



Profiles of academic motivation and wellbeing of physical education and sports instructors of internal affairs establishments: a person-centered approach based on self-determination theory

Iuliia Pavlova ^{1ABCD}, Dmytro Zikrach ^{2CD}, Vadym Shvets ^{13BDE},
Petro Petrytsa ^{4BDE}, Dorota Ortenburger ^{5DE}, Józef Langfort ^{5DE}

¹ Lviv State University of Physical Culture, Lviv, Ukraine

² SoftServe, Lviv, Ukraine

³ Training center named after Vasily Vyshivany, National Guard of Ukraine, Ukraine

⁴ Ternopil Volodymyr Hnatiuk National Pedagogical University, Ternopil, Ukraine

⁵ Department Kinesiology and Health Prevention, Jan Dlugosz University in Czestochowa, Poland

Authors' Contribution: A – Study Design, B – Data Collection, C – Statistical Analysis, D – Manuscript Preparation, E – Funds Collection

Abstract

Introduction: This study was conducted to test the hypothesis that different subgroups of students, based on a combination of their intrinsic and controlled motivation, are associated with differences in various indicators of physical, mental, and social health and quality of life. In this study types of motivational profiles, and motivational profile differences related to health-related quality of life indicators analysed. **Methods:** Future physical education and sports instructors (males, $n=281$, age= 26.5 ± 3.10 years) were involved in the study. The survey involved collecting socio-demographic data and assessing participants' academic competence (Academic Motivation Scale), anxiety (State-Trait Inventory), and quality of life (SF-36 Health Status Survey) of responders. Latent profile analysis (LPA) was executed to obtain the optimal number of motivation profiles via R software. **Results:** Two different profiles of academic motivation to study physical education and sports were obtained, in particular the autonomous motivation profile and the external/amotivation profile. Participants from the autonomous motivation profile had higher indices of intrinsic motivation, integrated regulation, and identified regulation, and higher life quality, indices of introjected regulation, amotivation, and anxiety were lower. The second profile is characterized by a predominance of controlled motives, and unsatisfactory mental health indicators.

Keywords: academic motivation scale, latent profile analysis, segmentation, life quality, physical activity, anxiety

Author for correspondence: Iuliia Pavlova, e-mail: pavlova.j.o@gmail.com

Received: 3.02.2022; Accepted: 2.03.2022; Published online: 6.07.2022

Cite this article as: Pavlova I, Zikrach D, Shvets V, Petrytsa P, Ortenburger D. Profiles of academic motivation and wellbeing of physical education and sports instructors of internal affairs establishments: a person-centered approach based on self-determination theory. Phys Act Rev 2022; 10(2): 1-11. doi: 10.16926/par.2022.10.16

INTRODUCTION

Motivation for any activity remains a complicated phenomenon to understand. People have different motivations for performing the same activities, and the same person's motivations can change over time. Because of such difficulties in interpretation and understanding, motivation and academic motivation, one of its forms, remains a subject of interest and careful study in contemporary scientific research [1–4]. The study of academic motivation helps to answer many questions, namely, why students differ in their ability to gain knowledge and develop cognitive resources, what motivates students to be active and persistent during learning, what influences their engagement, their involvement in learning, what conditions their interaction with others, what helps them stay positive, etc [5,6]. Encouraging academic motivation contributes to high learning efficiency, increases students' desire to be active while working in the classroom, and positively impacts student-student and teacher-student interactions [1,7]. It is a high level of academic motivation that determines high attention to learning activities, helps control the factors affecting the achievement of the learning objective, and encourages the student to put more effort into learning [8,9].

Self-determination theory provides a better understanding of the process of motivation development and its impact on human behaviour and well-being [1,9,10]. This theory is closely related to the understanding of basic psychological needs, corresponding to which, in order to have a high motivation to develop and achieve optimal functioning, three basic needs are essential – the need for autonomy, competence, and relatedness [9–11]. Autonomy can be defined as a person's need to feel desire in their actions. Competence refers to a person's need to feel effective in their interaction with the world, while relatedness refers to the need for connection with significant others, satisfaction with the social world, and a sense of acceptance of social reality. If these needs are not met, individuals tend to regulate their behavior by controlled causes.

Self-determination theory departs from the binary division of motivation into intrinsic and extrinsic motivation, and outlines more varieties of motivation [9,10]. Different approaches are used. First, the authors propose a motivation continuum containing amotivation (lack of motivation) to the most autonomous forms of motivation. Different types of extrinsic motivation have been proposed, differing in their characteristics and the amount of autonomy they represent.

Intrinsic motivation is defined as being triggered by the task itself (learning to learn), while extrinsic motivation is triggered by external rewards. Intrinsic motivation includes feelings of happiness about learning, orientation towards learning, immersion in tasks, increased effort during learning, interest in learning, low levels of anxiety and nervousness, interest in learning difficult material and solving complicated problems, persistence in improving own skills, sense of correspondence between effort and outcome, and high academic performance. Ryan & Deci [10] presented intrinsic motivation as a global construct, but Vallerand and colleagues [12] divided it into three parts: intrinsic motivation to know, to accomplish, and to experience stimulation. Intrinsic motivation to know covers the pleasure that a person experiences when learning, exploring, or trying to understand something new. Intrinsic motivation to accomplish refers to engaging in an activity through "the pleasures that a person experiences when trying to do or create something" [12]. Finally, intrinsic motivation to experience stimulation covers completing tasks for having fun.

