

## **Physical Fitness and Movement Activities of Bratislava University Students**

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### **Abstrakt**

In the contribution authors deal with 606 Bratislava university students, boys and girls from nine faculties. Their physical performance is evaluated by 6 tests: sit and reach, standing broad jump, over head 2 kg medicine ball throw, 10 x 5 m shuttle run and endurance shuttle run. Movement activities are evaluated from questionnaire. There is proved, that students from Faculty of Physical Education and Sport have significantly higher motor performance and they perform more movement activities like other students. It is shown, that those students who participated in optional PE lessons have higher motor performance. Those who practice movement activities in paid forms and in sport clubs have significantly higher motor performance, too.

**Key words:** university students, motor performance, movement activity

### **Introduction**

The life of present population can be characterized like hypokinetic. Period, we are living in, brings changes in living style mainly in young generation, which thanks modern technique products perform movement activities in smaller scale comparing their parents. It is manifested by lowering physical fitness, that leads to increase of so called civilization diseases, at children mainly obesity. It can be stated, that lack of movement negatively influences not only health, but also functional and psychological fitness of human being.

In many research studies is shown, that increase of physical education lessons instead some other subjects does not decrease quality of academic education, but paradoxically the quality of education does not increase after adding of academic subjects instead of physical activity; more often are watched negative influences on health (Trudeau, F., Shephard, R. 2008).

At present we have enough proves about the fact, that properly applied movement activity is extremely important factor for keeping health on demanded level and this enables independent life with fulfill each man participation in social life. Many manifestations, which were considered like aging characteristics, are in fact coursed by lack of physical exercises and movement activities (Šimonek, 2007).

University students form numerous social groups. In the sphere of movement activities performance among many of them arises critical period. Regular and compulsory PE realized during primary and secondary school attendance (two or three times per week) is changed on many universities on compulsory lessons, but only in the first year. Mostly it is organized once a week and lasts from 60 to 90 minutes. During next years of university studies the PE becomes obligatory, that courses among many students movement reduction. Difficulties are also coursed with changes of way of living of individuals. For many students it is the period of becoming independent, young man must take care for himself. Studies connected with extra jobs or parallel studding on more universities or faculties is the way of life in faster living pace. Many of them are finding their life partners, they marriage and are founding their families. These special problems course permanent psychological and emotional pressure, which have negative consequences on organism, too. All of stated reasons can have negative influence on movement activity. As a result the significant physical fitness decrease can be seen.

## Objectives

The purpose of this work is to contribute to reveal motor performance level with regard on performed movement activities of university students.

## Methods

In this research were involved randomnly selected students of both sexes from some Bratislava faculties resp. 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).

Tab. 1 Total involved students

| <b>Faculties</b> | <b>male</b> | <b>female</b> | <b>total</b> |
|------------------|-------------|---------------|--------------|
| 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           |
| FPEDAG           | -           | 18            | 18           |
|                  | <b>344</b>  | <b>262</b>    | <b>606</b>   |

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, FPEDAG – Pedagogical Faculty.

The level of motor performance we were evaluating with battery of 6 tests:

Sit and reach (SR), standing broad jump (SBJ), overhead medicimbale ball (2 kg) throw (MT), shuttle run 10 x 5 m (10 x 5), sit - ups in 30 s (SU), endurance shuttle run (ENDUR).

Movement activity was evaluated by questionnaire. In the first part we learned extent of movement activity in week program during compulsory or optional PE subject, in the second part we were learning the predominant form of movement activity (unpaid recreation form – UNPAID, paid recreation form – PAID and competitive form – COMF).

For motor performance evaluation we used fundamental statistic parameters: arithmetic mean ( $\bar{x}$ ), standard deviation (s), maximal value (max), minimal value (min), variation range ( $v_r$ ).

To learn significant differences among groups we used parametrical unpair t-test for independent groups. Statistical significance was evaluated on \*\*1 %, resp. \*5 % level.

## Results and discussion

### Level of motor performance

Many authors confirmed decreasing level of motor performance university students even with relation to entering higher years of study. Reasons can be seen also in extend and contence of PE education. In table 2 and 3 are stated parameters of our male and female motor performance.

