



The impact of the voice in relation to psychosomatic well-being after education in female student teachers A longitudinal, descriptive study

L.F.P. Meulenbroek ^{a,b,*}, M.J.C.M. van Opstal ^c, L. Claes ^d, H.A.M. Marres ^b, F.I.C.R.S. de Jong ^{e,f}

^a Inst. for Primary Teacher Education, HAN University of Applied Sciences, The Netherlands

^b Radboud University Nijmegen Medical Centre, Department of Otorhinolaryngology, The Netherlands

^c Practice Vocal Communication and Speaking Arts Performance, Leuven, Belgium

^d Department of Psychology, Catholic University Leuven, Belgium

^e Department of ENT, Head & Neck Surgery, University Hospital, Catholic University Leuven, Belgium

^f Centre of Excellence for Voice, Lab. Exp. ORL, K.U. Leuven, Belgium

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ABSTRACT

Objective: Voice handicap in relation to psychosomatic well-being after education in female student teachers.

Methods: A longitudinal survey among 90 female students using Voice Handicap Index and Symptom Check List-90 at the start and end of education.

Results: Student teachers in fourth grade showed lower VHI Total and lower SCL-90 Total scores compared to first grade. Students with higher VHI scores in fourth grade had higher risk on “Anxiety” (OR = 1.8 to 4.8), “Agoraphobia” (OR = 1.9 to 3.9) and “Insufficiency in thinking and acting” (OR = 1.6 to 3.2). Students with respectively higher VHI-Total and VHI-Emotional subscale scores had higher risk on “Depression” (OR = 1.7, resp. 3.9), “Interpersonal sensitivity and mistrust” (OR = 1.6, resp. 3.2), “Hostility” (OR = 1.7, resp. 2.1) and SCL-Total (OR = 3.1 resp. 4.0).

Conclusions: Student teachers at the end of education showed more well-being and were less vocally handicapped. A tendency for a positive relation between higher emotional voice handicap and more psychosomatic complaints was found.

Suggestions: The VHI has proven to be useful and special attention to VHI Emotional scale is advised in screening. This study might have implications for the preventive care and a multi-dimensional approach with attention to physical, mental and social voice care in future teachers is suggested. In contrast to the group score comparisons a closer look at individual reports on specific VHI items in relation to SCL-90 may be fruitful to detect tendencies. Student teachers can benefit from interdisciplinary collaboration between a psychologist and voice therapist in reducing psychosocial risk factors.

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Introduction

Many student teachers enter the university with mainly one noble motive: helping children in their development. They are neither adequately aware of the potential risk that teaching may have on their voice, nor if their vocal capacities are sufficient for the demanding future profession [1–3]. The fact that student teachers enter a voice demanding profession is not obvious to them. Thomas et al. demonstrated that student teachers with voice complaints reported

less frequently that stress and work pressure had a negative influence on their voice, compared to teachers with voice complaints [3]. In student teachers a correlation was found between voice complaints and higher Voice Handicap Index scores [4–6]. De Jong et al. observed that more than 12% of the teachers had experienced voice problems during education and this group reported significantly more voice complaints and absence from work due to voice problems in their career than their colleagues without voice problems during education [6].

Simberg et al. found no significant difference of prevalence of vocal symptoms reported by the first and fourth-year student teachers [7]. However, they observed a peak of symptoms like strained or tired voice, pain sensations or lump in the throat and low or hoarse voice in the third year. Thomas et al. showed that teachers did not always report voice complaints while they had a

* Corresponding author at: Inst. for Primary Teacher Education, HAN University of Applied Sciences, Ruitenberglaan 27, 6826 CC Arnhem, The Netherlands. Tel.: +31 26 3691653.

E-mail address: Leo.Meulenbroek@han.nl (L.F.P. Meulenbroek).