According to the self-determination theory, there are four types of extrinsic motivation [10,11]:

- extrinsic regulation is a less autonomous extrinsic motivation; a person's behaviour is conditioned by an external reward or threat;
- introjected regulation is external influences partly resonating with the inner self in order to demonstrate capability/avoid failure; the individual's activity is the result of the behaviour, but the individual does not actually identify with the activity, nor does he/she perceive the importance of the activity;
- identified regulation is an activity which is understood to be personally significant; the individual accepts the real value of the behaviour and values the reward that the behaviour provides;
- integrated regulation – the individual perceives external influences as fully consistent with her/his internal desire/desire, but, unlike intrinsic motivation, such activity is carried out not

for the activity itself, but to produce certain results. Such benefits may include increased well-being, integration of the individual into a particular social group, etc. Thus, the activity of a person in this case is motivated by the reward;

The study of motivation is possible through two approaches: a variable-centered approach and a person-centered approach [13,14]. A variable-centered approach is vital for understanding how motivation influences academic achievement and also helps to identify the direction of that influence. A person-centered approach allows us to analyze how individual students differ in their motivation and how this relates to their other characteristics. This approach allows us to better characterise the motivational orientation of individual students. Self-determination theory states that each person possesses combinations of intrinsic and controlled motivation for each activity, with possible options where one of them is dominant, or both are equally dominant [11,12]. Accordingly, applying the person-centered approach within the framework of self-determination theory makes it possible to identify distinct subgroups (motivational profiles) among students.

In this paper, we focus on the learning motivation of physical education and sports instructors of the internal affairs establishments. Physical training plays an important role in training specialists of various military specialties [15–18]. Such training contributes to the formation of special motor skills, improves the most important physical qualities for each military speciality, and is a prerequisite for the successful completion of combat missions. A high level of physical fitness significantly increases the professional mobility of soldiers, allowing them to assess the situation and make operational decisions quickly. The demands on the physical and mental condition of the physical training and sports instructor are high, as they are not limited to physical training of military personnel, it is a matter of addressing a much wider range of tasks (ensuring a proper social and psychological atmosphere, preparing military personnel for considerable psychophysical stresses, ensuring proper conditions for the training process, etc.). In turn, this requires a high level of academic preparation and maximum learning motivation.

This study was conducted to test the hypothesis that different subgroups of students, based on a combination of their intrinsic and controlled motivation, are associated with differences in various indicators of physical, mental, and social health and quality of life. In this study, we sought to answer two questions. First, what types of motivational profiles do future physical education and sports instructors have? Second, are the motivational profile differences related to health-related quality of life indicators?

MATERIALS AND METHODS

Participants and Procedure

Future physical education and sports instructors of internal affairs (males, $n=281$, age= 26.5 ± 3.10 years) were involved in the study. The required sample size was determined using G*Power software (Düsseldorf, Germany) [19]. With a medium effect size $d = 0.50$, an alpha-level of $p = 0.05$, a power of 0.95, a power analysis for the t-test (difference between two independent means) suggests we would need a sample size of $n = 176-246$ participants (allocation ratio 1–0.5).

The survey was conducted in 2020–2021. The survey was created and distributed via Google Forms. The survey involved collecting socio-demographic data (age, length of military service (in months), duration (in years) of sports activities, etc.) and assessing participants' academic competence, anxiety, and quality of life of responders. The responses received were pre-reviewed, but the questionnaires in which the answers to the questions were omitted were not taken into account during further analysis. A total of $n = 275$ answers were analysed.

Participants were made aware of the purpose and objectives of the study, informed of the measurement procedures, and agreed to participate in the study. During the comprehensive surveys, the researchers followed the World Medical Association Declaration of Helsinki as a statement of ethical principles to provide guidance to physicians and other participants in medical research involving human subjects. Each participant provided informed consent to participate in the study, and all measures were taken to ensure the anonymity of the participants.

Measures

Academic Motivation Scale (AMS) allows to evaluate different types of learning motivation according to the self-determination theory, in particular amotivation (AMOT), three types of intrinsic motivation (intrinsic motivation to know, IMTK; intrinsic motivation to accomplish, IMTA; intrinsic motivation to experience stimulation, IMES), and three types of extrinsic motivation (extrinsic motivation for external regulation, EMER; extrinsic motivation for introjected regulation, EMIN; extrinsic motivation for identified regulation, EMID) [12]. The tool consists of 28 questions. A seven-point Likert scale (1 – does not correspond at all, 7 – corresponds exactly) was used to evaluate each question in the questionnaire.

Translation of the questionnaire into Ukrainian following generally accepted approaches [20] was carried out as part of the study [2]. In addition, the psychometric properties of the questionnaire were checked for further work. Finally, the tool's validity was verified by internal consistency analysis (Cronbach's alpha) and confirmatory factor analysis (CFA). To assess the validity of the model derived from the CFA results, we used a set of measures [21]: the ratio of χ^2 to the number of degrees of freedom df (χ^2/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), goodness-of-fit index (GFI), standardized root mean square residual (SRMR). Some of the indicators (χ^2 , RMSEA, SRMR) were considered as determining indicators, as they are the ones that describe how well the proposed model fits the data set and whether the model corresponds to [21–23].

