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Differences in Leisure Time Physical Activity Predictors in Europe

Abstract: This paper contributes to the literature by showing that discrepancies in leisure time Physical activity between transition and non-transition countries are mainly due to lower activity by persons, who are in relationship, are older, reside in rural areas and/or have a lower income. Unlike existing studies our results of logit models show that, controlling for all other variables, females are equally likely (in transition economies) or more likely (in non-transition economies) to be regularly active in their leisure time than males. We believe that the reason for differences in results is omitted variable bias, since papers that find women to be less active do not control for person's income.

Keywords: leisure time physical activity, transition, policy measures, quality of life, predictors

Introduction

Future development strategies of European countries make a firm link between the active life of the population and society's health related quality of life and competitiveness. That is why "Sport for All" is increasingly being understood as an area any responsible government should address. This concept is further proven by current international documents such as the Treaty of Lisbon which is the foundation for European Union operations. The key motivation for authorities to engender this attitude towards sport should lay in (1) wide satisfaction of the interests of individuals and groups that are unable to satisfy their own needs for various reasons, and (2) a reduction in the normally quite high costs of physical inactivity, consisting mostly of costs of medical treatment and economic costs (days of absence from work). In Great Britain, for example, it has been estimated that these costs exceed 8 billion pounds each year (COM(2005) 637).

The motivations of life, such as competition, health improvements, relaxation and pleasure, inclusion in society, and improving physical appearance lead individuals to pursue regular physical activity in their leisure time. The patterns of leisure time physical activity (hereafter LTPA) vary greatly around the world. This is due to various incentives and opportunities in cultural and social environments as well as incentives from the state, in the sense of its informational, educational, infrastructural and regulatory activities.

The differences in incentives and opportunities regarding physical activity in Europe were the biggest before the collapse of Soviet-style communism in Central and Eastern Europe. While communist regimes used sport for multiple reasons (e.g. international prestige, integration of multi-ethnic population into one state etc.), one of the main purposes of regular participation in physical exercise was to promote health and hygiene. Their approach to health and recreation (called physical culture) included measures such as therapeutic gymnastics at all workplaces (Riordan 2007). The transition of centrally planned economies to market economies among other things also abolished the so called physical culture, but that did not annihilate the differences in the leisure time physical activity of citizens of the new democracies of Eastern Europe and that seen in Western European countries. In fact, Time Use Survey data (Eurostat 2014) show that persons from western countries spend more time on activities such as walking, sport and outdoor activities than those from Central and Eastern Europe. For example, persons from Spain, Norway and Finland spend 49, 33 and 38 minutes per day in sport activities respectively, while those from Bulgaria, Lithuania and Estonia did only 22, 18 and 24 minutes respectively.

The focus of this article is a study of the key factors that predict regular physical activity, particularly in a comparison of transition (economies that used to be centrally planned) to non-transition European countries. Considering the differences in the levels of leisure time physical activity in these two regions, we assume there are also statistically significant differences between the two in the influence of social, economic and other factors on regular leisure time physical activity. The results of our study can therefore serve as a valuable expert background for policymakers wishing to enhance health and quality of life through the promotion of physical activity among the least active groups, in response to differences in the social and cultural environments of Europe.

In recent years, particularly since 2008, there have been many studies on the subject, though most have centred on individual countries or cities and on health aspects and influences of physical activity on health (Holtermann et al. 2010; Lovasi et al. 2007; Savelle et al. 2010). Our contribution is focused on the personally, socially and economically varied predictors of physical activity or the characteristics of the most vulnerable groups of citizens in the sense of regularly deficient physical activity and consequentially poor health and quality of life in general. The applied model is very wide in terms of including independent variables and different countries. Our main contribution lies in the discovery of potential differences in the influence of different factors on leisure time physical activity and a call for appropriate policies and measures to promote “Sport for All” and improve quality of life in Eastern European countries.

The main purpose of this study is therefore: (1) to reduce the deficit in quantitative evidence regarding predictors of LTPA in different European regions; and (2) to increase the possibility for the generalization and thus policy application of conclusions, through the use of a large database of individuals from 18 European countries.

To achieve that purpose, the paper is structured as follows: following this introductory section, presented is a review and synthesis of the literature, which enables

us to theoretically establish connections between variables used later in the models. The next part describes the research setting, data, summary statistics and methods. The results of the models, using a large sample of 22,711 individuals from around Europe, are presented in last section. The paper concludes with discussion and implications.

