



FACTORS ASSOCIATED WITH BURNOUT VULNERABILITY IN POLISH PRE-SERVICE TEACHERS: INSIGHTS FROM THE AVEM DIAGNOSTIC INVENTORY AND IMPLICATIONS FOR OCCUPATIONAL HEALTH PREVENTION

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HIGHLIGHTS

- More than half of teacher education students were vulnerable.
- Younger age and working longer hours was risk factor.
- Considering current studies as the most preferred choice was a protective factor.
- Intrinsic career choice motivation and optimism was a protective factor.

ABSTRACT

Background: The present study aimed at the early detection of Polish teacher education students vulnerable to burnout and occupational health issues, using the work-related coping behavior and experience patterns (*Arbeitsbezogenes Verhaltens- und Erlebensmuster* – AVEM) diagnostic inventory to identify risk work-related patterns (the excessively ambitious pattern A and the resigned pattern B). **Material and Methods:** Participants were 431 full-time first-year teacher education students enrolled at various higher education institutions in Poland. They completed a survey including the AVEM inventory, the *Motivation for Choosing Teacher Education Questionnaire*, the intrinsic religiosity subscale of the *Duke University Religion Index*, and the revised *Life Orientation Test*. The predictive values of background variables, attitudes toward teaching and teacher education, career choice motivation, intrinsic religiosity, and dispositional optimism for assignment to the work-related patterns were examined using multinomial logistic regression, with the healthy ambitious pattern G serving as the reference group. **Results:** A total of 59.63% of participants were assigned to risk patterns indicating increased vulnerability to burnout and occupational health issues. Older students were less likely to be assigned to pattern A ($b = -1.28, p < 0.05$), whereas those working longer hours alongside their studies were more likely to be assigned to pattern A ($b = 1.09, p < 0.05$). Students who identified teacher education as their most preferred study choice ($b = -6.58, p < 0.05$) were less likely to be assigned to pattern B, as were those who chose teacher education based on ability belief ($b = -1.61, p < 0.05$). Higher levels of optimism protected against both pattern A ($b = -3.99, p < 0.001$) and pattern B ($b = -4.71, p < 0.001$). **Conclusions:** It is necessary to implement preventive measures to reduce long-term health risks in future teachers. However, the results should be interpreted with caution due to study limitations, such as the use of purposive sampling. *Med Pr Work Health Saf.* 2026;77(2)

Key words: optimism, burnout, occupational health, teacher education, work-related patterns, career choice motivation

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INTRODUCTION

Education is the foundation of societal development, but it is teachers who determine its quality and effectiveness, serving as key mediators in transmitting knowledge to younger generations and fostering the development of their competencies [1]. In European culture, historical archetypes of teachers included Greek philosophers such

as Socrates, regarded as the model of the ideal teacher – intelligent, morally upright, impartial, and independent [2]. However, in contemporary settings, the nature of teachers' work has undergone significant transformation and the expectations placed on them have expanded considerably. In addition to possessing extensive subject-matter expertise, teachers are now required to tailor instruction to the individual needs of students, support

their emotional and social development, while continuously adapt to rapid technological change. These expanding expectations, coupled with growing administrative workloads and intensified public scrutiny, have been associated internationally with rising levels of occupational stress and an elevated risk of work-related health problems, including burnout [3].

In Poland, further specific occupational stressors must be considered. Alongside the long-standing negative stereotypes surrounding the teaching profession and its perceived low prestige in society, recent systemic reforms – including curricular changes, restructuring of the school system, and the abolition of lower secondary schools – have increased administrative burdens for practicing teachers and created substantial job insecurity [4–6]. Given the accumulation of systemic and inherent occupational stressors – particularly among teachers working in highly demanding educational contexts – the high levels of burnout reported in contemporary research on Polish teachers are unsurprising [7]. Not only in-service teachers face increasing occupational challenges; multiple stressors also emerge already during teacher education. In addition to academic pressures, teaching placements represent a significant source of stress, as teacher education students often confront their own unpreparedness for the realities of school life, compounded by the frequently insufficient support provided by practicum supervisors [8]. Combined with the limited emphasis on fostering the emotional and social development of future teachers – an aspect crucial for coping with professional challenges [9] – these factors contribute to overload, reduced motivation, and even symptoms of burnout during teacher education [10,11]. Considering the inherently stressful nature of the teaching profession, compounded by the specific challenges of the Polish educational system, the occupational health of Polish teachers is at considerable risk. Given the pivotal role teachers play in the development of young people and the documented impact of teacher occupational health on students' well-being, academic performance, and motivation [12,13], the implementation of preventive measures to support and foster teacher occupational health is essential.

A preventive approach to teacher occupational health

Teachers in general, and Polish teachers in particular, face numerous challenges that render teaching a highly stressful profession. Since these occupational stressors are unlikely to be alleviated in the near future, em-

phasis must be placed on preventive measures that enhance individuals' capacity to manage work demands in a healthy way. One such preventive measure is *Arbeitsbezogenes Verhaltens- und Erlebensmuster* (AVEM); work-related coping behavior and experience patterns in English diagnostic inventory [14]. Developed within the framework of teacher occupational health, it assesses individuals' characteristic ways of coping with work demands as a decisive criterion for health-related evaluation. This perspective emphasizes the active role of individuals in managing occupational stress, recognizing that they are not merely passive recipients of strain but, through their distinctive patterns of behavior and experience, actively shape their own exposure. By identifying maladaptive patterns of coping and experience, AVEM enables the early detection of individuals particularly vulnerable to long-term occupational health problems and allows for the application of targeted preventive interventions before the onset of such issues. The AVEM inventory evaluates 11 dimensions of work-related behavior and experience, organized into 3 overarching domains. Professional commitment encompasses the perceived importance of work, professional ambition, willingness to exert effort, striving for perfection, and emotional distancing. Coping capacity reflects resignation tendencies, active problem-solving, and emotional stability. Subjective well-being includes satisfaction with work and life as well as the perception of social support. Based on cluster analyses of these dimensions, 4 distinct patterns of work-related behavior and experience have been identified. Two of these patterns are regarded as health-promoting (patterns G and S), while the other 2 are associated with elevated risk (patterns A and B) [14,15].