relatively severe voice handicap [5] and demonstrated in another study that starting teachers reported significantly more voice complaints compared to the student teachers [1]. Kooijman et al. showed that starting teachers experienced more voice complaints than experienced teachers [8]. Student teachers as future professional voice users are at risk of developing voice problems when they enter their career. This raises the question if student teachers are well prepared for the vocally demanding profession. Various authors give evidence for a lack of proper vocal preparation before the students enter the teaching profession [9–13]. Russell et al. described that when the transition occurs from education into full-time teaching responsibility, the graduates often feel unprepared and blame the educational program [14]. Trainee periods are supposed to prepare the students for the coming demanding profession. In general, it seems that practicum experiences are a reality shock for many student teachers as they become aware of the discrepancy between their pre-conceived ideas about teaching and the reality of the profession [14,15]. Thomas et al. demonstrated a tendency for psycho-emotional factors to be more influential in developing voice problems for starting teachers [8]. Fairfield and Richards found that one third of the trainees (last year of Postgraduate Certificate of Education) suffer from voice difficulties at teaching practice and that one out of twelve students was classified as having a moderate handicap as defined by the Voice Handicap Index (VHI) [9]. The impact of a voice problem depends on the individual reaction and adjustment to the voice problem [16]. Yiu stated that a voice handicap can be interpreted as a reduction or avoidance of voice activities that may result in an occupational or economic consequence [10].

The VHI has proved to be a reliable instrument to identify the degree of vocal handicap regardless age, gender or disease type [17–23]. The VHI is also considered to be an instrument to assess voice-specific quality of life [24,25]. The vocal handicap is not only reflected in the physical, but also in the emotional and social well-being of the person [10,18,26]. Since the voice is an important communication tool in society and especially in the teaching profession, voice problems can have a considerable impact on the occupational life [27,28] and on peoples' reports of health status: quality of life [26,29]. Various authors stressed the biopsychosocial impact of a voice problem in teachers and prospective teachers [5,8,10,19,30,31]. In a cross-sectional survey Vanhoudt et al. investigated the background biopsychosocial status of teachers with a relatively great voice handicap [31]. They used the VHI to assess the biopsychosocial impact of the voice and the Symptom Check List-90 (SCL-90) to assess overall physical and psychosocial dysfunction. They found a positive correlation between a relatively high voice handicap and the relative risk for a high total score on the SCL-90 and all the subscales. Furthermore, they observed that teachers who had a relatively high voice handicap and who did not report voice complaints had a greater relative risk for a high total score on the SCL-90 and for all the subscales. These findings indicate the relation between voice handicap and the behaviour of non-reporting of voice complaints when having a voice handicap appear to the biopsychosocial status of the teachers.

Obviously, there is need for adequate preparation of the student teacher for the future voice demanding profession. To the knowledge of the authors no longitudinal studies are available on the development of the biopsychosocial impact of the voice in relation to psychosomatic well-being in female student teachers during education. This was the impetus for this study, that investigates the relation between the shift of the impact of the voice after four years of education in relation to overall physical and psychosocial dysfunction in student teachers. The main question was: do student teachers who have a relatively high voice handicap at the beginning of their professional teaching occupation show more psychosomatic complaints at the end of their education compared to the students with a relatively low voice handicap?

Methods and materials

This study is part of a project on the causes and consequences of voice problems in student teachers at HAN University of Applied Sciences, in collaboration with the University Medical Centre of Radboud University Nijmegen, Department of ENT, the Netherlands, and the Department of ENT, Head and Neck Surgery, University Hospital, Catholic University Leuven, Belgium, and the Centre of Excellence for Voice, K.U.Leuven, Lab. Exp. ORL, Belgium.

Description of sample

A longitudinal survey was performed among student teachers in their first year and in the last year of study at the University of Applied Sciences. The Dutch versions of the Voice Handicap Index (VHI) questionnaire [20] and the Symptom Check List-90 (SCL-90) [32,33] were used. The VHI was designed to assess the subjective biopsychosocial consequences caused by voice problems. It consists of 30 questions divided into the emotional (E), physical (P) and functional (F) subscales (See Appendix I). The questions were rated on a five-point scale as follows: never (0), almost never (1), sometimes (2), almost always (3), always (4). The VHI proved to be a reliable instrument to assess vocal handicap regardless of age, gender or disease type [18–23]. The SCL-90 assesses psychosomatic well-being within nine domains (See Appendix II): anxiety (ANX, 10 items), agoraphobia (AGO, 7 items), depression (DEP, 16 items), somatic complaints (SOM, 12 items), insufficiency in thinking and acting (IN, 9 items), interpersonal sensitivity and mistrust (SEN, 18 items), hostility (HOS, 6 items) and sleep problems (SLE, 3 items). The remaining items are not arranged in one of these subscales and are therefore collectively termed “miscellaneous items” (MISC, 9 items). This ninth subscale refers to miscellaneous symptoms which low factor loading prevents them from being included in the other subscales. Some sample items are “Feelings of being trapped or caught”, “Feeling blocked in getting things done”, and “Feeling no interest in things”. In the present study these “miscellaneous items” are left out of the results and discussion of this study since the subscale does not provide direct information about the primary symptom dimensions. The subject rates each item on a five-point Likert scale: not at all (0), a little bit (1), moderately (2), quite a bit (3) and extremely (4).