Theoretical Background

Studies of national legislations in the area of sport carried out for the Council of Europe by Chaker (1999, 2004) show that most European countries pay the sufficient level of attention to the sporting activities of their citizens and understand these activities as a key element in the state's public interest. This leads states to promote sporting activities in various manners.

According to epidemiological studies (e.g. Li et al. 2010; Heath et al. 2005; Taguchi et al. 2010) regular sporting activities have numerous important effects on quality of life, particularly in terms of health. However, the link between recreational sport and quality of life is much more complex issue. We should not overlook some social studies arguing that recreational sport may be an additional pressure for ethnic or racial minority communities' assimilation (e.g. Long & Hylton 2014; Dyck 2007). Due to time constraint, it might crowd out other activities that affect quality of life (Samdahl 2005) or it might put more pressure on individuals who have to 'work harder' in their leisure time (Gershuny 2000). With that in mind, we turn our attention to health aspect of physical activity.

Despite the increasing physical activity in EU states between 2002 and 2004 (EC 2004; Sjöström et al. 2006), the overall level of activity remains low and there are vast differences between individual states (Martinez-Gonzalez et al. 2001). Significant regional variation regarding the levels and the dynamics of social connectedness, including sport, was found by Kohli, Hank, & Künemund (2009). Van Tuyckom and Scheerder (2010a) have showed that 4 out of 10 Europeans never do any leisure time sport activities. In their subsequent study (Van Tuyckom & Scheerder 2010b), they confirmed that physical activity in Europe and its member states is subject to (1) geographical stratification and (2) social stratification. In the aforementioned study, the authors empirically proved that the least active groups in Europe are south-eastern Europeans, women, the elderly, persons with a lower level of education and people living in rural areas. The authors point out that their results concern Europe as a whole and that it would be reasonable for upcoming studies to explore the differences in influencing factors among individual states. In this way the social and cultural differences between states could be taken into consideration when preparing national programmes for the promotion of leisure time physical activities, thereby overcoming the specific national barriers to physical activity. Our study aims to fill precisely this gap in knowledge.

In order to support and fulfil the national interest—healthy and satisfied individuals and societies—it is important to direct interventions to increase physical activity

towards the least active population groups (Steffen et al. 2006). This is another reason for knowing and better understanding the factors involved in physical activity.

In recent years there have been many studies on the links between physical activity and health. Most of them have selected health as the dependent variable and their results clearly show that physical inactivity or poor physical fitness are key contributors to chronic illnesses prevalent in industrial societies (Blair et al. 1996). Only a few cases have elected to study health as an independent variable. Abdullah, Wong, Yam, & Fielding (2005), for example, have listed poor health as one of the factors of physical inactivity among Hong Kong students.

Many studies of the links between physical activity and health consider specific population groups. Their results show that the most vulnerable groups in terms of persistently low physical activity level are as follows: women, particularly girls (Dugan et al. 2009; Lloyd & Little 2010; Dollman & Lewis 2010; Blomstrand, Bjorkelund, Ariai, Lissner & Bengtsson 2009; Dunton, Schneider & Cooper 2007), lower social strata (Dagkas & Stathi 2007), the elderly (Hughes, Seymour, Campbell Whitelaw & Bazzarre 2009; Thogersen-Ntoumani 2009; Taguchi, Higaki, Inoue, Kimura & Tanaka 2010), ethnic, religious minorities and immigrants (Seo & Li 2010; Misra, Endemann, & Ayer 2005; Kandula & Lauderdale 2005; Hosper, Deutekom & Stronks 2008; Sagatun, Kolle, Anderssen, Thoresen & Sogaard 2008; Neighbors, Marquez & Marcus 2008; Benett et al. 2006), children and youths (Godin, Anderson, Lambert & Desharnais 2005; Kjonniksen, Anderssen & Wold 2009; Sanchez-Lopez et al. 2009, etc.), smokers (Kirjonen et al. 2006; Leino-Arjas, Solovieva, Riihimaki, Kirjonen & Telama 2004) and workers with the sedentary job and sedentary youth (such as Sanchez-Lopez et al. 2009; Blomstrand et al. 2009; Jurak et al. 2005).