The Cronbach's alpha of the whole questionnaire was 0.889, including each of the individual scales in the range 0.744–0.878. The results obtained exceed the minimum allowable value ($\alpha > 0.7$). The Alpha value of each scale was at an acceptable level and showed no improvement when individual questions were excluded (IMTK: $\alpha = 0.837$, $0.769 < \alpha < 0.836$; IMTA: $\alpha = 0.842$, $0.771 < \alpha < 0.810$; IMES: $\alpha = 0.830$, $0.749 < \alpha < 0.836$; EMID: $\alpha = 0.794$, $0.715 < \alpha < 0.792$; EMIN: $\alpha = 0.771$, $0.675 < \alpha < 0.749$; EMER: $\alpha = 0.702$, $0.563 < \alpha < 0.702$; AMOT: $\alpha = 0.880$, $0.838 < \alpha < 0.876$). The consistency of the structure of the Ukrainian version of the questionnaire with the original version is confirmed by the CFA results. The model has a high level of acceptability [21,23,24], with 7 factors corresponding to scales: $\chi^2/df = 1027.890/322 = 3.19$ ($p < 0.001$), CFI, TLI > 0.9 (CFI = 0.950, TLI = 0.933), GFI = 0.885, RMSEA > 0.08 (RMSEA = 0.087, 90 % confidence interval: LO = 0.081, HI = 0.093), SRMR = 0.080

Health-related quality of life was assessed using the *SF-36 Health Status Survey* (SF-36) [25,26]. The questionnaire consists of 36 questions grouped into eight scales: physical functioning (PF), physical role functioning (RF), bodily pain (BP), vitality (VT), social functioning (SF), general health (GH), mental health (MH), and emotional role functioning (RE). The questions relate to the level of motor activity, assessment of general health, limitation of daily activities through the physical or emotional state, presence of pain in the respondent, level of vitality, social activity, ability to work. The indicator for each scale was scored from 0 (indicating the lowest quality of life) to 100 (indicating the highest quality of life). Indicators for all scales form two components – Physical Component Score (PCS) and Mental Component Score (MCS). PCS includes physical functioning, physical role functioning, bodily pain, and general health. MCS is formed by vitality, social activity, mental health, and emotional role functioning. For PCS and MCS, scores below 50 points indicate worse quality of life than the general population's average values.

State-Trait Inventory (STAI) developed by Spielberger et al. [27,28] were used to assess respondents' level of anxiety. The questionnaire consists of 40 questions and contains two subscales for assessing, namely, S-Anxiety and T-Anxiety. Each question was evaluated using a 4-point Likert scale (1 – not at all / almost never, 4 – very much so / almost always). The anxiety State scale (S-Anxiety) evaluates the respondent's current state of anxiety (the intensity of the sensation "at this point in time"), allows you to measure subjective feelings of fear, tension, nervousness, anxiety, and activation/arousal of the autonomic nervous system. The Trait Anxiety Scale (T-anxiety) focuses on the respondent's personal traits, allowing you to assess feelings of anxiety "in general" as well as a state of calm, confidence and safety. The purpose of the Anxiety Trait Scale is to characterise the respondent's propensity to be anxious, and as such, T-Anxiety is less responsive to change than S-Anxiety. The score range for each subscale is 20–80, and a higher score indicates greater anxiety. To detect clinically significant symptoms on the S-Anxiety Scale, a limit value of 39–40 points was proposed [29,30].

Data analysis

Latent profile analysis (LPA) was executed to obtain the optimal number of motivation profiles via R software. This type of analysis allows to find the distribution of respondents by some hidden (latent) feature based on the answers to a certain set of questions [31]. LPA aims to identify types or groups of individuals with different configuration profiles of personal attributes. In the behavioural domain, these personality attributes are psychological constructs; accordingly, LPA can be characterised as construct-based profile identification. Compared to traditional, non-latent clustering methods (for example, k-mean clustering, hierarchical clustering [32,33]), LPA treats profile membership as an unobserved categorical variable, where its value indicates which profile an individual belongs to with a certain degree of probability. In this paper, the indicators of intrinsic motivation (to know, to accomplish, experience stimulation), as well as external regulation, introjected regulation, identified regulation, and amotivation were taken for LPA.

Correlation and regression analyses were used to identify the need for LPA and preliminary data analysis. When performing LPA, different models are possible, depending on shape, volume and orientation. The analyzed models had the following characteristics: equal variance (E), variable/unqual variance (V), spherical, equal volume (EII), spherical, unequal volume (VII), diagonal, equal volume and shape (EEI), diagonal, varying volume, equal shape (VEI), diagonal, equal volume, varying shape (EVI), diagonal, varying volume and shape (VVI), ellipsoidal, equal volume, shape, and orientation (EEE), ellipsoidal, equal shape and orientation (VEE), ellipsoidal, equal volume and orientation (EVE), ellipsoidal, equal orientation (VVE), ellipsoidal, equal volume and equal shape (EEV), ellipsoidal, equal shape (VEV), ellipsoidal, equal volume (EVV), ellipsoidal, varying volume, shape, and orientation (VVV), univariate normal (X), spherical multivariate normal (XII), diagonal multivariate normal (XXI), ellipsoidal multivariate normal (XXX). Bayesian information criterion (BIC), integrated Completed Likelihood (ICL) criterion were introduced to ensure the best profile solution. ICL adds a penalty on solutions with greater entropy or classification uncertainty.

For the isolated profiles, comparisons were made on the AMS, SF-36, STAI subscales covering different parameters of motivation, health-related quality of life and mental health parameters. All data from each individual profile was checked for normality (Shapiro–Wilk test). T-test was used to identify possible differences between profiles. Differences at $p < 0.05$ were considered reliable.