Statistical analysis

To estimate the relative risk Odds Ratios (OR) were used to quantify the dependency of the groups in 2×2 tables. A relative risk of 50% or more was arbitrarily considered to be meaningful. This is indicated by an Odds Ratio equal or greater than 1.5 or equal or less than 0.66. Confidence intervals are used to provide the range about the observed effect size. In this study the range is set on 95%. If the range enclosed the value, it showed whether the difference between the groups was statistically significant at the 5% level. The data was analyzed using the statistical program SPSS 16.0.

Subjects

All 287 starting students at HAN University of Applied Sciences (cohort 2005–2006) mandatorily filled out the questionnaires. The students individually returned the questionnaires.

During the first three years of education a large number of students left the University or had some delays in their study trajectory due to negative results, preference to change the future profession or other personal reasons. At the end of the fourth year, 111 students finished the last trainee period and were asked to voluntarily fill out the same questionnaires again. The response rate was 97%. The results at the end of the fourth year were compared to the results at the start of the education. For this longitudinal study only female students were selected

and six male students were excluded, as previous research showed that voice problems in teachers are more common in women than in men [6,33–35]. Women react and respond differently than men, especially females with a functional dysphonia showed lower scores in the social-emotional subscale of the Voice related quality of life questionnaire (V-RQOL), indicating that they socially and emotionally suffer more from the voice disorder than men (29). A total of 90 questionnaires (81%) could be analyzed as these questionnaires were filled out completely in both 1st and 4th year. The mean age of the 90 subjects was 18.4 years (range 16–23) at the start of the study.

To enable a group comparison between students in 4th year and 1st year, group selections were created. Students with higher scores on the VHI in 4th year of education compared to the 1st year (n = 30) were indicated as having a positive VHI shift; students with lower VHI scores in the 4th year were indicated as having a negative VHI shift (n = 50). The students with an equal score voice handicap (n = 10) were left out of the group comparison in this study.

Results

Longitudinal study: an individual comparison

A comparison was made between the student scores on voice handicap (VHI) and psychosomatic well-being (SCL-90) in the 4th year and in the 1st year. The difference between 4th and 1st year was classified into three groups: lower, equal or higher.

Of the student teachers in the 4th year of education 56% showed lower VHI-Total scores (range -1 to -26) compared to their scores in the 1st year, 34% scored higher (range 1 to 51) and 10% scored equal. The same trend, a higher percentage of students showing lower scores at the end of education, was also found for all VHI subscales (Table 1).

Of the students in the 4th year 68% showed lower SCL-90-Total scores (range -1 to -54) compared to the individual scores in the 1st year, 31% showed higher scores (range 1 to 131) and 1% scored equal. More students showed lower scores than higher scores on the SCL-90 subscales in 4th year compared to their 1st year scores. A reverse trend was found in reporting "Sleep Problems" (Table 1).

Longitudinal study: a group comparison of voice handicap and psycho-somatic well-being

Students with higher VHI-Total scores in 4th year of education compared to the 1st year had a considerable higher relative risk of having also higher scores on the SCL-90 (OR = 3.1).

Table 2 shows a differentiated overview of the scores of the VHI and SCL-90 totals and subscales. Students with higher VHI-Total and all subscales scores in the

Table 1

Student scores in 4th grade compared to the individual scores in 1st grade on voice handicap (VHI) and well-being (SCL-90), in percentages of the total population (n = 90). >The difference [student scores 4th grade minus 1st grade], with <0 = lower, 0 = equal, >0 = higher. VHI-F = functional subscale of the Voice Handicap Index, VHI-E = emotional subscale, VHI-P = physical subscale, VHI tot = VHI Total, ANX = anxiety, AGO = agoraphobia, DEP = depression, SOM = somatic complaints, IN = insufficiency in thinking and acting, SEN = interpersonal sensitivity and mistrust, HOS = hostility, SLE = sleep problems, SCLtot = SCL-90 total.