Studies of physical activity of women have largely focused on the influence of physical activity on health. Only a handful of studies have centred on the factors affecting female physical activity. Lewis and Ridge (2005) have shown that mothers are a group with one of the lowest rate of physical activity. In the McIntyre and Rhodes study (2009), perceptions of control over time, fatigue, social support and child rearing have shown to be the key factors for distinguishing between women who have continued with physical activities throughout their passage into motherhood and those who ceased physical activity when they became mothers.

The sporting activities of youths greatly depend on the behaviour of their peers (Luszczynska, Gibbons, Piko & Tekozel 2004). Furthermore, youths are also greatly influenced by the sporting activities of their family members, particularly so with girls (Seabra, Mendonca, Goring, Thomis & Maia 2008), while boys whose parents had reported high work activity were less often physically inactive during leisure time. (Osler, Clausen, Ibsen & Jensen 2001). In accordance with the above, Shores and West (2010) states that students understand leisure time physical activity more in the sense of socializing (activities in public parks, bars, dance clubs) than in the traditional sense of exercise.

Studies of the male population are rare. Woitas-Slubowska (2008) found that low rates of leisure time physical activity of men are statistically-significantly linked to a low self-assessment of their health and poor socio-economic status (labourers,

unemployed, low income workers and low education workers). It should be noted that the influence of socio-economic position is weaker on former athletes than on men who have had no experience of competitive sport. In the latter group, a further factor in low leisure time physical activity is residing in rural areas.

Over the last two years, there have been studies in which authors have studied the influence of environmental factors, particularly in narrow geographical areas such as cities, on physical activity. They have pointed to the positive influence of accessible, orderly and safe environments, such as parks, on the frequency of physical activity (Brownson, Chiqui, Burgeson, Fisher & Ness 2010; Amorim, Azevedo & Halle 2010; Gomez et al. 2010; Huston, Evenson, Bors & Gizlice 2003; Sharpe, Granner, Hutto & Ainsworth 2004). A positive role of parks on physical activity was also discovered in the study performed by Walker et al. (2009) who found that park infrastructure satisfies the sporting activity needs of individuals who are not part of special types of organized group. In contrast, the model of Lindstrom, Moghaddassi and Merlo (2003) only attributes 5% of the variance of physical inactivity to environmental factors. Most of the influences are attributed to personal factors such as ethnicity, education and social inclusion. Similarly, Humber et al. (2006) have also established that the importance of environmental factors is not very high. Environmental factors such as proximity, costs, equipment, security are important predominantly for youths with a lower socio-economic status while social factors (friends, adult support) are important regardless of socio-economic status (Humbert et al. 2006).

Data and Summary Statistics

To test our hypothesis that there are statistically significant differences between transition and non-transition European countries in the influence of personal, social, economic and other factors on leisure time physical activity, we use two binomial logit models. The data set comes from the International Social Survey Programme—Leisure Time and Sports 2007 (ISSP). The ISSP is a continuing annual programme of cross-national collaboration on surveys covering topics important for social science research. The standard questionnaire was extended in 2007 with a module on leisure time and sport. The ISSP gives consideration to the best practice and improved standards for implementing public opinion surveys. The process of monitoring assures the quality of data and procedures. Thirty-four states from all over the world took part in the module “Leisure Time and Sports” (Scholz & Heller 2009: 9).

The sample is representative for all adult citizens of all nationalities, who are residing in private households and are over 14 years old. There are 49,729 observations in the database. The models in our research cover 18 European countries—10 non-transition countries (Austria, Belgium (Flanders), Finland, France, Germany, Ireland, Norway, Sweden, Switzerland and Great Britain) and 8 transition countries (Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Poland, Slovakia and Slovenia). The European selection contains 22,771 observations. For the purpose of our research there is sometimes a need to change the values of existing variables in ISSP data base and

create new variables. Details will be described later. Answers with codes 97 (refuse to answer), 98 (don't know), 99 (no answer) and 00 (not applicable) were recoded to missing values.

The measure of LTPA used throughout the paper is the variable *regular*. It is based on an interview question: *How often do you take part in sport, exercise, walking... in your free time?* A five point scale from *Every day* to *Never* was provided. The variable *regular* is equal to 1 if a person participates in sport every day or several times a week. Otherwise it is equal to 0. Looking only at the mean of the variable, we can see that a higher percentage of people is active in non-transition than in transition countries. A similar conclusion follows from [Figure 1](#), where a clear division between the two types of economies is observed.