Tab. 2 Statistical parameters of males student motor performance from selected faculties

| male            | variables | SR    | SBJ    | MT      | 10x5m | SU    | ENDUR |
|-----------------|-----------|-------|--------|---------|-------|-------|-------|
| FSPORT<br>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 |
| FMEDC<br>n=28   | x         | 26,68 | 227,64 | 999,29  | 18,60 | 27,36 | 66,14 |
|                 | s         | 6,96  | 28,52  | 168,81  | 1,62  | 4,44  | 23,92 |
| FCHEM<br>n=31   | x         | 21,42 | 211,23 | 1000,81 | 18,82 | 24,06 | 57,29 |
|                 | s         | 7,15  | 24,97  | 195,47  | 2,30  | 4,77  | 19,47 |
| FMATH<br>n=36   | x         | 25,36 | 228,39 | 941,67  | 18,59 | 26,14 | 59,31 |
|                 | s         | 7,29  | 19,43  | 143,10  | 1,44  | 3,15  | 15,67 |
| FLAW<br>n=27    | x         | 23,89 | 224,98 | 1080,00 | 18,29 | 27,52 | 67,41 |
|                 | s         | 7,87  | 23,06  | 178,03  | 1,37  | 4,28  | 20,50 |
| FNSCI<br>n=32   | x         | 21,98 | 217,97 | 923,91  | 19,06 | 23,84 | 64,22 |
|                 | s         | 7,73  | 25,17  | 146,03  | 2,48  | 3,65  | 18,78 |
| FECON<br>n=19   | x         | 20,58 | 222,84 | 970,00  | 18,03 | 25,68 | 50,89 |
|                 | s         | 5,92  | 25,50  | 148,51  | 1,26  | 3,65  | 22,25 |

Tab. 3 Statistical parameters of females student motor performance from selected faculties

| female                | variables | SR    | SBJ    | MT     | 10x5m | SU    | ENDUR |
|-----------------------|-----------|-------|--------|--------|-------|-------|-------|
| <b>FSPORT</b><br>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 |
| <b>FMEDC</b><br>n=39  | x         | 27,50 | 163,10 | 570,26 | 21,04 | 22,23 | 33,51 |
|                       | s         | 6,70  | 22,75  | 131,46 | 1,96  | 4,26  | 12,69 |
| <b>FCHEM</b><br>n=25  | x         | 24,82 | 155,68 | 655,00 | 21,83 | 21,64 | 32,08 |
|                       | s         | 5,72  | 23,59  | 128,99 | 2,48  | 4,30  | 13,74 |
| <b>FMATH</b><br>n=41  | x         | 28,57 | 158,56 | 581,46 | 21,87 | 21,10 | 33,44 |
|                       | s         | 6,89  | 20,72  | 105,13 | 1,28  | 3,92  | 10,58 |
| <b>FLAW</b><br>n=31   | x         | 27,03 | 170,19 | 674,68 | 20,53 | 21,55 | 37,29 |
|                       | s         | 8,29  | 21,36  | 115,53 | 1,58  | 4,33  | 14,23 |
| <b>FNSCI</b><br>n=39  | x         | 26,17 | 166,13 | 614,36 | 20,21 | 21,03 | 31,56 |
|                       | s         | 8,26  | 18,74  | 143,61 | 1,32  | 4,11  | 10,46 |
| <b>FECON</b><br>n=28  | x         | 28,93 | 166,21 | 625,54 | 20,09 | 21,11 | 35,96 |
|                       | s         | 5,55  | 19,02  | 81,20  | 1,42  | 3,47  | 20,05 |
| <b>FPEDAG</b><br>n=18 | x         | 25,97 | 162,50 | 613,33 | 20,50 | 22,22 | 33,06 |
|                       | s         | 6,90  | 13,50  | 64,90  | 1,04  | 3,42  | 10,94 |

In both tables can be seen, that students of the Faculty of Physical Education and Sport reach better level of motor performance, both in groups of boys and girls in all tests. This difference was mostly (except 1 case – SR girls) on 1% statistical significance). Practically the same results we gained, when we compared students of the Faculty of Physical Education and Sport with population norms.

Other faculties reach practically the same level of motor performance in both groups and in most tests. The comparison with population norms shows, that our boys are slightly better or worse in 5 tests (SR, SBJ, MT, 10 x 5, SU). Only in test ENDU are our boys significantly worse. Groups of our girls are mostly worse in all tests, especially in ENDU. From this can be deduced, that present university students are worse mostly in endurance ability, both boys and girls. Girls reach lower performance also in other tests. Boys keep motor performance on levels of former populations.

