conducted on a previous version of the questionnaire [Pruszewicz et al., 2004]. Detailed correlations between individual responses and acoustic parameters were not investigated, but treated as an objectifying reference point.

Case studies

1. 29-year-old[3] woman; the recording was made at the beginning and after two semesters of study (October 2013, June 2014). This is the most typical example, indicating both an improvement in self-assessment of the voice and its quality

3 Age refers to the date of the first measurement.

in terms of some parameters, especially jitter and shimmer. The VHI questionnaire score decreased from 35 to 19 points (difference: 16 points).



meanF0[Hz]	stDevF0[Hz]	voicebreaks[%]	energy[Pa2 sec]	jitter_loc_abs	shimmer_loc	mean_nhr	mean_hnr
205,16	54,62	22,6	0,0 323	228,89	19,432	0,288 847	8,389
210,77	51,95	33,92	0,0 764	187,152	14,37	0,200 214	11,024

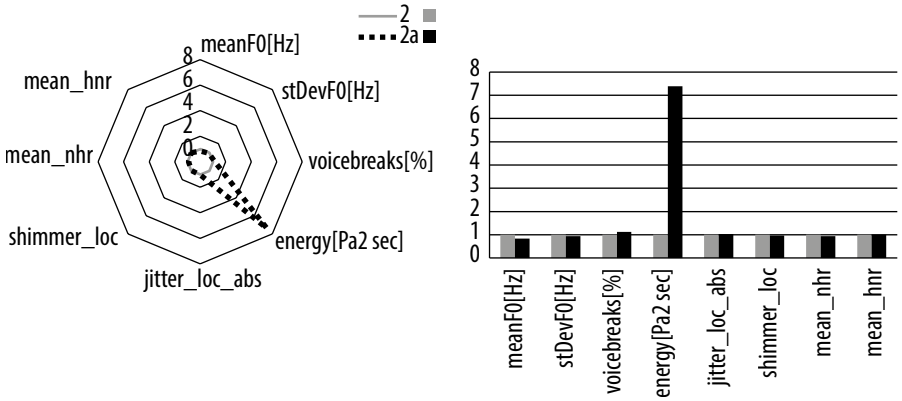
Chart 1. Results of the analysis of initial and final recordings in selected parameters

Source: own research

2. 37-year-old female; the recording was made at the beginning and after three semesters of study (October 2015, February 2017). The VHI questionnaire scores are almost 100% higher than at the beginning. There was an increase from 52 to 100 points (a difference of +48 points), which would signify a major voice disability and would qualify the person for urgent phoniatric consultation. Maximum values (*always*) were obtained for 14 questions of the questionnaire, almost half of all questions, while in the first study such a value appeared only twice. Here are some of the questions to which the answer increased from 1 (*almost never*) to 4 (*always*) after three semesters of study: "People are annoyed by my voice", "I use the telephone less often because people do not understand what I am saying to them", "I avoid contact with friends, neighbours, relatives because of my voice", "I have a limited social contact and am becoming a recluse because of my voice disorder", "I feel disabled because of my voice", or increased from *never* to *always*: "My voice is creaky and dry".

It is already worth paying attention to the baseline values whose high levels can indicate both voice problems and high expectations of oneself, self-criticism,

sensitivity, as well as intense experiencing of reality. On the other hand, the range of values within the compared answers may indicate emotionality, and certainly the presence of emotions when filling in the questionnaire. Its result in the described case may have been influenced by pre-examination stress and a subjective feeling of lack of preparation and knowledge, often going hand in hand with dutifulness, being accustomed to analytical and critical thinking (the person is an academic).

