

## ORIGINAL RESEARCH PAPER

**THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND EXERCISE MOTIVATION OF THE FIRST YEAR STUDENTS FROM REZEKNE AUGSTSKOLA****Aivars Kaupužs**

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**Abstract**

*The aim of this research is to assess the physical activity (PA) and exercise motivation of the first year students from Rezeknes Augstskola. The study further explored the relationship between results of International Physical Activity Questionnaire (IPAQ) and The Behavioural Regulation in Exercise Questionnaire – BREQ-2. The initial sample of 110 students was reduced to 98 participants (26 males, 72 females). Mean age of participants – 19.4±2.2 years. Findings show that 81.5% of the respondents are "high" physical active, 17% are "moderate" and 1.5% have "low" PA level. But only one third of respondents take part in leisure time activities. Intrinsic (10.9±3.87 points) and identified (8.9±2.92 points) motivation are the main behavioural regulation in exercise contexts for students. Respondents have low a motivation (2.35±2.08 points), external (1.45±2.35 points) and introjected (3.18±2.85 points) regulation score. The obtained data shows correlation between leisure time domain of PA and intrinsic regulation (Pearson Correlation  $r=0.284$ ;  $p<0.05$ ).*

**Keywords:** *behaviour regulation, motivation, physical activity, students*

**Introduction**

The habits and the way of life obtained in period of youth may substantially affect human health, development and quality of life in the future. Young people are often considered to be healthiest population, but, as shows studies, this generation's health is at risk. Changes in the dynamic society also change the values and daily habits. Modern technologies more

and more facilitate human lives, but it also reduces the physical activity. Sufficient physical activity (PA) is an essential prerequisite for health maintenance and improvement. Physical activities strengthen the musculoskeletal system, reduce the risk of the heart and vascular diseases, arthritis and multiple cancer risks, and also have a positive impact on human mental health.

Physical activity is „any bodily movement produced by skeletal muscles that result in energy expenditure” (Caspersen, Powell, Christensen, 1985). Physical activity is closely linked to physical fitness. Physical fitness is „a set of morphological and functional characteristics of the individual, which provides the ability to carry out physical activity” (Caspersen, Powell, Christensen, 1985). According to studies, the minimum required health-enhancing PA is not less than 150 minutes of moderate intensity or 75 minutes of high-intensity activity per week (Physical Activity Guidelines for Americans, 2008). All activities of daily living, which are made with at least medium intensity and continue at least for 10 minutes without interruption, are suitable in order to maintain health. However, despite the obvious physical and mental health benefits, 49% of the Latvian population does not engage in any sport or physical activities and as the main reason they mentioned “lack of time” and “lack of necessity to be physical active” (Sporting habits of the inhabitants of the Republic of Latvia, 2007). Also, cognitive factors affect one’s perceptions that there are no benefits from moderate activity, physical activity is not enjoyable, and lack of confidence in one’s ability to be active.

Starting studies at university, young people significantly change their learning process organization and everyday activity habits change too. The approaches of organizing sport activities at the Latvian universities are different from primary education. Physical activities at the universities are mainly organized as participation in team sport trainings or attending optional sport courses. Only in some particular universities, the study course „Sport” is in the compulsory section. Therefore, clarification of students’ motivation has an essential role in their involvement in physical activities.

There are many studies that have investigated the mechanisms of motivation to be physical active (Rodgers et al., 2010). G. Sage motivation is simply defined as the direction and intensity of one’s effort (Sage, 1977). Scientific literature describes different motivation theories, which the main conclusion is that a person’s internal processes have the determinative role on the personality action.

Behavioral change theories and models try to explain the reasons of individuals' behavioral patterns. Theories and models of physical activity behavior change have both empirical and theoretical background (Tab. 1).

**Table 1**

## Theories of Physical Activity Behaviour

Belief-Attitude Theories	Competence-Based Theories	Control-Based Theories	Stage-Based Theories	Hybrid Models
<i>Theory of Planned Behaviour</i> Ajzen, I. 1985	<i>Social Cognitive Theory</i> Bandura, A 1986	<i>Self-Determination Theory</i> Deci, E. L., & Ryan, R. M 1985	<i>Trans-theoretical Model</i> Prochaska & DiClemente, 1983	<i>Social Ecology Model of Health Promotion</i> Stokols 1992  <i>Ecological Systems Theory</i> Bronfenbrenner 1979  <i>The Health Action Process Approach</i> Schwarzer 2008
<i>Health belief model</i> Irwin M. & Rosenstock I.M. 1966;	<i>Relaps prevention model</i> Marlatt, Gordon 1985			