Degree is a measurement of obtained education—the higher the value of degree, the higher is education (1 = no formal qualification, 2 = lowest formal qualification, 3 = above lowest formal qualification, 4 = higher secondary level completed, 5 = above higher secondary level, 6 = university degree completed.). *Employment* can be of three types—full time employment, part-time employment or other. *Health status* is measured on a five point scale ranging from 1 (poor) to 5 (excellent). The variable *social* is based on a question *Do you prefer to be alone or with other people in your free time?* Answers from *most of time alone* (assigned value is 1) to *most of time with other people* (assigned value is 4) were provided. Our data set contains four dummy variables—*female* is equal to 1 if person is a female, *urban* is equal to 1 if individual is living in urban area, *couple* is 1 for persons living with a partner (regardless of marital status) and *D* is equal to 1 if a person has a zero income. Furthermore, we use data on number of children, logarithm of income and self-reported social status (interviewees were asked to place themselves on a social ladder ranging from 10 (top) to 1 (bottom)). The biggest relative differences among transition and non-transition countries are apart from regular LTPA in income and social status. Descriptive statistics of key variables are presented in [Table 1](#).

Results

We estimated separated logit models for transition and non-transition countries. [Table 2](#) shows that age and number of children negatively affect LTPA. Females are more likely to be active in their free time than males; however the effect is not statistically significant for transition countries. It is interesting that people with no income, are more likely to be active than people who earn money. This is in line with findings made by Sayer and Gornick (2009). However, controlling for zero income, an increase in income increases the probability of being active. Similarly, social status and health status positively affect LTPA. In transition countries, people in relationship and those living in rural areas are less likely to be active in their free time. In both types of economies, the individuals with part-time or other type of employment are more likely to participate in sport than those with full time employment. Furthermore, there is an indication of the positive effect of education on LTPA. And lastly, persons

Table 1

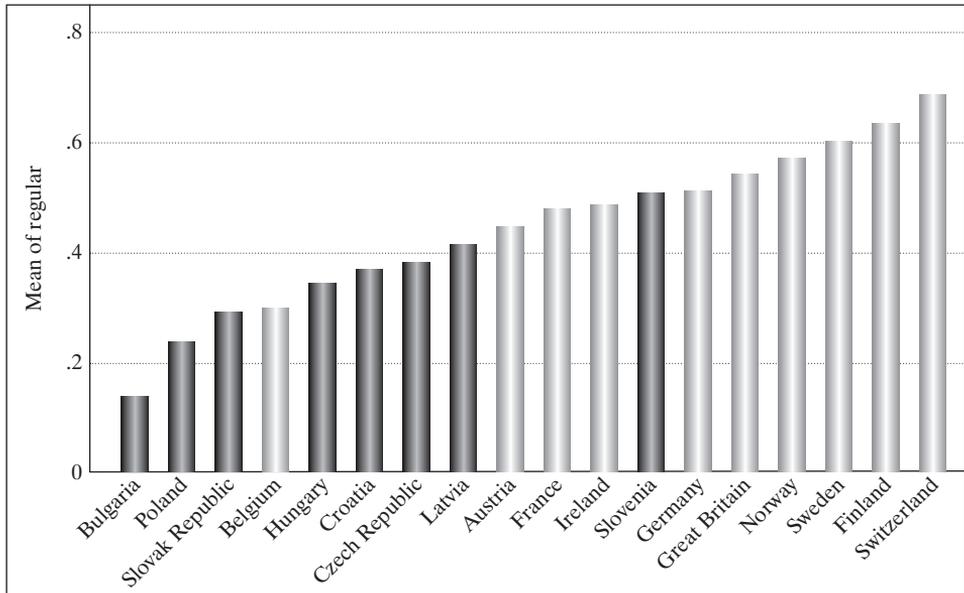
Descriptive statistics for transition and non-transition countries

