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Attitudes of Czech University Students to a Healthy Lifestyle

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Abstract

The paper describes the results of a research study investigating the attitudes of university students to concepts associated with health and healthy lifestyle by means of a semantic differential. Another objective was to compare these attitudes with the basic components of a healthy lifestyle. Specifically, these components included student-reported eating habits, leisure activity and physical activity. The research sample consisted of 612 university students enrolled in various teacher training programmes. The tool for the measurement of the students' attitudes was a semantic differential of an own design using a factor analysis. To measure their attitudes to health and healthy lifestyle, the students were presented with the following concepts: I, Stress, Risky sexual behaviour, Drugs, Alcohol, Smoking, Health, Disease, Physical activity and Healthy lifestyle. The authors also investigated other students' characteristics relating to the issue such as eating habits and preferred leisure activity and physical activity. Further indicators included the following: field of study, year of study, and gender. The obtained data were used to develop a semantic space to observe the concepts in various groups of respondents. The differences between various groups were further compared by means of the Student's t-test and analysis of variance. It was revealed that men and women have different attitudes to health, and that students who highly value their health, healthy lifestyle and physical activity mostly adhere to healthy eating principles and engage in physical activity.

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Keywords: Students' attitudes; health; lifestyle; semantic differential; factor analysis; ANOVA; t-test.

1. Introduction

“When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied.”
Heraclitus

This idea has been relevant for centuries and recently has gained special significance. Understanding the concept of health will make it easier to implement measures to promote health. Despite the general awareness about the importance of health and healthy lifestyle (Report on health, 2014), research

(HBSC, 2016) suggests that in the Czech Republic the level of health is insufficient, health-related risks are underestimated, and pharmacological treatment is preferred over regime or diet related measures. According to the “Action plan to improve health literacy”, which should be included in the governmental document “Health 2020”, one of the six pillars of the plan in the Czech Republic should be education of pupils and students and also lifelong learning of teachers (Health 2020, 2014).

It is therefore necessary for future teachers to adopt desirable attitudes to health and healthy lifestyle, which will then be reflected not only in their educational activities but also in their own behaviour, which is for students a model of an adequate attitude (Hřivnová, 2016).

2. Problem statement

Attitudes of people and their behavioural tendencies shaped by the social conditions during the course of life appear as an important indicator of behaviour and experiencing. These attitudes are decisive for the behaviour of individuals also in important areas such as health and healthy lifestyle. One of the signs of a democratic society, which understands the health of its citizens as a value, is responsible and shared care for and interest in their health across all groups of individuals and all age cohorts. In this context, the authors were interested in the attitudes to health and healthy lifestyles of future teachers, who will have a crucial effect on health literacy of their students. The significance of the concept of health must be understood very broadly and in a holistic way, whether health is understood as a state (mental, physical, social) or a dynamic process subject to many circumstances (Holčík, 2009).

3. Research questions

The basic research question of the present research was: What are the attitudes of Czech university students to health and healthy lifestyle? This question was followed by other research questions: Do students' attitudes differ by various fields of study? Do students' attitudes differ by the actual year of study? Do students' attitudes differ by gender? Do students' attitudes correspond with their eating habits, leisure activity and physical activity?

4. Purpose of the study

The objectives of the present study are defined in two areas. The first area included the preparation and optimization of the modified semantic differential for Czech university students of teacher training programmes using a factor analysis. The aim of the second area was to investigate the attitudes to selected concepts associated with health and healthy lifestyle (biological and social component of health) at faculties where future teachers are educated. A total of 10 concepts were selected as indicators of the mentioned attitudes: I, Stress, Risky sexual behaviour, Drugs, Alcohol, Smoking, Health, Disease, Physical activity and Healthy lifestyle – see Table 6. These attitudes were further related to eating habits (number of meals per day) and frequency of leisure activity and physical

activity. The research areas were further analysed in relation to the students' gender, year of study and field of study.

5. Research methods - Semantic Differential

The semantic differential method, specifically the two-factor ATER version (Chráska sr., 2007) has been previously used by the authors to compare the attitudes of university students in the Czech Republic, Poland and Slovakia (Chrásková, 2016). It has been discovered however that simple acceptance of existing semantic differential scales is not always adequately transferable to other socio-cultural environments (Chráska jr. & Chrásková, 2016). The ATER measuring instrument was optimised by means of a factor analysis; however, in the present research the authors opted for the four-factor semantic differential (Pöschl, 2011), which was enriched with further scales of an own design.

