

Personality Determinants of Pro-health Behaviours Among Polish and Spanish Physical Education Students

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Summary

The aim of the study was to analyse personality determinants related to the level of pro-health-behaviours among Polish and Spanish physical education students. The study was conducted among 219 Polish and 280 Spanish students, using the NEO-FFI Personality Inventory as well as the Pro-health Behaviour Inventory by Juczyński. Statistical analyses were performed using Pearson's correlation coefficient and moderation analysis. Among the pro-health behaviours, students obtained the highest results in terms of positive mental attitude, and among personality traits, for extraversion. A significant increase in the general index and some domains of pro-health behaviours together with an increase of extraversion, conscientiousness, openness and agreeableness, as well as a decrease in neuroticism, were found among all the students. The moderating influence of home country on personality relationships with health-promoting behaviours was also confirmed, with an indication towards an increase in the general index of health-promoting behaviours and/or individual domains along with the intensification of agreeableness and conscientiousness, and a decrease along with the increase in neuroticism and extraversion, but only among Polish students. Regardless of country of origin, the overall index of health-promoting behaviours increased along with the rise in conscientiousness (notably among Spanish students). Significant relationships between personality traits and the level of pro-health behaviours have been demonstrated, as well as the moderating influence of home country on the relationship between these variables among Polish and Spanish physical education students.

Keywords: pro-health behaviours, personality traits, the Big Five model, physical education students

Introduction

A healthy lifestyle, including a rational diet, recreational physical activity, avoidance of psychoactive substances, the use of effective counter-measures and undergoing preventive check-ups, is a key determinant of modernly defined health (Gray, 2017). Lifestyle, which is crucial for health, requires creating healthy attitudes and behaviours at all stages of ontogenesis. Within this context, it should be emphasised that health education at school should involve teachers of all specialisations, especially those teaching physical education. School health education has been included in the core-curriculum documents of many countries, including Poland (core curriculum for general education: Journal of Laws 2017, item 356, and teacher education standards: Journal of Laws 2019, item 1450) and in Spain (general education objectives, Decree 97/2015 from 3rd March).

The effectiveness of teachers' work related to school health education depends, among others, on their individual attitudes towards health as well as conditioning factors. Meanwhile, in studies indicating the low position of vital values and the low and average level of pro-health behaviours among teachers of teaching faculties (future teachers), it is suggested that they are not sufficiently prepared to promote a healthy lifestyle among children and adolescents as proper role-models (Kosiba et al., 2017a). The importance of teachers' lifestyles in shaping students' pro-health attitudes has been confirmed by authors in many countries (Montenegro et al., 2014; Findholt et al., 2016; Chang et al., 2017). Despite the important role of a healthy lifestyle in maintaining health, the prevalence of anti-health behaviours in the lifestyles of teachers has been greatly demonstrated (Deasy et al., 2015; Kosiba et al., 2016a; Yahia et al., 2016).

Pro-health behaviours are determined by a wide spectrum of socioeconomic, cultural and personality-related factors (Remick et al., 2009). The importance of personality traits as significant prognostic factors for assessing pro-health behaviours has been indicated in studies. In earlier research conducted among Polish students of physical education and other teaching specialisations, links have been shown between the level of health-related behaviours and the intensity of life satisfaction as well as readiness to change. In these studies, tendencies have been confirmed regarding more healthy behaviours along with the increase in life satisfaction (Kosiba et al., 2016b), self-confidence, passion and optimism (Kosiba et al., 2019a). In turn, in other trials (Posadzki et al., 2010), positive relationships between sense of self-efficacy, coherence and optimism with students' health-promoting behaviours have been shown. Relationships with generalised sense of self-efficacy and pro-health behaviours have also been confirmed among students of dietetics (Nowak et al., 2018), as well as Iranian students (Bakouei et al., 2018).

It may also be deduced from the literature that subjective health-related dispositions, including self-esteem, emotional intelligence and coping with stress, are important for the quality of health-related behaviours (Martins et al., 2010; Fernández-Abascal and Martín-Díaz, 2015). Positive beliefs about oneself are of key importance in this area (Meichenbaum, 1996). Within this context, pro-health behaviours are directly conducive to: motivation, persistence and a sense of control over events, which are more pronounced in people with high and stable self-esteem (Wojciszke and Doliński, 2008). In research on subjective dispositions conducive to pro-health behaviours among female students, two skills of particular importance are indicated: using emotions in action and distancing oneself through sense-of-humour in difficult situations (Kulik et al., 2018).

An interesting area of research seems to be assessment of the predictive significance concerning personality traits included in the five-factor model, including neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (Costa and McCrae, 1992), with regard to pro-health behaviours among various population groups. Personality traits demonstrate a relationship with behavioural determinants of health among individuals as well as social groups.

Earlier research on the personality-related determinants of pro-health behaviours among academic youth concerned, among others, Kraków students' food choices (Gacek, 2007), students' eating habits in Ghana (Intifal et al., 2019), eating disorders among Korean medical students (Lee et al., 2015), eating disorders and alcohol consumption among American students (Martin et al., 2015) and the intake of dietary supplements by Japanese students (Sato et al., 2018). The studies also concerned the lifestyle of American students (Raynor and Levine, 2009), addiction to physical exercise among French students (Kern, 2010) and the use of psychological and psychiatric assistance (Jennings et al. 2017), as

well as behaviours related to violence among Italian students (Presaghi et al., 2015). It has also been confirmed that there is a relationship between the level of physical activity (one of the pro-health behaviours) and extraversion, neuroticism as well as conscientiousness (Wilson and Dishman, 2015). However, the results of some studies were ambiguous, and the authors suggested the need for further research (Martin et al., 2015; Wilson and Dishman, 2015).

The presented work, concerning the personality determinants of health-related behaviours among Polish and Spanish physical education students, also fits into the context of socio-cultural factors.

Within this context, research has been undertaken into the predictive role of personality traits included in the five-factor model, with reference to the scale of pro-health behaviours among Polish and Spanish physical education students who are to be health educators of children and youth in their future work. Assuming that lifestyle, as the basic determinant of health, is associated with personality traits, and additionally, that physical education students in their future professional work will be involved in youth health education, research has been undertaken on the personality-related determinants of pro-health behaviours among Polish and Spanish students.

The aim of the study was to analyse the relationship between the level of pro-health behaviours and personality traits among Polish and Spanish physical education students, as well as the moderating significance of students' country of origin in relation to the studied correlations. The level of pro-health behaviours and personality traits included in the five-factor model was also compared among the specified students.

Material and methods

Research was conducted between 2017 and 2019 among 499 second- and third-year first level (Bachelor degree studies) physical education students, aged 18 to 35 (21.65 ± 2.42). The mean of the Polish students was 23.13 ± 1.98 , while for the Spanish students, this totalled 20.45 ± 2.05 years. The study included 219 Polish students (University of Physical Education in Kraków, $n = 135$ and University of Physical Education in Wrocław, $n = 84$) and 280 Spanish students (University of Murcia, Faculty of Sports Sciences, $n = 127$ and the University in Granada, Faculty of Sports Sciences, $n = 153$). The studied group comprised 189 women (109 from Poland and 80 from Spain) and 310 men (110 from Poland and 200 from Spain). The research was conducted in groups (auditorily). The inclusion criteria were: studying in the field of physical education (2nd- and 3rd-year B.A. degree). The study of Spanish students was carried out in connection with a delegation under the Erasmus programme.

In the study, the authors used the diagnostic survey method and two standardised research tools: the In-

ventory of Pro-health Behaviours (IZZ) by Z. Juczyński (2012) and the NEO-FFI Personality Inventory (Costa and McCrae, 1992). Based on the Inventory of Pro-health Behaviours (IZZ) created by Z. Juczyński (2012), four categories of pro-health behaviours were evaluated (proper eating habits, preventive behaviours, pro-health practices and positive mental attitude), as well as the general index of pro-health behaviours (Juczyński, 2012). Based on the NEO-FFI questionnaire (Costa and McCrae, 1992), personality traits included in the five-factor model were diagnosed. The questionnaire includes five scales (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness), a total of 60 self-report items requiring responses on a five-point scale, in which: 1 means - "I strongly disagree", 2- "I disagree", 3- "I have no opinion", 4- "I agree", 5- "I strongly agree".