RESULTS

Table 1 contains correlations between different types of motivation, as well as averages and standard deviations. Correlation analysis revealed that extrinsic and intrinsic motivation were positively related to each other. The simplex pattern on the subscale of academic motivation was not fully supported [12,34]. When moving diagonally, and then to the left along the correlation matrix, a decreasing trend in values was not observed in all cases. In particular, the IMTA intrinsic motivation scale is more weakly related to the EMID scale in the continuum ($r = 0.530$), but more strongly related to the EMIN scale ($r = 0.643$). In addition, the adjacent EMID and EMIN extrinsic motivation scales were less closely related ($r = 0.546$) than the separated EMID and EMER subscales ($r = 0.648$). In the case of amotivation, as expected, negative correlations with both intrinsic and extrinsic motivation scales were observed. However, the closer continuum scales (EMER, EMIN) were less related to amotivation when compared to the EMID scale ($r = -0.426$) and IMTK scale ($r = -0.516$).

Table 1. Correlations between AMS scales and its descriptive statistics (means, standard deviations).

Scales	Indicators (points)		Correlation analysis					
	M	SD	IMTK	IMTA	IMES	EMID	EMIN	EMER
IMTK	23.26	4.85	1					
IMTA	20.60	5.72	0.727*	1				
IMES	20.19	5.78	0.718*	0.737*	1			
EMID	23.35	4.84	0.658*	0.530*	0.557*	1		
EMIN	20.86	5.73	0.485*	0.643*	0.515*	0.546*	1	
EMER	21.01	4.84	0.357*	0.375*	0.376*	0.648*	0.593*	1
AMOT	9.76	6.36	-0.516*	-0.258*	-0.266*	-0.426*	-0.154**	-0.173***

M – Mean; SD – standard deviation; * $p < 0.0001$; ** $p = 0.010$; *** $p = 0.004$

Table 2. Assumptions tests of the OLS regression and regression model to predict academic motivation.

Scales	Assumption tests of the OLS regression		The OLS regression model*						
	Skewness	Durbin-Watson	R ²	Adj. R ²	F-statistics	p	B (SE)	X ₁ (SE)	X ₂ (SE)
IMTK	-0.925	1.923	0.020	0.013	2.894	0.057	22.645 (0.636)	-0.008 (0.016)	0.178 (0.075)
IMTA	-0.693	2.055	0.009	0.002	1.318	0.269	20.946 (0.754)	-0.026 (0.019)	0.081 (0.089)
IMES	-0.574	1.957	0.001	-0.007	0.097	0.908	20.492 (0.765)	-0.005 (0.019)	-0.033 (0.091)
EMID	-1.048	2.013	0.008	0.001	1.091	0.337	23.957 (0.638)	-0.024 (0.016)	0.0134 (0.076)
EMIN	-0.840	1.879	0.007	0.000	1.033	0.357	21.619 (0.756)	-0.0273 (0.019)	0.0044 (0.089)
EMER	-0.888	1.922	0.006	-0.001	0.804	0.449	21.744 (0.639)	-0.016 (0.016)	-0.0558 (0.076)
AMOT	0.925	1.768	0.035	0.028	5.033	0.007	10.736 (0.827)	0.0175 (0.021)	-0.203 (0.098)

B – constant; SE – standard error; X – predictor variables: X₁ – duration of military service, X₂ – duration of physical education/sports

The data was processed using the ordinary least squares (OLS) regression method. Initially, the linearity, normality, and independence of errors of OLS regression were checked (Table 2). All asymmetry values were between -2 and 2, indicating a normal data distribution. The Durbin-Watson score was within an acceptable range of 1.5 to 2.50, supporting the assumption of independence from bias.

According to the results of regression analysis, socio-demographic indicators (duration of military service, duration of physical education / sports) did not significantly affect different types of motivation. Statistically significant indicators indicating a high suitability of the proposed model were found in relation to the IMTK ($R^2 = 0.020$, $p = 0.057$) and AMOT ($R^2 = 0.035$, $p = 0.007$). Accordingly, predictor variables (duration of military service, physical education / sports) explained 2 % and 3.5 % of the variance of the outcome variable. Thus, sampling bias will not have an impact in this study. Accordingly, the LPA results will not be affected by socio-demographic indicators.

According to the results of the LPA analysis, the two-profile solution was recognized as the optimal model. The best characteristics were found in the VEV model (BIC = -4272.129, ICL = -4285.489), which contained two components. This model was used to divide participants according to motivational profiles.

The first profile contained 86 participants, the second – 189 participants. The figure shows information about intrinsic and extrinsic motivation, as well as the amotivation of each of these profiles. Profile 1 comprised 31.27 % of the total sample and included individuals with very high levels of intrinsic motivation (IMTK = 26.90 ± 1.44 points; IMTA = 25.55 ± 2.42 points) and identified regulation (EMID = 26.64 ± 1.88 points) (Figure 1). In general, this profile was characterized by high levels of both intrinsic and extrinsic motivation, while the level of amotivation was very low (AMOT = 4.78 ± 1.28 points). The second profile included 189 participants (68.73 % of the general sample), it was characterized by a predominance of extrinsic motivation (EMID = 21.91 ± 4.85 points; EMIN = 19.53 ± 5.50 points; EMER = 20.12 ± 4.75 points). Compared to the first profile, the level of amotivation for the second profile was 2.5 times lower. Based on the assessment of the motivation subscales of each individual profile, the first profile was called the autonomous motivation profile, and the second profile was called the extrinsic/motivational profile. The profiles significantly differed from each other on all indicators of both intrinsic and extrinsic motivation ($p < 0.001$).