5.1. Traditional semantic differential

The semantic differential (referred to as SD) is a research technique developed in 1950s in the USA by Professor Osgood (Osgood, 1957) for measuring individual psychological significance of words or attitudes to something. The method focuses on simple evaluations and is therefore particularly suitable for measuring emotional and behavioural aspects of attitudes. A great advantage is easy administration and relatively quick assessment. The basic dimensions of the semantic space were defined by C. Osgood using a factor analysis; a total of three most significant factors were identified. As a result, each concept is usually assessed in terms of the following three factors: factor of evaluation, factor of potency (power) and factor of activity.

5.2. Four-factor semantic differential

In the Czech Republic the issue of measuring students' attitudes was addressed by Pöschl (2011), who developed a questionnaire for measuring attitudes using the method of a four-factor semantic differential. The significance of various concepts was mapped by means of thirteen seven-point assessment scales. Each scale was defined by a pair of opposing adjectives. The following four factors were identified by means of a factor analysis: factor of evaluation, factor of activity, factor of potency and factor of complexity.

The first three factors (evaluation, potency and activity) were consistent with those originally identified by Osgood. The fourth factor of "complexity" was represented by a single assessment scale (not included in the original Osgood's list) and acts as a separate distinctive aspect.

5.3. Optimization of modified semantic differential

In the present research the authors adopted a modified semantic differential according to Pöschl (2011), which is based on the ATER semantic differential and enriched with scales measuring the energy of the concepts (marked en) – see Fig. 1. The * symbol indicates reverse scales. The resulting semantic differential is anticipated to have a four-factor structure.

The data were obtained from the students by means of the scales of the modified semantic differential and subsequently subjected to a factor analysis in the STATISTICA Cz 12.0 programme in order to assess the anticipated factor structure (Chráska jr., 2014) and agreement with the four-factor model.

Health										
1.	useful	<input type="checkbox"/>	useless	ev*						
2.	slow	<input type="checkbox"/>	fast	ac						
3.	strong	<input type="checkbox"/>	weak	po*						
4.	undemanding	<input type="checkbox"/>	demanding	en						
5.	monotonous	<input type="checkbox"/>	varied	ev						
6.	young	<input type="checkbox"/>	old	ac*						
7.	remote	<input type="checkbox"/>	close	po						
8.	difficult	<input type="checkbox"/>	easy	en*						
9.	beautiful	<input type="checkbox"/>	ugly	ev*						
10.	passive	<input type="checkbox"/>	active	ac						
11.	genuine	<input type="checkbox"/>	superficial	po*						
12.	simple	<input type="checkbox"/>	complex	en						
13.	boring	<input type="checkbox"/>	interesting	ev						
14.	flexible	<input type="checkbox"/>	rigid	ac*						
15.	narrow	<input type="checkbox"/>	wide	po						

Fig. 1. Record sheet for the semantic differential for the concept of health.

The structure of the research sample is shown in Table 1. Of the original sample of 612 students of various teacher training programmes, only 350 fully completed semantic differential questionnaires were used.

Table 1. Structure of the research sample.

Year of study	Gender (Male)	Gender (Female)	Missing (Data)	Row (Totals)
1	15	76	0	91
2	49	130	1	180
3	0	3	0	3
4	20	44	0	64
5	1	1	0	2
Missing	3	2	5	10
All Groups	88	256	6	350

The scales were designed in a way so that each scale measures only one factor, i.e. only evaluation, activity, potency or energy of the concept. However, the results in Table 2 suggest that the scales do not always have the anticipated factor structure.

For example factor 1 significantly correlates with scales 5 and 13 (designed for evaluation) and 10 and 14 (designed for activity), which should not be the case. This factor would at the same time measure both evaluation and activity of the concept. Factor 2 significantly correlates with scales 4, 8, and 12 (all primarily designed for energy) and thus meets the requirement for measuring a single component of an attitude. Factor 3 significantly correlates with scales 1 and 9 (both primarily designed for evaluation) and thus meets the requirement for measuring a single component of an attitude. Factor 4 significantly correlates only with scale 3 (designed for potency) and thus meets the requirement for measuring a single component of an attitude. However, 4 factors explain only about 46 % of variance (see Table 3) and residual correlations (unexplained by the model) are significantly higher than 0.

