51 - SOMATIC PARAMETERS AND PHYSICAL FITNESS LEVEL DETERMINATION BY PHYSICAL ACTIVITY ATTITUDES OF SLOVAK UNIVERSITY STUDENTS

JAROMIR SEDLACEK[1],
PAVOL RUZBARSKY[1],
MARTIN ZVONAR[2],
PETER KRSKA[3],
GEORGHE BALINT[4]
[1]University of Presov, Faculty of Sport, 17th November str., Presov, Slovakia
[2]Masaryk University, Faculty od Sports Studies, Kamenice 5, Brno, Czech Republic
[3]Catholic University, Faculty of Education, Hrabovska 1, Ruzomberok, Slovakia
[4]Faculty of Movement, Sports, and Health Sciences, V. Aleksandri University of Bacau
jaromir.sedlacek47@gmail.com

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ABSTRACT
Introduction: Regular whole life recreational movement activity plays irreplaceable role for increasing individual health and prolonging active life. From the point of the view the childhood and adolescent age are the decisive periods for performing physical activities and its integration into life of each man. University students are specific and numerous social groups. Hey are in critical age from the point of performing recreational activities and thus their physical fitness level can often decrease. In this contribution authors deal with relationships of physical activity attitudes with somatic and physical fitness parameters of Slovak universities students.

Material and methods: In this research are involved 606 students, 344 males and 262 females from two Bratislava Universities (8 faculties). Attitudes were estimated by Lickert scale in three components (cognitive, emotional and tendency to act), from somatic parameters were measured body height and body weight, physical fitness was evaluated with reduced Eurofit and former Czechoslovak battery tests: sit and reach, standing broad jump, medicine ball throw, shuttle run 10x5m, sit-ups and endurance shuttle run. We have available students from the Faculty of Physical Education and Sports (FSPORT) and from 8 different faculties (not physical education and sport study orientation). Differences and relationships were evaluated by t-test and correlative coefficients; we used •$p<0.05$, ••$p<0.01$ significance level.
Results: We found that there are not great differences between somatic parameters FSPORT and others faculties, both male and female. In physical fitness factors reached clear majority FSPORT students. In attitudes reached significantly higher levels FSPORT students in all three components, mainly in component tendency to act. Gender differences in attitudes were not very different. Components of attitudes relate to physical fitness level mostly in groups of other faculties students, more often among females.
Conclusions: We proved that lower like average values in component tendency to act in other faculties courses often lack of physical activity and it influences also lower level of physical fitness. We suppose that entrance in FSPORT studies also means that attitudes components must reach relatively higher levels.

Keywords**:** university students, somatic parameters, physical fitness, attitudes, physical activity

1 INTRODUCTION

Nowadays in our lives play regular movement activities all the time more and more important role. The purpose of any recreational movement activity is to increase individual health and prolong active life. From the point of the view the childhood and adolescent age are the decisive periods for performing movement activities and its integration into life of each man. On the other side we must admit and many authors proved (1, 2, 3, 4, 5) that present population life can be characterized like hypokinetic. Period, we are living in, brings changes in living style mainly among young generation, which thanks modern technique products perform movement activities in smaller scale comparing their parents.

University students are specific and numerous social groups; at present about 40% of youths in Slovakia enter universities. Their age is from 19 to 25. For performing recreational activities the first few years of productive age are critical. Difficulties are dealt with: leaving of parents, entrance into occupation, finding life partner, marriage entrance, starting their own family lives, becoming parents (6). Many authors point out the weak physical fitness level of university students (7, 8, 5, 22). At age of 20 years the main motivation is own figure formation, but later this motif decreases. The 2nd most important motivation is strengthening health, which in the older student respondents had an increasing percentage of motivation (9).

Long-term spending of time in one position in most of the sitting and travel to education results in a disorder of the support-movement system of students accompanied by pain and the often appearance of civilization diseases. The lack of physical activity during the study leads to hypokinetic life, which is also recorded in early childhood (10). A study on addictive substances use among students has shown stability in the use of tobacco products in males and elevated levels in females. In the case of alcoholic beverages, there is a sharp rise in both sexes as if students did not realize their harmfulness (11).

There is shown in one research (13) according EUROFIT test battery application realized in Kosice Pavel Jozef Safarik University that the highest level of physical fitness had students in half of the 90s and since that time is physical fitness of students continuously decreasing. There is also stressed to draw the attention to increase movement activity of university students.

