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ORIGINAL PAPER

# VOICE DISORDERS AMONG TEACHERS FROM THE PERSPECTIVE OF AFFECTIVE TEMPERAMENT AND OCCUPATIONAL BURNOUT SYNDROME

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**Highlights**

- Occupational burnout affects subjective assessment of voice dysfunction.
- Affective temperament does not affect teachers' self-assessment of voice disorders.
- Hyperthymic temperament predominates in people with voice disorders.

**Abstract**

**Background:** Teachers are the occupational group most at risk for dysphonia. Therefore, it is important to introduce effective methods to support the rehabilitation process of occupational voice disorders. Knowledge about temperamental conditioning responsible for susceptibility or resistance to workplace stress and the occupational burnout syndrome in teachers is very important for the rehabilitation process due to further voice work. **Material and Methods:** The dependence of subjective voice assessment of professionally active teachers on affective temperament and occupational burnout was analyzed. The study included 174 female teachers who participated in a 24-day inpatient voice rehabilitation program at the Health Resort Hospital in Ciechocinek, Poland, 2019–2021. Subjective voice impairment was assessed using the *Voice Handicap Index* (VHI) self-assessment questionnaire. Affective temperament types were assessed using the *Temperament Evaluation of the Memphis, Pisa, Paris and San Diego Autoquestionnaire* (TEMPS-A). The *Maslach Burnout Inventory* (MBI) questionnaire was used to measure burnout. The VHI, TEMPS-A and MBI questionnaires were administered to the teachers at the beginning of the rehabilitation stay. **Results:** Total self-report of voice dysfunction, as assessed by the VHI questionnaire, was shown to be significantly associated with occupational burnout in all its dimensions ($p = 0.00$). The association of the subjective assessment of voice dysfunction in the teachers surveyed with affective temperament types was not confirmed. **Conclusions:** The study could be expanded to include a control group. The research on the relationship between occupational burnout and voice disorders could also be repeated with another group of voice professionals, such as singers. Demonstrating a correlation based on results obtained regardless of occupation would increase the reliability and confirm the universal value of the present study. Prophylaxis that takes into account temperamental conditioning and occupational burnout, as well as practical preparation of teachers for voice work, may be helpful in preventing voice dysfunction in this professional group. Med Pr Work Health Saf. 2025;76(5):361–371

**Key words:** occupational voice disorders, teachers, affective temperament, prophylaxis, occupational burnout, voice rehabilitation

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## INTRODUCTION

Voice disorders affect various professional groups. Statistics show that teachers are the most susceptible to dysphonia [1,2], and the majority are women (88.1%) [3,4]. The causes of voice problems in this profession are excessive voice strain [5], unfavorable working conditions [6], incorrect vocal emission [7], and lack of teacher preparation for voice work [8]. Currently, chronic occupational stress [9] and emotional problems resulting from inappropriate responses to difficult situations are receiving increasing attention [1]. Previous research has shown that voice quality depends on a person's emotional state [10,11].

Temperamental conditioning, which is responsible for human behavior in difficult situations, is important

for coping with stress. The term "temperament" is described as a set of stable, genetically determined styles of emotional response that shape the development of individual coping mechanisms to deal with stress [12]. The modern concept recognizes 5 basic types of affective temperament [13], which manifest themselves with varying intensity in an individual. These are: cyclothymic, depressive, hyperthymic, irritable, and anxious temperaments. Previous research has shown association between affective temperament and occupational stress and burnout [14]. Temperamental traits are considered to be a predisposing or protective factor against burnout [15]. Depressive, cyclothymic and irritable temperaments are associated with stronger reactions to stressful situations at work, whereas hyperthymic temperament promotes resistance to occupational stress [16]. Strong correlations have been found between individual dimensions of affective temperament and the levels of occupational stress as well as the risk of stress-related diseases. It has been shown that people with depressive and anxious temperaments cope the worst with occupational stress, in contrast to hyperthymic individuals, who tolerate stressful situations much better [17].

According to Maslach [18], burnout is a syndrome of emotional exhaustion, depersonalization and a reduced sense of personal accomplishment. This condition can occur in those who work with other people in an emotionally charged manner [19]. Teaching is classified as a helping profession. Meeting pedagogical and educational expectations requires the involvement of the entire personality [20], making teachers more vulnerable to occupational burnout [21].