Table 2. Control factor analysis of the semantic differential scales including four factors – Factor Loadings (Varimax normalized) Extraction: Maximum likelihood factors.

Scale	Anticipated dimension	Scale identification	Factor 1	Factor 2	Factor 3	Factor 4
1. useful – useless	evaluation	1(ev)rev	0.565	-0.085	0.599	0.227
2. slow – fast	activity	2(ac)	0.194	0.036	-0.366	0.045
3. strong – weak	potency	3(po)rev	0.285	0.030	0.013	0.702
4. undemanding – demanding	energy	4(en)	0.024	0.689	-0.126	0.064
5. monotonous – varied	evaluation	5(ev)	0.684	0.080	-0.047	0.104
6. young – old	activity	6(ac)rev	0.406	-0.107	0.015	0.129
7. remote – close	potency	7(po)	0.503	-0.060	0.123	0.282
8. difficult – easy	energy	8enrev	-0.174	0.713	0.038	-0.047
9. beautiful – ugly	evaluation	9(ev)rev	0.614	-0.171	0.597	0.197
10. passive – active	activity	10(ac)	0.654	0.046	0.035	0.180
11. genuine – superficial	potency	11(po)rev	0.291	0.116	0.321	0.346
12. simple – complex	energy	12(en)	0.059	0.724	-0.014	0.032
13. boring – interesting	evaluation	13(ev)	0.782	-0.080	0.171	0.108
14. flexible – rigid	activity	14(ac)rev	0.614	-0.066	0.027	0.068
15. narrow – wide	potency	15(po)	0.324	0.051	-0.074	0.097

Table 3. Control factor analysis of the SD scales including four factors – own values (Eigenvalue) and explained variance

Value	Eigenvalues		Extraction: Maximum likelihood factors	
	Eigenvalue	% Total (variance)	Cumulative (Eigenvalue)	Eigenvalue
1	4.035	26.898	4.035	26.898
2	1.611	10.739	5.646	37.637
3	0.757	5.050	6.403	42.687
4	0.434	2.895	6.837	45.582

As a result, the SD scales were reduced to only two factors (partially corresponding factors 2 – energy and 3 – evaluation in the previous analysis) and another factor control of the SD structure was performed – see Tables 4 and 5.

Table 4. Control factor analysis of the semantic differential scales including two factors – Factor Loadings (Varimax normalized) Extraction: Maximum likelihood factors.

Factor Loadings (Varimax normalized) Extraction: Maximum likelihood factors (Marked loadings are >0.700000)			
Variable	Factor 1	Factor 2	Communalities from 2 Factors
1(ev)rev scale	0.853	-0.044	0.730
4(en) scale	-0.076	0.688	0.480
8(en)rev scale	-0.140	0.693	0.499
9(ev)rev scale	0.894	-0.133	0.817
12(en) scale	-0.001	0.722	0.522

The results in Tables 4 and 5 clearly show that the scales already have a two-factor structure. In the measurement of the attitudes of Czech university students the average evaluation and average energy will be calculated from the following scales (which after a factor analysis best fitted the proposed model): evaluation (scales 1 and 9), energy (scales 4, 8 and 12).

Table 5. Control factor analysis of the semantic differential scales including two factors – own values (Eigenvalue) and explained variance.

Eigenvalues (DATA IGA ICEEPSY) Extraction: Maximum likelihood factors				
Value	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	1.694	33.877	1.694	33.877
2	1.354	27.076	3.048	60.953

6. Findings

6.1. Semantic space of the investigated concepts

The data obtained from the modified two-factor semantic differential were used to define the resulting semantic spaces of the concepts for Czech university students – see Fig. 2. The x axis represents the average evaluation of the concept; the y axis shows the average energy in a specific group of students (measure of how the concept is demanding for the students in terms of energy – energy expenditure). The semantic space clearly shows which concepts are close in terms of significance and to which students hold similar attitudes. These concepts form certain clusters (e.g. I, Healthy lifestyle, Physical activity and Health or Disease and Stress) – see Fig. 2.