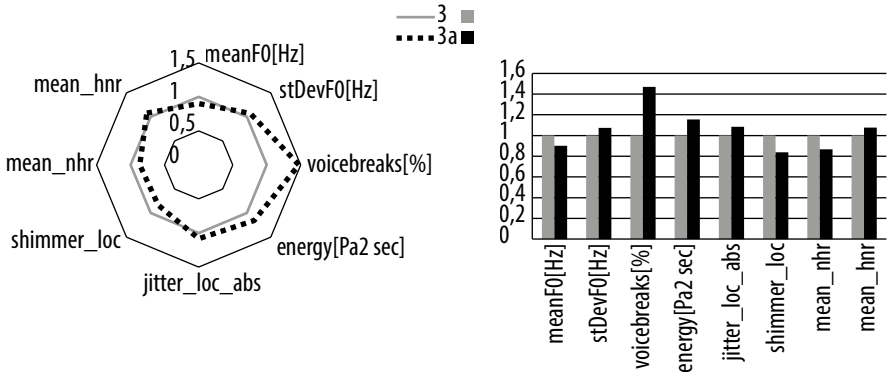


meanF0[Hz]	stDevF0[Hz]	voicebreaks[%]	energy[Pa2 sec]	jitter_loc_abs	shimmer_loc	mean_nhr	mean_hnr
237,8	52,08	32,47	0,0679	133,936	11,179	0,155413	13,593
197,46	48,59	36,51	0,5016	138,817	10,859	0,145451	13,69

Chart 2. Results of the analysis of initial and final recordings in selected parameters

Source: own research

3. 54-year-old female; the recording was made at the beginning and after two semesters of study (October 2021, June 2022). The VHI questionnaire score increased from 26 to 33 points (difference: +7 points). Similarly to case 2, the high initial values can be interpreted as suggesting a level of attitude towards herself, perceiving herself rather in a negative light. The increase between responses do not show spikes (by 1 point). In the listening analysis (which is not analysed here), improvements in voice quality were perceived both by other participants in the class and by the subject herself. The opinion expressed by her outside the questionnaire proved an extremely significant overall change. In each case, the trainer's listening assessment significantly complements the other methods of measurement and gives them their proper weight.



meanF0[Hz]	stDevF0[Hz]	voicebreaks[%]	energy[Pa2 sec]	jitter_loc_abs	shimmer_loc	mean_nhr	mean_hnr
183	36,03	32,91	0,1 835	168,268	12,581	0,161 027	12,343
164,83	38,67	48,4	0,2 119	182,417	10,543	0,139 484	13,289

Chart 3. Results of the analysis of initial and final recordings in selected parameters

Source: own research

Experiment

An additional experiment was carried out comparing questionnaires completed by two female students of the 2022/2023 yearbook: 28-year-old (case 4) and 44-year-old (case 5) at the beginning of the study (before the beginning of classes, 22th Oct. 2022) and after three weeks (10th Nov. 2022), i.e. after two full sessions containing a total of 32 didactic hours, which included practical classes in voice production, speech technique, acting tasks and self-massage, and a lecture in phoniatrics. The answers which showed a change are presented below. In both cases, an acoustic evaluation of the recordings was also carried out, the results of which are not presented here.

The analysis of cases 4 and 5 shows a deterioration of voice self-assessment (more than doubled in case 4) that occurred during the measurement period, in all subscales. In the part of the physical subscale both individuals' scores improved. Looking at the individual responses gives an indirect answer about the reliability of the questionnaire as the only way to measure student voice.

It turns out that after three weeks of studies, the student finds that he becomes "angry when people tell him to repeat himself", he begins "to be annoyed by voice problems", he "feels embarrassed when people do not understand what he is saying

to them", he "feels less professionally competent because of voice problems", his voice becomes "weak, being heard with difficulty by others", the student begins "to feel left out of a conversation" because of his voice (increases from 0 to 1 or 2)[4]. It makes one wonder whether it is likely that such far-reaching changes would also occur in voice quality in such a short period of time.

The analysis of the questions shows how far the respondent's mental and emotional condition, as well as his impressions are the subject of the VHI questionnaire. This is evidenced by the verbs referring to the inner state: "They make me irritated", "I am angry", "I feel embarrassed", "I feel inner tension", "I feel left out". It is impossible not to ask whether the person is actually pushed away, whether they anticipates to be pushed away, whether such situations have already occurred, especially over the course of three weeks. As you can see, a subjective assessment can be as indicative of voice problems as it is of a tendency to be nervous or embarrassed. In the case of, for example, highly sensitive or introverted people the reason for avoiding relationships or withdrawal does not have to be the voice (it may instead indicate difficulties in this area), but the personality type. Neuroticism or extroversion are likely to affect the VHI score, which is understandable as the questionnaire is in fact "a subjective tool to assess the impact of voice disorders on psychosocial functioning" [*Zalecenia…*, n.d.].