The increasing prevalence of functional voice disorders among teachers is associated with chronic job stress and increased risk for burnout. Therefore, it is important to take into account the emotional functioning of individuals in this professional group when considering the prevention and treatment of dysphonia.

The purpose of this study was to analyze the relationship of subjective voice evaluation of professionally active teachers treated for voice disorders to affective temperament and occupational burnout.

## MATERIAL AND METHODS

The study included 174 female teachers aged 27–72 years (mean [M] = 51 years) who participated in a 24-day inpatient voice rehabilitation program at the Health Resort Hospital in Ciechocinek, Poland, 2019–2021. The participants' job seniority ranged 2–49 years (M = 27.7 years). More than 80% of the subjects had 20 years of job seniority. One percent were >60 years. Based on the phoniatric examination, 139 teachers were diagnosed with hyperfunctional dysphonia, which accounted for 79.89%. Vocal nodules were found in 35 subjects (20.11%). Subjective evaluation of the teachers' voice was performed using the self-administered *Voice Handicap Index* (VHI) questionnaire modified by Pruszewicz [22,23]. The VHI test consists of 3 subscales:

- I – self-assessment of functional state,
- II – self-assessment of emotional state,
- III – self-assessment of physical state.

The VHI questionnaire contains a total of 30 questions, 10 for each subscale. Questions from the functional domain explore how voice impairment affects daily social and work life. Questions from the emotional subscale address the patient's feelings about his or her own voice. The third section of the questionnaire deals with physical complaints related to the voice organ.

On each of the subscales, the respondent can score 0–40 pts (up to a total of 120 pts). A range of 0–30 pts is regarded as mild voice impairment, 31–60 pts indicates moderate voice impairment, and 61–120 pts is considered severe voice impairment.

The *Temperament Evaluation of the Memphis, Pisa, Paris and San Diego Autoquestionnaire* (TEMPS-A) in the Polish adaptation by Borkowska et al. [24] was used to assess affective temperament traits. The Polish version of TEMPS-A is a validated scale with satisfactory reliability. Cronbach's α coefficient values for individual temperament types range 0.69–0.83 [24].

The TEMPS-A contains 110 items assessing affective temperament traits represented on 5 scales: depression, cyclothymia, hyperthermia, irritability and anxiety. Items are grouped thematically:

- depressive temperament: questions 1–21 (21 pts),
- cyclothymic temperament: questions 22–42 (21 pts),
- hyperthymic temperament: questions 43–63 (21 pts),
- irritable temperament: questions 64–84 (21 pts in the female ver., 20 in the male ver.),
- anxious temperament: questions 85–110 (26 pts).

The TEMPS-A scale allows comparisons between the groups studied, but does not answer the question of a person's temperament type, as there are no norms for normative temperament [25]. Table 1 shows the basic characteristics of individuals with different temperament types.

The *Maslach Burnout Inventory* (MBI) in the Polish adaptation by Pasikowski [26] was used to measure oc-

**Table 1.** Basic characteristics of individuals with different temperament types

| Affective temperament | Characteristics |
|---|---|
| Depressive | low mood, lack of self-confidence, difficulty in establishing interpersonal relationships, lack of motivation to perform tasks, low energy level, persistence and reliability in performing tasks, poorer coping with occupational stress |
| Cyclothymic | frequent mood swings, openness to new relationships, creativity, intellectual effort in the tasks preformed, unstable energy level, superficial thinking, increased reaction to occupational stress |
| Hyperthymic | self-confidence, optimism, risk-taking, sociability, creativity, eloquence, physical endurance, lack of objectivity towards oneself, resistance to occupational stress |
| Irritable | skepticism, criticality, tendency to complain, tendency to show critical thinking, lower level of empathy, violent reactions to stimuli, stronger reaction to occupational stress |
| Anxious | physical and mental tension, worries about health, tendency to ruminate, susceptibility to somatic complaints, poor coping with occupational stress |

Based on research by Akiskal et al. [13], Jaracz et al. [14] and Borkowska et al. [24].

cupational burnout. This instrument distinguishes 3 domains of the burnout syndrome: emotional exhaustion, depersonalization, and reduced personal commitment. The Polish adaptation of the method is characterized by high psychometric indices. Reliability coefficients measured by Cronbach's α for individual scales of the questionnaire are: emotional exhaustion – 0.85, depersonalization – 0.60, reduced commitment – 0.76 [26]. The questionnaire consists of 22 questions divided into 3 groups, each of which addresses 1 of the elements of burnout [26]. The level of occupational burnout is indicated by high scores on the subscales of emotional exhaustion and depersonalization, and low scores on the subscale of reduced personal accomplishment (job satisfaction).