As shown in the semantic space arranged by gender, it can be generally stated that men perceive all concepts as less energy demanding than women – see Fig. 2.

A closer analysis of the differences in the perception of the concepts by gender (based on a t-test) is shown in Tab. 6.

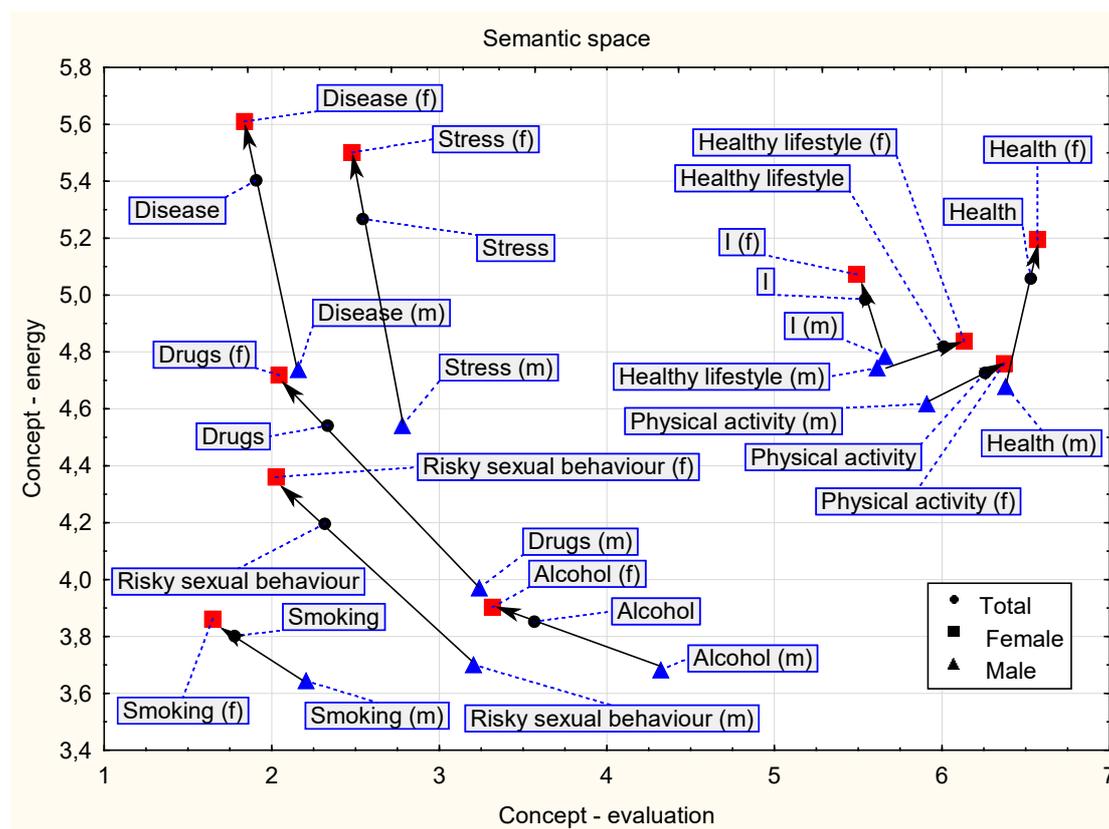


Fig. 2. Semantic space of the concepts for all students and for men and women.

6.2. Differences in the perception of the investigated concepts and in the monitored variables by gender and year of study

Statistically significant differences in the perception of the concepts by various groups of students should always be considered both in terms of evaluation and the degree of expended energy (complexity).

During the research it was revealed that men and women perceived the concepts (except the concept I) in a different way and as a result have different attitudes to healthy lifestyle – see Table. 6. Other monitored variables (number of meals per day and frequency of leisure activity and physical activity per month) did not show any differences between students by gender or year of study.

It was further revealed that negative concepts such as Risky sexual behaviour, Drugs or Disease are (in terms of healthy lifestyle) evaluated by male and female students as bad and difficult. In contrast, differences in the perception by year of study were confirmed only for the concept I, which is at the beginning of study perceived as statistically significantly more difficult. Overall, however, no differences were observed in the monitored variables by year of study ($p=0.522$).