### **Influence of movement activities forms on motor performance**

In tables 4 and 5 are results of t-tests of statistical characteristics of our students (except FSPORT) differed by having compulsory (COMPULS) or optional (OPTIONAL) PE subject. In the group of boys we can see better motor performance in 5 tests among those who practise only optional PE subject. Results in test SR is practically the same. Differences are

significant (5%) in test of endurance shuttle run. Very similar is the situation in the groups of girls. Those who participate in optional PE have better performance in all 6 tests. Significant (5%) differences were found in 3 tests: SBJ, MT and 10 x 5. It seems, that those students who manifested interest for optional PE, have also higher level of motor performance.

Tab. 4 Differences in male motor performance in the form of compulsory or optional PE on universities

| <b>COMPULS male (n=90)</b>  | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
|-----------------------------|-----------|------------|-----------|--------------|-----------|--------------|
| <b>x</b>                    | 23,48     | 221,8      | 977,5     | 18,68        | 25,59     | 58,02        |
| <b>s</b>                    | 7,178     | 26,09      | 174,8     | 1,771        | 4,391     | 20,56        |
|                             |           |            |           |              |           |              |
| <b>OPTIONAL male (n=83)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
| <b>x</b>                    | 23,49     | 222,5      | 989,0     | 18,54        | 25,83     | 64,86        |
| <b>s</b>                    | 7,801     | 23,47      | 165,1     | 1,933        | 4,042     | 19,50        |
|                             |           |            |           |              |           |              |
| <b>t - test</b>             | 0,009     | 0,178      | 0,443     | 0,484        | 0,377     | 2,238*       |
|                             |           |            |           |              |           | p < 0,05     |

Tab. 5 Differences in male motor performance in the form of compulsory or optional PE on universities

| <b>COMPULS female (n=134)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
|-------------------------------|-----------|------------|-----------|--------------|-----------|--------------|
| <b>x</b>                      | 26,95     | 160,5      | 600,1     | 21,12        | 21,60     | 33,72        |
| <b>s</b>                      | 6,331     | 20,97      | 112,9     | 1,883        | 4,015     | 13,89        |
|                               |           |            |           |              |           |              |
| <b>OPTIONAL female (n=87)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
| <b>x</b>                      | 27,47     | 167,6      | 637,5     | 20,56        | 21,36     | 33,92        |
| <b>s</b>                      | 8,151     | 19,70      | 129,5     | 1,488        | 4,009     | 12,48        |
|                               |           |            |           |              |           |              |
| <b>t - test</b>               | 0,530     | 2,517*     | 2,269*    | 2,349*       | 0,436     | 0,110        |
|                               |           | p < 0,05   | p < 0,05  | p < 0,05     |           |              |

In tables 6 and 7 are seen differences among parameters of those who perform movement activities during their free time and those who do not perform them. Absolute majority of our students perform movement activities in their free time (boys 94,5%, girls 90,5%), that can be considered as positive. In both groups have better motor performance those, who perform movement activities (except in test SR in girls). In groups of boys differences are in 5 tests on 1% level and only in test MT are differences on 5% level. Also in groups of girls are differences significant on 1% level in 5 tests. Only test SR does not show any significant difference.

Tab. 6 Differences of motor performance in „performing or not performing“ movement activities in free time

| <b>MACT - yes male (n=325)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
|--------------------------------|-----------|------------|-----------|--------------|-----------|--------------|
| <b>x</b>                       | 28,13     | 234,2      | 1064,8    | 17,71        | 28,11     | 74,86        |
| <b>s</b>                       | 8,267     | 22,98      | 183,9     | 1,562        | 4,555     | 24,47        |
| <b>MACT - no male (n=19)</b>   |           |            |           |              |           |              |
| <b>x</b>                       | 19,58     | 209,5      | 957,4     | 19,34        | 24,74     | 53,05        |
| <b>s</b>                       | 4,653     | 26,45      | 160,3     | 2,364        | 4,080     | 23,62        |
| <b>t - test</b>                | 4,464**   | 4,521**    | 2,490*    | 4,287**      | 3,152**   | 3,782**      |
|                                | p < 0,01  | p < 0,01   | p < 0,05  | p < 0,01     | p < 0,01  | p < 0,01     |