Self-assessment questionnaires of voice impairment, affective temperament, and occupational burnout were administered at the beginning of the rehabilitation program.

Parametric and non-parametric descriptive statistics, such as arithmetic mean (M), standard deviation (SD), minimum (min.), maximum (max) were used to statistically describe the collected data. Kruskal-Wallis analysis of variance by ranks was used to analyze the significance of differences between the groups compared. Correlation tests were performed using Spearman's rank correlation.

## RESULTS

### Subjective assessment of voice impairment among the teachers surveyed

On the total VHI scale, the teachers surveyed scored 54.64 pts, indicating moderate voice impairment. Patients reported the highest level of voice impairment on the physical subscale (24.11 pts). Subjects scored much lower on the functional (14.03 pts) and emotional (16.5 pts) subscales. Some respondents reported no problems with their voice on the functional and emotional subscales (min. 0) and minor problems on the physical subscale (min. 5). There were also teachers who perceived their voice as almost completely impaired (max 38–46 pts).

### Relationship between temperaments and teachers' self-assessment in functional, emotional and physical dimensions

The dominant temperaments of the teachers surveyed were identified in Figure 1. In the group studied, the highest intensity of traits characteristic of the hyperthymic temperament was observed in 60.34% of partic-

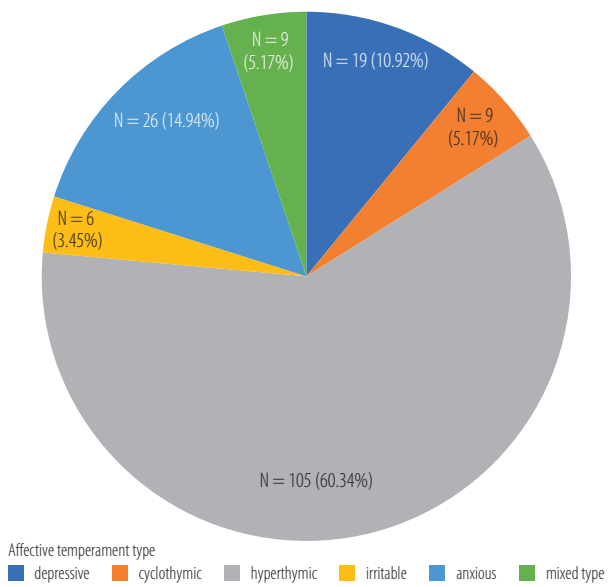


**Figure 1.** Dominant type of affective temperament in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

**Table 2.** Affective temperament and subjective *Voice Handicap Index* (VHI) assessment in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| Affective temperament | Participants [n] | VHI [pts] (M) | | | |
|---|---|---|---|---|---|
| | | overall | subscale | | |
| | | | I – functional | II – emotional | III – physical |
| Depressive | 19 | 70.15 | 68.63 | 77.05 | 72.10 |
| Cyclothymic | 9 | 103.16 | 87.50 | 107.27 | 102.50 |
| Hyperthymic | 105 | 90.31 | 91.21 | 89.82 | 88.48 |
| Irritable | 6 | 102.66 | 116.08 | 93.25 | 94.83 |
| Anxious | 26 | 90.40 | 89.46 | 90.96 | 92.46 |
| Depressive–hyperthymic | 7 | 61.78 | 61.92 | 55.00 | 75.42 |
| Cyclothymic–hyperthymic | 1 | 68.50 | 45.00 | 34.00 | 136.50 |
| Depressive–cyclothymic–hyperthymic | 1 | 12.50 | 55.00 | 20.00 | 4.00 |

Mean rank from Kruskal-Wallis test.

ipants. Traits associated with the anxious temperament were much less pronounced (14.94%), while other trait profiles were observed less frequently (3.45–10.92%). In 5% of participants, there was no clear dominance of a single temperamental profile; instead, mixed patterns were observed, such as depressive–hyperthymic, depressive–hyperthymic, or depressive–cyclothymic–hyperthymic. It is important to emphasize that these descriptions do not imply a classification of individuals into specific temperament types, but rather refer to the relative intensity of particular traits as measured by the TEMPS-A scale.

The relationship between affective temperament and the subjective assessment of the voice in terms of functional, emotional and physical characteristics was evaluated. The analysis was performed for all VHI subscales, and the results are shown in Table 2.