Variable	All			Transition			Non-transition		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Regular	22531	0.448	0.497	8889	0.335	0.472	13642	0.521	0.500
Age	22750	47.711	17.321	8937	47.129	17.475	13813	48.088	17.211
Degree	22537	2.743	1.366	8921	2.693	1.244	13616	2.775	1.439
Employment	22618	1.929	0.921	8938	1.979	0.958	13680	1.897	0.894
Female	22771	0.549	0.498	8952	0.558	0.497	13819	0.543	0.498
Health status	22602	3.206	1.076	8908	3.055	1.121	13694	3.305	1.034
Social	21754	2.867	0.880	8721	2.903	0.889	13033	2.842	0.873
No. children	22280	0.582	0.961	8878	0.543	0.899	13402	0.607	0.999
Urban	21666	0.607	0.488	7911	0.622	0.485	13755	0.598	0.490
Social status	18688	5.492	1.752	6402	4.927	1.779	12286	5.786	1.664
Couple	21305	0.654	0.476	7905	0.617	0.486	13400	0.675	0.468
log(income)	18893	5.999	2.620	7135	5.099	2.583	11758	6.545	2.489
D	18893	0.146	0.353	7135	0.193	0.395	11758	0.118	0.322

Source: ISSP.

Graph 1

The percentage of people regularly participating in LTPA by country



Source: ISSP.

in non-transition economies with a more sociable personality tend to be more active in their leisure time.

Since we employ a logit model we cannot simply test for the equality of coefficients of transition and non-transition countries. Allison (1999) first pointed out that the

difference in estimated coefficients might be due to the different residual variation across groups. To overcome this problem, we employ an approach proposed by Long (2009). Instead of comparing coefficients we compare predicted probabilities between groups, as these are not affected by group differences in residual variation. The z -statistic to test the equality of predicted probabilities is:

$$z = \frac{\pi(x_1^*)^{transition} - \pi(x_2^*)^{non-transition}}{\sqrt{Var[\pi(x_1^*)^{transition} - \pi(x_2^*)^{non-transition}]}}$$

where $\pi(x_i)$ is predicted probability at values x of the independent variables for group i . The test statistics has an asymptotic normal distribution.

Table 2

Logit models predicting regular LTPA for transition and non-transition countries

Variable	Transition		Non-transition	
	β	se	β	se
Female	0.007	(0.069)	0.155***	(0.046)
Age	-0.025***	(0.003)	-0.007***	(0.002)
No. children	-0.069*	(0.041)	-0.048**	(0.024)
Urban	0.433***	(0.070)	0.047	(0.044)
Couple	-0.249***	(0.074)	-0.045	(0.049)
log(income)	0.628***	(0.060)	0.201***	(0.041)
Employment				
Part time	0.626***	(0.137)	0.474***	(0.068)
Other	0.958***	(0.105)	0.613***	(0.064)
Social				
More alone	-0.065	(0.139)	0.182**	(0.091)
More with others	-0.133	(0.129)	0.275***	(0.088)
Most with others	0.126	(0.134)	0.146	(0.093)
Degree				
Lowest formal	0.169	(0.296)	0.157	(0.180)
Above lowest	0.122	(0.295)	0.268	(0.177)
Higher secondary	0.359	(0.293)	0.082	(0.180)
Above higher secondary	0.344	(0.301)	0.330*	(0.182)
University	0.656**	(0.306)	0.597***	(0.185)
Social status	0.112***	(0.021)	0.048***	(0.014)
Health status				
Fair	0.482***	(0.156)	0.412***	(0.128)
Good	0.463***	(0.155)	0.672***	(0.123)
Very good	0.405**	(0.164)	1.002***	(0.127)
Excellent	0.394**	(0.181)	1.084***	(0.135)
D	3.140***	(0.366)	1.205***	(0.294)
Constant	-5.272***	(0.526)	-2.929***	(0.347)
Observations	4,958		9,395	

* p-value < 0.1

** p-value < 0.05

*** p-value < 0.01

Source: ISSP.