Tab. 7 Differences of motor performance in „performing or not performing“ movement activities in free time

| <b>MACT - yes female (n=237)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
|----------------------------------|-----------|------------|-----------|--------------|-----------|--------------|
| <b>x</b>                         | 27,80     | 170,7      | 652,0     | 20,29        | 22,41     | 38,55        |
| <b>s</b>                         | 6,953     | 23,30      | 134,6     | 1,958        | 4,234     | 17,51        |
| <b>MACT - no female (n=25)</b>   |           |            |           |              |           |              |
| <b>x</b>                         | 27,36     | 151,8      | 537,0     | 21,66        | 19,92     | 28,96        |
| <b>s</b>                         | 8,011     | 18,63      | 98,6      | 1,831        | 2,900     | 9,62         |
| <b>t - test</b>                  | 0,294     | 3,930**    | 4,151**   | 3,327**      | 2,862**   | 2,694**      |
|                                  |           | p<0,01     | p<0,01    | p<0,01       | p<0,01    | p<0,01       |

In tables 8 and 9 are stated differences of parameters in dependence of performing movement activities in unpaid form. In tables can be seen that groups of students, who perform in their free time „unpaid“ movement activities, have higher level of motor performance (except test MT in group of boys), though only in two tests was reached 5% level of significance (girls – MT and SU). In both groups have majority students, who perform in their free time „unpaid“ movement activities (over 80%).

Tab. 8 Unpaid form: differences of free time movement activities performance

| <b>UPAIDF - yes male (n=274)</b> | <b>SR</b> | <b>SBJ</b> | <b>MT</b> | <b>10x5m</b> | <b>SU</b> | <b>ENDUR</b> |
|----------------------------------|-----------|------------|-----------|--------------|-----------|--------------|
| <b>x</b>                         | 28,00     | 233,3      | 1054,1    | 17,78        | 27,95     | 74,55        |
| <b>s</b>                         | 8,320     | 23,84      | 182,2     | 1,626        | 4,620     | 24,07        |
| <b>UPAIDF - no male (n=70)</b>   |           |            |           |              |           |              |
| <b>x</b>                         | 26,33     | 231,1      | 1077,2    | 17,85        | 27,83     | 70,17        |
| <b>s</b>                         | 8,337     | 23,85      | 191,7     | 1,772        | 4,501     | 27,81        |
| <b>t - test</b>                  | 1,493     | 0,684      | 0,936     | 0,309        | 0,189     | 1,314        |

Tab. 9 Unpaid form: differences of free time movement activities performance

| UPAIDF - yes female (n=215) | SR    | SBJ      | MT     | 10x5m | SU     | ENDUR |
|-----------------------------|-------|----------|--------|-------|--------|-------|
| x                           | 28,00 | 170,2    | 649,1  | 20,35 | 22,41  | 38,27 |
| s                           | 6,795 | 22,69    | 132,8  | 1,830 | 4,270  | 17,27 |
| UPAIDF - no female (n=47)   | SR    | SBJ      | MT     | 10x5m | SU     | ENDUR |
| x                           | 26,65 | 162,9    | 604,1  | 20,77 | 21,04  | 34,74 |
| s                           | 8,081 | 26,48    | 144,2  | 2,570 | 3,605  | 16,36 |
| <b>t - test</b>             | 1,189 | 1,936(*) | 2,067* | 1,308 | 2,047* | 1,279 |
|                             |       | p<0,10   | p<0,05 |       | p<0,05 |       |

In tables 10 and 11 are stated differences of parameters in dependence of performing movement activities in paid form during free time. In the group of boys can be seen, that in all tests have higher level of motor performance those, who use paid movement activities. All differences are significant on 1% level of importance. Also the group of girls using paid forms reach higher level of motor performance in all 6 tests. Statistical significance were found in tests MT, SU (1%) and SBJ, ENDUR (5%). Among boys are prevailing those, who use paid activities (65%). On the contrary among girls only 41% are using these form of activities.

Tab. 10 Paid form: differences of free time movement activities performance

| PAIDF -yes male (n=189) | SR       | SBJ      | MT       | 10x5m    | SU       | ENDUR    |
|-------------------------|----------|----------|----------|----------|----------|----------|
| x                       | 29,12    | 236,7    | 1092,7   | 17,49    | 29,07    | 79,16    |
| s                       | 7,955    | 22,36    | 178,5    | 1,502    | 4,415    | 24,24    |
| PAIDF - no male (n=155) | SR       | SBJ      | MT       | 10x5m    | SU       | ENDUR    |
| x                       | 25,88    | 228,2    | 1017,5   | 18,17    | 26,52    | 66,95    |
| s                       | 8,473    | 24,77    | 182,9    | 1,758    | 4,422    | 24,10    |
| <b>t - test</b>         | 3,649**  | 3,346**  | 3,845**  | 3,837**  | 5,319**  | 4,660**  |
|                         | p < 0,01 |