Research was conducted as part of the project entitled "Zachowania zdrowotne studentów kierunków nauczycielskich wybranych krajów europejskich w kontekście ich przyszłej roli zawodowej jako edukatorów zdrowia – analiza wybranych uwarunkowań formalno-prawnych, społeczno-kulturowych i psychologicznych" [Eng. Pro-health Behaviours Among Students of Teaching Faculties of Selected European Countries Within the Context of Their Future Professional Role as Health Educators – Analysis of Selected Formal, Legal, Socio-cultural and Psychological Conditions] (University of Physical Education in Kraków, 136/BS/INS/2017), according to the principles of the Declaration of Helsinki after obtaining the participants' informed consent.

The IBM SPSS 21 program and J.T. Newsom's macro were used for statistical calculations. Basic statistics of the studied variables were calculated (means and standard deviations). To determine relationships between variables, Pearson's correlation analysis was applied. To compare the level of pro-health behaviours and person-

ality traits between students from Poland and Spain, a test with independent estimation of variance was used. In order to determine the differences in relationships between personality traits and students' pro-health behaviours, moderation analysis with simple comparisons (simple slopes) was implemented. The level of statistical significance was $p = 0.05$.

Research results

Among the analysed personality traits, Polish and Spanish physical education students obtained the highest average results in the categories of extraversion (40.48) and agreeableness (39.69) as well as conscientiousness (37.89) and openness (37.15), while lower values were noted in the area of neuroticism (33.34) (Tab. 1). Among the categories of pro-health behaviours, they obtained the highest average results in the category of positive mental attitude (22.26), lower values in terms of pro-health practices (20.10) and proper eating habits (19.85), while the lowest recorded results were for preventive behaviours (18.97) (Tab. 1).

In the study group, Polish physical education students demonstrated a higher level of extraversion and conscientiousness, and at the same time, a lower level of neuroticism than Spanish students. Among the pro-health behaviours of Polish subjects, lower levels of positive mental attitude, pro-health practices and overall level of health-promoting behaviours were noted than for the Spanish students (Tab. 2).

The conducted analysis of the relationship between personality traits and pro-health behaviours for the whole group showed that along with the increase in neuroticism, the level of positive mental attitude, proper eating habits and the general index of pro-health behaviours decreased. Along with the increase in extraversion, the level of positive mental attitude, preventive behaviours,

Table 1. Level of personality traits (NEO-FFI) and pro-health behaviours (IZZ) among Polish and Spanish physical education students (descriptive statistics)

Variables		N	Descriptive statistics			
			Minimum	Maximum	M	SD
Personality traits (NEO-FFI)	Neuroticism	499	13.00	57.00	33.34	6.26
	Extraversion	499	22.00	59.00	40.48	5.71
	Openness	499	23.00	53.00	37.15	4.36
	Agreeableness	499	23.00	53.00	39.69	4.58
	Conscientiousness	499	21.00	60.00	37.89	7.11
IZZ categories	Positive mental attitude (PMA)	499	10.0	30.0	22.26	3.63
	Preventative behaviours (PB)	499	6.0	30.0	18.97	4.05
	Proper eating habits (PEH)	499	6.0	30.0	19.85	5.01
	Pro-health practices (PHP)	499	7.0	29.0	20.10	3.64
	IZZ Total	499	40.0	113.0	81.18	12.02

M - arithmetic mean; SD - standard deviation

Table 2. Comparing the level of personality traits and pro-health behaviours for the total number of Polish (n = 219) and Spanish (n = 280) students

Variables		M ± SD Poland	M ± SD Spain	t	Df	p	F quotient of variance	p of variance
NEO-FFI	Neuroticism	32.58±8.57	33.93±3.43	-2.20*	272	0.029	6.25	<0.001
	Extraversion	43.34±6.04	38.23±4.26	10.63*	376	<0.001	2.01	<0.001
	Openness	36.92±5.48	37.34±3.22	-0.99*	332	0.323	2.89	<0.001
	Agreeableness	39.84±5.52	39.58±3.68	0.62*	361	0.534	2.25	<0.001
	Conscientiousness	43.79±6.46	33.27±2.98	22.29*	290	<0.001	4.71	<0.001
IZZ	Positive mental attitude (PMA)	21.58±3.59	22.79±3.57	-3.73	497	<0.001	1.015	0.905
	Preventative behaviours (PB)	18.96±4.03	18.98±4.08	-0.06	497	0.949	1.023	0.864
	Proper eating habits (PEH)	20.24±4.38	19.55±5.45	1.56*	497	0.119	1.548	0.001
	Pro-health practices (PHP)	19.07±3.48	20.91±3.57	-5.77	497	<0.001	1.050	0.706
	IZZ – general index	79.85±11.54	82.23±12.31	-2.20	497	0.028	1.139	0.314

* - test with independent estimation of variance; M - arithmetic mean; SD - standard deviation

Table 3. Personality traits (NEO-FFI) and the level of pro-health behaviours (IZZ) among Polish and Spanish physical education students (Pearson's correlation analysis) (N = 499)

IZZ categories	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Positive mental attitude (PMA)	-0.208**	0.211**	0.002 ^{ns}	0.131**	-0.023 ^{ns}
Preventative behaviours (PB)	-0.062 ^{ns}	0.088*	0.134**	0.075 ^{ns}	0.075 ^{ns}
Proper eating habits (PEH)	-0.103*	0.178**	0.105**	0.106*	0.148**
Pro-health practices (PHP)	-0.081 ^{ns}	-0.059 ^{ns}	0.027 ^{ns}	0.056 ^{ns}	-0.149**
IZZ – general index	-0.151**	0.150**	0.098*	0.126**	0.035 ^{ns}

ns – no statistical significance; * - p < 0.05; ** - p < 0.01

Table 4. Moderation analysis – moderating variable: country; dependent variable: positive mental attitude

Dependent variable	Moderator	Independent variable	B	BS	t	(PMA)	Interaction
Positive mental attitude (PMA)	Country	Neuroticism	0.17	0.05	3.66	<0.001	$\beta_p = -0.30 (p < 0.001)$ $\beta_s = 0.12 (p = 0.259)$
		Extraversion	0.02	0.06	0.30	0.768	$\beta_p = 0.34 (p < 0.001)$ $\beta_s = 0.37 (p < 0.001)$
		Openness	-0.03	0.05	-0.56	0.579	$\beta_p = 0.01 (p = 0.834)$ $\beta_s = -0.04 (p = 0.598)$
		Agreeableness	-0.19	0.05	-3.44	0.001	$\beta_p = 0.25 (p < 0.001)$ $\beta_s = -0.06 (p = 0.388)$
		Conscientiousness	-0.13	0.07	-1.90	0.058	$\beta_p = 0.28 (p < 0.001)$ $\beta_s = -0.02 (p = 0.871)$

Legend: β - standardised coefficient Beta; BS - standard error; p - significance; P - Poland; S - Spain

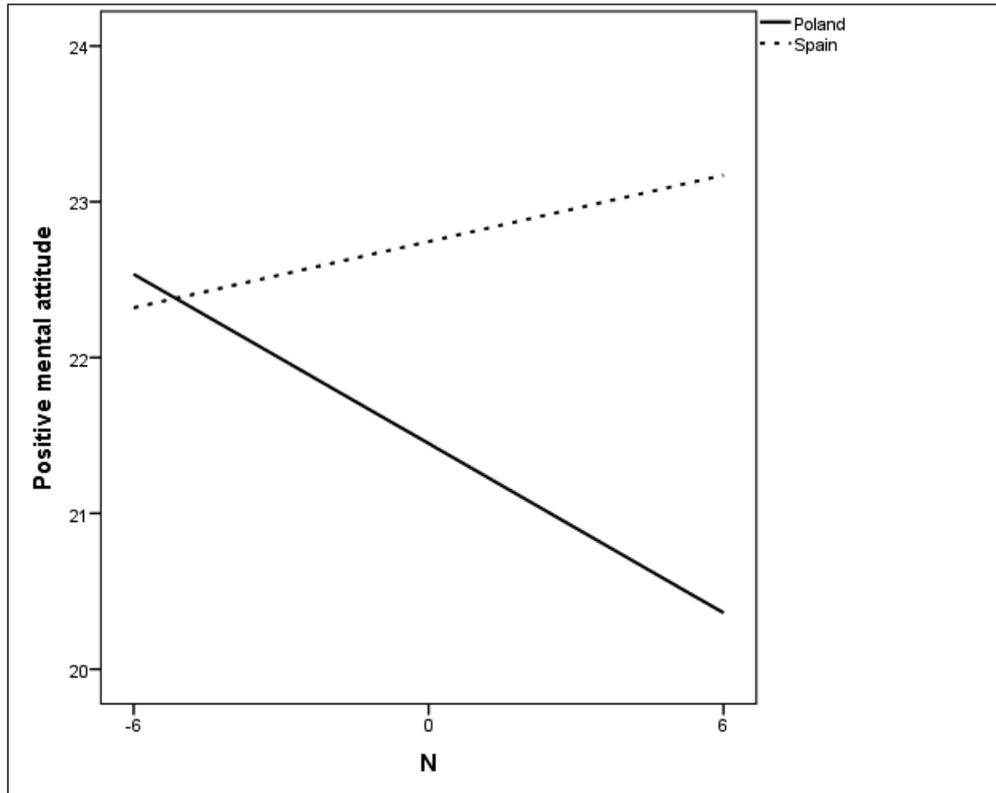


Figure 1. Correlation between neuroticism and the level of positive mental attitude depending on physical education students' country of origin (Poland vs. Spain)