Pattern G – healthy ambitious

Pattern G represents individuals in good psychological health who approach their work with a health-promoting attitude. They show strong, though not excessive, professional commitment – valuing their work and striving for high performance while still maintaining the ability to distance themselves from job-related demands. This balance allows them to relax and protect their personal life from professional intrusion. Their coping resources are strong, with low resignation tendencies, active problem-solving, and emotional stability. Combined with high satisfaction in work and life and a strong sense of social support, this profile reflects optimal conditions for successfully applying professional skills without compromising well-being [14,15].

Pattern S – unambitious

Pattern S is marked by low professional commitment and limited personal investment at work. These individuals score low on ambition, effort, and perfectionism, while demonstrating the highest ability to emotionally distance themselves from job demands. Importantly, their reduced commitment is not accompanied by despair or resignation, but rather by stable coping resources and positive life satisfaction. While their health is not at risk, their low motivation may raise concerns in professional contexts such as teaching. This “energy-conserving” attitude, however, can function as a protective factor under unfavorable working conditions [14,15].

Pattern A – excessively ambitious

Pattern A reflects excessive occupational commitment. Individuals in this profile place very high significance on work and exert great effort but struggle to emotionally detach from professional demands. Their coping capacity is weak, leaving them vulnerable to stress and frustration. Negative emotions dominate their work experience, as high effort is not sufficiently rewarded – a phenomenon described as a “gratification crisis” [16]. This discrepancy between high commitment and low satisfaction increases the risk of health problems, particularly cardiovascular diseases. The profile shows similarities to the classic “type A behavior” concept but extends it by highlighting the interaction between overcommitment, insufficient coping, and emotional strain [14,15].

Pattern B – resigned

Pattern B reflects a risk profile that shares many features with burnout but cannot be equated with the syndrome itself. It is characterized by very low professional commitment, particularly regarding the subjective importance of work and ambition – similar to the S-pattern – but differs in that disengagement is combined with limited ability to emotionally distance from job demands. Coping resources are critically weak, marked by strong resignation tendencies, minimal problem-focused coping, and low emotional stability. Indicators of well-being, including satisfaction with work and life and perceived social support, are consistently low. The overall picture is dominated by exhaustion, resignation, diminished resilience, and negative emotions, all of which correspond to central features of burnout as described by Freudenberger [17] and Maslach [18]. However, unlike burnout, which is understood as a process unfolding over time, the B-pattern should be regarded as a marker of heightened burnout vulnerability [14,15].

Application of AVEM in teacher education students

The AVEM patterns have been frequently investigated among professionals in various occupations, with both international and national research showing that teachers are among the most vulnerable groups. Nevertheless, whereas in Germany, approx. 60% of teachers were classified into the risk patterns [15], in Polish samples the proportion reached 80% [19] and in some cases even >90% [20], pointing to the markedly heightened vulnerability of Polish teachers.

University students constitute a frequently examined population in AVEM research, underscoring the inventory’s potential to promote occupational health among future professionals when applied early [21,22]. Student-focused studies typically aim to map the distribution of patterns in different samples and to identify risk and protective factors associated with specific patterns. Such findings strengthen the preventive value of the tool by pointing to vulnerable groups most prone to risk patterns. However, research addressing Polish teacher education students is still lacking, despite the alarming situation among Polish teachers and the clear preventive potential of the AVEM inventory. Following the recommendations of several authors [21,23,24] to implement AVEM at the very beginning of teacher education, the present study investigates pattern distribution among first-year Polish teacher education students and examines risk and protective factors linked to (un)healthy patterns.

Potential risk and protective factors

National studies indicate that the mental health of Polish teacher education students may already be at risk before they enter the profession, with a considerable proportion displaying symptoms of burnout [11]. Research on students has further identified several risk factors for burnout and related mental health problems, including high levels of neuroticism [25] and perfectionism [26]. The present study makes a novel contribution by examining risk and protective factors specifically linked to vulnerability to burnout and occupational health issues among teacher education students. As one of the first studies of its kind in Poland, it not only enhances the preventive value of such investigations and extends the scope of existing national findings, but also provides knowledge that may inform the design of early interventions within teacher education programs.

Student background

Most evidence on student background factors relevant to AVEM pattern assignment comes from international re-

search. Studies based on German-speaking student samples consistently show that women are more frequently assigned to risk patterns, whereas men are more often associated with pattern S [23,27–29]. These trends align with findings from Polish workforce studies [30,31] and research on Polish students, suggesting that femininity may increase vulnerability to unhealthy patterns, while masculinity may act as a protective factor [32]. The possible link between patterns and age among students remains inconclusive. Jäger [33] found that younger German students were more likely to be assigned to the healthy ambitious pattern G than older peers, yet other international studies did not confirm this trend, suggesting no clear association between work-related patterns and age [34,35]. In the Polish context, however, younger nursing students demonstrated higher levels of burnout compared to their older counterparts [36]. In contrast, international research indicates that assignment to (un)healthy patterns may also be shaped by family and financial background. A tendency toward healthy patterns has been observed among students from families with higher socioeconomic standing [35], whose fathers had attained higher education [37], and who received greater financial support [27,37].

These findings align with Polish research linking poor mental health to unfavorable financial circumstances, financial stress, and low social status [38]. In addition, the likelihood of being assigned to a healthy pattern was higher for students who had a personally important job while studying [23] but who were not employed full-time [33]. Among Polish students, however, neither job status nor working hours showed an association with burnout [39].

Attitudes toward teaching and teacher education

International evidence on teacher education students has convincingly shown that attitudes toward teaching and teacher education are closely linked to the pattern distribution. In this respect, students with a high subjective certainty about their choice of a teaching career and with the intention of pursuing such a career after completing their studies displayed healthy work-related patterns; the opposite applied to students who were uncertain or did not intend to become teachers [28,40]. Additionally, those who had chosen teacher education as a second choice, and those least satisfied with their studies and their choice of a teaching career, were more likely to be assigned to pattern B [21,28].