Table 6. Results of the Student's t-test – concepts by gender, and results of an analysis of variance ANOVA by year of study.

Concept/Variable	Male (N=88)	Female (N=253)	p	Year 1 (N=86)	Year 2 (N=176)	Year 4 (N=60)	p
I (ev)	5.659	5.490	0.268	5.721	5.384	5.592	0.102
I (en)	4.784	5.073	0.056	5.256	4.839	4.983	0.036
Stress (ev)	2.778	2.480	0.071	2.599	2.489	2.792	0.311
Stress (en)	4.542	5.501	<0.001	5.151	5.320	5.394	0.549
Risky sexual behaviour (ev)	3.205	2.026	<0.001	2.128	2.344	2.708	0.075
Risky sexual behaviour (en)	3.701	4.360	0.002	4.434	4.072	4.283	0.253
Drugs (ev)	3.239	2.043	<0.001	2.221	2.446	2.442	0.558
Drugs (en)	3.970	4.718	<0.001	4.628	4.419	4.556	0.600
Alcohol (ev)	4.322	3.317	<0.001	3.634	3.619	3.433	0.650
Alcohol (en)	3.682	3.903	0.174	3.977	3.701	4.039	0.117
Smoking (ev)	2.205	1.647	<0.001	1.773	1.872	1.642	0.459
Smoking (en)	3.644	3.861	0.281	3.907	3.752	3.894	0.720
Health (ev)	6.381	6.571	0.064	6.477	6.500	6.683	0.262
Health (en)	4.678	5.195	0.005	5.182	4.989	5.078	0.623
Disease (ev)	2.159	1.838	0.030	1.930	1.895	2.008	0.824
Disease (en)	4.739	5.610	<0.001	5.508	5.377	5.322	0.697
Physical activity (ev)	5.909	6.372	<0.001	6.256	6.247	6.208	0.956
Physical activity (en)	4.617	4.759	0.379	4.957	4.578	4.928	0.059
Healthy lifestyle (ev)	5.614	6.131	<0.001	6.029	6.000	5.900	0.757
Healthy lifestyle (en)	4.743	4.838	0.556	4.802	4.835	4.928	0.836
Number of meals per day	4.399	4.365	0.813	4.458	4.318	4.565	0.542
Frequency of leisure activity	16.460	14.345	0.153	15.393	13.715	15.491	0.443
Frequency of physical activity	13.477	13.357	0.930	12.774	13.545	13.018	0.861

Note: in the third (N=3) and fifth (N=2) year – graduation year, the number of students was insufficient to perform an analysis of variance ANOVA by year of study. Therefore, the analysis was not performed for the students in these years.

6.3. Differences in the perception of the investigated concepts and in the monitored variables by field of study

The authors further focused on whether the students' attitudes differ by their field of study. In terms of various teacher training programmes the students were divided into five groups – see Table. 7; the students were compared by means of an ANOVA. The results suggest that generally the the students' attitudes differ by their field of study ($p=0.014$).

Table 7. Analysis of variance (ANOVA) for the monitored variables by field of study.

Concept/Variable	Technical (N=30)	Artistic (N=35)	Social science (N=86)	Special education (N=38)	Natural science (N=123)	Significance
I (ev)	5.533	5.429	5.593	5.513	5.528	0.976
I (en)	4.322	4.733	5.174	4.693	5.184	0.001
Stress (ev)	2.350	3.057	2.390	2.961	2.374	0.011
Stress (en)	4.633	5.105	5.391	5.702	5.420	0.021
Risky sexual behaviour (ev)	2.900	2.757	2.314	1.763	2.195	0.007
Risky sexual behaviour (en)	3.922	4.181	4.140	5.009	4.057	0.032
Drugs (ev)	2.617	2.829	2.198	2.079	2.297	0.209
Drugs (en)	4.311	4.562	4.558	4.912	4.344	0.404
Alcohol (ev)	3.883	3.686	3.640	2.895	3.683	0.028
Alcohol (en)	3.722	3.981	3.837	4.000	3.718	0.709
Smoking (ev)	1.817	2.171	1.814	1.789	1.691	0.413
Smoking (en)	3.944	3.886	3.876	3.763	3.650	0.830
Health (ev)	6.517	6.400	6.576	6.408	6.622	0.435
Health (en)	4.556	4.914	5.047	5.140	5.238	0.253