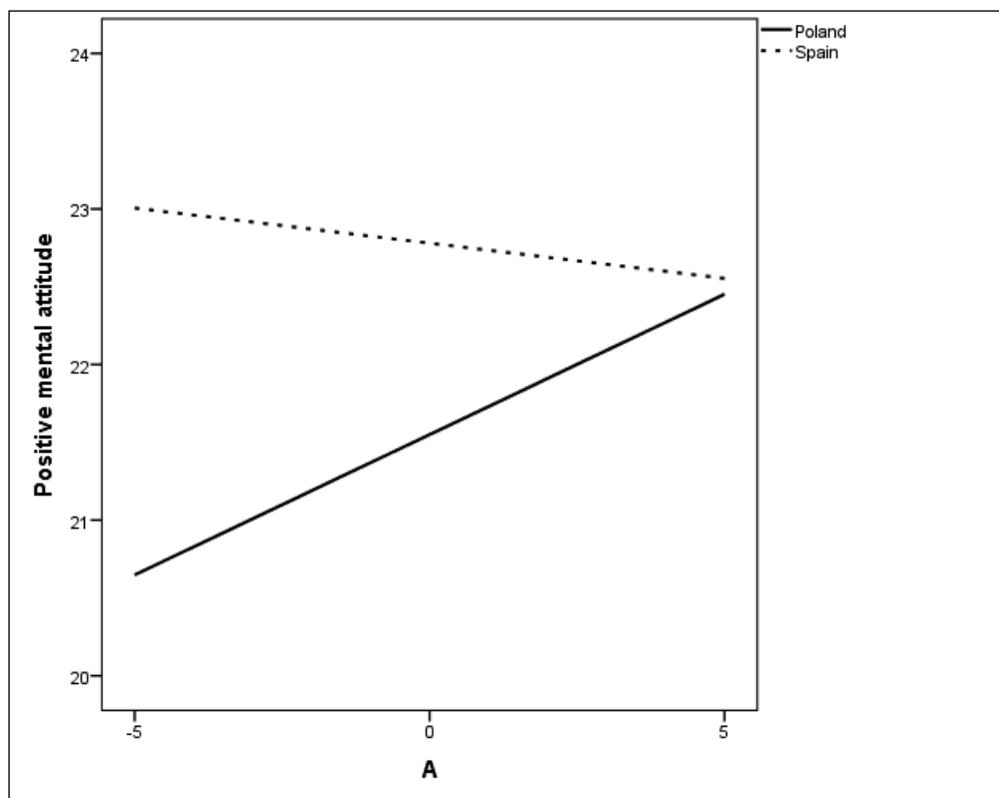


Figure 2. Relationship between agreeableness and the level of positive mental attitude depending on the physical education students' country of origin (Poland vs. Spain)

proper eating habits and the general level of pro-health behaviours also experienced an increase. The higher level of conscientiousness was associated with the lower level of pro-health practices and the higher level of proper eating habits. Along with the increase in openness, there was an increase in the level of preventive behaviours, proper eating habits and the general index of pro-health behaviours. Agreeableness was positively correlated with the level of positive mental attitude, proper eating habits and the general index of pro-health behaviours (Tab. 3).

Moderation analyses indicated that the students' country of origin may be considered as a moderator of

the relationship between neuroticism and agreeableness with positive mental attitude. Among Polish students, the level of positive mental attitude decreased with the increase in neuroticism, while in the case of the increase in agreeableness – this level also increased. However, among Spanish students, these correlations were inverse, but not considered statistically significant (Figs. 1 and 2). In both groups, the level of positive mental attitude increased along with the rise in extraversion (Tab. 4).

It was found that only in the case of the relationship between the level of preventive behaviours and conscientiousness may the students' home country be considered

Table 5. Moderation analysis – moderating variable: country; dependent variable: preventative behaviours

Dependent variable	Moderator	Independent variable	B	BS	T	p	Interaction
Preventative behaviours (PB)	Country	Neuroticism	0.09	0.05	1.83	0.068	$\beta_P = -0.10$ (p = 0.042) $\beta_S = 0.12$ (p = 0.280)
		Extraversion	0.02	0.06	0.38	0.701	$\beta_P = 0.10$ (p = 0.131) $\beta_S = 0.14$ (p = 0.090)
		Openness	-0.07	0.05	-1.37	0.172	$\beta_P = 0.17$ (p = 0.001) $\beta_S = 0.04$ (p = 0.596)
		Agreeableness	-0.06	0.06	-1.02	0.306	$\beta_P = 0.11$ (p = 0.050) $\beta_S = 0.01$ (p = 0.844)
		Conscientiousness	-0.22	0.07	-3.08	0.002	$\beta_P = 0.27$ (p < 0.001) $\beta_S = -0.22$ (p = 0.123)

Legend: β - standardised coefficient Beta; BS - standard ; p - significance; P - Poland; S - Spain

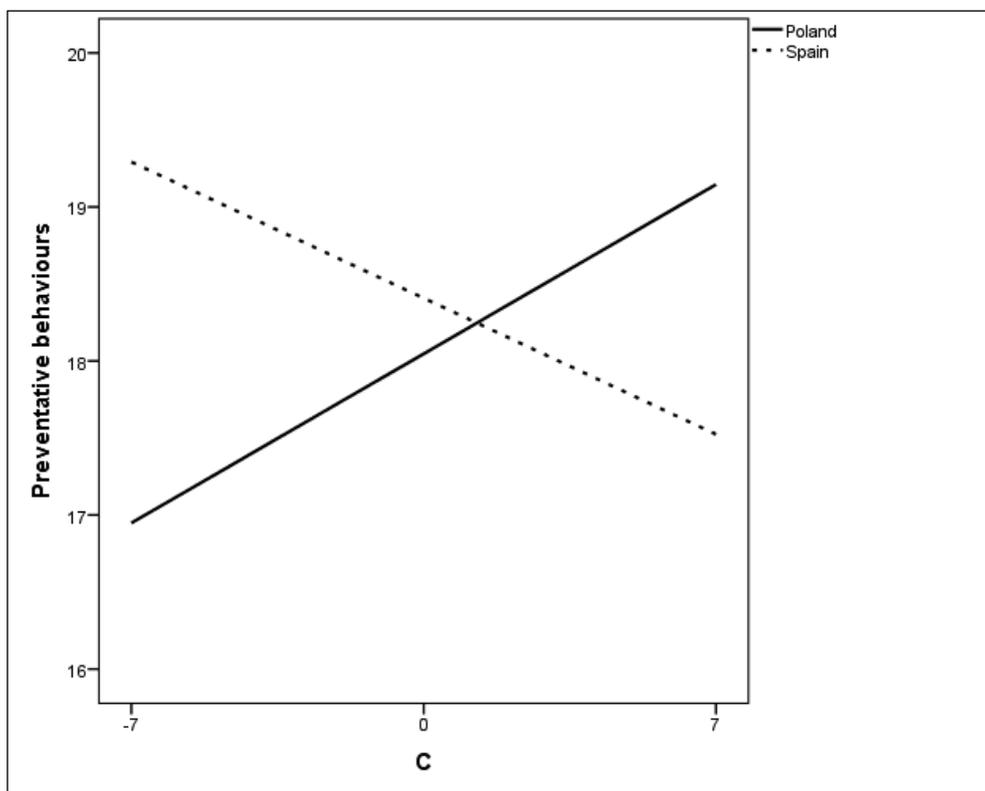


Figure 3. Relationship between conscientiousness and the level of preventative behaviours depending on physical education students' country of origin (Poland vs. Spain)

a moderator. The higher the level of conscientiousness among Polish students, the higher their level of preventive behaviours, while among students from Spain, this correlation was negative (Fig. 3, Tab. 5).