Optimism

It is understood as a generalized, relatively stable tendency to expect positive outcomes across important

life domains, whereas pessimism refers to the anticipation of negative ones [41]. The beneficial effects of optimism on both physical and mental health are well documented, with evidence showing its protective role against stress, depression, anxiety, and post-traumatic stress disorder [42,43]. In AVEM research, optimism has been linked to a greater likelihood of assignment to patterns G and S among Polish nurses [44]. It also protected against both risk patterns in Austrian students [45], while pessimism was associated with pattern A in German and Austrian students [46]. Among Polish teacher education students, higher optimism was also related to more health-promoting behaviors and more positive mental attitudes [47]. The close link between dispositional optimism and the health-promoting pattern G, in contrast to the risk patterns, is also theoretically well grounded. From the perspective of key models explaining burnout development – such as the job demands–resources model and conservation of resources theory – optimism represents a central personal resource. In this respect, optimism supports positive appraisal of demands and proactive coping, thereby helping to buffer the negative effects of strain. At the same time, it may facilitate further resource gain and reduce the risk of resource loss spirals. Through these combined mechanisms, the protective role of optimism against burnout vulnerability is theoretically well substantiated [48,49].

Further examination of optimism as a protective factor against assignment to risk patterns appears particularly relevant, given that Masłowska [50] found the vast majority of Polish teacher education students to be pessimistic. This tendency is echoed in the general population, where annual Eurofound surveys consistently place Poland below the EU-27 (i.e. the 27 member states of the European Union) average in optimism, with the most recent data showing that only 30% of respondents felt optimistic about their future [51].

Religiosity

It has been identified as an important factor in promoting health and protecting against occupational health issues. Among university students, higher levels of religiosity have been associated with better overall health, lower stress, reduced burnout symptoms, and improved academic performance [52–54]. Religiosity has also been linked to a lower likelihood of risk patterns and a higher likelihood of healthy patterns, as shown in studies of Polish nurses [55], Swiss employed women [56], and German pastors, though not among German theology students [57]. In Polish students, religiosity has been

identified as a key psychosocial resource associated with better mental health [38]. Moreover, internalized religiosity has been found to foster constructive coping and more positive life orientations, while the absence of religiosity was linked to destructive coping and pessimistic worldviews [58].

Career choice motivation

Motivation – particularly high-quality autonomous motivation originating from internal factors – underpins optimal psychological functioning and protects against occupational health issues such as burnout in both teachers and university students [59–61]. Among Polish students, autonomous motivation has been linked to better health and greater well-being [62]. Several studies have also demonstrated a close connection between teacher education students' career choice motivation and their work-related patterns. Research consistently shows that G-type students most often choose teaching due to intrinsic and altruistic motives, whereas B- and S-type individuals display markedly lower levels of such motivation [63]. Research studies using the German questionnaire on motivation for choosing teacher education (also applied in the present study), found that both German and Austrian S-type students were less likely to enter teacher education out of genuine interest in the studied subject(s) [24,45], while Austrian S- and B-type students were less likely to enter teacher education out of the belief that the teaching profession's demands matched one's own abilities [45]. Moreover, German A- and B-type students were more likely to be motivated by the perceived low difficulty of the studies [24]. Furthermore, B-type teacher education students frequently view teaching as a fallback career, either because alternative career paths were unavailable or because first-choice aspirations could not be realized [29,63]. This finding is consistent with Polish research on teacher motivation, which indicates that B-type teachers are primarily driven by external factors such as workplace convenience or flexible hours, and that as many as 38% admit to having chosen the teaching career accidentally [64]. The empirically supported link between intrinsic motivation and the health-promoting pattern G, on the one hand, and extrinsic motivation and the risk patterns, on the other, is also theoretically well grounded in self-determination theory. From this perspective, intrinsic – or more broadly, autonomous – motivation supports sustained engagement while simultaneously protecting well-being and both physical and mental health, which is consistent with the defining characteristics of pattern G. In contrast, external, or controlled,

motivation often fails to sustain involvement over time and is associated with lower-quality functioning and compromised well-being, which mirrors the defining features of pattern B [59].

The present study

There is a pressing need for a preventive approach that allows for the early identification of future Polish teachers at risk of developing long-term occupational health issues, including burnout. To address this, vulnerability to burnout and occupational health issues in first-year teacher education students is assessed using the AVEM diagnostic inventory, while the aim is also to identify potential risk and protective factors associated with assignment to (un)healthy work-related patterns.

The central research questions are:

- How are the work-related patterns distributed among Polish teacher education students at the beginning of their studies?
- Which variables function as risk factors for unhealthy patterns, and which serve as protective factors against them?

MATERIAL AND METHODS

Participants

Initially, 475 students participated in the study. After data screening, 44 participants were excluded: 17 students were removed because they were enrolled in higher years of study, and 27 because they were enrolled in study programs other than teacher education. The final analytical sample therefore consisted of 431 full-time first-year teacher education students enrolled at various higher education institutions in Poland, including Kazimierz Wielki University in Bydgoszcz, Jan Długosz University in Częstochowa, Adam Mickiewicz University in Poznań, and others (a detailed overview of participants' institutions and study programs is provided in Table 1). Of these, 92.34% identified as female, 6.03% as male, 1.16% as another gender, and 0.46% preferred not to disclose their gender. The predominance of female students reflects the typical gender distribution among teacher education students in Poland. Participants ranged in age 18–48 years (mean ± standard deviation [M±SD] 19.90±2.04 years). The sample included 0.46% international students, defined as individuals who held citizenship in a country other than Poland or who had entered the country specifically for the purpose of study. Further sample characteristics are presented in Table 2. All participants were offered person-

Table 1. First-year teacher education students across higher education institutions in Poland, 2022–2024 – distribution by institution and study program