The question related to breathing is interesting and symptomatic. The sensation of "shortness of breath when speaking is" physical, but to a large extent it can be considered psychophysical. The increase of the score from 1 to 2 is probably related to the beginning of breathing exercises during first classes where students experience full breathing, begin to observe it, notice its quality and to compare it with the way of breathing in previous functioning.

A downward trend can be observed in the part of the questions about the physical sphere, i.e. the one taught in the strict sense. What is most satisfactory are the answers that show an improvement, especially to the question that came up for both respondents: "I seem to create my voice with effort". For case 4, the scores dropped from 1 to 0, and for case 5 from 2 to 0, indicating desirable learning outcomes (although again, as above, the questionnaire results should be approached with caution). The range of changes is not huge, falling within 0 – *never*, 1 – *almost never*, 2 – *sometimes*, but the short time distance between the moments of measurement may indicate the intensity of the changes taking place in this area.

The reasons for the increase in values on the VHI questionnaire can be manifold. Low values obtained initially may indicate both a lack of voice problems and a lack of reflection on the role of the voice in social situations. An increase in awareness that occurs in the process of teaching voice production alongside with perfectionism and self-criticism may lead to the deterioration in the subject's perception of their

4 I provide the readers with the Polish-language translation of the VHI questionnaire.

voice quality. The change may therefore indicate an increase in sensitivity to voice quality, which should be taken as a positive aspect of education.

The deterioration of the voice self-perception in the experiment may also be the result of encountering a new content, a certain way of narration present at the studies, and of meeting (and sometimes comparing oneself to) more advanced students or voice-using professionals. Prior knowledge of the issue of voice also plays an important role.

Both the assessment and the voice recording take place at a specific moment and under specific conditions, usually on the day of the final examination. The examination is therefore loaded with special external circumstances that trigger additional emotions. The recording itself is already a stress factor, sometimes even more so at the end of the study than at the beginning, as the students want to present their new skills well, but trying to do so can result in too much tension and worse results despite the fact that stress management is, among other things, part of the training (stressful situations in which the use of the voice is necessary occur in everyday life. It is therefore possible to take into account the influence of both internal and external circumstances in the interpretation of the questionnaire.

The case presentation reveals the multidimensional conditions of the voice phenomenon, its dependence on sensitivity, self-awareness, openness. It shows how many changes can be observed in the emotional sphere because of the work on voice.

Conclusions

Discrepancies between the results obtained by the two methods, especially cases of deterioration in self-assessment of the voice despite objective improvements in its quality with regard to certain parameters, lead to the conclusion that objective and subjective assessment tools should be used together, preferably with other voice examination methods, so that its assessment is as comprehensive as possible.

The questionnaire is used, among others, by university teachers who, due to the nature and location of their work and their lack of qualifications, cannot carry out a full phoniatric examination. It is treated indirectly as one of the main standardised methods of measuring the progress made by students and as a landmark for teaching work. A reduction in the numerical values of the VHI is essentially regarded as an improvement in voice quality and evidence of the effectiveness of education. The extreme case 2 discussed in the article shows how unreliable it can be to infer student progress solely on the basis of questionnaire results. When interpreting them, it is important to take into account the influence of psychological factors, both fixed and temporary, such as temperamental traits, personality, mood, perception not only of the voice but also of the self. It would be useful to combine the questionnaire data with the determination of the psychological profile of the subject. Above all, however, it should be

remembered that the subject of the acoustic analysis is the voice, whereas the subject of the VHI questionnaire is the study of the self-assessment of the voice. Importantly, the holistic listening assessment carried out by the trainer who observes the voice over many months or years and perceives its sound in the context of the whole person, still has an important place in the voice training process.