It was also found that the country is a moderator of the relationship between proper eating habits and agreeableness as well as conscientiousness. Among students from Poland, the higher the level of agreeableness, the higher the level of proper eating habits, while in the case of physical education students from Spain, this relationship was negative and did not demonstrate

statistical significance (Fig. 4). The results regarding conscientiousness are quite interesting. Along with the increase of conscientiousness among Spanish students, the level of proper eating habits decreased, while in Polish students – this level experienced an increase (Fig. 5, Tab. 6).

Home country was not recognised as a moderator of relationships between personality and pro-health practices (Tab. 7).

It has been indicated that country of origin is a moderator of the relationship between the general level of

Table 6. Moderation analysis – moderating variable: country; dependent variable: proper eating habits

Dependent variable	Moderator	Independent variable	B	BS	t	p	Interaction
Proper eating habits (PEH)	Country	Neuroticism	0.08	0.05	1.66	0.098	$\beta_P = -0.13$ (p = 0.008) $\beta_S = 0.61$ (p = 0.539)
		Extraversion	0.04	0.06	0.67	0.503	$\beta_P = 0.16$ (p = 0.013) $\beta_S = 0.23$ (p = 0.005)
		Openness	-0.09	0.05	-1.76	0.078	$\beta_P = 0.16$ (p = 0.003) $\beta_S = -0.01$ (p = 0.903)
		Agreeableness	-0.12	0.06	-2.23	0.026	$\beta_P = 0.18$ (p = 0.001) $\beta_S = -0.03$ (p = 0.712)
		Conscientiousness	-0.31	0.07	-4.48	<0.001	$\beta_P = 0.36$ (p < 0.001) $\beta_S = -0.34$ (p = 0.015)

Legend: β - standardised coefficient Beta; BS - standard ; p - significance; P - Poland; S - Spain

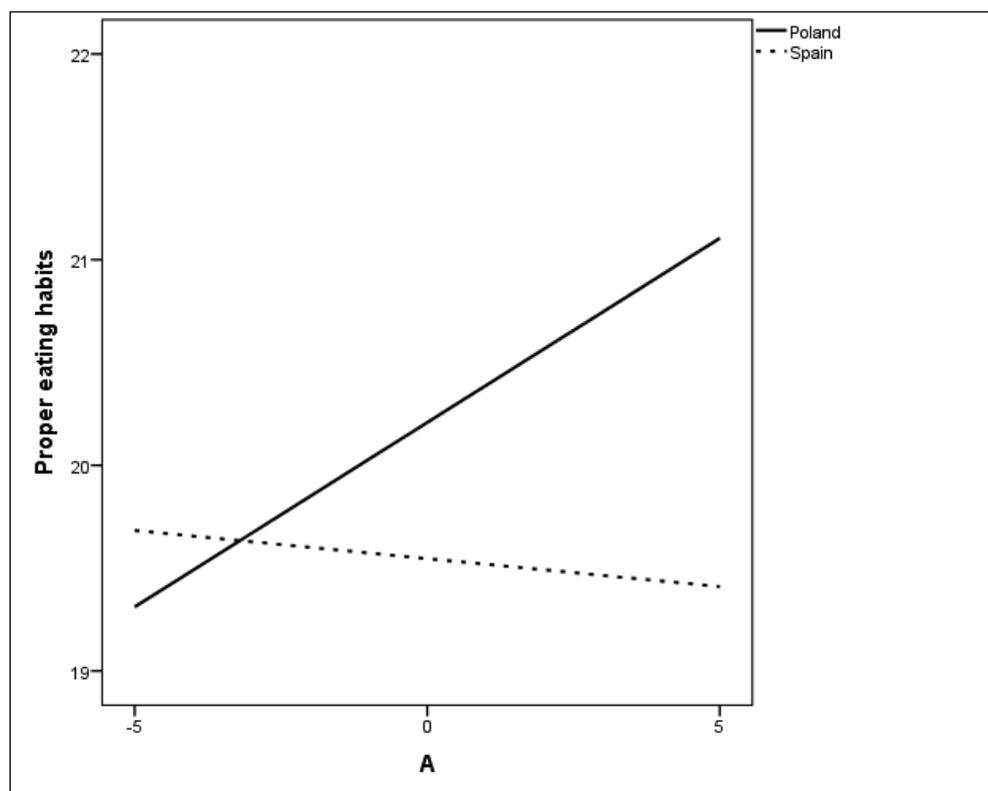


Figure 4. Relationship between agreeableness and the level of proper eating habits depending on physical education students' country of origin (Poland vs. Spain)

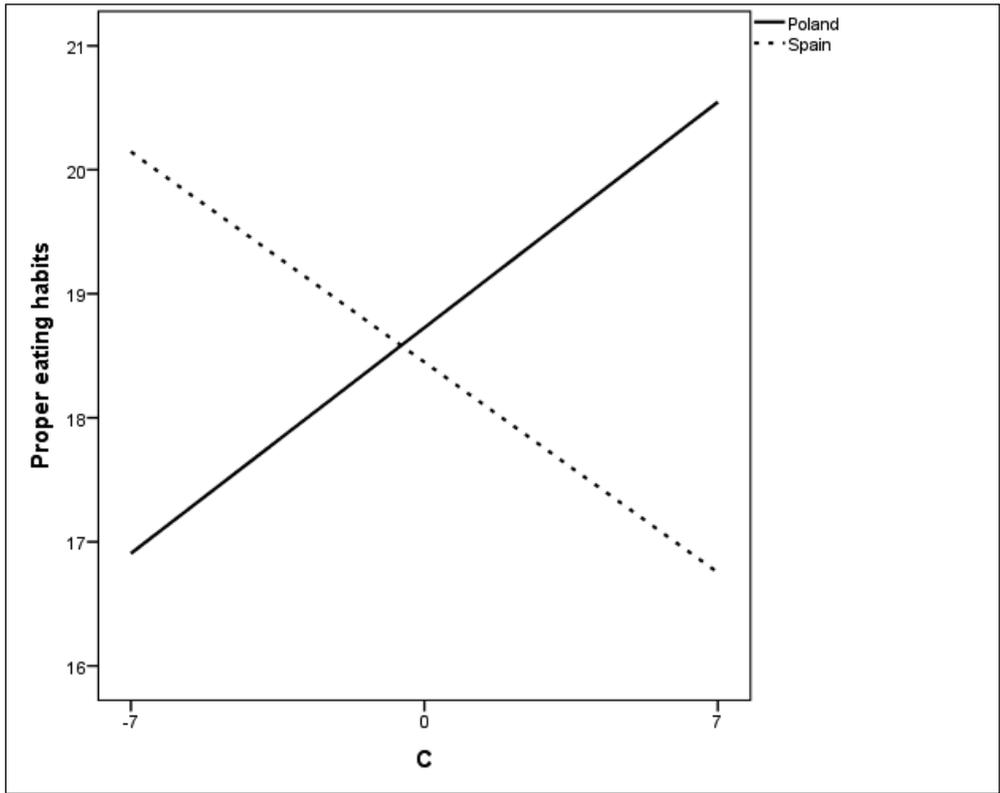


Figure 5. Relationship between conscientiousness and the level of proper eating habits depending on physical education students’ country of origin (Poland vs. Spain)

Table 7. Moderation analysis – moderating variable: country; dependent variable: pro-health practices

Dependent variable	Moderator	Independent variable	B	BS	t	p	Interaction
Pro-health practices (PHP)	Country	Neuroticism	0.09	0.05	1.82	0.069	$\beta_P = -0.14$ (p = 0.002) $\beta_S = 0.07$ (p = 0.533)
		Extraversion	0.10	0.06	1.64	0.101	$\beta_P < 0.01$ (p = 0.973) $\beta_S = 0.16$ (p = 0.034)
		Openness	-0.09	0.05	-1.68	0.094	$\beta_P = 0.06$ (p = 0.225) $\beta_S = -0.09$ (p = 0.229)
		Agreeableness	-0.05	0.05	-0.96	0.336	$\beta_P = 0.10$ (p = 0.081) $\beta_S = 0.01$ (p = 0.910)
		Conscientiousness	-0.06	0.07	-0.88	0.378	$\beta_P = 0.11$ (p = 0.139) $\beta_S = -0.03$ (p = 0.824)

Legend: β - standardised coefficient Beta; BS - standard; p - significance; P - Poland; S - Spain

pro-health behaviours and extraversion as well as conscientiousness. The higher the level of extraversion among Polish students, the lower was the overall index of pro-health behaviours, while among Spanish students, this relationship was positive, however, it was very weak and did not demonstrate statistical significance (Fig. 6). Nonetheless, along with the increase of conscientiousness in both groups, the general level of pro-health behaviours increased, but among students from Spain, this relationship was statistically significant and stronger than among Polish the students (Fig. 7, Tab. 8).