Variable	Participants (N = 431)	
	n	%
Higher education institution		
Kazimierz Wielki University	138	32.02
Jan Długosz University in Czestochowa	121	28.07
Adam Mickiewicz University	70	16.24
University of Warmia and Mazury	22	5.10
Nicolaus Copernicus University in Toruń	19	4.41
Maria Grzegorzewska University	17	3.94
University of Silesia in Katowice	13	3.02
Maria Curie-Skłodowska University	7	1.62
Pedagogical University of Kraków	6	1.39
University of Lodz	5	1.16
University of Warsaw	3	0.70
Gdansk University of Physical Education and Sport	2	0.46
AGH University of Krakow	2	0.46
Cardinal Stefan Wyszyński University in Warsaw	1	0.23
Feliks Nowowiejski Academy of Music	1	0.23
Wroclaw University of Health and Sport Sciences	1	0.23
University of Gdańsk	1	0.23
University of Rzeszów	1	0.23
University of Wrocław	1	0.23
Study program		
pedagogy	354	82.13
preschool and/or early-school pedagogy	248	57.54
school pedagogy and/or educational therapy	38	8.82
special education	21	4.87
care pedagogy with addiction prevention and sociotherapy	18	4.18
teacher education	19	4.41
care and educational pedagogy	7	1.62
specialization: social animation and cultural management	2	0.46
specialization: media education and journalistic techniques	1	0.23
teaching specialization	77	17.87
English philology	17	3.94
art and/or music education	13	3.02
physical education	11	2.55
Polish philology	9	2.09
mathematics education	7	1.62
applied linguistics (English-German)	6	1.39
history education	5	1.16

Table 1. First-year teacher education students across higher education institutions in Poland, 2022–2024 – distribution by institution and study program – cont.

Variable	Participants (N = 431)	
	n	%
Study program – cont.		
teaching specialization – cont.		
chemistry education	4	0.93
applied linguistics (Russian-English)	1	0.23
philosophy education	1	0.23
humanities education (Polish language and history)	1	0.23
biological and nature education	1	0.23
mathematics and computer science education	1	0.23

alized feedback on their assigned work-related pattern, provided under a confidential identification code and accompanied by explanatory material and tailored developmental recommendations.

Procedure

Participants were asked to participate in the research approx. 1 month after enrolling in the higher education institution to ensure they had acquired sufficient academic experience before completing the AVEM items. They were invited to participate either during university lectures – completing an online survey via their smartphones or personal computers – or via email and/or social media platforms. Since lecture attendance was voluntary and not systematically recorded at the participating institutions, and because the reach of indirect contact methods (email and social media) could not be reliably estimated, the exact number of students invited remains unknown. Consequently, a response rate could not be calculated.

Ethics

The study received approval from the Faculty Research Ethics Committee of the Kazimierz Wielki University in Bydgoszcz, Faculty of Psychology (consent No. 4/17.01.2023). Participants provided informed consent prior to participation.

Measures

Background characteristics

Data on background characteristics included gender, age, higher education institution, study program, international student status, and parental education (whether ≥ 1 parent or guardian had completed higher education).

In addition, participants provided information on their current job status, average number of hours worked during term time, disposable income (average monthly amount of money available after covering essential living expenses), and place of residence during term time.

Attitudes towards teaching and teacher education

Certainty about teaching as the right profession was measured with the question: “How sure are you that teaching is the right career for you?” answered on a 5-point Likert-type scale (1 – “very unsure,” 5 – “very sure”). Whether teacher education was the participant’s first choice was assessed with the question: “Is your current teacher education degree course your first (most preferred) choice?”

Work-related coping behavior and experience patterns

They were assessed using the 66-item Polish version of the AVEM inventory [65] (originally in German by Schaarschmidt and Fischer [14]). Items were answered on a 5-point Likert scale (1 – “strongly disagree,” 5 – “strongly agree”) with student-adjusted instructions [23].

Dispositional optimism

It was measured using the revised *Life Orientation Test* [66] (Polish adaptation [67]). For this study, only the 6 scorable items from the original 10-item version were used; the 4 filler items were excluded. To ensure consistency with other measures, the response scale was adapted from the original 0–4 format to a 1–5 Likert scale (1 – “strongly agree,” 5 – “strongly disagree”).

Intrinsic religiosity

It was measured using the 3-item intrinsic religiosity subscale of the *Duke University Religion Index* [68] (Polish

Table 2. First-year teacher education students across higher education institutions in Poland, 2022–2024 – distribution by background and study characteristics

Variable	Participants (N = 431)		Min.–max	M±SD
	n	%		
Age [years]			18–48	19.90±2.04
Gender				
male	26	6.03		
female	398	92.34		
other	5	1.16		
prefer not to say	2	0.46		
International student				
yes	2	0.46		
no	429	99.54		
Parental education				
≥1 parent/guardian has a university degree	189	43.85		
neither parent/guardian has a university degree	229	53.13		
not available ^a	13	3.02		
Housing				
flat/apartment or university residence				
shared bedroom	65	15.08		
private bedroom	137	31.79		
parent/guardian's house	214	49.65		
own household	12	2.78		
other	1	0.23		
not available ^a	2	0.46		
Job status				
only studying	283	65.66		
has a personally important job	63	14.62		
has a job personally less important and/or temporary	77	17.87		
not available ^a	8	1.86		
Current teacher education degree program as the most preferred study choice				
yes	372	86.31		
completely different degree program preferred	43	9.98		
other teacher education specialization preferred	14	3.25		
current degree program preferred, but at a different university	2	0.46		
Work time (if working) [h/week]			1–80	18.48±11.62
Disposable monthly income [PLN]			0–10.000	718.32±832.12
Certainty that teaching is the right profession [1–5 Likert scale]			1–5	3.73±1.02

^aRespondents did not provide a valid response.

adaptation [69]). Items were answered on a 5-point Likert scale (1 – “definitely not true,” 5 – “definitely true of me”).