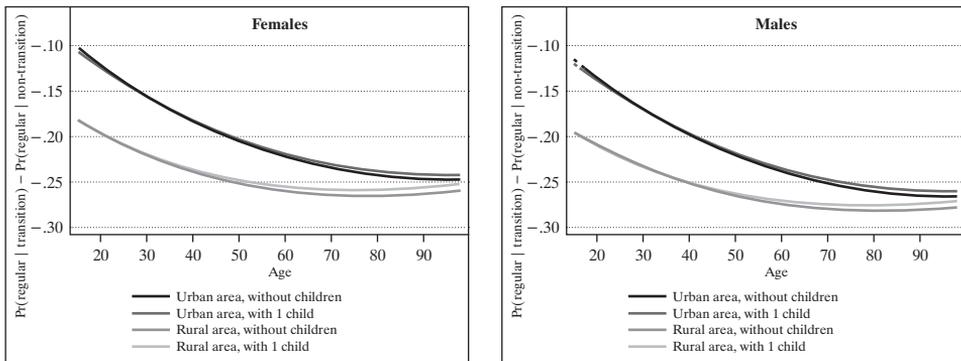
Based on the estimates from Table 2, the predicted probability of regular LTPA for transition countries with values of all variables set to group mean is 0.298 and

for non-transition countries it is 0.512, a difference of -0.214 which is significantly different from zero ($z = -24.092$). This implies that there are significant differences in LTPA between two types of economies. But a more informative approach is to look at differences in predicted probabilities at specific values of certain variables.

Graphs below show the differences between two types of economies in the probability of regular LTPA. Due to limited space only the variables of greater interest and/or the ones in which the differences are the highest are presented here. If the difference in probability is significant, the line is solid, otherwise it is dashed. All three double graphs show, that the differences increase with age. Graph 2 shows that the difference in probability of regular LTPA between transition and non-transition economies is larger for persons living in rural areas than for those in urban areas. It is also greater for females than males. The differences are quiet similar for those with and without children. However, the difference is much greater for persons that are in a relationship than for singles (see Graph 3). It is interesting that while the difference between transition and non-transition economies in the probability of LTPA is around -0.1 for females in their twenties that are living in an urban area and are in a relationship, the difference in probabilities is not significant for their single counterparts. The difference between the two types of economies is also not significant for single males under the age of thirty and males in relationship who are under twenty years old, all living in urban area. Otherwise, the probability of being regularly physically active in leisure time is substantially higher for non-transition than for transition countries. Another important factor affecting LTPA is income. Graph 4 displays the differences in LTPA for males and females at the 25th, 50th and 75th percentile of income. It indicates that the lower the income, the higher and more significant the difference between transition and non-transition economies.

Graph 2

Differences between transition and non-transition economies in the probability of regular LTPA by the number of children, gender and living area

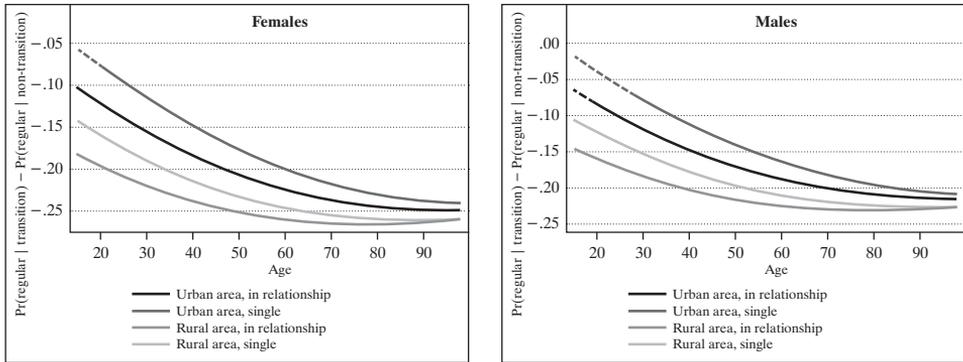


Note: Values of all other variables are set to their mean.

Source: ISSP.

Graph 3

Differences between transition and non-transition economies in the probability of regular LTPA by marital status, gender and living area

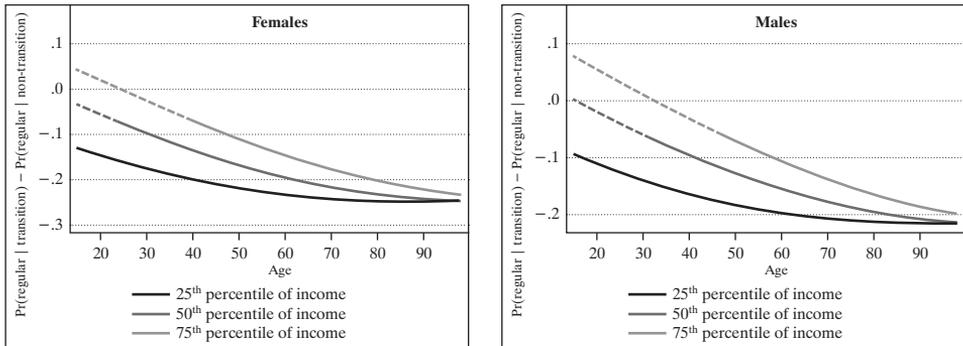


Note: Values of all other variables are set to their mean.