Discussion

The discussed research indicates differences in the level of personality traits and pro-health behaviours among Polish and Spanish physical education students. Variation was also found regarding the relationship between these variables, as well as the moderating impact of students’ country of origin on correlations between personality dimensions included in the five-factor model and the level of students’ pro-health behaviours.

Table 8. Moderation analysis – moderating variable: country; dependent variable: IZZ total

Dependent variable	Moderator	Independent variable	B	BS	t	p	Interaction
IZZ – general index	Country	Neuroticism	0.07	0.05	1.40	0.163	$\beta_P = 0.03$ (p = 0.502) $\beta_S = 0.20$ (p = 0.066)
		Extraversion	0.14	0.06	2.32	0.021	$\beta_P = -0.15$ (p = 0.021) $\beta_S = 0.09$ (p = 0.262)
		Openness	-0.06	0.05	-1.13	0.257	$\beta_P = 0.04$ (p = 0.436) $\beta_S = -0.07$ (p = 0.399)
		Agreeableness	-0.05	0.06	-0.98	0.328	$\beta_P = 0.03$ (p = 0.590) $\beta_S = -0.06$ (p = 0.413)
		Conscientiousness	0.19	0.07	2.65	0.008	$\beta_P = 0.13$ (p = 0.071) $\beta_S = 0.55$ (p < 0.001)

Legend: β - standardised coefficient Beta; BS - standard ; p - significance; P - Poland; S - Spain

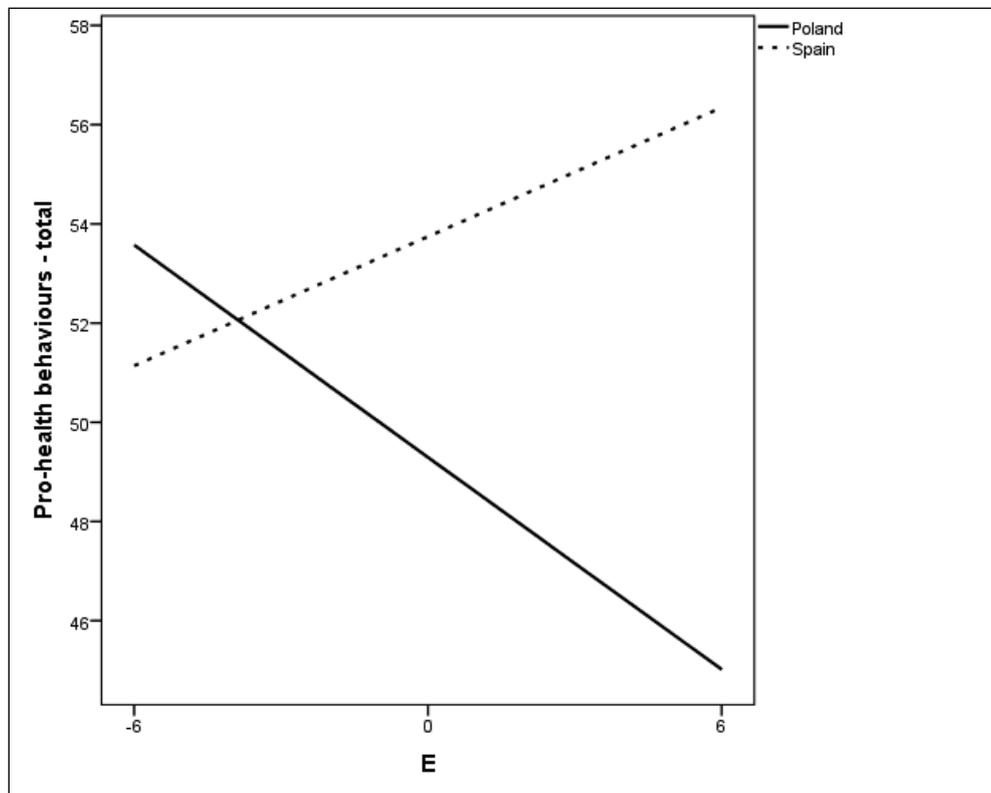


Figure 6. Relationship between the level of extraversion and the total index of pro-health behaviours depending on physical education students’ country of origin (Poland vs. Spain)

Diversification of the level of personality traits among physical education students, with an indication of the highest intensity for extraversion and the lowest for neuroticism, may be associated with the specialisation of study focused on physical activity, which can meet the high demand for stimulation (in people with high extraversion) while improving the emotional dimension of health. The obtained results can be referred to research among Serbian teachers who were characterised by high conscientiousness and openness (Djigić et al., 2014). High levels of these variables have also been

reported among the studied students (future teachers). Furthermore, high values of conscientiousness have also been noted among university students in Ghana (Intiful et al., 2019).

Research on the intensity and determinants of pro-health behaviours among students in Poland is carried out by many research centres (Romanowska-Tolłoczko, 2011; Rasińska, 2012; Palacz, 2014; Kropornicka et al., 2015; Kulik et al., 2017; Kosiba et al., 2019b). A high level of positive mental attitude and so-called pro-health practices (including recreational physical activity) may

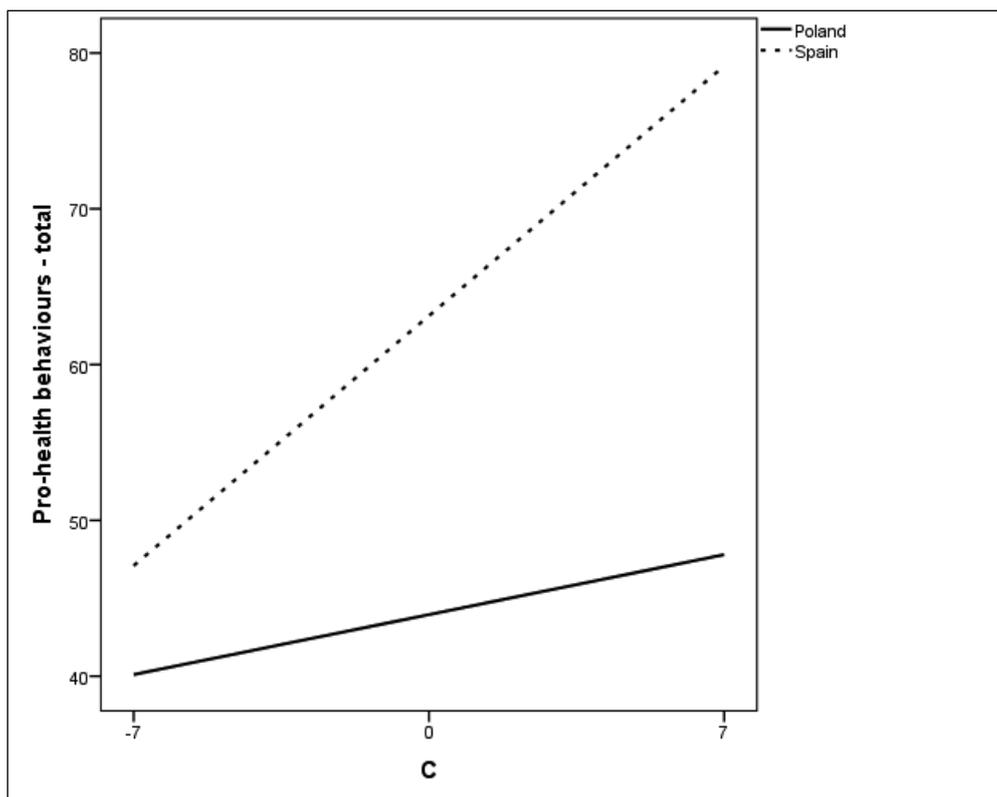


Figure 7. Relationship between the level of conscientiousness and the total index of pro-health behaviours depending on physical education students' country of origin (Poland vs. Spain)

be associated with the profile of education, focused on increased physical activity, which is an important factor in optimising health, including its mental domain. Relatively high results in this respect also correspond to the tendencies of higher levels of physical activity among physical education students than those of other faculties (Fagaras et al., 2015; Jakubiec et al., 2015; Yager et al., 2017; Kosiba et al., 2019b). With reference to the discussed results, in other studies, high levels of positive mental attitude but low levels of preventive behaviours were also indicated (Kosiba et al., 2017b; Kosiba et al. 2019b). The demonstrated low level of proper eating habits among students also corresponds to the results obtained in other studies confirming nutritional irregularities among physical education students, both in Poland (Myszkowska-Ryciak et al., 2011; Skrzypek et al., 2016; Popławska et al., 2018), in Spain and Romania (Chacón-Cuberos et al., 2018) as well as Chile (Valdes-Badilla et al., 2015).