Table 1. Summary of the initial and final results of VHI for individual case studies[5]

Voice Handicap Index										
Samoocena stanu funkcjonalnego										
	1		2		3		4		5	
	1	2	1	2	1	2	1	2	1	2
1. Ludzie mają kłopoty ze zrozumieniem mnie w pomieszczeniu, w którym panuje hałas.	2	1	3	2	2	1	0	0	0	1
2. Niekiedy rodzina w domu ma kłopoty ze zrozumieniem tego, co do nich mówię.	1	0	2	3	2	0	0	0	0	0
3. Używam rzadziej telefonu, ponieważ ludzie nie rozumieją tego, co do nich mówię.	0	0	1	4	2	1	0	0	0	0
4. Unikam zabierania głosu w miejscach publicznych.	2	1	3	2	2	2	0	0	2	2
5. Ludzie w bezpośredniej rozmowie proszą mnie o powtórzenie wypowiedzi.	1	0	1	3	1	1	0	1	0	0
6. Unikam kontaktu z przyjaciółmi, sąsiadami, krewnymi z powodu mojego głosu.	0	0	1	4	0	0	0	0	0	0
7. Mój głos jest słaby, z trudem słyszany przez innych.	2	0	2	3	0	1	0	2	0	0
8. Moje kłopoty głosowe ograniczają moje życie osobiste i społeczne.	2	1	2	3	0	1	0	0	0	0
9. Czuje się odsunięty od konwersacji z powodu mojego głosu.	1	0	3	3	0	1	0	1	0	0
10. Moje problemy głosowe powodują, że mniej zarabiam.	0	0	2	3	0	0	0	0	0	0
Suma	11	3	20	28	9	8	0	4	2	3
Samoocena stanu emocjonalnego										
	1		2		3		4		5	
	1	2	1	2	1	2	1	2	1	2
11. Ludzie są zirytowani moim głosem.	0	0	1	4	0	1	0	0	0	0
12. Mam wrażenie, że ludzie nie rozumieją moich dolegliwości związanych z głosem.	1	x	2	3	1	2	0	0	0	0
13. Moje kłopoty z głosem denerwują mnie.	2	2	3	4	1	2	0	2	0	2
14. Ograniczyłam(em) kontakty towarzyskie, stając się odludkiem z powodu zaburzeń głosu.	0	0	1	4	0	0	0	0	0	0

5 It was decided to keep the Polish version of the VHI questionnaire completed by the students.

Table 1 (cont.)

Voice Handicap Index										
15. Z powodu mojego głosu czuję się niepełnosprawny.	0	0	1	4	0	0	0	0	0	0
16. Jestem zły, kiedy ludzie każą mi powtarzać.	0	1	3	2	0	0	0	1	0	0
17. Czuje się zakłopotany, kiedy ludzie nie rozumieją tego, co do nich mówię.	1	0	3	3	0	0	0	1	0	0
18. Z powodu kłopotów z głosem czuję się mniej kompetentny zawodowo.	0	0	2	3	0	2	0	1	0	2
19. Wstydzę się swoich kłopotów związanych z głosem.	0	0	3	3	0	1	0	0	0	0
20. Kiedy rozmawiam z innymi, odczuwam wewnętrzne napięcie z powodu mojego głosu.	0	0	2	3	2	2	0	1	0	0
Suma	4	3	20	33	4	10	0	6	0	4
Samoocena stanu fizycznego										
	1		2		3		4		5	
	1	2	1	2	1	2	1	2	1	2
21. Brakuje mi powietrza przy mówieniu.	2	2	1	4	2	2	1	2	2	2
22. Ludzie często pytają, co się stało z moim głosem.	1	0	1	4	1	1	0	1	0	0
23. Nie mogę przewidzieć nagle występujących zmian w czystości, wyrazistości mojego głosu.	2	1	2	4	2	2	1	1	0	2
24. Staram się tak zmieniać głos, aby brzmiał w moim odczuciu lepiej.	2	0	3	2	2	2	2	1	2	2
25. Mówienie jest dla mnie dużym wysiłkiem.	2	2	1	4	1	2	1	1	0	1
26. Mój głos pogarsza się wieczorem.	2	2	1	4	0	0	0	0	0	0
27. Mój głos jest skrzeczący i suchy.	2	1	0	4	0	0	0	0	0	0
28. Wydaje mi się, że tworzę głos z wysiłkiem.	2	2	0	3	1	1	1	0	2	0
29. Brzmienie mojego głosu jest zmienne w ciągu dnia.	2	1	1	4	2	3	1	0	2	2
30. Mój głos słabnie w trakcie mówienia.	3	2	1	4	2	2	0	0	0	0
Suma	20	13	11	37	13	15	7	6	8	9
Suma całkowita	35	19	52	100	26	33	7	16	10	16

0 – never; 1 – almost never; 2 – sometimes; 3 – almost always; 4 – always.

Source: own study

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