The authors (14) present the results of the exploratory study of the students of the University of Presov and the University of Constantin the Philosopher in Nitra. Students who perform a minimum amount of physical activity consider their quality of life to be very good, while students who perform their physical activity more often it means that they are active athletes, reached the greatest psychological comfort.

Very often it is coursed by lack of physical education lessons, insufficient material conditions, but here also plays the role their former education, experience with movement activities, psychological and personal qualities including attitudes towards performing physical activities continuously.

Attitudes belong to the important motivation factors and as well as factors of the whole personality development, which not only orient man behaviour and activity, but very often determine its daily advance and course. Generally the attitude is relatively stable readiness to react at certain way to persons, groups, situations, things, opinions and ways of behaviour. In this attitude definition "like readiness at certain reaction way" there is necessary to stress that attitudes are accented by emotions and oriented on values (15). They cannot be considered being person qualities, but as a relatively firm characteristics, which express his positive or negative position on certain sphere of concrete situation. Attitudes that are formed in connection with various kind of activity are defined like clearer, more stable in time, in memory better fixed and more resisting to a change (16). There was realized genetic determination research (17) of individual differences in attitudes and found, that attitude to physical activities demanding movement activity, position to organized sports playing, or attitude to physical fitness are genetically conditioned. By correlation they found, that attitude to physical fitness and attitude to emotion experience positively significantly correlate with physical fitness. The process of attitudes formation takes a course during adolescence, for in this period of individual development man comes into contact with social phenomenon in larger extent. Majority attitudes are stabilized in third person life decade; that is at age of university studies. Historical research and findings show even on mutual relationships of terms attitude and value, attitude and need, attitude and behaviour.

At content definition of attitude conception there is the possibility to form following components:

- cognitive (COG), or rational component – it is formed by ideas, opinions of individual about thing or phenomenon, while as the most complicated are considered opinions regarding evaluation,
- emotional (EMO), or feelings component – it relates to emotions connected with thing or phenomenon, while emotions express attitude dynamism to favourable or unfavourable thing related with pleasant or unpleasant emotional feeling to attitude subject,
- behavioural component, that means tendency to provide action (TEA) – it means readiness to behaviour and acting connected with attitude.

Consistency of stated components enables to reveal man behaviour with great probability estimation. On the contrary, strong inconsistency decreases probability of real behaviour prediction (15, 8).

University students´ attitudes and their interest for regular movement activity reflect education and motivation also in subject physical and sport education from the level of elementary schooling till university studies. Student should entrance the life with trained habits and positive approach to perform regular movement activities (18).

1.2 Objectives

The purpose of this research is to reveal influence of physical activity performance attitudes of university students on their somatic parameters and physical fitness level.

2 MATERIAL AND METHODS

In this research were involved randomly selected students of both sexes from some Bratislava faculties (from 2 universities) with various study orientation (table 1). Average decimal age of the whole group was 20.73 years (20.85 at males and 20.57 at females). Somatic parameters were estimated with body height (BH) and body weight (BW). The level of physical fitness level we were evaluating with battery of 6 tests (19, 20): Sit and reach (SR), standing broad jump (SBJ), overhead medicine ball (2 kg) throw (MT), shuttle run 10 x 5 m (10x5), sit - ups in 30 s (SU), endurance shuttle run (ENDUR).

For the purpose of our research we prepared questionnaire, in which we used for attitudes evaluation Lickert-scale of summed estimations (15; 21). Male and female students attitudes to movement activities performance were learned in three components by questionnaire; cognitive or rational (COG), emotional or expressive (EMO) and in component tendency to act (TEA). In single attitude components each respondent evaluated questions on 5 rate scale (numerical value of scale from 1 to 5); each component was formed by 4 questions. The minimum of gained score were 4 points (4 questions x 1 point), medium value was 12 points and maximum 20 points (4 questions x 5 points). Sum of points was total score of respondent in concrete component. On the bases of distance of single means from central value in watched groups we evaluated respondent attitudes (8). Fundamental characteristics can be seen in table 2.

For motor performance evaluation we used fundamental statistic parameters: arithmetic mean (x), standard deviation (s), maximal value (max), minimal value (min), variation range (v_r).To learn significant differences among groups we used parametrical un-pair t-test for independent groups. Mutual relations between attitudes components with somatic and physical fitness parameters were evaluated with Pearson correlative coefficient. Statistical significance was evaluated on **1 %, or *5 % level.