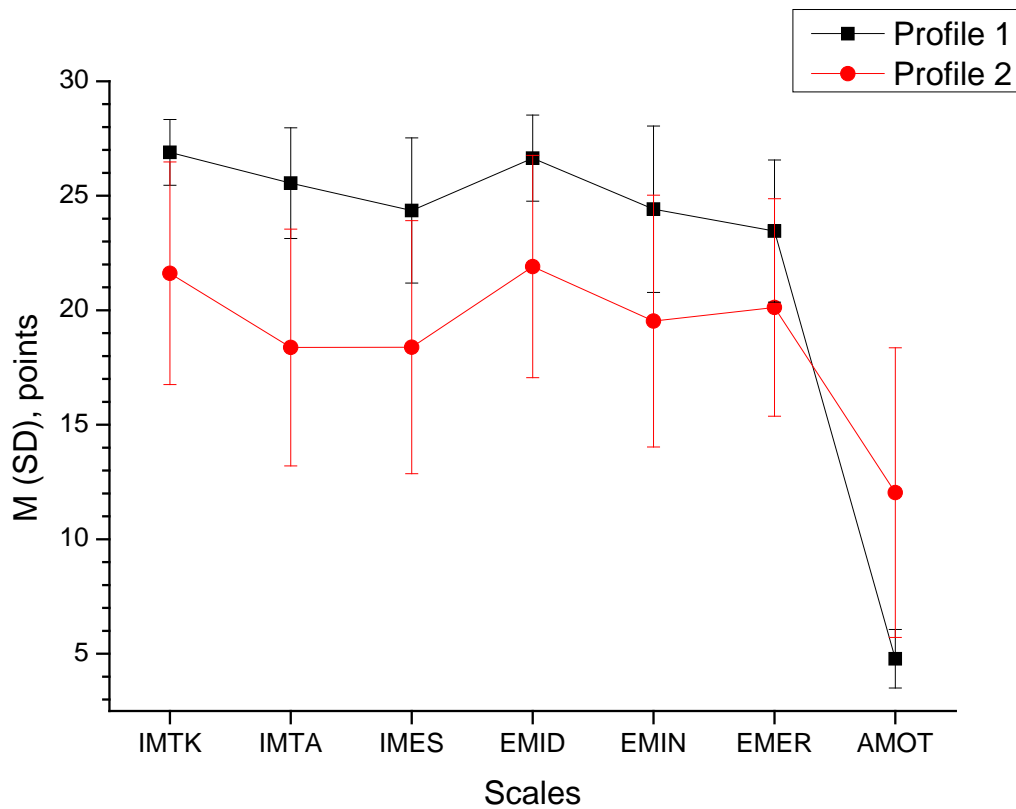


Figure 1. Academic motivation profiles.

Table 3. Health-related quality of life and level of anxiety of respondents who belong to different motivational profiles.

Scales	Profile 1			Profile 2			t-test	p
	M ± SD	SE	95% CI	M ± SD	SE	95% CI		
S-anxiety	30.61 ± 6.47	0.69	29.23; 31.99	39.14 ± 10.57	0.77	37.62; 40.65	-6.947	< 0.0001
T-anxiety	33.90 ± 5.73	0.61	32.67; 35.12	39.87 ± 8.63	0.63	38.63; 41.11	-5.885	< 0.0001
PF	96.72 ± 12.80	1.37	94.00; 99.45	89.79 ± 20.97	1.53	86.78; 92.80	2.848	0.005
RP	95.98 ± 14.70	1.58	92.84; 99.11	75.93 ± 35.01	2.55	70.90; 80.95	5.133	< 0.0001
BP	90.53 ± 16.22	1.74	87.07; 93.99	80.04 ± 24.05	1.75	76.59; 83.49	3.696	< 0.0001
GH	86.69 ± 13.27	1.42	83.86; 89.52	72.31 ± 19.13	1.39	69.57; 75.06	6.339	< 0.0001
VT	81.78 ± 16.12	1.73	78.35; 85.22	69.71 ± 19.94	1.45	66.85; 72.57	4.950	< 0.0001
SF	91.95 ± 14.39	1.54	88.89; 95.02	83.33 ± 21.96	1.60	80.18; 86.48	3.345	0.001
RE	97.70 ± 11.13	1.19	95.33; 100.0	76.90 ± 35.91	2.61	71.74; 82.05	-6.606	< 0.0001
MH	86.21 ± 12.20	1.31	83.61; 88.81	70.84 ± 19.10	1.39	68.10; 73.58	6.885	< 0.0001
PCS	51.37 ± 3.89	0.42	50.54; 52.20	51.66 ± 5.60	0.41	50.85; 52.48	-0.431	0.667
MCS	56.06 ± 5.24	0.56	54.95; 57.18	48.76 ± 10.21	0.74	47.29; 50.23	6.296	< 0.0001

M – Mean; SD – standard deviation; SE – standard error; p – statistical significance

A comparison of the quality of life and anxiety levels of respondents belonging to different profiles revealed statistically significant differences in almost all parameters (Table 3). The quality of life of participants from the first profile was high on all scales, in particular, it almost reached the maximum on some scales and indicated a high level of daily activity (PF = 96.72 ± 12.80 points), and no influence of physical and emotional problems on daily activity (RP = 95.98 ± 14.70 points; RE = 97.70 ± 11.13 points). Viability had the lowest value among all the analyzed scales (VT = 81.78 ±

16.12 points). The second profile included participants with a high quality of life (> 75 points) on only three scales – PF, BP, SF. But in the average range ($50 < x < 75$ points), there were values of scales describing the general health ($GH = 72.31 \pm 19.13$ points), mental and emotional health of the respondent ($MH = 70.84 \pm 19.10$ points), the level of vitality ($VT = 69.71 \pm 19.94$ points). The values of the RE and RP scales were almost close to the average range of values. For both profiles, the physical component of the quality of life was in line with population norms, while for the second profile, the mental component of the quality of life was low. Also, in participants who belonged to the second profile, the anxiety indicator exceeded the standard values ($S\text{-Anxiety} = 39.14 \pm 10.57$ points; $T\text{-Anxiety} = 39.87 \pm 8.63$ points).