Referring to the future professional work of physical education students, it may be presumed that those presenting more intense pro-health behaviours can more effectively shape their students' attitudes towards health. The basis for these assumptions may be the results of American research in which the importance of positive attitudes towards rational nutrition among teachers for improving the nutrition of students was confirmed (Findholt et al., 2016). Therefore, it is very important to shape pro-health behaviours among physical education

students who will be included in the implementation of school health-education in their future work.

The discussed research also demonstrated significant correlations between some personality traits and the general index as well as individual domains of health-promoting behaviours among Polish and Spanish physical education students. It was found that along with the increase in the level of neuroticism associated with emotional lability, low self-esteem and high sensitivity, the overall index of health-related behaviours as well as positive mental attitude and proper eating habits experienced a decrease. The intensification of extraversion, associated with sociability, assertiveness and the search for sensations, increased the level of positive mental attitude, preventive behaviours, proper eating habits and the general level of pro-health behaviours. It was also shown that along with the increase in conscientiousness associated with obligation and pursuit of specific goals, pro-health practices decreased, while the scale of proper eating habits tended to increase. In addition, it was noted that preventative behaviours, proper eating habits and general pro-health behaviours increased with increasing openness. On the other hand, along with the intensification of agreeableness, positive mental attitude, proper eating habits and the general level of pro-health behaviours also increased. Therefore, it may be concluded that among the analysed personality traits, the high level of extraversion, openness and agreeableness as well as the low level of neuroticism, have posi-

tive significance for the scale of pro-health behaviours among Polish and Spanish physical education students. Recalling the personality characteristics discussed above, it should be noted that the examined students were characterised by a high level of extraversion, agreeableness, conscientiousness and openness, and a lower level of neuroticism, which is a positive psychological basis for their health-promoting behaviours.

The noted regularities may find their explanation in the characteristics of the analysed personality-related dimensions, and also referring to the results of research by other authors on the psychological determinants of pro-health behaviours among academic youth. Extraversion and conscientiousness turned out to be strong predictors of American students' pro-health behaviours, with an indication of a more healthy lifestyle among students with a high degree of conscientiousness (Raynor and Levine, 2009). In the discussed research conducted by the authors of this study, the level of conscientiousness indicated a positive relationship with the scale of proper eating habits, which are an important determinant of health, increasing health potential and reducing the risk of developing chronic diseases. Also, among university students in Ghana, relationships between these personality traits (except for neuroticism) and nutritional behaviours have been demonstrated in such a way that extraversion and openness were positively associated with nutritional interest, conscientiousness with dietary diversity and limiting sugar intake, and agreeableness with skipping meals and variety in diet (Intiful et al., 2019). Correlations between extraversion and more frequent fish consumption as well as low neuroticism and regularity of meals have been demonstrated among students of Kraków universities from various fields of education (Gacek, 2007). On the other hand, among Japanese students, a positive relationship between extraversion and the use of dietary supplements was confirmed (Sato et al., 2018). Assuming that physical activity is a particularly important aspect of a healthy lifestyle, significant positive relationships were noted with extraversion, conscientiousness and openness, while negative correlations with neuroticism have been confirmed in other studies (Wilson and Dishman, 2015). In American research, it has been shown that students with high levels of conscientiousness fastened seatbelts more often, limited alcohol consumption, undertook physical activity and consumed fruit and vegetables. Highly extraverted individuals, however, smoked cigarettes more often, consumed alcohol and had many sexual partners, which may be explained by their high demand for stimulation (Raynor and Levine, 2009). In Turkish studies, it has been demonstrated that there is a positive relationship between other psychological features (positioning sense of control over health and sense of efficacy) and students' pro-health behaviours (AçıközÇepni and Kitiş, 2017). The holistic concept of health emphasises the key importance of a healthy lifestyle, not only to strengthen health potential, but also to improve quality of life. Studies among students of teaching faculties have

shown that adolescents with a greater intensity of pro-health behaviours were also characterised by higher life satisfaction (Kosiba et al., 2017b).

In the discussed research, it was also indicated that the relationships of some personality dimensions with the general level of pro-health behaviours and their individual areas were moderated by the factor of the students' country of origin (Poland vs. Spain). In this regard, it was shown that only among Polish students did positive mental attitude decrease along with the increase in neuroticism, while it tended to increase along with the rise in agreeableness. Furthermore, a high level of conscientiousness favoured undertaking preventive behaviours (differently in Spanish students). In addition, only among Polish students did the higher level of agreeableness increase the scale of proper eating habits. In turn, with the increase in the level of conscientiousness among Spanish students, the level of proper eating habits experienced a decrease (this differed in the case of Polish students). In addition, only among Polish students along with the increase in extraversion did the general index of pro-health behaviours decrease, while an increase was also noted along with the increase in conscientiousness (in both groups, significantly among students from Spain). The issue of moderating significance of home country with regard to the relationship between personality traits and health-related behaviours is explored to a limited extent, hence, the small number of works in question. There are publications available in literature devoted to the subject of physical activity determinants, which, however, did not allow to clearly identify moderators of the relationship between personality and physical activity (Wilson and Dishman, 2015). In other studies on pro-health behaviours among Polish and Spanish physical education students, the diversity of certain aspects of lifestyle was confirmed, with Spanish students showing a higher level of physical activity and more rational dietary choices. However, regardless of the students' country of origin, the authors suggested the need to rationalise the students' lifestyle in a way that promotes early prevention of chronic diseases (Lopez-Sanchez et al., 2019). Lifestyle differences may result from varying cultures, traditions and climatic factors, but also from the implementation of effective health policies which have been in use since 2000 (Lopez-Sanchez et al., 2019). The cited authors also suggested the legitimacy of repeating research in various regions of Poland and Spain, which the authors of this work tried to undertake. Also, in other studies on the determinants of nutritional behaviours among students from Germany, Denmark, Poland and Bulgaria, differentiation of dietary choices has been shown depending on country and sex (El Ansari et al., 2012). The legitimacy of continuing research in various countries was also suggested by authors of research on the relationship between satisfaction and body mass, rational nutrition, health awareness and physical activity among students from various cultures (Egypt, Palestine and Finland) (El Ansari and Berg-Beckhoff, 2019).

To conclude, personality traits demonstrated a correlation with the pro-health behaviours of Polish and Spanish physical education students, moderated by their country of origin. Further research is required to more precisely define correlations and direct appropriate interventions, as also pointed out by other authors (Intiful et al., 2019). Characteristics of personality traits and pro-health behaviours among physical education students and the relationships between these variables (culturally and geographically modified) allow for the description of individual determinants of student lifestyles important health resources with potential significance for the implementation of health education in their future professional work (as P.E. teachers). The importance of diagnosis for the optimal orientation of health education implemented as part of classes should also be greatly highlighted. The limitations of the presented research, particularly related to the choice of a specific environment (in terms of geography, socio-cultural and educational profile and level of studies), should also be highlighted. This may indicate the direction of future research on the determinants of health-related behaviours among the academic youth.

Conclusions

1. In total, Polish and Spanish physical education obtained the highest results in terms of positive mental attitude, while among personality traits, the level was highest for extraversion (and the lowest for neuroticism).
2. Statistically significant correlations between the intensity of personality traits and the level of pro-health behaviours have been demonstrated among all Polish and Spanish physical education students, with an indication of the increase in the general index and some domains of pro-health behaviours along with the intensification of extraversion, conscientiousness, openness and agreeableness, as well as neuroticism.
3. A moderating influence of country of origin on the relationships between the dimensions of personality and health-promoting behaviours has been noted among Polish and Spanish physical education students. An increase was indicated for the general index of health-related behaviours and/or individual domains along with the intensification of agreeableness (nutritional behaviours) and conscientiousness (mental attitude), preventive and nutritional behaviours, while a decrease was demonstrated along with the increase in neuroticism (mental attitude) and extraversion (general index) only among Polish students. Regardless of the home country factor, the general index of health-promoting behaviours increased along with the rise in conscientiousness. This increase was significant among Spanish students, however, in their case, along with the increase in conscientiousness, the scale of proper eating habits experienced a decrease.