Table 1. Total involved student

Faculties	male	female	total
FSPORT	171	41	212
FMEDC	28	39	67
FCHEM	31	25	56
FMATH	36	41	77
FLAW	27	31	58
FNSCI	32	39	71
FECON	19	28	47
FEDUC	-	18	18
	344	262	606

Legend: FSPORT – Faculty of Physical Education and Sport, FMEDC – Faculty of Medicine, FCHEM – Faculty of Chemical and Nutrition Technologies, FMATH – Faculty of Mathematics, Physics and Informatics, FLAW – Faculty of Law, FNSCI – Faculty of Natural Sciences, FECON – Faculties from Economic University, FEDUC – Faculty of Education (Pedagogical Faculty).

Table 2. Fundamental statistical characteristics of attitude components of male and female students of selected faculties and universities

Males		COG	EMO	TEA	Females	COG	EMO	TEA
FSPORT	x	15.22	15.06	14.43	FSPORT	15.46	16.24	14.12
n = 171	s	2.40	2.60	2.96	n = 41	3.00	2.91	2.81
FMEDC	x	13.54	14.11	10.75	FMEDC	14.54	13.74	10.03
n = 28	s	3.09	3.27	2.82	n = 39	2.88	3.00	3.11
FCHEM	x	13.65	13.90	11.10	FCHEM	15.00	13.44	11.28
n = 31	s	3.00	3.39	2.84	n = 25	2.64	2.98	2.85
FMATH	x	12.44	14.36	10.42	FMATH	13.41	13.49	9.41
n = 36	s	2.67	3.14	2.89	n = 41	3.07	3.05	2.51
FLAW	x	12.52	14.04	10.52	FLAW	15.26	14.84	11.29
n = 27	s	3.10	2.73	2.79	n = 31	2.28	2.32	2.68

FNSCI n = 32	x	12.06	14.34	11.28	FNSCI n = 39	14.95	14.79	10.74
	s	2.31	2.19	2.45		2.79	2.79	3.24
FECON n = 19	x	12.11	13.32	10.37	FECON n = 28	14.07	14.50	11.29
	s	1.91	2.96	2.29		3.01	3.24	2.52
FEDUC n = 0	x	-	-	-	FEDUC n = 18	15.78	14.67	12.33
	s					3.19	3.02	3.49

3 RESULTS

Average values of physical development and physical fitness parameters can be seen in tables 3, 5 and 6. In tables 4 and 7 are results of T-tests, differences between FSPORT and other faculties in watched somatic and physical fitness parameters.

Table 3. Level of physical development parameters of involved groups

		Males		Females		
N	variables	BH	BW	N	BH	BW
FSPORT	x	180.9	77.37	FSPORT	167.76	59.24
n = 171	s	6.87	8.86	n = 41	5.97	5.59
FMEDC	x	183.79	77.14	FMEDC	168.46	57.21
n = 28	s	5.8	14.29	n = 39	6.24	6.86
FCHEM	x	182.29	78.44	FCHEM	168.08	62.46
n = 31	s	8.74	14.54	n = 25	7.48	11.96
FMATH	x	182.39	73.69	FMATH	166.88	59.44
n = 36	s	5.56	10.96	n = 41	5.21	8.42
FLAW	x	180.48	76.02	FLAW	169.42	58.89
n = 27	s	6.29	10.45	n = 31	5.97	7.36
FNCSI	x	182.53	75.52	FNCSI	167.18	58.40
n = 32	s	7.33	12.04	n = 39	5.82	10.62
FECON	x	181.95	79.34	FECON	169.93	61.21
n = 19	s	5.86	11.67	n = 28	6.29	9.10
FEDUC	x	-	-	FPEDAG	168.56	59.42
-	s	-	-	n = 18	5.18	8.02

Table 4. T-test differences between FSPORT and other faculties in physical development parameters

	Gender	BH	BW
FMEDC	Males n=28	2.11•	0.11
	Females n=39	0.51	1.46
FCHEM	Males n=31	0.99	0.55
	Females n=25	0.19	1.48
FMATH	Males n=36	1.22	2.16•
	Females n=41	0.70	0.12
FLAW	Males n=27	0.29	0.71
	Females n=31	1.17	0.23
FNCSI	Males n=32	1.22	1.01
	Females n=39	0.43	0.49