DISCUSSION

The experience of military operations and the results of scientific research substantiate that physical training is a fundamental means of improving combat readiness [Formatting Citation]. The head of a law enforcement agency in the field of physical education and sport must ensure proper conditions for the organization of the educational and training process and the possibility of using a variety of forms and means of physical training; the rational distribution of physical activity throughout the day and week. It is important to ensure a high level of theoretical, methodological and practical readiness of the personnel conducting physical training sessions. Physical training carried out systematically helps to intensify the process of combat training. In the process of physical improvement, the socio-psychological atmosphere in the team is important. A physical training and sports instructor must be able to objectively evaluate and monitor, direct and correct the behavior of cadets in accordance with the requirements of the team. Successful combat performance depends on the ability to withstand excessive psychophysical strain, as well as the combat response and coherence of the team. Accordingly, the professional competence of instructors must cover both general and specialized knowledge, they must be characterized by a high level of learning motivation and further self-improvement. Combined with psychological characteristics, this will allow to solve the problems of training soldiers with high efficiency. Also, due to the volume, importance and complexity of the tasks, it is obvious that the physical education instructor must be in good health, have a high level of physical fitness, and stress resistance.

The study aimed to identify the profiles of academic motivation in future instructors of physical education and sports and to investigate the differences in different types of motivation, as well as different parameters of physical and mental health, and quality of life according to the identified profiles.

In this paper, a person-centered approach was used to study academic motivation profiles of future physical education and sports instructors. The person-centered approach operates under the assumption that there may be numerous unobserved subgroups in a population and that relationships between traits may differ in these subgroups [13,14]. Thus, the purpose of this approach was to identify such subgroups based on different configurations of estimates of these traits. Importantly, this raises the possibility that a trait may be expressed differently and related differently to other variables, depending on the strength of the other traits in the profile. According to this concept, we consider the individual as a whole, and the individual traits/interactive elements function together to form dynamic patterns.

Variable-centered approach is also used to study the level of academic motivation and various indicators of health and quality of life [38,39]. From a methodological point of view, this approach involves correlation analysis and study of linear statistical models. This approach can provide useful information about how different motivations are related to different dimensions of quality of life, but it does not take into account the fact that an individual can be considered as an integrated whole. The solution proposed in our study is based on a person-centered approach and allows us to better understand how different behavioral motivations interact with each other and are reflected at the individual level. The results obtained provide information about the critical indicators of individuals who differ in their motivational characteristics.

Using latent profile analysis, we obtained two different profiles of academic motivation to study physical education and sports, in particular they were the autonomous motivation profile and the

external/amotivation profile. That is, a special analytical strategy (latent profile analysis, rather than cluster analysis) was used in the paper, and all types of motivational behavior in accordance with self-determination theory [10,11] were taken into account. This allowed us to get a more complete picture of motivation profiles.

Participants from the autonomous motivation profile had higher indices of intrinsic motivation, integrated regulation, and identified regulation, while indices of introjected regulation and amotivation were lower. The results obtained suggest that individuals with this profile may have a high level of both intrinsic and extrinsic motivation at the same time. Intrinsic motivation, integrated and identified regulation form a holistic structure in the participants belonging to this profile, corresponding to the self-determination theory, according to which these three behavioral motivations are considered as autonomous motivation [10–12]. Thus, the three behavioral motivations have a relatively high level of self-determination, regardless of their specific reasons (e.g., satisfaction or valuable outcome) for engaging in learning.

The second profile is characterized by a predominance of controlled motives. Interestingly, in this case, less self-determined motivation behavior (namely, introjected regulation), together with autonomous motivations, contributed to the formation of a separate motivational profile. Introject regulated behavior is initiated by avoiding guilt and shame or self-esteem.

The combination of extrinsic types of motivation and amotivation in the extrinsic/amotivation profile indicates that individuals who are extrinsically motivated for learning activities are also likely to be amotivated, characterized by a lack of competence and a lack of recognition of the value of the activity. Since externally regulated behavior depends on external influences and demands, individuals with such behavioral motivation are unlikely to feel competent and appreciative of the work they do.

It can be assumed that the obtained motivational profiles can be used to predict the quality of life. Thus, the study of the quality of life of participants belonging to different profiles shows that those with the autonomous motivation profile had better physical and mental health, were energetic, full of energy, social, and had low levels of anxiety. In general, all parameters were at a high level, exceeding the indicators of young people from different countries of the world {Formatting Citation}, which meets the requirements for military personnel. However, participants in the second profile had critical quality-of-life indicators, especially when considering the type of profession chosen and the demands placed on it. The participants were characterized by unsatisfactory mental health indicators, had low vitality, assessed their health status as low, and had signs of clinical anxiety. The reason for this phenomenon may be the negative impact of the coronavirus pandemic on various aspects of youth mental health [41-43].