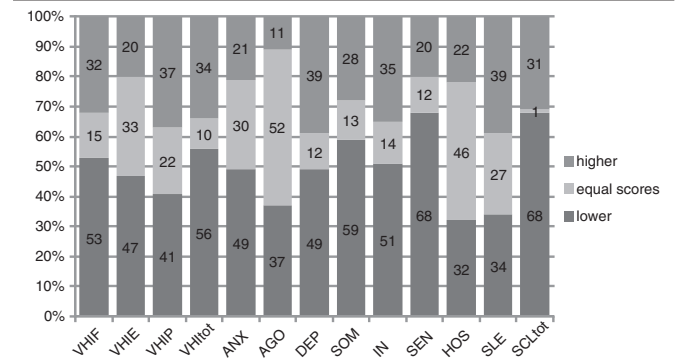


Table 2

shows the relative risk (Odds Ratio) and 95% confidence intervals of students with a positive shift of VHI-Total or subscale scores to have higher scores on SCL-Total or subscales. ANX = anxiety, AGO = agoraphobia, DEP = depression, SOM = somatic complaints, IN = insufficiency in thinking and acting, SEN = interpersonal sensitivity and mistrust, HOS = hostility SLE = sleep problems and TOTAL = SCL-Total.

SCL-90	VHI-Total	VHI-F	VHI-E	VHI-P
ANX	3.2 (0.99–10.74)	1.8 (0.51–5.97)	4.8 (1.16–19.93)	3.2 (0.90–11.59)
AGO	3.5 (0.71–16.64)	1.9 (0.42–8.81)	3.8 (0.58–24.88)	3.9 (0.36–42.20)
DEP	1.7 (0.64–4.38)	0.9 (0.33–2.35)	3.9 (1.14–13.58)	2.7 (0.96–7.54)
SOM	0.7 (0.26–2.02)	0.5 (0.17–1.67)	1.2 (0.35–4.04)	0.9 (0.33–2.77)
IN	3.2 (1.18–8.56)	2.0 (0.74–5.42)	1.6 (0.47–5.20)	1.7 (0.60–4.65)
SEN	1.6 (0.51–4.67)	1.6 (0.52–4.66)	3.2 (0.88–11.60)	1.4 (0.44–4.54)
HOS	1.7 (0.51–5.91)	1.2 (0.44–4.18)	2.1 (0.46–9.81)	1.8 (0.72–6.48)
SLE	1.1 (0.39–3.05)	0.8 (0.29–2.34)	1.2 (0.35–4.32)	1.2 (0.43–3.58)
TOTAL	3.1 (1.16–8.27)	2.0 (0.76–5.39)	4.0 (1.24–12.89)	1.4 (0.52–3.87)

4th year of education compared to the 1st year, had a higher relative risk of having higher scores on the subscales "Anxiety" (OR = 1.8 to 4.8), "Agoraphobia" (OR = 1.9 to 3.9) and "Insufficiency in thinking and acting" (OR = 1.6 to 3.2). Meaningfully relative risks were also found in students with higher scores on the VHI-Total and VHI-E of having high scores on the subscales "Depression" (OR = 1.7, resp. OR = 3.9), "Interpersonal sensitivity and mistrust" (OR = 1.6, resp. OR 3.2), "Hostility" (OR = 1.7, resp. OR = 2.2), and SCL-Total (OR = 3.1 resp. OR = 4.0). Furthermore meaningful relative risks were found on the VHI-F on the subscales "Interpersonal sensitivity and mistrust" (OR = 1.6), and SCL-Total (OR = 2.0). Students with a higher score on the VHI-P had a meaningfully higher relative risk of having high scores on the subscales "Depression" (OR = 2.7) and "Hostility" (OR = 1.8).

Discussion

Recent studies showed the relation between voice handicap and well-being in (student) teachers. Psycho-emotional factors seemed to be more influential in starting teachers than in students [1], and a correlation between voice handicap and psychosomatic well-being was found in studies by Meulenbroek et al. in starting student teachers [30] and by Vanhoudt et al. in teachers [31]. From this point of view, it was interesting to investigate differences in self-perceived voice handicap in relation to psychosomatic well-being in 1st year and 4th year female student teachers, since the latter group is about to enter the teaching profession. The difference between 1st year and 4th year students represent the *in toto* result of the education of the students. It should be stressed that assessment of the specific effects of the various educational aspects is not the aim of this study. In contrast with the available cross-sectional studies the present study is longitudinal. A longitudinal study was performed to detect and monitor variations and trends. By repeating the same assessment at a different time it was possible to collect information that could easily be compared and the data from the assessments were compared across these time points in order to assess patterns of change. Cross-sectional surveys do not have data that reveal time changes and provide data from different respondents. The essence of this longitudinal study was to investigate the shift in voice handicap related to overall well-being after education. So far, there are no previous studies available on this subject.