References:

- Açıköz Çepni, S. & Kitiş, Y. (2017). Relationship between healthy lifestyle behaviors and health locus of control and health-specific self-efficacy in university students. *Japan Journal of Nursing Science*, 14 (3), pp. 231-239. DOI: 10.1111/jjns.12154.
- Bakouei, F., Seyedi-Andi, S.J., Bakhtiari, A. & Khafri, S. (2018). Health Promotion Behaviors and Its Predictors Among the College Students in Iran. *International Quarterly of Community Health Education*, 38 (4), pp. 251-258. DOI: 10.1177/0272684X18781780.
- Chacón-Cuberos, R., Badicu, G., Zurita-Ortega, F. & Castro-Sánchez, M. (2018). Mediterranean Diet and Motivation in Sport: A Comparative Study Between University Students from Spain and Romania. *Nutrients*, 11 (1), pii: E30. doi: 10.3390/nu11010030.
- Chang, L.C., Liao, L.L., Chen, M.I., Niu, Y.Z. & Hsieh, P.L. (2017). Strengthening teachers' abilities to implement a vision health program in Taiwanese schools. *Health Education Research*, 32 (5), pp. 437-447. DOI: 10.1093/her/cyx057.
- Costa, P.T. & McCrae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory (NEO-FFI) professional manual*. Psychological Assessment Resources, Odessa, FL.
- Deasy, C., Coughlan, B., Pironom, J., Jourdan, D. & Mcnamara, P.M. (2015). Psychological distress and lifestyle of students: implications for health promotion. *Health Promotion International*, 30 (1), pp. 77-87. DOI: 10.1093/heapro/dau086.
- Decreto 97/2015, de 3 de marzo, por el que se establece la ordenación y el currículo de la Educación Primaria en la Comunidad Autónoma de Andalucía [Decree 97/2015 from 3rd March, establishing the organization and curriculum of Primary Education in the Autonomous Community of Andalusia].
- Djigić, G., Stojiljković, S. & Dosković, M. (2014). Basic personality dimensions and teachers' self-efficacy. *Procedia – Social and Behavioral Sciences*, 112, pp. 593-602.
- El Ansari, W. & Berg-Beckhoff, G. (2019). Association of Health Status and Health Behaviors with Weight Satisfaction vs. Body Image Concern: Analysis of 5888 Undergraduates in Egypt, Palestine, and Finland. *Nutrients*, 11 (12). DOI: 10.3390/nu11122860.
- El Ansari, W., Stock, C. & Mikolajczyk, R.T. (2012). Relationships Between Food Consumption and Living Arrangements Among University Students in Four European Countries – A Cross-Sectional Study. *Nutrition Journal*, 11, 28. DOI: 10.1186/1475-2891-11-28.
- Fagaras, S.P., Radu, L.E. & Vanvu, G. (2015). The Level of Physical Activity of University Students. *Procedia – Social and Behavioral Science*, 197, pp. 1454-1457.
- Fernández-Abascal, E.G. & Martín-Díaz, M.D. (2015). Dimensions of emotional intelligence related to physical and mental health and to health behaviors. *Frontiers in Psychology*, 6, pp. 1-14. doi: 10.3389/fpsyg.2015.00317.
- Findholt, N.E., Izumi, B.T., Shannon, J. & Nguyen, T. (2016). Food-related practices and beliefs of rural US elementary and middle school teachers. *Rural Remote Health*, 16 (2), p. 3821.

- Gacek, M. (2007). *Uwarunkowania wybranych zachowań żywieniowych młodzieży akademickiej* [Personal conditioning of chosen nourishment behaviours of the academic youth]. *Nowiny Lekarskie*, 76 (1), pp. 29-32.
- Grey, M. (2017). Lifestyle determinants of health: Isn't it all about genetics and environment? *Nursing Outlook*, 65 (5), pp. 501-505. DOI: 10.1016/j.outlook.2017.04.011.
- Intifal, F.D., Oddam, E.G., Kretchy, I. & Quampah, J. (2019). Exploring the relationship between the big five personality characteristics and dietary habits among students in a Ghanaian University. *BMC Psychology*, 7 (1), p. 10. DOI: 10.1186/s40359-019-0286-z.
- Jakubiec, D., Kornafel, D., Cygan, A., Górska-Klęk, L. & Chromik, K. (2015). Lifestyle of Students From Different Universities in Wrocław Poland. *Roczniki Państwowego Zakładu Higieny*, 66 (4), pp. 337-344.
- Jennings, K.S., Goguen, K.N., Britt, T.W., Jeffirs, S.M., Wilkes, J.R., Brady, A.R., Pittman, R.A. & DiMuzio, D.J. (2017). The role of personality traits and barriers to mental health treatment seeking among college students. *Psychological Services*, 14 (4), pp. 513-523. DOI: 10.1037/ser0000157.
- Juczynski, Z. (2012). *Narzędzia pomiaru w promocji psychologii i zdrowia* [Measurement tools in health promotion and psychology]. Pracownia Testów Psychologicznych, Warszawa.
- Kern, L. (2010). Relationship between exercise dependence and big five personality. *Encephale*, 36 (3), pp. 212-218. DOI: 10.1016/j.encep.2009.06.007.
- Kosiba, G., Gacek, M., Bogacz-Walancik, A. & Wojtowicz, A. (2016a). The lifestyle of students – future teachers. *Antropomotoryka. Journal of Kinesiology and Exercise Sciences*, 74 (26), pp. 83-94. DOI: 10.5604/01.3001.0009.5616.
- Kosiba, G., Gacek, M., Wojtowicz, A. & Bogacz-Walancik, A. (2016b). Health-Related Behaviours, Physical Activity and Perceived Life Satisfaction in the Academic Youth of Pedagogical Subjects in Cracow. *Studies in Sport Humanities*, 20, pp. 6-15.
- Kosiba, G., Gacek, M., Bogacz-Walancik, A. & Wojtowicz, A. (2017a). Wartości witalne w hierarchii wartości a styl życia studentów kierunków nauczycielskich [Vital Values in the Hierarchy of Values and the Lifestyle of Student Teachers]. *Przegląd Badań Edukacyjnych*, 24 (1), pp. 21-40. DOI: <http://dx.doi.org/10.12775/PBE.2017.002>.
- Kosiba, G., Gacek, M., Bogacz-Walancik, A. & Wojtowicz, A. (2017b). Zachowania prozdrowotne a satysfakcja z życia studentów kierunków nauczycielskich [Health-related behaviours and perceived life satisfaction in the academic youth of pedagogical subjects]. *Teraźniejszość – Człowiek – Edukacja*, 2 (78), pp. 79-93.
- Kosiba, G., Gacek, M. & Wojtowicz, A. (2019a). Readiness to change and pro-health behaviours among students of physical education and other teaching specialisations. *Central European Journal of Sports Sciences and Medicine*, 28 (4), pp. 53-65. DOI: 10.18276/cej.2019.4-05.
- Kosiba, G., Gacek, M., Wojtowicz, A. & Majer, M. (2019b). Level of knowledge regarding health as well as health education and pro-health behaviours among students of physical education and other teaching specialisation. *Baltic Journal of Health and Physical Activity*, 11 (1), pp. 83-95. DOI: 10.29359/BJHPA.11.1.0.
- Kropornicka, B., Baczevska, B., Dragan, W., Krzyżanowska, E., Olszak, C. & Szymczuk, E. (2015). Zachowania zdrowotne studentów Uniwersytetu Medycznego w Lublinie w zależności od miejsca zamieszkania [Health behaviours of students of the Medical University of Lublin depending on the place of residence]. *Rozprawy Społeczne*, 9 (2), 58-64.
- Kulik, A., Grądziel, J. & Smotrycka, A. (2017). Zachowania zdrowotne studentek – charakterystyka i znaczenie zmiennych socjodemograficznych [Health behaviours of female students – characteristic and significance of sociodemographic variables]. *Problemy Higieny i Epidemiologii*, 98 (4), pp. 371-380.
- Kulik, A., Grądziel, J. & Smotrycka, A. (2018). Dyspozycje podmiotowe studentek sprzyjające podejmowaniu zachowań zdrowotnych [Personal resources conducive to making health behaviours among female students]. *Polskie Forum Psychologiczne*, 23 (1), pp. 188-200. DOI: 10.14656/PFP20180112.
- Lee, S.J., Cloninger, C.R. & Chae, H. (2015). Cloninger's Temperament and Character Traits in Medical Students of Korea With Problem Eating Behaviors. *Comprehensive Psychiatry*, 59, pp. 98-106. DOI: 10.1016/j.comppsy.2015.02.006.
- Lopez-Sanchez, G.F., Radzimirski, Ł., Skalska, M., Jastrzębska, J., Smith, L., Wakuluk, D. & Jastrzębski, Z. (2019). Body Composition, Physical Fitness, Physical Activity and Nutrition in Polish and Spanish Male Students of Sports Sciences: Differences and Correlations. *International Journal of Environmental Research and Public Health*, 16 (7), pii: E1148. DOI: 10.3390/ijerph16071148.
- Martin, J.L., Groth, G., Longo, L., Rocha, T.L. & Martens, M.P. (2015). Disordered eating and alcohol use among college women: associations with race and big five traits. *Eating Behaviors Journal*, 17, pp.149-152. DOI: 10.1016/j.eatbeh.2015.02.002.
- Martins, A., Ramalho, N. & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Personality & Individual Differences*, 49, pp. 554-564.
- Meichenbaum, D. (1996). Stress inoculation training for coping with stressors. *The Clinical Psychologist*, 49, pp. 4-7.
- Montenegro, E., Salinas, J., Parra, M., Lera, L. & Vio, F. (2014). Evaluation of a nutrition education intervention in teachers and students in pre-school and primary schools in los Andes, Chile. *Archivos Latinoamericanos de Nutricion*, 64 (3), pp. 182-191.
- Myszkowska-Ryciak, J., Kraśniewska, A., Harton, A. & Gajewska, D. (2011). Porównanie wybranych zachowań żywieniowych studentek Akademii Wychowania Fizycznego Szkoły Głównej Gospodarstwa Wiejskiego [Comparison of selected nutritional behaviours of female students of the University of Physical Education and of the University of Life Sciences in Warsaw]. *Problemy Higieny i Epidemiologii*, 92 (4), pp. 931-934.
- Nowak, G., Pawlas, K., Duda, S., Kulik, A. & Nowak, D. (2018). Poczucie własnej skuteczności a zachowania zdrowotne i satysfakcja z życia studentów dietetyki [Self-Efficacy, Health Behavior and Satisfaction with Life among Dietetics Students]. *Psychologia Rozwojowa*, 23 (3), 83-95. DOI: 10.4467/20843879PR.18.018.9359.