Self-determination theory (SDT) is widely applied for examination of human motivation to different types of behavior including physical activity. Theory of self-determination is differentiating the types of motivation. The main distinction is between autonomous motivation and controlled motivation. SDT, like other behavior explanation theories, was developed in the mid-1980s of last century. The core components of theory were defined by E. Deci and R. Ryan in 1985 (Deci, Ryan, 1985). This theory is based on recognition that individual has three innate psychological need – autonomy of ego, expertise and belonging. Autonomy of personality is described as inner locus of control – it is a person who explains life events with one's peculiarities of personality and possesses perception that action is carried out at one's own choice. Competence is confidence of the ability of an individual and readiness to make effective action. As social beings, each person feels the need of belonging to one of the social groups. It means that person takes certain actions to meet the psychological needs and it can be referable to physical activity too.

Self-determination theory explains that the extents to these needs are affected by the level of person's motivation. Continuum is peculiar to expressions of action motivation and it can be described from amotivation (lack of motivation) to true inner motivation. Levels of motivation and its representative actions are presented in the Table 2.

Nowadays topical research studies, applying components of SDT, are based on an assessment of the internal and external motivation components and its interaction with physical activity determinants. In the research of N.Cacisarantis and co-authors was founded that intrinsic and introjection motivation affects the perceived competence on physical activity, but it is not sufficient condition for developing strong intentions for behavior (Chatzisarantis et al., 2003).

**Table 2**

Continuum of Motivation Factor of the Self-determination Theory

Locus of inner control	Locus of external control			
<b>True inner motivation</b>	<b>Weak external regulation</b>	<b>Strong external regulation</b>	<b>External regulation</b>	<b>Lack of motivation</b>
„I exercise because it is fun”	„I exercise because I want to look good”	„I exercise because I don’t want to feel guilt for leaving my team”	„I exercise because my parents want it”	„I think exercising is a waste of time”
Action to feel joy and comfort, incentives are not required	Action is run by internally defined values	Action is taken as an internal need, but the cause is an external effects	Action is ruled by system of penalty and an incentive	Action is not happening because there is no need to
High autonomy of activity				Low autonomy of activity

Based on SDT statements, it can be concluded that promoted inner motivation can encourage the participation in physical activities. This can be achieved by:

- reducing the need for external encouragement and controlling monitoring;
- promoting the self decision making;
- focusing attention to the own tasks and purposes;
- ensuring rational reasoning to the action;
- recording results of operations, which reflects the increase of competence.

The aim of the study was to define physical activity of first year students in Rezekne Augstskola (Rezekne Higher Education Institution) using the International Physical Activity Questionnaire (IPAQ) and compare results with The Behavioural Regulation in Exercise Questionnaire (BREQ-2) results.

It will provide the internationally comparable data and will allow evaluating students' physical habits and motivation changes during the study period.

## **Material and methods**

### *Physical activity*

To assess the level of physical activity long version of the International Physical Activity Questionnaire (IPAQ) was used. The given instrument has been validated with a criteria method in several researches and has been adapted in 12 countries (Craig et al., 2003). Questionnaire can be used with a wide range of respondents (aged from 15 to 69). The obtained results are objectively comparable between persons and other researches, including international ones. The items in IPAQ are structured to provide separate domain-specific scores for walking, moderate intensity and vigorous intensity activity within each of the leisure time PA, domestic and gardening (yard) activities, work-related PA and transport-related PA. All questions are referred to the previous 7 days. The results were presented as the estimation of energy expenditure in metabolic equivalent-minutes per week (MET-min/week). To calculate physical activity scores, only the activities lasting at least 10 minutes at the time were taken into account. Both categorical and continuous indicators of physical activity are possible to obtain from IPAQ. The following values continue to be used for the analysis of IPAQ data:

- vigorous PA - 8.0 METs;
- moderate PA - 4.0 METs;
- walking - 3.3 METs.

There are three levels of physical activity to classify results of the respondents: low, moderate and high. The algorithms for classification of the data are defined in scoring protocol (Guidelines for Data Processing and Analysis of the IPAQ 2005). The gained data can be reported as a continuous measure too. The MET-minute is computed by multiplying the MET score of an activity by the minutes performed during the week. The sitting time is an additional indicator variable of time spent in sedentary activity.