A large number of starting students had left the university prematurely and decreased the total group of subjects. In an exit interview

72 dropouts were asked whether the result of the voice screening had influenced their decision to end the study. Of the dropouts that did not pass the voice screening ($n=32$) 66% did not take the test result into account in their decision to drop out, in comparison to 22% of the students that were successful in the voice screening ($n=32$). Only 7% of the students that did not pass and 9% of the students that passed the screening were contemplating selecting a vocally suitable study or profession. No analysis was performed in relation to voice handicap or psychosomatic complaints in these dropouts. Students with an equal score ($n=10$), were excluded. Because of the group selection, with an exclusion of students with an equal score ($n=10$), the sample size concerning shifts in voice handicap and well-being was reduced from 90 to 80 students. The size can be considered to be relatively small and may have influenced the statistical power. Therefore Odds Ratios (OR) were used to estimate the relative risk and 95% confidence intervals showed whether the difference between the groups was statistically significant.

This study showed that there is a tendency for less voice handicap and more well-being after education. The voice handicap scores may have been influenced by improved awareness. Voice education and voice training during education may have improved vocal awareness and may lead to a change of students coping behavior and consequently to a decrease of voice handicap. On the other hand students may become more aware of the degree of severity of their voice handicap after completing the Voice Handicap Index several times. This awareness may lead to increased VHI scores as demonstrated by Jacobson [17]. More psychosomatic well-being is in line with statements in previous studies in student teachers. Hemmings and Hockley reported that student teachers' stress diminished over time in a nine week practicum where identified coping strategies were self-help, relaxation/recreation, teaching and managing and organization [36]. Fives et al. showed that high levels of guidance of their supervising teacher influences the students' self-efficacy [37]. Higher practicum ratings are also related to greater perceptions of competence and certainty [38]. The students in this study may have experienced positive feelings towards a successfully finished trainee period, positive judgment by the supervising teacher at the training school and high feelings of student teacher's self-efficacy might have influenced well-being positively. This is in agreement with a decrease of psychosomatic complaints. On the other hand, Kaldi showed that prospective teachers rated that their well-being was not strongly affected by the teaching itself and did not indicate high levels of stress [39].

It is interesting to examine if, and which SCL-90 subscales were related to a positive or negative shift in voice handicap after education and psychosomatic well-being. The SCL-90 is a measure of state stress. The VHI reports on aspects of awareness of voicing. From the perspective of the model of stress-voicing as presented by Wellens and Van Opstal [40–43] the findings of the present study allow a vision on plausible relationships based on correlations between the scores of the different subtests.

This study revealed two tendencies. Firstly, a high relative risk in students with a higher voice handicap of having higher anxiety scores. Secondly, a depended relation of students with higher emotional impact of a voice handicap and a relative higher risk of having higher scores on all subscales of the SCL-90, except for "somatic complaints" and "sleep problems".

Students with higher scores on VHI-Total and subscales VHI-P and VHI-E, had about three to five times higher relative risk of having higher anxiety scores and higher scores on agoraphobia. A higher impact of the voice can be caused by feelings of insecurity when vocal incompetence is experienced in classroom activities. This might lead to anxiousness and worries, negativism, a depressed and negative mood and more tension when they have to speak in front of the class. This can lead to more feelings of being emotionally handicapped (higher scores on VHI-E items: e.g. "I am tense when talking with others because of my voice", "My voice

problem upsets me", "My voice makes me feel incompetent") and can be reflected when experiencing the voice physically aspects of the voice handicap (VHI-P: "I run out of air when I talk", "I feel as though I have to strain to produce voice", "I use a great deal of effort to speak"). Problems in the communicational function (VHI-F) and the abilities of voicing, both socially as in the classroom can be experienced consciously: e.g. "People have difficulty understanding me in a noisy room", "I speak with friends, neighbors or relatives less often because of my voice", "My voice difficulties restrict my personal and social life". This can lead to situations that students feel uncomfortable in front of the class. Increasing anxiety and the implicit worrying seems to provoke agoraphobia. In the context of vocal communication the reality testing of social and voicing abilities is *de facto* hindered in case of agoraphobic tendencies that causes a lack of social reinforcements in non-situational adapted use of the voice. Because of the behaviors of social anxiety and of avoidance tendencies that are characteristic in it, agoraphobia can be considered as an element that maintains a vicious circle of distress–disvoicing that interferes significantly with occupational functioning [43].