On the functional subscale, the most severe voice dysfunction was reported by subjects with the irritable temperament. Subjects with the dominant depressive temperament and those with compound temperaments reported the least voice problems. The differences were not statistically significant.

The highest level of voice dysfunction on the emotional subscale was observed in cyclothymic individuals. The least voice problems in the functional and physical dimensions were reported by teachers with depressive temperaments and those with heterogeneous temperaments. These differences were not statistically significant.

On the physical subscale, the highest level of voice dysfunction was reported by teachers with cyclothymic and cyclothymic–hypertymic temperaments. Relatively less voice dysfunction, but not statistically significant, was shown by teachers with the depressive temperament.

The relationship between the dominant type of the affective temperament and the VHI total score was also analyzed. The highest subjective voice impairment was observed in subjects with cyclothymic and irritable types. Among homogeneous temperaments, teachers with the depressive temperament reported the least voice problems. Even less voice dysfunction was reported by those with compound temperaments. The differences were found to be statistically insignificant from the perspective of the total VHI scale.

### Individual affective temperament traits and voice impairment

The intensity of temperaments was determined in the subjects. The tool used and its method of assessment allowed a temperament trait to be represented on a scale of 0–1, so it was possible to determine the average intensity of the trait. The highest intensity was recorded for the hyperthymic temperament (M = 0.49) and the lowest for the irritable type (M = 0.14). The results are included in Table 3. The relationship between self-rated voice impairment and temperament intensity is shown in Table 4.

The results did not confirm a statistically significant relationship between temperament intensity and the subjective assessment of voice impairment on individual subscales. No statistical significance was also found for the total VHI scale. The results are presented in Table 5.

**Table 3.** Intensity of affective temperament traits in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| Affective temperament | Intensity of a temperament trait* | | | |
|---|---|---|---|---|
| | M | min. | max | SD |
| Depressive | 0.35 | 0.00 | 0.76 | 0.15 |
| Cyclothymic | 0.27 | 0.00 | 0.90 | 0.19 |
| Hyperthymic | 0.49 | 0.04 | 0.85 | 0.18 |
| Irritable | 0.14 | 0.00 | 1.00 | 0.16 |
| Anxious | 0.32 | 0.00 | 0.88 | 0.23 |

* Trait intensity was assessed using the *Temperament Evaluation of Memphis, Pisa, Paris and San Diego Autoquestionnaire* and rescaled to a 0–1 range.

**Table 5.** Relationship between affective temperament types and overall self-assessed voice impairment in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| Variable | R | t | p |
|---|---|---|---|
| VHI and depressive type | –0.01 | –0.15 | 0.87 |
| VHI and cyclothymic type | 0.02 | 0.32 | 0.74 |
| VHI and hyperthymic type | 0.06 | 0.82 | 0.41 |
| VHI and irritable type | 0.11 | 1.53 | 0.12 |
| VHI and anxious type | 0.05 | 0.78 | 0.43 |

R – Spearman's rank correlation coefficient, t – Student's t-test, VHI – *Voice Handicap Index*.

### Occupational burnout and voice impairment

Occupational burnout was assessed using individual indicators, such as emotional exhaustion, depersonalization and personal commitment.

Occupational burnout among teachers was manifested in moderate levels of decreased commitment and emotional exhaustion. Due to the unequal construction of the scales, the results of emotional exhaustion, depersonalization and reduced commitment could not be directly compared on the basis of the arithmetic mean. In order to compare them, the item mean ($M_i$) was calculated, which turned out to be highest for reduced commitment ($M_i$ = 2.58 pts), slightly lower for emotional exhaustion ($M_i$ = 2.38 pts), and lowest for depersonalization ($M_i$ = 2.13 pts). The obtained indicators were at a medium level, except for depersonalization, which reached a low level in the study group. The results are included in Table 6.

The relationship between subjective voice assessment and occupational burnout was analyzed. A statistically significant correlation was found between the self-assessment of voice impairment on the functional subscale and emotional exhaustion as well as reduced commitment. For depersonalization, significant links were revealed on the emotional and physical subscales. It was shown that the higher the score obtained on the burnout questionnaire, the worse the perception of one's own voice. Although no statistically significant relationship was found between functional self-perception of voice and depersonalization, it was noted that as the teachers' levels of depersonalization increased, so did their voice dysfunction on the functional subscale. The results are included in Table 7. An analogous analysis was performed on the aggregate results of the VHI questionnaire. The results are included in Table 8. The overall self-assessment of vocal impairment on the VHI scale was significantly related to burnout in all aspects. The strength of the relationships remained at similar levels.