### *Behavioural regulation in exercise*

The parameters of exercising motivation were determined using The Behavioural Regulation in Exercise Questionnaire - BREQ-2 (Markland & Tobin, 2004), which questions are based on Self-determination Theory (Deci & Ryan 2000). This questionnaire was developed and supplemented by group of scientists. It was done with a goal to establish the reasons why

people decide to participate or not in physical activity. The BREQ-2 has been adapted to Latvian by the translation-back translation method. The questionnaire item pool includes 19 assertions which are divided into 5 subscales of motivation:

- amotivation - „I can't see why I should bother exercising”;
- external regulation- „I exercise because other people say I should”;
- introjected regulation – „I feel guilty when I don't exercise”;
- identified regulation - „I value the benefits of exercise”;
- intrinsic regulation - „I exercise because it's fun”.

Each item is measured on a five-point Likert-scale. Answering the assertion, a respondent has to evaluate how much he or she agrees to it (0 – not true for me; 1-2-3 – sometimes true for me; 4 – very true for me). The mean of the all subscales was calculated on a five point scale to set off the extent of each motivation type separately. The Relative Autonomy Index (RAI) was used to get information about the level of relative autonomy of person as motivation types are located on the self-determination continuum. The RAI was calculated by weighting each motivation subscale by their specific weights and summing up the weighted scores: (amotivation multiplied by -3; external regulation multiplied by -2; introjected regulation multiplied by -1; identified regulation multiplied by 2; intrinsic regulation multiplied by 3). The maximum score for the RAI is +20 and the minimum score is -24. Higher positive scores for the RAI shows the degree to which an individual is more self-determined in the regulation of his/her behaviour. Lower negative scores indicate less autonomous motivation.

#### *Participants*

The first year students of Rezekne Augstskola (RHEI) took part in research. The time for filling up the questionnaire wasn't limited. It was organized for respondents in their first sport lesson in order to find out about students physical activity before they began studying in RHEI. Totally 110 students took part in survey. Valid questionnaires for further data processing were 98 (72 women and 26 men). Average age of respondents was 19.4±2.2 years. The survey was carried out in second week of September in 2012.

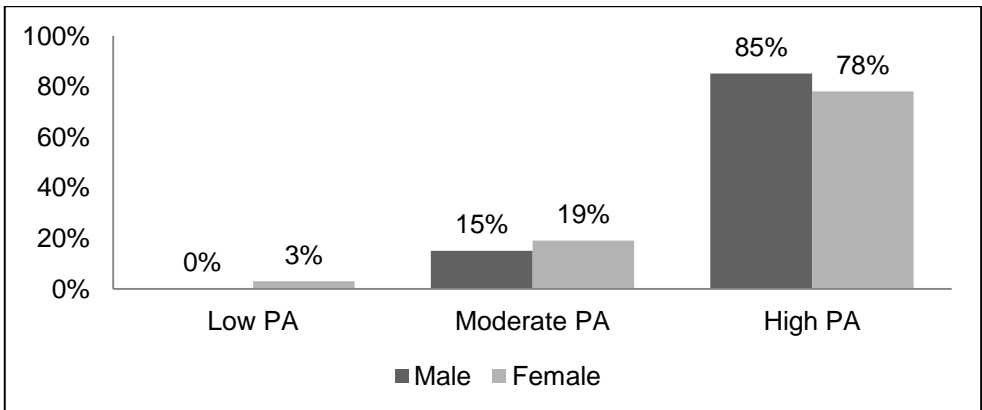
#### *Data Analysis*

Statistical analysis. The data were analyzed with SPSS version 15.0 for Windows. Standard methods: the mean, median, standard deviation (SD) and % were employed for descriptive statistics for each variable. Correlations between continuous variables were tested by the use of Pearson's correlation coefficient. The comparison of men and women results of IPAQ questionnaire shows that there are no significant differences

between groups in level of physical activity. Therefore, the data were analyzed for the whole group throughout the article.

## Results

According guidelines for the data processing and analysis of the IPAQ - high physical activity level is achieved at 3000 MET- minutes per week, moderate – at least 600 MET- minutes per week and low activity – less than 600 MET- minutes per week ([www.ipaq.ki.se](http://www.ipaq.ki.se)). In some studies it was found that self-estimated questionnaires shows the tendency to overrate the level of physical activity than it really is (Janevic, McLaughlin, Connell, 2012). The similar situation was ascertained in this research too. Twelve respondents declare the result which exceeds the 30000 MET- minutes per week. It can be compared to 12 hours of very hard physical work without interruption 5 days per week; therefore, these questionnaires were recognized as invalid and was not included in further processing of results. The distribution of physical activity based on IPAQ survey data is presented in Figure 1.