Students with a positive shift on VHI-Emotional subscale tend to have higher relative scores on the SCL-90-Total and seven of the subscales. Awareness of cognitive, social and vocal dysfunctions can go along with increasing depression, which might be considered as a plausible effect of intensified and enduring anxieties. Students with an emotionally high impact of the voice tend to have an almost four times higher risk of having depressed feelings. These unpleasant feelings can consist of moody feelings of indifference and social inhibition (VHI-E: "I am less outgoing because of my voice problem"). This is the case at increased (self-)eagerness and helplessness because of the self-perception of voicing (VHI-E: "My voice makes me feel incompetent", "My voice problem upsets me") in interaction with the wide spread dysfunctions and with a general overwhelming attitude of negativism and hostility that seems obvious when student teachers end up with a miscellaneous collection of psycho-neurotic symptoms. These students with a higher emotional impact of the voice tend to have a two times higher relative risk on "hostility" and three times higher on "interpersonal sensitivity and mistrust". These undesirable reactions are in a reversed relation to a positive attitude towards work, flexible coping and optimal adaptation. Moreover, these limitations to the output of eu-stress energy might be associated with a dysfunction in the perception of the environment and thus in the attention to (dis)stressing stimuli. It seems likely for student teachers who have developed these general limitations in self-control in stress to have also been limited in developing a competence of situational adapted vocal and social skills. This is of importance for voice coaching these students since Kooijman et al. (45) showed that physical and psycho-emotional factors appear to be the most important risk factors in the development and consolidation of voice problems.

A higher physical impact of the voice was not reflected in a relative risk to score high on "somatic complaints" of the SCL-90. The physical subscale of the Voice Handicap Index and the subscale "somatic complaints" of the Symptom Check List-90 do only partially match regarding the content of the items. The broad inventory of complaints in the SCL-90 (e.g. headaches, faintness, nausea, pains in heart, chest, lower back, or muscles), focuses on different somatic aspects than in the Voice Handicap Index (e.g. "I run out of air when I talk", or: "my voice sounds creaky and dry" [32,33]).

Students with a higher emotional and physical voice handicap showed a two times higher relative risks for hostility. Feelings of hostility appear as eliciting and/or maintaining the reported vocal dysfunctions (VHI-P). The easily expression of these feelings is likely to evolve social conflicts. Student teachers who reported increased awareness of physical aspects of vocal dysfunctions, may tend to suffer from the anticipation of loss of control and show avoidances.

The tensions of the anxiety cluster interact with insufficiencies in cognitive functioning by obsessive thoughts, acts and affects. The basic mood of depression with feelings of loneliness and social isolation are facilitators of increasing nervousness, tension, worrying and anticipatory anxiety.

Remarkably, when student teachers showed a higher functional impact of the voice in 4th year than in 1st year, they had a lower (OR=0.5) relative risk on “somatic complaints” compared to students with a negative shift. In a previous study Meulenbroek [30] showed that starting students with a relative high voice handicap had higher SCL-Total and subscale scores. Apparently, the number of 1st year students with a higher functional voice handicap and a higher risk of having more psychosomatic complaints, for example somatic complaints, seems to decrease during education. Although some of the 1st year students had somatic complaints like “headaches” and “pains in lower back”, this does not explain the relation with a high functional impact of the voice. The higher score on “somatic complaints” can be caused by antecedently internal stressors or physical or psychological events (e.g. vocal condition) that elicit a biological alarm reaction in vocally demanding teaching situations and evokes frustration and anxiety. Inexperienced starting student teachers may not have been taught adequate coping strategies in the first training periods and may have used vocal compensation mechanisms as a secondarily defense strategy (struggle). The social threat elicits defense, obviously consisting of agoraphobic behaviors as well as of obsessions and compulsions in feeling, thinking and in motor behaviors. This kind of interactions in emotional and vocal behaviors are alike with experiences in performance anxiety and stage-fright [41]. The avoidance reactions are contra-productive in social and general anxiety.