CONCLUSIONS

Future physical education and sports instructors are characterized by two profiles of academic motivation. A profile characterized by a high level of intrinsic motivation covers individuals with a higher quality of life and optimal mental health, and is more favorable when compared with the characteristics of the second profile. Based on the results obtained, it may be important to adjust external conditions (punishment, reward) to improve the academic motivation of this group of students. In our opinion, the relationship between the mental component of quality of life and academic motivation requires further study and analysis. However, given the low indicators of this component of quality of life and the high level of anxiety in a significant number of respondents, the development of special interventions aimed at improving the mental component of quality of life and psychological health in this category of students is relevant.

CONFLICT OF INTEREST

The authors report that there is no conflict of interest.

REFERENCES

1. White RL, Bennie A, Vasconcellos D, Cinelli R, Hilland T, Owen KB, Lonsdale C. Self-determination theory in physical education: A systematic review of qualitative studies. *Teach Teach Educ* 2021; 99: 103247. doi: 10.1016/j.tate.2020.103247
2. Kuśnierz C, Rogowska AM, Pavlova I. Examining Gender Differences, Personality Traits, Academic Performance, and Motivation in Ukrainian and Polish Students of Physical Education: A Cross-Cultural Study. *Int J Environ Res Public Heal* 2020; 17(16): 5729. doi: 10.3390/IJERPH17165729
3. Tóth-Király I, Morin AJS, Litalien D, Valuch M, Bóthe B, Orosz G, Rigó A. Self-determined profiles of academic motivation. *Motiv Emot* 2022; 1–19. doi: 10.1007/S11031-021-09918-X
4. Yoo HJ, Marshall DT. Examining the relationship between motivation, stress, and satisfaction among graduate students. *J Furth High Educ* 2021. doi: 10.1080/0309877X.2021.1962518
5. Urdan T, Bruchmann K. Examining the Academic Motivation of a Diverse Student Population: A Consideration of Methodology. *Educational Psychologist* 2018; 53(2): 114–130. doi: 10.1080/00461520.2018.1440234
6. Theobald M. Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: A meta-analysis. *Contemp Educ Psychol* 2021; 66: 101976. doi: 10.1016/J.CEDPSYCH.2021.101976
7. Kim KR, Seo EH. The relationship between teacher efficacy and students' academic achievement: A meta-analysis. *Soc Behav Pers* 2018; 46(4): 529–540. doi: 10.2224/SBP.6554
8. Steinmayr R, Weidinger AF, Schwinger M, Spinath B. The importance of students' motivation for their academic achievement-replicating and extending previous findings. *Front Psychol.* 2019;10:1730. doi:10.3389/fpsyg.2019.01730
9. Deci EL, Ryan RM. Intrinsic Motivation and Self-Determination in Human Behavior 1985; doi: 10.1007/978-1-4899-2271-7
10. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol* 2000; 55(1): 68–78. doi: 10.1037//0003-066x.55.1.68
11. Vallerand R. Deci and Ryan's Self-Determination Theory: A View from the Hierarchical Model of Intrinsic and Extrinsic Motivation. *Psychol Inq.* 2000; 11(4): 312–318.
12. Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educ Psychol Meas.* 1992; 52(4): 1003–1017. doi: 10.1177/0013164492052004025
13. Laursen B, Hoff E. Person-centered and variable-centered approaches to longitudinal data. *Merrill Palmer Q.* 2006; 52(3): 377–389. doi: 10.1353/MPQ.2006.0029
14. Howard MC, Hoffman ME. Variable-Centered, Person-Centered, and Person-Specific Approaches: Where Theory Meets the Method 2017; 21(4): 846–876. doi: 10.1177/1094428117744021
15. Marins EF, David GB, Del Vecchio FB. Characterization of the physical fitness of police officers: A systematic review. *J Strength Cond Res* 2019; 33(10): 2860–2874. doi: 10.1519/JSC.0000000000003177
16. Kyröläinen H, Pihlainen K, Vaara JP, Ojanen T, Santtila M. Optimising training adaptations and performance in military environment. *J Sci Med Sport* 2018; 21(11): 1131–1138. doi: 10.1016/J.JSAMS.2017.11.019
17. Maczuga T, Cynarski WJ. Influence of special coordination exercises on the level of policemen's self-defence skills. *Phys Act Rev* 2021; 9(2): 130-141. doi: 10.16926/par.2021.09.29
18. Plavina L, Kolesova O, Eglite J, Cakstins A, Cakstina S, Kolesovs A. Antioxidative system capacity after a 10-day-long intensive training course and one-month-long recovery in military cadets. *Phys Act Rev* 2021; 9(1): 62-69. doi: 10.16926/par.2021.09.08
19. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods* 2007; 39(2): 175–91. doi: 10.3758/BF03193146
20. Wild D, Eremenco S, Mear I, Martin M, Houchin C, Gawlicki M, Hareendran A, Wiklund I, Chong LY, Von Maltzahn R, Cohen L, Molsen E. Multinational trials – Recommendations on the translations required, approaches to using the same language in different countries, and the approaches to support pooling the data: The ispor patient-reported outcomes translation and linguistic validation good research practices task force report. *Value Heal.* 2009
21. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Model* 1999; 6(1): 1–55. doi: 10.1080/10705519909540118
22. McDonald RP, Ho MHR. Principles and practice in reporting structural equation analyses. *Psychol Methods* 2002; 7(1): 64–82. doi: 10.1037/1082-989x.7.1.64