Career choice motivation

Motivation for choosing teacher education was measured using the *Motivation for Choosing Teacher Education*

Questionnaire (Fragebogen zur Erfassung der Motivation für die Wahl des Lehramtsstudiums – FEMOLA [70]). The instrument consists of 33 items answered on a 4-point Likert scale (1 – “strongly disagree,” 4 – “strongly agree”) and introduced by the statement: “I chose teacher education, because ...”. Items form 6 subscales: 3 intrinsic motives – educational interest (6 items), subject-specific interest (5 items), and ability beliefs (5 items); and 3 extrinsic motives – utility (8 items), low difficulty of study (4 items), and social influences (5 items). The original German version was translated into Polish using a collaborative, iterative approach [71,72]. Two researchers independently prepared translations, which were reviewed with a third researcher, a Polish native speaker experienced in questionnaire design, resulting in the most suitable final wording. A pretest with teacher education students using the think-aloud method revealed no comprehension issues, and the version was retained without modifications.

Statistical analyses

First, scores for each scale covered by the AVEM and FEMOLA instruments, as well as for dispositional optimism and intrinsic religiosity, were computed by reversing the negatively worded items and then averaging the items corresponding to each scale. Each participant was subsequently assigned to 1 of the 4 work-related patterns that showed the highest correspondence with their individual responses to the AVEM inventory items. This classification followed the algorithm provided by Schaar-schmidt and Fischer [14]. Reliability estimates were calculated for all scales, alongside descriptive statistics and inter-variable correlations.

The predictive values of selected background variables, attitudes toward teaching and teacher education, dispositional optimism, intrinsic religiosity, and career choice motivation for assignment into specific work-related patterns were examined using multinomial logistic regression, with the healthy ambitious pattern G serving as the reference group. Prior to inclusion in the regression model, continuous variables were standardized. Extreme univariate outliers were identified using a *z*-score criterion ($z > 3.29$) and treated as missing. For background variables, categories with a small proportion of participants or representing unclear responses were excluded, and the remaining categories were merged where appropriate. All analyses were conducted in SPSS, v. 25 (IBM Corp., Armonk, NY, USA), except for the multinomial logistic regression, which was carried out in R (R Core Team, Vienna, Austria).

RESULTS

All reliability estimates (Cronbach’s α and McDonald’s ω) indicated at least acceptable internal consistency [73]. Table 3 presents the reliability estimates together with descriptive statistics for the scale variables, while inter-variable correlations are shown in Table 4.

Regarding the distribution of work-related patterns, 105 participants (24.36%) were assigned to pattern G, 69 (16.01%) to pattern S, 104 (24.13%) to pattern A, and 153 (35.50%) to pattern B. The multinomial logistic regression indicated several significant predictors of work-related patterns, with pattern G serving as the reference group. Older students were less likely to be classified into pattern A ($b = -1.28$, $p < 0.05$). In contrast, working longer hours increased the likelihood of belonging to pattern A ($b = 1.09$, $p < 0.05$) but decreased the likelihood of belonging to pattern S ($b = -2.96$, $p < 0.05$). Students who identified teacher education as their most preferred study choice were less likely to fall into pattern B ($b = -6.58$, $p < 0.05$). Similarly, greater certainty that teaching was the right profession reduced the probability of classification into pattern S ($b = -4.22$, $p < 0.05$). Higher levels of optimism emerged as a protective factor against both pattern A ($b = -3.99$, $p < 0.001$) and pattern B ($b = -4.71$, $p < 0.001$). Greater career choice motivation based on ability belief was associated with lower odds of membership in both pattern S ($b = -3.02$, $p < 0.05$) and pattern B ($b = -1.61$, $p < 0.05$). Assignment to pattern S was further predicted by higher motivation related to perceiving teacher education as less difficult ($b = 1.79$, $p < 0.05$) and by lower motivation driven by subject interest ($b = -5.12$, $p < 0.05$).

The likelihood ratio test indicated that the multinomial logistic regression model provided a significantly better fit to the data than the intercept-only model, $\chi^2(57) = 161.45$, $p < 0.001$. The McFadden’s pseudo- R^2 was 0.568, indicating that the model achieved a substantial improvement in fit compared to a model without predictors. Table 5 presents the regression coefficients along with their standard errors, odds ratios, and 95% confidence intervals.

DISCUSSION

This study focused on work-related coping behavior and experience patterns, which can signal vulnerability to burnout and other occupational health issues among Polish teacher education students at the start of their studies. The findings indicate that nearly 60% of these students were classified as vulnerable: 24.13% were assigned to pattern A, characterized by ex-

Table 3. Means, standard deviations, and reliability estimates for optimism, religiosity, career choice motivation scales (*Fragebogen zur Erfassung der Motivation für die Wahl des Lehramtsstudiums – FEMOLA*), and work-related coping behavior and experience pattern scales (*Arbeitsbezogene Verhaltens- und Erlebensmuster – AVEM*) among first-year teacher education students in Poland, 2022–2024

Scale	M	SD	α	ω
Optimism	3.35	0.78	0.80	0.81
Religiosity	2.67	1.32	0.93	0.93
FEMOLA				
utility	2.63	0.56	0.79	0.79
educational interest	3.38	0.64	0.90	0.90
ability belief	3.13	0.57	0.79	0.79
social influences	2.50	0.74	0.75	0.76
low difficulty of study	2.20	0.67	0.73	0.74
subject interest	3.41	0.56	0.82	0.82
AVEM				
subjective significance of work	2.73	0.75	0.77	0.78
professional ambition	3.70	0.73	0.78	0.79
tendency to exert	3.27	0.77	0.75	0.77
striving for perfection	3.67	0.75	0.80	0.80
emotional distancing	3.10	0.74	0.74	0.74
resignation tendencies	3.03	0.85	0.86	0.86
offensive coping with problems	3.37	0.79	0.85	0.85
balance and mental stability	3.26	0.80	0.77	0.78
satisfaction with work	3.16	0.81	0.85	0.85
satisfaction with life	3.20	0.89	0.87	0.87
experience of social support	3.53	0.76	0.71	0.71

The unit corresponds to the Likert response scale, ranging 1–4 for FEMOLA and 1–5 for all other instruments.

cessively high professional motivation but low coping capacity and subjective well-being, and 35.50% were assigned to the resigned risk pattern B, marked by low professional motivation, coping capacity, and subjective well-being. The heightened level of vulnerability observed in this study is not unexpected, as previous research has reported alarmingly high vulnerability levels – measured using the AVEM instrument – among Polish teachers, with >80% assigned to risk patterns [19] and, in some cases, >90% [20]. In addition, risk patterns were exhibited also in 52% of Czech first-year teacher students, who represent a culturally similar sample to Polish students [23]. This pattern of evidence suggests that future teachers enter teacher education already exhibiting elevated vulnerability, which appears to increase further after entering the profession, likely exacerbated by the challenging working conditions they encounter.