The results in this paper indicate the necessity of a holistic approach in the vocal education of student teachers. This statement may be extended to the education for other voice demanding professions. In the holistic conception of a management of stress-voicing of the (student) teachers it is evident that a diversity of behavioral aspects is to be taken into account. As a consequence, a holistic and integrative strategy in prevention and therapy should be directed by functional analysis of the circular relationships between attitudes and (non) desirable skills: emotionally, vocally and socially, as has been stated by Van Opstal [42,43].

Suggestions

The use of the Voice Handicap Index in the screening of student teachers at the university of applied sciences was already broadly accepted. The present study showed that special attention to the Emotional scale of the Voice Handicap Index is advised. This study might have implications for the preventive care and a multi-dimensional approach with attention to physical, mental and social voice care in future professional teachers, is suggested. In the holistic conception of management of stress-voicing of the (student) teachers it is evident that a diversity of behavioral aspects is to be taken into account. In contrast to the group score comparisons a closer look at the individual reports on specific items of VHI in relation to SCL-90 is supposed to be fruitful to detect tendencies. Student coaching with goal setting and regarding voice ergonomics and holistic characteristics, e.g. coping dialogue, can be seen as a supplement to the original voice therapy. Moreover the capacities and possibilities can be used to change negative habits in professional and social situations. The coach and student are conscious and active in a dynamic process to change non-desirable habits and skill modes [42,43]. Consequently, intensive individual voice therapy, individual coaching of basic skills, coaching during teaching practice and joining sectional coaching or workshops are presented to the student. Furthermore, student teachers can benefit from a multidisciplinary collaboration

between a psychologist and a speech pathologist in reducing possible psychosocial risk factors.

Appendix I. Voice handicap index

These are statements that many people have used to describe their voices and the effects of their voices on their lives. Choose the response that indicates how frequently you have the same experience by placing a cross mark in one of the adjacent boxes.

		Never	Almost never	Some- times	Almost always	Always
F1	My voice makes it difficult for people to hear me					
P2	I run out of air when I talk					
F3	People have difficulty understanding me in a noisy room					
P4	The sound of my voice varies throughout the day					
F5	My family had difficulty hearing me when I call them throughout the house					
F6	I use the phone less often than I would like					
E7	I am tense when talking with others because of my voice					
F8	I tend to avoid groups of people because of my voice					
E9	People seem irritated with my voice					
P10	People ask “What is wrong with your voice?”					
F11	I speak with friends, neighbors or relatives less often because of my voice					
F12	People ask me to repeat myself when speaking face to face					
P13	My voice sounds creaky and dry					
P14	I feel as though I have to strain to produce voice					
E15	I find other people do not understand my voice problem					
F16	My voice difficulties restrict my personal and social life					
P17	The clarity of my voice is unpredictable					
P18	I try to change my voice to sound different					
F19	I feel left out of conversations because of my voice					
P20	I use a great deal of effort to speak					
P21	My voice is worse in the evening					
F22	My voice problem causes me to lose income					
E23	My voice problem upsets me					
E24	I am less outgoing because of my voice problem					
E25	My voice makes me feel handicapped					
P26	My voice “gives out” on me in the middle of speaking					
E27	I feel annoyed when people ask me to repeat					
E28	I feel embarrassed when people ask me to repeat					
E29	My voice makes me feel incompetent					
E30	I am ashamed of my voice problem					

The Voice Handicap Index consists of 30 questions in Total, regarding emotional (E), physical (P) and functional (F) subscales.

Appendix II. The Symptom Check List-90 (SCL-90)

The Symptom Check List-90 (SCL-90) assesses psychosomatic well-being within nine domains:

- Anxiety (ANX), 10 items: 2,17,23,33,39,57,72,78,80,86.
- Agoraphobia (AGO), 7 items: 13,25,47,50,70,75,82.
- Depression (DEP), 16 items: 3,5,14,15,19,20,22,26,29,30,31,32,51,54,59,79.
- Somatic complaints (SOM), 12 items: 1,4,12,27,40,42,48,49,52,53,56,58.
- Insufficiency in thinking and acting (IN), 9 items: 9,10,28,38,45,46,55,65,71.
- Interpersonal sensitivity and mistrust (SEN), 18 items: 6,7,8,18,21,34,35,36,37,41,43,61,68,69,73,76,83,88.
- Hostility (HOS), 6 items: 11,24,63,67,74,81.
- Sleep problems (SLE). 3 items: 44,64,66.
- "Miscellaneous items" (MISC), 9 items: 16,60,62,77,84,85,87,89,90.

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