## DISCUSSION

Most scientific publications focus on analyzing the impact of social and health factors on the development of voice dysfunctions, but there is increasing attention to the relationship between occupational stress and voice disorders [27,28]. Less addressed is the question of temperamental conditioning responsible for susceptibility or resilience to occupational burnout and its relationship to voice disorders.

**Table 4.** Intensity of affective temperament and self-assessed voice impairment on the total *Voice Handicap Index* (VHI) scale in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| VHI subscale | Affective temperament | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | depressive | | cyclothymic | | hyperthymic | | irritable | | anxious | |
| | R | p | R | p | R | p | R | p | R | p |
| I – functional | –0.0054 | 0.943 | 0.0425 | 0.577 | 0.0877 | 0.250 | 0.0577 | 0.449 | 0.0328 | 0.667 |
| II – emotional | 0.0266 | 0.727 | 0.0096 | 0.900 | 0.0409 | 0.592 | 0.0508 | 0.505 | 0.0680 | 0.373 |
| III – physical | 0.0936 | 0.220 | 0.0178 | 0.816 | –0.0640 | 0.402 | 0.1315 | 0.084 | 0.1087 | 0.153 |

R – Spearman's and p-values for correlations between affective temperament traits and VHI subscales.

**Table 6.** Occupational burnout values and levels in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| Indicator | M | Min. | Max | SD | Level* |
|---|---|---|---|---|---|
| Emotional exhaustion | 21.46 | 14.00 | 30.00 | 3.45 | medium |
| Depersonalization | 10.65 | 5.00 | 17.00 | 1.46 | low |
| Reduced commitment | 20.64 | 15.00 | 29.00 | 2.38 | medium |

* Emotional exhaustion level: 0–16 – low, 17–26 – medium, ≥27 – high; depersonalization level: 0–6 – low, 7–12 – medium, ≥13 – high; reduced commitment level: 0–31 – low, 32–38 – medium, ≥39 – high.

**Table 7.** Relationship between self-assessment of voice impairment and occupational burnout on *Voice Handicap Index* (VHI) subscales in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| VHI subscale | Emotional exhaustion | | Depersonalization | | Reduced commitment | |
|---|---|---|---|---|---|---|
| | R | p | R | p | R | p |
| I – functional | 0.2005 | 0.008 | 0.1387 | 0.069 | 0.1950 | 0.010 |
| II – emotional | 0.2190 | 0.004 | 0.1830 | 0.016 | 0.1740 | 0.022 |
| III – physical | 0.1782 | 0.019 | 0.2505 | 0.001 | 0.2320 | 0.002 |

R – Spearman's rank correlation coefficient, p – significance level.

The present study is an analysis of the relationship between affective temperament traits and occupational burnout and self-assessment of voice dysfunction in working teachers.

The teachers surveyed rated their voice impairment as moderate, i.e., 54.6 pts on the total VHI scale. They perceived the greatest voice limitations from the perspective of physical assessment, but reported fewer problems on the functional and emotional subscales. In studies of healthy people in the general population, mean VHI scores ranged 8.90–10.5 pts [29], and in patients with dysphonia, mean VHI scores ranged 35.5–48.1 pts [30–32]. Ohlsson [33] showed that in a group of women with diagnosed voice disorders, the value of the VHI index was 33 pts, while without voice disorders it was 10 pts. Compared to working teachers, pre-service teachers had a relatively high level of voice impairment, namely 19 pts on the VHI scale [33]. Students who reported voice problems in college were more likely to experience voice problems later in their careers. Based on previous meta-analyses, voice dysfunctions have been shown to have a high rate of recurrence [34].

**Table 8.** Relationship between occupational burnout and self-assessed voice impairment in 174 female teachers undergoing inpatient voice rehabilitation, Poland, 2019–2021

| Variable | R | t | p |
|---|---|---|---|
| Emotional exhaustion and VHI | 0.19 | 2.63 | 0.00 |
| Depersonalization and VHI | 0.19 | 2.60 | 0.00 |
| Reduced commitment and VHI | 0.21 | 2.84 | 0.00 |

R – Spearman's rank correlation coefficient, t – Student's t-test, VHI – *Voice Handicap Index*.