**Figure 1.** The results of the International Physical Activity Questionnaire (IPAQ)

The data show that most of respondents are quite active. 78% of women and 85% of men represented a high level of physical activity. These results exceed 3000 MET-minutes per week which is equivalent to 1 hour of walking and 1 hour of moderate intensity activity every day. Although the risk of overestimating of physical intensity has to be taken into account, however the total data indicates a trend that in this age group the physical activity level is sufficient.

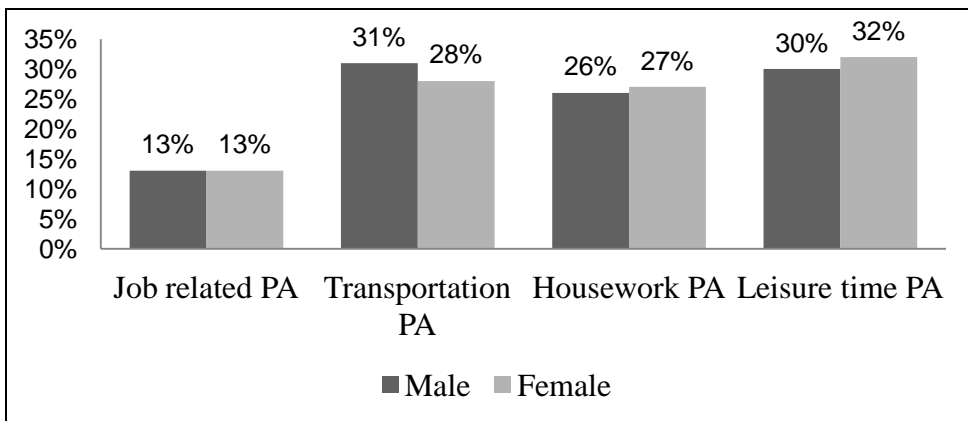
The statistical analysis of data shows that there are not significant differences of the total amount and level of physical activity between men and women ( $p>0.05$ ). The data were compared with research which was carried out in Croatia in 2009, which included the study of PA using IPAQ survey for different age range (Jurakić et al., 2009). The age group of Croatsians' that is presented in Table 3 is from 25 to 34 years. Comparing the results of total PA no statistically significant differences were found between groups ( $p>0.05$ ).

**Table 3**

The comparison of common physical activities between genders and researches

MET-minutes per week	RHEI students men	RHEI students women	Croatsians men	Croatsians women
Average	6454.5	5518.5	8186	4656
Median	5833	5824.5	4770	2712
Standard Deviation	$\pm 3078.1$	$\pm 2656.4$	-	-

The structure of the long format of the IPAQ provides more detailed analysis of PA of the respondents, and the possibility of omitting some kind of PA is reduced. Nevertheless, the higher number of questions potentially overestimates the prevalence of PA. The amount of total PA from the IPAQ long format was calculated separately in 4 domains (job related PA, transportation PA, housework PA, leisure time PA). It enables to assess how much respondents participate in leisure time physical activities which are mainly carried out with a medium or high intensity. The distribution of physical activity by domains based on IPAQ survey data is presented in Figure 2.

**Figure 2.** The distribution of physical activity by domains



It can be concluded that only 13% of respondents carry out the job related physical activity. Only approximately one third of respondents (30% men and 32% women) are active in their leisure time. Physical activities in spare time, time spending walking, working at home, for both groups of genders are distributed proportionally. There are no statistically significant difference between genders in physical activity domains ( $p>0.05$ ). The gained results indicate that it is important to take into consideration the interests of young women too and it is necessary to offer the attractive physical activities for them in university curriculum.

IPAQ questionnaire includes question about time spent sitting. This indicator variable allows assessing parameters of person's sedentary life. The research data show that before studies in university they spent sitting in average  $294\pm 130$  minutes a day. The statistically significant difference between genders was not found ( $p>0.05$ ).