This research also identified several risk and protective factors for vulnerability to burnout and occupational health issues, which may guide timely interventions

aimed at correcting risk patterns and fostering the resilience of future teachers, thereby minimizing the long-term risk of developing health problems. The primary protective factor against both risk patterns A and B was optimism. Similar findings have been reported among German and Austrian students, with optimism protecting against both risk patterns [45] and pessimism being associated with a higher likelihood of pattern A [46]. This result is consistent with broader evidence demonstrating the protective role of optimism against both mental and physical health problems [42,43].

Further, students who identified teacher education as their most preferred study choice were less likely to be assigned to pattern B. In other words, students for whom teacher education was not the preferred choice were more vulnerable. This aligns with previous findings linking pattern B to choosing teacher education as a fall-back career due to a lack of other alternatives or because first-choice career options could not be attained, as described among German teacher education students [63].

Table 4. Correlation matrix of optimism, religiosity, career choice motivation scales, and work-related coping behavior and experience pattern scales among first-year teacher education students across higher education institutions in Poland, 2022–2024

Variable	Pearson's r correlation																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. Optimism																			
2. Religiosity	0.26***																		
3. Utility	0.21***	0.27***																	
4. Educational interest	0.24***	0.21***	0.38***																
5. Ability belief	0.15**	0.05	0.29***	0.60***															
6. Social influences	0.18***	0.13**	0.50***	0.38***	0.37***														
7. Low difficulty of study	0.16**	0.09	0.40***	0.06	0.08	0.19***													
8. Subject interest	0.20***	0.15**	0.30***	0.63***	0.53***	0.23***	0.10*												
9. Subjective significance of work	0.07	0.13**	0.24***	0.32	0.24***	0.20***	-0.07	0.29***											
10. Professional ambition	0.16***	0.05	0.10*	0.33***	0.35***	0.04	-0.07	0.39***	0.51***										
11. Tendency to exert	-0.07	0.00	0.08	0.21***	0.25***	0.02	-0.09	0.24***	0.52***	0.54***									
12. Striving for perfection	0.05	0.09	0.10*	0.23***	0.28***	0.06	-0.08	0.28***	0.41***	0.60***	0.60***								
13. Emotional distancing	0.14**	-0.03	0.09	-0.09	-0.05	0.09	0.15**	-0.17***	-0.38***	-0.45***	-0.39***								
14. Resignation tendencies	-0.35***	-0.10*	-0.11*	-0.14*	-0.18***	-0.10*	-0.04	-0.12*	-0.07	0.13**	0.13**	-0.20***							
15. Offensive coping with problems	0.51***	0.20***	0.29***	0.33***	0.28***	0.17***	0.04	0.29***	0.32***	0.33***	0.15**	0.24***	0.04						
16. Balance and mental stability	0.32***	0.16***	0.22***	0.28***	0.30***	0.17***	0.12*	0.24***	0.16**	0.13**	0.03	0.15**	0.09	-0.42***	0.43***				
17. Satisfaction with work	0.31***	0.18***	0.25***	0.33***	0.42***	0.18***	0.11*	0.33***	0.38***	0.44***	0.32***	0.32***	-0.19***	-0.24***	0.37***	0.27***			
18. Satisfaction with life	0.64***	0.30***	0.38***	0.36***	0.27***	0.32***	0.15**	0.26***	0.17***	0.18***	-0.04	0.09	0.11*	-0.42***	0.58***	0.39***	0.42***		
19. Experience of social support	0.31***	0.12*	0.21***	0.17***	0.14**	0.31***	0.03	0.11*	0.04	-0.13*	-0.04	0.09	-0.32***	0.25***	0.24***	0.20***	0.51***		

* p < 0.05. ** p < 0.01. *** p < 0.001.

Table 5. Results of multinomial logistic regression predicting work-related coping behavior and experience patterns among first-year teacher education students across higher education institutions in Poland, 2022–2024