Tab. 11 Paid form: differences of free time movement activities performance

| PAIDF - yes female (n=108) | SR    | SBJ    | MT      | 10x5m | SU      | ENDUR  |
|----------------------------|-------|--------|---------|-------|---------|--------|
| x                          | 28,09 | 173,1  | 672,3   | 20,19 | 23,99   | 40,68  |
| s                          | 7,520 | 24,57  | 141,1   | 1,989 | 4,161   | 17,00  |
| PAIDF - no female (n=154)  | SR    | SBJ    | MT      | 10x5m | SU      | ENDUR  |
| x                          | 27,52 | 165,9  | 619,0   | 20,59 | 20,89   | 35,51  |
| s                          | 6,707 | 22,39  | 127,8   | 1,970 | 3,713   | 16,96  |
| <b>t - test</b>            | 0,639 | 2,443* | 3,181** | 1,607 | 6,329** | 2,426* |
|                            |       | p<0,05 | p<0,01  |       | p<0,01  | p<0,05 |

In tables 12 and 13 are stated differences of parameters in dependence of performing movement activities in competitive and sport clubs form during free time. Similarly like in paid form, there were found higher level of motor performance in all tests; all differences are on 1% significance level of statistical importance, both in groups of boys and girls (except SR test in group of girls: 5% significance). From the total nombre in competitive and sport clubs movement activities are 89% boys and 85% of girls from the Faculty of Physical Education and Sport.

Tab. 12 Competitive and sport clubs form: differences of motor performance level

| COMPF - yes male (n=156) | SR       | SBJ      | MT       | 10x5m    | SU       | ENDUR    |
|--------------------------|----------|----------|----------|----------|----------|----------|
| x                        | 30,86    | 241,3    | 1126,1   | 16,99    | 29,89    | 86,51    |
| s                        | 7,161    | 16,85    | 168,4    | 0,903    | 4,015    | 23,16    |
| COMPF - no male (n=188)  | SR       | SBJ      | MT       | 10x5m    | SU       | ENDUR    |
| x                        | 25,00    | 225,8    | 1003,0   | 18,47    | 26,29    | 62,99    |
| s                        | 8,328    | 26,39    | 178,3    | 1,829    | 4,400    | 20,99    |
| <b>t - test</b>          | 6,924**  | 6,330**  | 6,536**  | 9,219**  | 7,866**  | 9,868**  |
|                          | p < 0,01 |

Tab. 13 Competitive and sport clubs form: differences of motor performance level

| COMPF - yes female (n=34) | SR     | SBJ     | MT      | 10x5m   | SU      | ENDUR   |
|---------------------------|--------|---------|---------|---------|---------|---------|
| x                         | 30,24  | 194,0   | 789,3   | 18,25   | 24,26   | 59,09   |
| s                         | 4,901  | 21,27   | 133,1   | 1,500   | 3,768   | 20,87   |
| COMPF - no female (n=228) | SR     | SBJ     | MT      | 10x5m   | SU      | ENDUR   |
| x                         | 27,39  | 165,1   | 618,9   | 20,75   | 21,86   | 34,44   |
| s                         | 7,247  | 21,51   | 121,8   | 1,839   | 4,162   | 13,97   |
| <b>t - test</b>           | 2,217* | 7,302** | 7,520** | 7,562** | 3,186** | 8,925** |
|                           | p<0,05 | p<0,01  | p<0,01  | p<0,01  | p<0,01  | p<0,01  |

## Conclusions

1. There was confirmed expected higher level of motor performance of students from the Faculty of Physical Education and Sport in all tests. Other faculties reached significantly lower level of motor performance, which did not differ them mutually very much.
2. Participation in compulsory or only optional PE lessons (except FSPORT students) did not differ principally mutual level of motor performance. Students attending optional PE lessons reached slightly higher level of motor performance. This trend is more considerable in groups of girls.

3. We found statistically significant differences (except test SR) between groups, that perform additional free time movement activities comparing those who do not practise them.
4. Unpaid forms of movement activities did not differ principally level of motor performance, mainly in group of boys. Among girls there were found slight differences in favour of group that practise unpaid forms of movement activities.
5. Paid forms of movement activities differed groups significantly. Those who performed paid forms of movement activities reached unambiguously higher level of motor performance, both in groups of boys and girls.
6. Individuals, who were practising competitive movement activities reached significantly higher level of motor performance in all parameters, both in groups of boys and girls.

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