FECON	Males n=19	0.64	0.89
	Females n=28	1.45	1.11
FPEDAG	Males n=0	-	-
	Females n=18	0.49	0.09

Legend: •p<0.05, ••p<0.01

Table 5. Statistical parameters of male student physical fitness from FSPORT and other faculties

male	variables	SR(cm)	SBJ (cm)	MT(cm)	10x5 m(s)	SU (1)	ENDUR(1)
FSPORT n=171	x	31.88	243.68	1135.56	16.97	30.16	86.16
	s	6.95	16.96	165.63	0.84	3.80	22.84
OTHER FACULTIES n=173	x	23.49	222.12	983.01	18.61	25.71	61.30
	s	7.46	24.79	169.85	1.84	4.21	20.29

Table 6. Statistical parameters of female student physical fitness from FSPORT and other faculties

female	variables	SR(cm)	SBJ (cm)	MT(cm)	10x5 m(s)	SU (1)	ENDUR(1)
FSPORT n=41	x	31.01	199.00	781.85	17.86	25.76	58.34
	s	5.87	12.17	126.04	0.86	3.23	20.47
OTHER FACULTIES n=221	x	27.15	163.29	614.86	20.90	21.50	33.8
	s	7.08	20.72	120.78	1.75	4.01	13.32

Table 7. T-test differences between FSPORT and other faculties in the level of motor performance parameters

	Gender	SR	SBJ	MT	10x5m	SU	ENDUR
FMEDC	Males	3.66••	4.14••	4.02••	8.11••	3.53••	4.27••
	Females	2.49•	8.86••	7.35••	9.49••	4.18••	6.48••
FCHEM	Males	7.67••	9.04••	4.05••	8.00••	7.88••	6.61••
	Females	4.19••	9.83••	3.93••	9.40••	4.42••	5.67••
FMATH	Males	5.07••	4.78••	6.52••	9.12••	5.93••	6.72••
	Females	1.72	10.77••	7.81••	16.62••	5.86••	6.91••

FLAW	Males	5.44••	5.04••	1.60	6.85••	3.30••	4.01••
	Females	2.38•	7.23••	3.70••	9.16••	4.72••	4.89••
FNCSI	Males	7.25••	7.22••	6.75••	8.72••	8.68••	5.11••
	Females	3.03••	9.35••	5.55••	9.46••	5.74••	7.30••
FECON	Males	6.81••	4.79••	4.17••	4.92••	4.88••	6.40••
	Females	1.48	8.73••	5.78••	8.10••	5.69••	4.49••
FPEDAG	Males	-	-	-	-	-	-
	Females	2.87••	10.26••	5.35••	10.21••	3.80••	4.92••

Legend: •p<0.05, ••p<0.01

Intersexual attitude components (cognitive - COG, emotional – EMO and tendency to act – TEA) comparison can be seen in table 8.

Table 8. Significance of differences (t-tests values) in single attitudes components between male and female students of selected faculties and universities

	Gender		T –test coefficients		
Faculties	males	females	COG	EMO	TEA
FSPORT	171	41	0.54	2.55*	0.59
FMEDC	28	39	1.36	0.47	0.97
FCHEM	31	25	1.76	0.53	0.23
FMATH	36	41	1.46	1.23	1.62
FLAW	27	31	3.86**	1.20	1.07
FNSCI	32	39	4.67**	0.77	0.77
FECON	19	28	2.51*	1.27	1.26
FEDUC	0	18	-	-	-

Legend: •p<0.05, ••p<0.01

In tables 9 (a, b) and 10 (a, b) we can see mutual relationships between attitudes components and single somatic and motor performance level parameters, both in groups of males and females, in FSPORT and not sport faculties (others faculties).