In the study presented here, the mean score of the VHI voice self-assessment was found to be higher than in the analyses presented by other authors, because the study group consisted of teachers with diagnosed voice disorders who were participating in a comprehensive voice rehabilitation program conducted at a health resort hospital.

The study group consisted mainly of teachers with a hyperthymic temperament, who also had the highest intensity of this trait in the entire study group. There were fewer teachers with anxious and depressive temperaments, and the intensity of these traits was low. Only 6% of the subjects had presented compound temperaments. The results of the presented study differ from those of other authors. In the TEMPS-A scale study, Vazquez et al. [35] showed that depressive and anxious temperaments predominated in women. Similarly, in the Borkowska et al. [24] study, women showed depressive, anxious, and cyclothymic traits. It was shown that individuals with specific affective temperaments tend to gravitate towards specific professions. For instance, future nurses, who are more susceptible to burnout, are more likely to exhibit anxious–depressive traits [36].

The predominance of the hyperthymic temperament, which is associated with stress tolerance and risk-taking propensity, was demonstrated [14]. A higher intensity of the hyperthymic temperament is associated with

better performance in difficult tasks that require quick decisions and actions often under time pressure, such as those inherent in the daily work of paramedics [37]. The results suggest that the hyperthymic temperament may be associated with greater resilience to occupational stress, but further research is needed to confirm this.

The present study did not confirm the relationship between the type and intensity of the affective temperament and the total VHI scale as well as its individual subscales. There are no reports describing the relationship between the subjective assessment of voice disorders and the type of affective temperament, therefore it is not possible to relate the obtained results to other studies.

The question of the influence of personality on the development of voice disorders is most often addressed in the literature [38], but the results and conclusions presented are inconclusive. Personality traits such as impulsivity and hyperactivity have been shown to be independent factors associated with the occurrence of vocal nodules in study subjects [39]. However, a body of research suggests that a person's personality, temperament, and emotional state have a significant impact on the quality of the voice produced [2,40]. People with vocal nodules are characterized as domineering, impulsive and aggressive, while individuals with hyperfunctional dysphonia are described as having low stress tolerance, alienated and unhappy [38]. It has been shown that voice disorders are statistically more common in people with a depressive episode [40].

The results of the present study showed no relationship between individual affective temperament types and the self-reported voice impairment on the total VHI scale. The hyperthymic temperament was clearly dominant, with the highest intensity of the trait recorded. This temperament is an indicator of better functioning in stressful situations [16,41]. A hyperthymic individual is characterized by a high level of activity, a tendency to experience pleasurable emotions [25], which may explain the relatively better self-assessment of voice, despite the fact that all subjects were diagnosed with and rehabilitated for voice disorders.

On the VHI functional subscale, the highest levels of voice problems were reported by teachers with the irritable temperament, and the lowest by those with the depressive temperament. Irritable individuals tend to experience negative emotions and anxiety over time, which may justify the highest level of reported voice problems in the functional domain. In Jaracz's study [37], it was the irritable temperament that increased the risk of stress-related disorders at work and the development of burnout syndrome.

Cyclothymic temperament is characterized by emotionally labile people who are also very engaged in situations that require creativity and intellectual effort [25]. In addition, cyclothymic people want to meet the demands and are very committed, putting a lot of effort into the tasks entrusted to them, which can leave them feeling physically exhausted [25]. In the present study, teachers with a cyclothymic temperament rated their voice lower on the emotional and physical subscales. The results obtained indicate that cyclothymic temperament may be associated with emotional lability and physical exhaustion, but specific data would need to be collected to confirm or exclude the suggested relationship. People with a depressive temperament type are characterized by low energy levels, a tendency to be indifferent and a reduced mood. Kidd [42], Oxlad and Wade [43] have shown that these people have poor control over their health behavior, as they are often indifferent to it. It is worth noting that in this study, teachers with a depressive temperament rated their voice relatively better on all VHI subscales than those with other affective temperament types, despite diagnosed voice disorders and participation in rehabilitation. The results obtained suggest that depressive temperament may be associated with less control over one's own health, but more complete data and more detailed analyses in this direction would be needed to confirm the existence of such a correlation.