## **Discussion**

Analyzing the data about exercising motivation it was founded that the self-realization and expected benefits of personality (identified and intrinsic regulation) are most essential for students. External and introjected regulations are not so important meaning for students for participation in physical activities. Only small part of students indicates that they are not motivated to participate in physical activities. The Relative Autonomy Index was  $9.08\pm 4.4$  that shows positive tendency for autonomous motives for exercising. Also in this questionnaire no statistically significant differences between genders were found ( $p>0.05$ ). Although in research done by Egli and colleagues with the student population, gained results shows that male students are more motivated by intrinsic factors (power, competition and challenges), but female students are more motivated by extrinsic motives, such as body weight control and appearance (Egli et al., 2011). The gained results were compared with data from Wilson and colleagues (Wilson et al., 2012) research that has been done in Canada with young population (161 males with mean age 18.91 years and 220 females with mean age 18.52 years). The research was provided by paper-and-pencil surveys in classes at vocational and general colleges located in central Canada. The comparisons of the main figures of the researches are presented in Table 4. There are the tendencies that Canadian you people have more autonomous motivation for exercising, but also they have more pressure from the persons who have important influence in an individual's behavior. It could be explained with bigger social, media and marketing enforcement for Canadian inhabitants to be fit and physically active than it is in Latvia. For Latvian people every day

physical activity is more common than exercising in leisure time as it shows the data from IPAQ questionnaire.

**Table 4**

The parameters of exercising motivation (BREQ-2)

Type of motivation	Maximum possible value	Average sum of subscale - RHEI (SD)	Mean of subscale-RHEI (SD)	Mean of subscale-Canada (SD)
Amotivation	16	2.35 (2.08)	0.59 (0.52)	0.21 (0.38)
External regulation	16	1.45 (2.35)	0.36 (0.58)	1.43 (0.55)
Introjected regulation	12	3.18 (2.85)	1.06 (0.95)	2.22 (0.85)
Identified regulation	16	8.9 (2.92)	2.23 (0.73)	3.02 (0.68)
Intrinsic regulation	16	10.9 (3.87)	2.73 (0.96)	3.04 (0.81)

The Pearson's correlations between the five motivation types are presented in Table 5. Internal perceived locus motivation types (identified and intrinsic regulation:  $r = 0.300$ ,  $p \leq 0.05$ ; introjected and identified regulation:  $r = 0.512$ ,  $p < 0.01$ ) were significantly related to each other. As it was expected, for respondents with low level of motivation to participate in physical activities (amotivated) intrinsic regulation is not meaningful. The negative correlations among the subscales that are more distant on the self-determination continuum (amotivation and intrinsic regulation:  $r = -0.284$ ,  $p \leq 0.05$ ) and stronger positive correlations between adjacent subscales approved the gained results as conformable to Self-determination theory statements (Tab. 5).

**Table 5**

Pearson correlations between the motivation types

Type of motivation	Amotivation	External regulation	Introjected regulation	Identified regulation
External regulation	0.271	–	–	–
Introjected regulation	-0.219	0.237	–	–
Identified regulation	-0.187	0.132	0.512**	–
Intrinsic regulation	-0.284*	-0.102	0.233	0.300*

\*  $p \leq 0.05$ ; \*\*  $p < 0.01$ ;

Although most of the studies indicate that higher levels of autonomous motivation are related to higher amounts of PA (Verloigne et al., 2011, Daley & Duda 2006) in our research the obvious data were not founded. The Relative Autonomy Index does not correlate with physical activities results of IPAQ. The positive correlation was founded only during comparing results of IPAQ domains and exercising motivation types (leisure time activities and intrinsic regulations  $r=0.284$ ,  $p \leq 0.05$ ). The correlation between total amount of the daily physical activities and exercising motivation parameters of was not found.

## **Conclusions**

The most of the student's physical activity results refer to "moderate" or "high" PA level, but there is a risk of overestimating of the total activity at this age group. Nevertheless the obtained results let conclude that most of the first year student have sufficient total physical activities level, but only one third of respondents took part in leisure time activities before studies. Respondents spent sitting at an average five hours a day before they have started the studies in university. The differences between women and men in results of physical activity survey are not statistically significant. Our findings approve the theoretical relationships between motivation types on the self-determination continuum. The main motives for students to participate in physical activities are self-realization and expected benefits for personality. The obtained results show that leisure time activities have mostly close correlation with parameters of motivation.

It is important to acknowledge potential limitations that must be considered in the interpretation of the research data. Firstly, as in other self-reported measures, the physical activity level was obtained by the questionnaire. The usage of this method might potentially overestimate the results of total physical activity. As in any questionnaire approach, the responses were dependent on respondent's recollection and how attentive the subjects may have been in their responses. Secondly, the sample was limited to first year students, thereby restricting the ability to generalize the findings to other age groups. Finally, the proportion between genders was not equal because of study peculiarities in RHEI. In future research should be investigated the physical activity with objective methods and ascertain whether the more physically active people are more autonomously motivated.

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