Table 9. Correlative coefficients between male attitudes components with somatic and physical fitness parameters

a) FSPORT

n=171	BH	BW	SR	SBJ	MT	10x 5m	SU	ENDUR
COG	0.01	0.14 *	-0.01	-0.04	0.17 *	0.01	0.07	-0.02
EMO	0.07	0.10	-0.10	-0.11	0.01	-0.03	-0.09	-0.13
TEA	0.07	0.06	-0.13	-0.04	0.03	-0.13	-0.02	-0.07

Legend: •p<0.05, ••p<0.01

b) Other faculties

n=173	BH	BW	SR	SBJ	MT	10x 5m	SU	ENDUR
COG	-0.16 *	0.06	0.20 **	-0.01	0.05	0.17 *	0.17 *	0.08
EMO	-0.06	-0.11	0.23 **	0.19 *	0.01	-0.17 *	0.19 *	0.22 **
TEA	-0.04	-0.13	0.21 **	0.04	-0.02	-0.14	0.13	0.21 **

Legend: •p<0.05, ••p<0.01

Table 10. Correlative coefficients between female attitudes components with somatic and physical fitness parameters

a) FSPORT

n=41	BH	BW	SR	SBJ	MT	10x 5m	SU	ENDUR
COG	-0.13	0.31 *	-0.01	-0.22	0.18	0.17	0.20	0.03
EMO	0.24	0.33 *	-0.26	0.13	0.41 **	-0.03	0.04	0.17
TEA	0.18	0.38 *	0.01	0.10	0.37 *	0.05	0.04	0.17

Legend: •p<0.05, ••p<0.01

b) Other faculties

n=221	BH	BW	SR	SBJ	MT	10x 5m	SU	ENDUR

COG	0.01	0.21**	-0.05	0.05	0.21**	-0.10	0.29**	0.13
EMO	0.01	-0.01	0.05	0.17*	0.22**	0.26**	0.19**	0.23**
TEA	-0.02	0.03	-0.03	0.16*	0.26**	-0.28**	0.14*	0.25**

Legend: •p<0.05, ••p<0.01

4 DISCUSSION

4.1 Somatic parameters comparison

In table 3 we can see not too great range in average values and standard deviations in these parameters both in groups of male and as well of female. Small differences in these parameters are confirmed in table 4, where are seen values of T-test between FSPORT and other faculties. Only in 2 cases from 28 values are watched statistically significant differences on •p<0.05 level. These rare differences are more likely coursed by not very large samples as the selection of them was based on voluntariness and that is why single group samples were not representative. These two tables confirm us that from the point of view of difference based on study orientation (sport versus others study fields) there were not in somatic parameters found any significant variations.

4.2 Physical fitness level comparison

In tables 5 and 6 can be seen average values with standard deviations in test of general motor performance separately of SPORT versus other faculties. It is clear from the first view that in all tests are relatively great differences in sport performance level; FSPORT students possess higher level of it both in groups of male or female. This is also confirmed in table 7, where can be seen t-test values between FSPORT and others single faculties. Among 78 values only in 5 cases are seen not ••p<0.01 differences; in 4 cases it is in female groups in test sit and reach (SR), where are two differences on •p<0.05 level and 2 values without our both watched levels; in one case there is not any significant difference in male test medicine ball throw (MT) in the FLAW. We can state that sport study orientation positively influences general physical fitness level practically in all tests and fields. The clear higher level is watched in endurance, strength, speed and agility abilities in both genders; only flexibility in female groups reached values that are not so different and are up to certain level comparable.

4.3 Attitude components comparison

In table 2 we can see attitude components in both genders in single faculties. Average value 12 is overreached mostly in components COG and EMO in male and female groups in all faculties. It seems that these values are slightly higher more in COG like in EMO components among female sport as well as not sport faculties. In three cases in COG components are differences in female groups (comparing male groups, table 8) statistically significantly higher (FLAW, FNSCI and FECON), as well as it is in EMO component in FSPORT. So from the point of gender differences we can state that in COG and EMO components reached female groups higher values and all of these coefficients overreach clearly average value 12. The highest coefficients in those two components reached students from the faculty of SPORT (this is logical), though even some female groups from not sport oriented faculties reached very high values of these coefficients, too. But in the 3rd component tendency to act (TEA) are results completely different. In all faculties both in male or female groups coefficients fall down. All not sport oriented faculties fall clearly under average value 12 (except female in FEDUC that reached value 12.33 that is nearly average value). Only fall in FSPORT is not so high, values in this component stayed still over average value and reached 14.43 in male and 14.12 in female group. The male value 14.43 of FSPORT is the highest reached value among all TEA components. It seems that this is the most decisive factor to explain differences in general motor performance level in favour of FSPORT students (comparing with other faculties) both males and females. On the other side the two remaining components COG and EMO reflect more often knowledge and emotion qualities that can be derived easier from personal education level and intellectual action. So it is logical that the differences between SPORT and other faculties (not sport oriented) are here in these components smaller and that they can also overreach even in other faculties average values.