Disease (ev)	2.033	2.286	1.855	2.053	1.780	0.209
Disease (en)	5.089	5.314	5.465	5.386	5.553	0.546
Physical activity (ev)	6.000	6.043	6.151	6.421	6.447	0.031
Physical activity (en)	4.789	4.886	4.702	4.754	4.743	0.969
Healthy lifestyle (ev)	5.900	5.800	6.110	5.882	6.024	0.573
Healthy lifestyle (en)	4.989	4.829	4.663	4.579	5.068	0.120
Number of meals per day	4.083	4.614	4.529	4.329	4.289	0.200
Leisure activity - frequency	12.533	18.114	14.174	15.026	14.398	0.373
Frequency of physical activity	11.933	15.000	14.186	13.342	12.593	0.674

Statistically significant differences in the perception of the investigated concepts are shown in Fig 3. A more positive evaluation of Stress was reported by students of artistic fields and special education. In terms of energy expenditure, Stress is most difficult for students of special education and least difficult for technical students, who at the same time reported the worst evaluation.

The concept Risky sexual behaviour is worst evaluated by students of special education, at the same time, this concept is the the most difficult. Similarly, these students report the worst evaluation of the concept Alcohol; students of other groups do not differ in the evaluation of the concept Alcohol.

The concept Physical activity is better evaluated by students of special education and natural sciences compared with other specializations. This concept together with the concept Health (in which there are no statistically significant differences between the groups) has the best evaluation among students.

The concept I is least difficult for students of technical fields and special education, on the contrary it is most difficult for students of natural sciences and social sciences. In general, the concept I is ranked among concepts with a higher degree of difficulty (besides Disease, Stress and Health).

6.4. Differences in the perception of the investigated concepts and in the monitored variables by healthy eating principles

The authors were further interested in whether the students' attitudes are influenced by their healthy lifestyle behaviour. Using an analysis of variance, the variables were compared according to whether the students adhere to healthy eating principles – see Table. 8.