Working on the voice also requires on working on the emotions. This fact is overlooked by teachers, who focus on didactic and educational tasks, often with excessive anxiety and involvement of their own emotions. Previous research has already confirmed the link between emotional lability, understood as the tendency to react neurotically in difficult situations, and the development of functional dysphonia and vocal nodules [37]. It has been shown that although dysphonia can develop after a viral infection, it is most often associated with emotional or psychological experiences [10,44]. Teachers have higher levels of anxiety and depression than other professionals. Their emotional problems are often associated with occupational burnout syndrome, the symptoms of which are similar to those of depression [45]. Based on the results of previous studies, teaching is one of the professions clearly at risk for burnout [46–48]. The level of occupational burnout among the teachers surveyed was analyzed on the basis of 3 dimensions: emotional exhaustion, depersonaliza-

tion, and personal commitment. Reduced commitment was the most characteristic feature of the study group. Emotional exhaustion and depersonalization were at the middle and lowest levels, respectively. The results can be explained by the fact that the average job seniority was significant, namely 27.7 years. As seniority increases, teachers may express the belief that they are unproductive, that their ability to perform tasks is limited, and that they are less able to cope with difficult work situations. A study by Smulczyk et al. [49] of 1703 teachers found that those in younger age groups were more likely to experience burnout. Teachers <35 years were more likely to have negative feelings about their profession than older colleagues. Symptoms of burnout syndrome in young teachers have also been observed by other researchers [50,51]. A study by Antoniou et al. [52] of primary and secondary school teachers did not confirm a significant effect of seniority on the severity of burnout syndrome and its individual components.

It was confirmed that occupational burnout and long-term exposure to stress lead to a decrease in immunity [53]. Symptoms typical of emotional exhaustion, such as irritability, fatigue are characterized by lowered mood, pain, and thus may increase susceptibility to the development of voice disorders.

The subjective assessment of voice impairment was found to be significantly related to the occupational burnout of the subjects on all subscales of the VHI. There was a statistically significant correlation between the self-reported voice impairment on the functional subscale and emotional exhaustion and decreased commitment. An association between emotional exhaustion and psychosomatic complaints was already confirmed in the past [54]. In the study presented here, these were complaints related to the vocal tract. The higher the level of emotional exhaustion and reduced commitment, the more serious the vocal complaints. This observation should be considered in the diagnosis and treatment of occupational voice disorders in teachers. Chronic stress has been shown to mediate the etiopathogenesis of many conditions [55] and to be a direct cause of voice disorders [56].

In teachers, stress can aggravate voice problems, and in emotional individuals who are less able to cope with difficult situations, it can be a major cause [1,57].

Psychological problems considerably affect the quality of teachers' voices. Knowledge of psychological and temperamental factors influencing human behavior in difficult situations can be useful both in phoniatric-logopedic diagnostics and in increasing the effectiveness of voice disorders rehabilitation. Conscious improvement of correct voice emission in teachers combined with effective management of emotional tension and professional stress may help prevent voice disorders. Prophylaxis, taking into account temperamental conditioning and practical preparation of teachers for voice work, may contribute to reducing the number of functional voice disorders in this professional group.

**Study limitations**

The results of the present study should be interpreted with several important limitations in mind. First, only female teachers participated in the study. Since no male teachers or persons representing other professions were included, it is difficult to determine whether the results obtained are applicable to the broader population. Therefore, it would be worthwhile to conduct similar analyses among teachers in the future, which would allow a better understanding of possible gender differences and broaden the scope of interpretation of the data obtained.

Another limitation is the lack of a control group. The inclusion of a group consisting of, e.g., teachers without voice disorders, novice teachers, or non-professional voice users would better illustrate the relationships between affective temperament, professional burnout, and voice disorders. If similar correlations were found outside the teaching community, this would increase the validity of the findings and confirm their broader applicability.

It is also worth considering extending the study to other groups of professional voice users, such as singers. Demonstrating similar correlations regardless of occupation could confirm the universal nature of the observed relationships and strengthen the reliability of the results.

The above limitations not only indicate the need for caution in interpreting the results, but also underscore the need for continued research in this area.

## CONCLUSIONS

Occupational burnout is associated with self-reported voice dysfunction in teachers. Emotional factors should be considered in the prevention and rehabilitation of occupational voice disorders. Implementing therapeutic techniques aimed at coping with occupational stress to prevent occupational burnout may increase the effectiveness of voice disorder rehabilitation. Prevention that takes into account knowledge about occupational burnout, together with practical preparation of teachers

for voice work, may be helpful in preventing voice disorders in this professional group.

## AUTHOR CONTRIBUTIONS

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