23. Brown T. Confirmatory Factor Analysis for Applied Research: Second Edition. New York: The Guilford Press; 2006.
24. Ardenska M, Ardenska A, Tomik R. Validity and reliability of the Polish version of the Academic Motivation Scale: a measure of intrinsic and extrinsic motivation and amotivation *Heal Psychol Rep*. 2019; 7(3): 254–266. doi: 10.5114/HPR.2019.86198
25. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992; 30(6): 473–483.
26. Ware JE, Kosinski M, Bayliss MS, McHorney CA, Rogers WH, Raczek A. Comparison of methods for the scoring and statistical analysis of SF-36 health profile and summary measures: summary of results from the Medical Outcomes Study. *Med Care* 1995; 33(4 Suppl): AS264-79.
27. Spielberger CD, Gorsuch R, Lushene R, Vagg PR, Jacobs G. Manual for the State-Trait-Anxiety Inventory STAI (form Y). Palo Alto: CA Consulting Psychologists Press; 1983
28. Spielberger CD, Gorsuch RL, Lushene RE. STAI Manual for the State-Trait Anxiety Inventory. Palo Alto: CA Consulting Psychologists Press; 1970.
29. Julian LJ. Measures of Anxiety State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). *Arthritis Care Res (Hoboken)* 2011; 63 Suppl 11(011): S467-72. doi: 10.1002/acr.20561
30. Ortenburger D, Wąsik J, Pavlova I, Mosler D. Anxiety level in context of chosen pro-health attitudes of male students during COVID-19 pandemic. *J Mens Health* 2021; 17(4): 109–116. doi: 10.31083/JOMH.2021.093
31. Williams GA, Kibowski F. Latent Class Analysis and Latent Profile Analysis. *Handb Methodol Approaches to Community-Based Res* 2016; 143–152. doi: 10.1093/MED:PSYCH/9780190243654.003.0015
32. Pavlova I, Zikrach D, Mosler D, Ortenburger D, Gora T, Wasik J. Determinants of anxiety levels among young males in a threat of experiencing military conflict—Applying a machine-learning algorithm in a psychosociological study. *PLoS One* 2020; 15(10): e0239749. doi: 10.1371/journal.pone.0239749
33. Guijarro-Romero S, Mayorga-Vega D, Casado-Robles C, Viciano J. Could an intermittent Physical Education-based fitness teaching unit affect secondary school students' motivation, autotelic experience, and physical self-concept? A cluster-randomized controlled trial. *Phys Act Rev* 2022; 10(1): 31-43. doi: 10.16926/par.2022.10.04
34. Cokley KO. Examining the validity of the academic motivation scale by comparing scale construction to self-determination theory. *Psychol Rep* 2000; 86(2): 560–564. doi: 10.2466/pr0.2000.86.2.560
35. Crawley AA, Sherman RA, Crawley WR, Cosio-Lima LM. Physical fitness of police academy cadets: Baseline characteristics and changes during a 16-week academy. *J Strength Cond Res* 2016; 30(5): 1416–1424. doi: 10.1519/JSC.0000000000001229
36. Wasik J, Czarny W, Małolepszy E et al. Kinematics of taekwon-do front kick. *Arch Budo Sci Martial Arts Extreme Sports*. 2015; 11: 23-28
37. Wasik J. The structure and influence of different flying high front kick techniques on the achieved height on the example of taekwon-do athletes. *Arch Budo* 2012; 8: 45-50
38. Roeser RW, Strobel KR, Quihuis G. Studying Early Adolescents' Academic Motivation, Social-Emotional Functioning, and Engagement in Learning: Variable- and Person-Centered Approaches. *Anxiety, Stress & Coping* 2002; 15(4): 345–368. doi: 10.1080/1061580021000056519
39. Moreira PAS, Dias P, Vaz FM, Vaz JM. Predictors of academic performance and school engagement — Integrating persistence, motivation and study skills perspectives using person-centered and variable-centered approaches. *Learn Individ Differ* 2013; 24: 117–125. doi: 10.1016/j.lindif.2012.10.016
40. Jenkinson C, Coulter A, Wright L. Short form 36 (SF 36) health survey questionnaire: Normative data for adults of working age. *Br Med J* 1993; 306(6890): 1437–1440. doi: 10.1136/bmj.306.6890.1437
41. Ochnik D, Rogowska AM, Kuśnierz C, Jakubiak M, Schütz A, Held MJ, Arzenšek A, Benatov J, Berger R, Korchagina E V., Pavlova I, Blažková I, Aslan I, Çınar O, Cuero-Acosta YA. Mental health prevalence and predictors among university students in nine countries during the COVID-19 pandemic: a cross-national study. *Sci Reports* 2021; 11(1): 1–13. doi: 10.1038/s41598-021-97697-3
42. Ochnik D, Rogowska AM, Kuśnierz C, Jakubiak M, Wierzbik-Strońska M, Schütz A, Held MJ, Arzenšek A, Pavlova I, Korchagina EV, Aslan I, Çınar O. Exposure to COVID-19 during the First and the Second Wave of the Pandemic and Coronavirus-Related PTSD Risk among University Students from Six Countries – A Repeated Cross-Sectional Study. *J Clin Med* 2021; 10(23): 5564. doi: 10.3390/jcm10235564
43. Ortenburger D, Mosler D, Pavlova I, Wąsik J. Social Support and Dietary Habits as Anxiety Level Predictors of Students during the COVID-19 Pandemic. *Int J Environ Res Public Health* 2021; 18(16): 8785. doi:10.3390/ijerph18168785