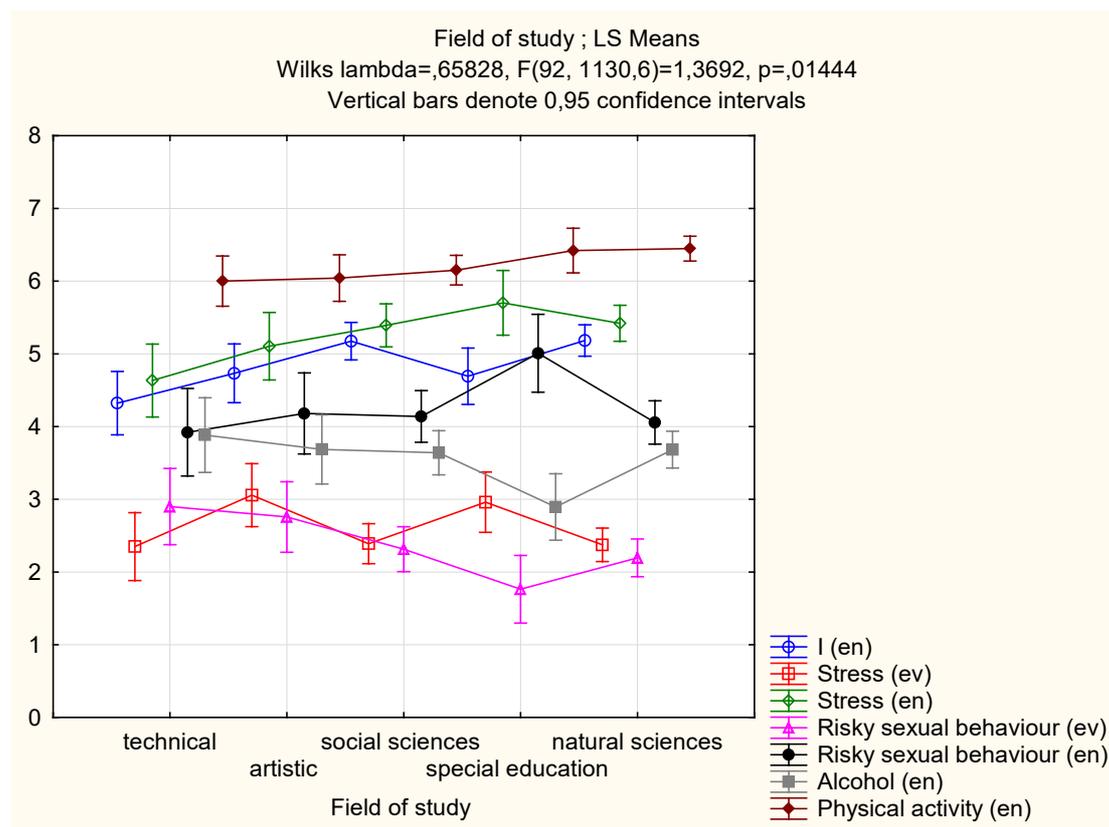


Fig. 3. Analysis of variance (ANOVA) for statistically significant differences in the students' attitudes by their field of study.

Table 8. Analysis of variance (ANOVA) for the monitored variables by eating habits.

Concept/Variable	Eating according to the principles of healthy diet			Significance
	Always (N=65)	Never (N=57)	Sometimes (N=193)	
I (ev)	5.877	5.518	5.466	0.058
I (en)	5.256	5.170	4.829	0.025
Stress (ev)	2.323	2.465	2.575	0.404
Stress (en)	5.554	5.070	5.347	0.166
Risky sexual behaviour (ev)	2.108	2.482	2.251	0.362
Risky sexual behaviour (en)	4.528	4.047	4.159	0.231
Drugs (ev)	2.115	1.956	2.469	0.060
Drugs (en)	4.672	4.439	4.501	0.705
Alcohol (ev)	3.277	3.737	3.598	0.184
Alcohol (en)	4.021	3.795	3.784	0.436
Smoking (ev)	1.492	1.632	1.922	0.034
Smoking (en)	4.026	3.795	3.693	0.379
Health (ev)	6.769	6.544	6.495	0.044
Health (en)	5.174	4.936	5.079	0.687
Disease (ev)	1.723	1.965	1.930	0.429
Disease (en)	5.646	5.199	5.468	0.203
Physical activity (ev)	6.592	5.939	6.272	0.001
Physical activity (en)	4.897	4.702	4.691	0.522
Healthy lifestyle (ev)	6.454	5.614	6.008	<0.001
Healthy lifestyle (en)	4.631	5.099	4.858	0.136
Number of meals per day	4.746	3.842	4.422	<0.001
Frequency of leisure activity	15.969	13.684	14.534	0.543
Frequency of physical activity	17.292	10.263	12.865	0.001

It was revealed that students who highly value the concepts Health, Healthy lifestyle and Physical activity mostly adhere to healthy eating principles and engage in physical activity. Of all monitored concepts, Smoking has the worst evaluation while the concept I has the most difficult evaluation.

7. Conclusions

The results of the research suggest that Czech university students have positive attitudes to health and healthy lifestyle, physical activity and to themselves. On the other hand, they expressed negative evaluation of smoking, risky sexual behaviour, drugs, stress and disease.

These results were further analysed according to the field of study of the future teachers. The greatest differences in the attitudes to health and healthy lifestyles were observed in the students of special education. This may be due to the fact that these students primarily prepare for work with disabled individuals. Another monitored variable – year of study – did not show significant differences.

It was also revealed that men and women perceived the concepts (except the concept I) in a different way and, as a result, have different attitudes to healthy lifestyle. Women reported worse evaluation of risky lifestyle aspects (smoking, risky sexual behaviour, disease, drugs, stress, and alcohol) than men and better evaluation of positive lifestyle aspects (physical activity, healthy lifestyle, health and I) than men. At the same time, women indicated more difficult evaluation of all monitored concepts than men.

According to the results of the research, approximately 19 % of students who highly value their health, healthy lifestyle and physical activity mostly adhere to healthy eating principles and engage in physical activity. In practice this means that they are not indifferent to their lifestyle and have a responsible attitude to themselves. It can therefore be concluded that these students will become a good example for their future students.

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