4.4 Attitudes components relationships with somatic and physical fitness parameters

In tables 9 (a, b) and 10 (a, b) we can see mutual relationships between attitudes components and single somatic and motor performance level parameters, both in groups of males and females, in FSPORT and not sport faculties (others faculties). Coefficients in somatic parameters show that relationships with attitude components are not very clear and often. With parameter BH we can see practically none statistically significant coefficient in any of our four groups; it seems very logical. BW parameter shows some statistically significant relationships. It is interested that in female FSPORT group overreached all three attitude components (COG, EMO, TEA) $p<0.05$. There are watched two more significant coefficients: between male FSPORT and COG component ($p<0.05$) and female others faculties and COG ($p<0.01$). We have not any reasonable explanation why these relationships between BW and attitude components occurred.

Relationships between physical fitness parameters and attitude components show in FSPORT both male and female groups only rare statistically significant values. It is the test MT, where are watched some higher values; in male FSPORT group can be seen one $p<0.05$ overreach (COG) connected more or less with large sample of tested students (n=171) and that is why the coefficient is relatively low, though statistically significant. In female FSPORT relationships between MT and EMO ($p<0.01$) and TEA ($p<0.05$) components we can see more likely competitive effort and higher experience level with this test performance. The other coefficients between physical fitness tests and single attitude components in groups FSPORT both male and female did not reach any statistically significant value. It means that both groups are homogenous from the point of motor performance level and that their attitude components differences do not influence level of their physical fitness. Coefficients between attitude components and others faculties show different tendencies like it is in FSPORT both male and female. There are found far more relationships on statistically significant levels. In male group we can see that 10 coefficients (from 18, those are 3 components x 6 tests) overreach significant level. Overreach in the test sit and reach (SR) in all three components on $p<0.01$ level is again difficult to explain. Significant overreach in other tests (except MT) manifest relationships mostly in EMO component though there are few also found in COG and TEA components. It can again show on competitive (EMO, TEA) effort (SBJ, 10x5, SU, ENDUR), or on skilfulness and technique experience (10x5, SU) with single tests performance. In other faculties female group can be seen 12 (from totally 18) statistically significant relationships between parameters of physical fitness with attitude components. None significant relationship is seen in test sit and reach (SR); this is complete opposite from male other faculties group. But other tests show with attitude components often and mainly strong ($p<0.01$) relationships. We can state that components EMO and TEA influence in other female group faculties statistically significantly level of motor performance; all tests SBJ, MT, 10x5, SU and ENDUR overreach statistical significance level. Thus these two components play very important role in this group for reaching higher physical fitness level. Component COG overreach only in 2 cases level of statistical significance (MT, SU).

From above stated we can say that in FSPORT both in female and male groups there are not manifested in physical fitness tests clear relationships between attitude components and motor performance level. On the other side the groups of not sport (other) faculties manifest relatively strong mutual influence between physical fitness tests and attitudes. Stronger and more frequent can be seen relationships in female group, mainly in components EMO and TEA in 5 (from totally 6) applied tests. It also corresponds with knowledge that boys in Slovakia universities (of course except sport oriented faculties) practise more often recreational sport activities. Thus we can explain the smaller relationships between attitude components and male other faculties group.

5 CONCLUSIONS

1. There were found only slight differences in somatic parameters between Faculty of Physical Education and Sports and other faculties (not sport study orientation), both in of male as well as female groups.
2. This study confirms expected statistically significant differences in motor performance level between FSPORT and other faculties in favour of FSPORT in groups of male and female, too.
3. In single attitude components reached highest values FSPORT students. In component COG and EMO also students from other faculties reached over average values, slightly higher values reached females. But in the component TEA only the students of the FSPORT of both genders reached over average values; here reached males of FSPORT clearly the highest values. Found low level of this TEA component among other faculties could influence predominantly lower level of their general motor performance compared with FSPORT students in groups of males as well as females.
4. In this study we did not found significant relationships between somatic parameters and attitudes components. Also relationships between physical fitness parameters and attitudes components in groups of FSPORT students both male and female did not reach some significant importance. The other situation seems among students of other faculties. Here males and even more often and strongly females group overreached statistically significant values. It seems, that for physical fitness level of other faculties have higher importance EMO and TEA components, more likely in female group.

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