Variable	Pattern S			Pattern A			Pattern B		
	B(SE)	OR	95% CI for OR	B(SE)	OR	95% CI for OR	B(SE)	OR	95% CI for OR
Intercept	-16.03 (9.41)			3.46 (2.80)			9.37 (3.58)**		
Gender ^a	-28.17 (0.00)	0.00	0.00–0.00	1.46 (2.53)	4.33	0.03–612.70	-0.09 (2.86)	0.92	0.00–248.93
Age	-1.63 (0.83)	0.20	0.04–1.00	-1.28 (0.53)*	0.28	0.10–0.78	-0.55 (0.57)	0.58	0.19–1.75
Parental education ^b	2.08 (1.97)	8.00	0.17–378.39	1.35 (1.08)	3.84	0.46–31.98	-2.07 (1.31)	0.13	0.01–1.66
Housing									
parent/guardian's house ^c	3.27 (2.52)	26.29	0.19–∞	-0.85 (1.50)	0.43	0.02–8.12	0.08 (1.49)	1.08	0.06–20.10
flat/apartment or university residence – private bedroom ^d	-16.83 (0.00)	0.00	0.00–0.00	-0.19 (1.55)	0.83	0.04–17.21	0.41 (1.59)	1.50	0.07–33.99
Job status ^e	-2.31 (1.93)	0.10	0.00–4.33	0.72 (0.95)	2.06	0.32–13.30	-1.86 (1.27)	0.16	0.01–1.88
Working hours	-2.96 (1.40)*	0.05	0.00–0.80	1.09 (0.53)*	2.98	1.05–8.46	0.26 (0.58)	1.30	0.41–4.09
Disposable income	1.54 (0.97)	4.69	0.70–31.44	0.33 (0.53)	1.40	0.49–3.96	-0.34 (0.62)	0.71	0.21–2.41
Teacher education as the most preferred study choice ^f	11.06 (6.74)	63 724.74	0.12–∞	-2.66 (2.27)	0.07	0.00–5.93	-6.58 (2.81)*	0.00	0.00–0.34
Certainty about teaching being the right profession	-4.22 (2.02)*	0.01	0.00–0.77	0.50 (0.58)	1.66	0.53–5.17	0.11 (0.68)	1.12	0.30–4.23
Optimism	0.42 (1.60)	1.52	0.07–35.24	-3.99 (1.19)***	0.02	0.00–0.19	-4.71 (1.25)***	0.01	0.00–0.10
Religiosity	-0.77 (0.97)	0.46	0.07–3.07	0.40 (0.53)	1.50	0.53–4.24	0.82 (0.64)	2.28	0.65–7.95
Motivation									
utility	0.06 (1.18)	1.06	0.10–10.65	-1.19 (0.64)	0.30	0.09–1.07	-0.87 (0.74)	0.42	0.10–1.78
educational interest	5.64 (3.19)	282.30	0.54–∞	-0.93 (0.87)	0.39	0.07–2.17	-1.22 (1.00)	0.30	0.04–2.09
ability belief	-3.02 (1.36)*	0.05	0.00–0.71	-1.30 (0.67)	0.27	0.07–1.02	-1.61 (0.78)*	0.20	0.04–0.92
social influences	-1.99 (1.16)	0.14	0.01–1.34	0.15 (0.54)	1.16	0.40–3.38	0.02 (0.59)	1.02	0.33–3.26
low difficulty of study	1.79 (0.89)*	5.99	1.05–34.16	-0.38 (0.61)	0.69	0.21–2.27	0.27 (0.69)	1.31	0.34–5.03
subject interest	-5.12 (2.29)*	0.01	0.00–0.53	0.49 (0.71)	1.64	0.41–6.53	-1.13 (0.74)	0.32	0.08–1.38

Pattern A – excessively ambitious, pattern B – resigned, pattern S – unambitious, pattern G (healthy ambitious) was used as the reference category.

$\chi^2(57) = 161.45, p < 0.001$.

McFadden's pseudo- $R^2 = 0.568$.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^a 0 – female, 1 – male.

^b 0 – neither parent/guardian has a university degree, 1 – ≥ 1 parent/guardian has a university degree.

^c 0 – flat/apartment or university residence – shared bedroom, 1 – parent/guardian's house.

^d 0 – flat/apartment or university residence – shared bedroom, 1 – flat/apartment or university residence – private bedroom.

^e 0 – no personally important job (created by merging the options only studying and job personally less important and/or temporary), 1 – personally important job.

^f 0 – not the most preferred study choice (created by merging all options in which the current teacher education degree program was not the preferred choice), 1 – the most preferred study choice.

This trend was also confirmed by Olszewski [64], who found that 38% of Polish teachers assigned to pattern B reported that their initial decision to pursue a teaching career was accidental.

Another important motivational factor acting as a protective factor against pattern B – similar to Austrian students [45] – was ability belief, defined as the motivation to pursue a teaching career based on a perceived match between one's own abilities and the requirements for successful teaching, such as explaining clearly, making subject matter engaging, and demonstrating patience [70]. In contrast, students assigned to pattern B showed reduced levels of this type of career-choice motivation, suggesting that they do not believe they possess the abilities needed to become good teachers – a finding that corresponds with their tendency to choose teacher education as a second-choice program. Overall, this supports previous evidence on the protective role of intrinsic motivation against risk patterns [24,63].

In addition, the results indicated that younger students were particularly prone to pattern A, compared with their older counterparts who were more likely to be assigned to pattern G. Interestingly, AVEM research conducted with German students showed either no influence of age [34,35] or higher likelihood of being assigned to pattern G in younger students [33]. However, broader evidence on college students' mental health shows that younger age is associated with more mental health problems [74], a trend also observed among Polish nursing students [36]. The findings suggest that specifically in Polish teacher education students, younger students may benefit most from early interventions.

Pattern A was also associated with increased working hours. This finding is consistent with the defining characteristics of this pattern, which include excessive professional commitment, a heightened subjective importance of work, and a strong tendency to exert oneself [14,15]. From this perspective, it is unsurprising that individuals displaying pattern A devote more time to work. However, it is also highly plausible that the necessity to work intensively alongside their studies (e.g., to cover living and study-related expenses in the absence of other financial support) fosters the overcommitment characteristic of pattern A, and that this pattern develops as a consequence of prolonged overwork. In contrast, an opposite trend was observed for pattern S, as membership in this unambitious pattern was associated with reduced working hours. This is in line with the low professional commitment that defines pattern S, in which individuals limit their work efforts to what is strictly nec-

essary [14,15]. Similar to pattern A, it remains unclear from the cross-sectional data whether reduced job engagement is merely a correlate of the pattern or whether pattern S may develop in circumstances where, e.g., students are not required to work during their studies because their living expenses are covered by other sources (e.g., parental support). The latter assumption – that pattern assignment may be influenced by life circumstances such as the availability of financial support – is likely, since it is supported by findings from Austrian teacher education students: an increased tendency towards pattern A was observed among those receiving no financial support, whereas students receiving >200 EUR/month in financial support displayed a greater tendency towards pattern S [37].