- Palacz, J. (2014). Zachowania zdrowotne studentów w świetle wybranych uwarunkowań [Health behaviours of students in the light of the selected conditions]. *Medycyna Ogólna i Nauki o Zdrowiu*, 20 (3), pp. 301-306. doi: [org/10.5604/20834543.1124662](https://doi.org/10.5604/20834543.1124662).
- Popławska, H., Dmitruk, A., Kunicka, I., Dębowska, A. & Hołub, W. (2018). Nutritional Habits and Knowledge About Food and Nutrition Among Physical Education Students Depending on their Level of Higher Education and Physical Activity. *Polish Journal of Sport and Tourism*, 25, pp. 35-41. DOI: <https://doi.org/10.2478/pjst-2018-0018>.
- Posadzki, P., Stockl, A., Musonda, P. & Tsouroufli M. (2010). A mixed-method approach to sense of coherence, health behaviors, self-efficacy and optimism: towards the operationalization of positive health attitudes. *Scandinavian Journal of Psychology*, 51 (3), pp. 246-252. <https://doi.org/10.1111/j.1467-9450.2009.00764.x>.
- Presaghi, F., Manca, M., Rodriguez-Franco, L. & Curcio, G. (2015). A Questionnaire for the Assessment of Violent Behaviors in Young Couples: The Italian Version of Dating Violence Questionnaire (DVQ). *PLoS One*, 10 (5), e0126089. <https://doi.org/10.1371/journal.pone.0126089>.
- Rasińska, R. (2012). Nawyki żywieniowe studentów w zależności od płci [Dietary habits of students depending on sex]. *Nowiny Lekarskie*, 81 (4), pp. 354-359.
- Raynor, D.A. & Levine, H. (2009). Associations Between the Five-Factor Model of Personality and Health Behaviors Among College Students. *Journal of American College Health*, 58 (1), pp. 73-81. DOI: 10.3200/JACH.58.1.73-82.
- Remick, A.K., Polivy, J. & Pliner, P. (2009). Internal and external moderators of the effect of variety on food intake. *Psychological Bulletin*, 135 (3), pp. 434-451. DOI: 10.1037/a0015327.
- Rozporządzenie Ministra Edukacji Narodowej z dnia 14 lutego 2017 r. w sprawie podstawy programowej wychowania przedszkolnego oraz podstawy programowej kształcenia ogólnego dla szkoły podstawowej, w tym dla uczniów z niepełnosprawnością intelektualną w stopniu umiarkowanym lub znacznym, kształcenia ogólnego dla branżowej szkoły I stopnia, kształcenia ogólnego dla szkoły specjalnej przysposabiającej do pracy oraz kształcenia ogólnego dla szkoły policealnej (Dz. U. 2017, poz. 356) [Ordinance of the Minister of National Education from 14th February, 2017 on the core curriculum for pre-school and general education for primary schools including students with moderate or severe mental disabilities, general education for first-de-
- gree trade schools, general education for special schools preparing for work and general education for post-secondary schools (Journal of Laws 2017, item 356)].
- Rozporządzenie Ministra Nauki i Szkolnictwa Wyższego z dnia 25 lipca 2019 r. w sprawie standard kształcenia przygotowującego do wykonywania zawodu nauczyciela (Dz. U. 2019, poz. 1450) [Ordinance of the Minister of Science and Higher Education from 25th July 2019 on the standard of education preparing for the teaching profession (Journal of Laws 2019, item 1450)].
- Romanowska-Tolłoczko, A. (2011). Styl życia studentów oceniany w kontekście zachowań zdrowotnych [University students' lifestyles within the context of their pro-health behaviours]. *Hygeia Public Health*, 46 (1), pp. 89-93.
- Sato, Y., Chiba, T. & Umegaki, K. (2018). Personality and dietary supplement use among Japanese female students. *Nihon Kosho Eisei Zasshi*, 65 (6), 300-307. DOI: 10.11236/jph.65.6_300.
- Skrzypek, A., Szeliga, M., Stalmach-Przygoda, A., Kowalska, B., Jabłoński, K. & Nowakowski, M. (2016). Analysis of Lifestyle and Risk Factors of Atherosclerosis in Students of Selected Universities in Krakow. *Przegląd Lekarski*, 73 (5), pp. 316-319.
- Wilson, K.E. & Dishman, R.K. (2015). Personality and physical activity: A systematic review and meta-analysis. *Personality and Individual Differences*, 72, pp. 230-242. <https://doi.org/10.1016/j.paid.2014.08.023>.
- Wojciszke, B. & Doliński, D. (2008). *Ja i samoocena* [My self-esteem and me]. In: J. Strelau & D. Doliński. *Psychologia. Podręcznik akademicki*. (Vol. 2). Gdańsk, Gdańskie Wydawnictwo Psychologiczne, pp. 79-92.
- Valdes-Badilla, P., Godoy-Cumillaf, A., Herrera-Valenzuela, T. & Durán-Agüero, S. (2015). The comparison between food habits and physical condition among physical education and other undergraduate students. *Nutricion Hospitalaria*, 32 (2), pp. 829-836. DOI: 10.3305/nh.2015.32.2.9194.
- Yager, Z., Gray, T., Curry, C. & McLean, S.A. (2017). Body dissatisfaction, excessive exercise, and weight change strategies used by first-year undergraduate students: comparing health and physical education and other education students. *Journal of Eating Disorders*, 5 (10). DOI: 10.1186/s40337-016-0133-z.
- Yahia N., Wang, D., Rapley, M. & Dey, R. (2016). Assessment of weight status, dietary habits and beliefs, physical activity, and nutritional knowledge among university students. *Perspectives in Public Health*, 136 (4), pp. 231-244. DOI: 10.1177/1757913915609945.