In addition to identifying risk and protective factors associated with vulnerability to occupational health issues, the data provide a more nuanced understanding of the motivational profile linked to pattern S, extending beyond its general characteristics of low professional commitment and reduced work-related effort. Teacher education students assigned to pattern S displayed reduced motivation in terms of ability belief and subject interest – a combination that appears to be a defining feature of this pattern, as confirmed in international studies with German and Austrian teacher education students [24,45]. They also reported lower certainty that teaching is the right profession for them and greater motivation to choose teacher education due to the perceived low difficulty of the program. Interestingly, in German and Austrian samples these motivational patterns were more closely linked to pattern B [24,37,63], suggesting possible cultural differences between Polish, German, and Austrian teacher education students. In sum, Polish students assigned to pattern S were less likely to choose teacher education because they believed in their teaching abilities or were genuinely interested in the subject matter, and more likely to select it because they viewed it as less demanding. Combined with their low certainty about teaching as a right career for them, this makes it unlikely that they will enter the profession. In contrast to their counterparts assigned to pattern B – who often chose teacher education due to a lack of alternative options or entered the program accidentally – the profile of pattern S suggests a more deliberate decision to study teacher education, albeit one driven primarily by the perceived manageability of the program and the potential intention to use the degree in fields outside teaching. Thus, while pattern S may be less problematic from an occupational health perspective, it is highly

problematic from a motivational standpoint, as individuals with this profile are unlikely to develop into successful teachers.

Limitations

The main limitation of this study is the purposive sampling, which means the sample cannot be considered nationally representative. Moreover, the recruitment procedure did not allow the calculation of response rates, making it possible that participants differed systematically from those who did not take part. The study is further limited by its cross-sectional design, which is common in occupational health psychology. In such designs, the studied constructs are often presented as “predictors” and “outcomes,” even though causal relationships cannot be demonstrated [75]. Another limitation is the relatively small number of cases in the outcome category related to pattern S (16% of the sample), which may have contributed to unstable odds ratio estimates for some predictors. This is reflected in the very large point estimates and wide confidence intervals, which must be interpreted with caution. Future studies with larger samples are needed to confirm these associations. Further, because no α -level correction was applied for multiple testing in the logistic regression, the risk of a Type I error may have been increased. This factor should therefore be considered when interpreting the reported statistical associations. Although the predominantly female sample accurately reflects the gender distribution in Polish teacher education, the small proportion of male participants limits conclusions regarding gender differences, and it remains unclear to what extent gender-specific evidence from international research also applies to Polish teacher education students. Finally, the present findings are grounded in the specific context of Polish teacher education, and their generalizability to other cultural or educational systems – including those within Central and Eastern Europe – remains unclear, as the distinctive occupational stressors of the Polish education system may shape work-related pattern distributions in context-specific ways.

CONCLUSIONS

The present study, which examined the distribution of work-related patterns among Polish first-year teacher education students, revealed that around 60% were assigned to risk patterns indicating increased vulnerability to burnout and occupational health issues. In addition, several risk and protective factors linked to the likelihood

of being assigned to these patterns were identified. Specifically, younger students, those working longer hours alongside their studies, and those for whom teacher education was not their preferred choice of study were the most vulnerable. By contrast, optimism and choosing teacher education out of the belief that the profession's demands matched one's own abilities acted as protective factors. Beyond its theoretical contribution, this study carries important implications for teacher education. Given the alarming prevalence of vulnerability to burnout and occupational health issues among Polish first-year teacher education students, it is necessary to implement preventive measures to reduce long-term health risks and support the well-being of future teachers. Specific recommendations for informing teacher education policy are presented below.

The present study showed that students who are genuinely motivated to choose teacher education are more likely to exhibit the health-promoting pattern G. Thus, although the use of AVEM diagnostics for admission purposes is not explicitly recommended, students' career-choice motivation may represent an indirect factor worth considering. In contrast, the primary recommendation is to implement early preventive measures, as research has shown that risk patterns are to a large extent correctable when interventions are applied already during teacher education [76]. In this respect, the AVEM inventory is suggested to be administered as early as possible after students enter teacher education, serving as a self-reflective and preventive tool to help identify vulnerabilities at an early stage. Vulnerable students should be offered individual counseling to support the development of coping strategies, strengthen resilience, and maintain motivation. Preventive intervention modules should also be integrated into curricula to provide structured guidance on coping and resilience building. For timely correction of risk patterns, effective programs already exist – such as *Strengthened for the Teaching Profession* [76] – which could be adapted to the Polish context. Targeted support should further be directed at particularly vulnerable groups, such as younger students and those working long hours alongside their studies. Since optimism emerged as the main protective factor against psychological vulnerability, positive psychology interventions – such as the Best Possible Self exercise, whose effectiveness in increasing optimism has been confirmed [77] – should also be considered. Equally important is career choice motivation, which should be systematically addressed from the beginning of teacher education. Motivational support –

delivered through individual coaching or targeted classroom interventions – can help students reflect on their reasons for choosing the teaching profession and strengthen awareness of the meaningful, rewarding, and enjoyable aspects of this career path. Such reflection can foster deeper commitment to the profession and promote autonomous career choice motivation. In addition, students should receive guidance on setting priorities, creating realistic schedules, and breaking long-term career goals into smaller, achievable steps, which reinforces their sense of competence and progress. In this way, motivational support that addresses both academic engagement and long-term dedication to the teaching profession allows these dimensions to reinforce one another, fostering engagement, well-being, and persistence throughout students' career journeys.

When implementing these measures, 2 key barriers should be taken into account. First, research indicates that individuals assigned to pattern B are often the least likely to seek psychological support, which may result in a paradoxical situation in which those most in need of intervention may remain outside the reach of voluntary support offers [30]. Second, the high number of vulnerable students may exceed the capacity of existing support resources at Polish higher education institutions. Both barriers may be addressed by integrating preventive measures and intervention formats into compulsory components of teacher education. When embedded within existing supportive structures – such as psychology-oriented seminars – and delivered sensitively in a group format, these interventions can help prevent the overburdening of institutional support structures while also offering additional benefits, including facilitated peer sharing of experiences and strategies and stigma reduction. In this way, basic preventive support can be provided broadly and equitably, increasing the likelihood that it reaches students who are most vulnerable but least likely to engage with voluntary support offers.

AI USE

Artificial intelligence tools (ChatGPT) were used to improve the language and clarity of the text. The authors reviewed and edited all content generated by AI and take full responsibility for the final manuscript.

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