Source: ISSP.

Graph 4

Differences between transition and non-transition economies in the probability of regular LTPA by gender and income



Note: Values of all other variables are set to their mean.

Source: ISSP.

Discussion and conclusion

The objective of the research was to develop a model predicting regular LTPA for transition and non-transition countries. This enables us to obtain new results regarding predictors of LTPA that can potentially differ between transition and non-transition countries and suggest to follow regionally specific policy. A review and synthesis of the literature from the fields of sport and quality of life uncovered the following factors, which were included in the model: sex, age, number of children, living in urban/rural

area, living with a partner or not, income, employment status, self-reported social status, education, health status and sociability.

Unlike existing studies our results show that, controlling for all other variables, females are equally likely (in transition economies) or more likely (in non-transition economies) to be regularly active in their leisure time than males. The reason for discrepancies between our and existing results could be the absence of income as a controlling variable in papers that find women to be less active (e.g. [Van Tuyckom & Scheerder 2010a](#) and [2010b](#)). It is well established that women earn less than men, and we find that income has a positive effect on regular LTPA, thus results omitting income are downward biased.

The result that education, social status, health status and income increase the probability of regular LTPA is not surprising. The more unexpected is a result that persons with zero income exhibit a higher likelihood of being physically active than those with positive earnings. A possible explanation is that these are persons that are supported by others, e.g. students, who have more possibilities and more time for LTPA. However, based on the data at hand, we cannot provide a definite explanation. Furthermore, in line with existing studies (e.g. [Van Tuyckom and Scheerder 2010b](#); [Woitak-Slubowska 2008](#)) we find a negative effect on leisure time physical activity of age, having children and living in rural area. But our main contribution is an analysis of differences in the effects of variables on the probability of regular LTPA between transition and non-transition countries.

We find that most of the difference in regular LTPA between two types of economies is due to the dissimilarities in impact of age, residing in urban areas, living with a partner and logarithm of income. The difference increases with age, the fact that a person lives in rural area and/or in a relationship and decreases with the increase in income.

We believe that there are two major reasons for these differences. The first reason might be the policy on sport and recreation in transition countries, which is traditionally oriented mostly towards youth and their achievements in professional sport. On one hand, this policy has brought Central and Eastern European countries many successful athletes, with their top performances affirming the national self-image. But on the other hand, programmes and financing for “Sport for All” as a quality-of-life component has been neglected for many years. Thus non-competitive sport such as recreation for fun and recreation for health, have not been sufficiently promoted in media, in policy, and in society as a whole. The second reason might be over-priced or insufficient infrastructure, especially in rural areas. This is implied by the differences in the effect of income and residing in rural area between two types of economies.

Research results indicate that the policy focus in transition countries has to be switched from professional sport to the public interest of a healthy and satisfied society. Concrete measures have to be oriented towards the most deprived groups (adults, couples, people with lower income and those residing in rural areas) in the sense of regular physical activity. To promote recreation for health and relaxation in transition countries it is necessarily to strengthen mutual cooperation in the field of sport with other governmental fields such as health, education and tourism, including

the civil and social sport spheres and the local political level. Creating complete programmes of sporting activities and arranging public-private partnership measures as a model for enhancing the sport participation of the most deprived groups, is an important element of quality-of-life-oriented sport policy. International openness and its positive influences can also contribute to readiness to change. An example of its effect is observed in Slovenia, which is an exception among transition countries, which in general have still not surpassed a narrower understanding of sport policy and have not fully comprehended the health related quality-of-life dimension of sport. Over the last decade people in Slovenia have changed their sporting behaviour substantially and sport has also become of value for the middle-aged generation. As changes have not been perceived in general policy orientation, we assume that this is due to the international openness.

As with any research, several limitations should be noted. First, although the research includes a large data set from all over the Europe, the data is four or five years old. This is enough time for changes to occur in society. It is thus possible that the results of the research reflect a state that has since improved. It would therefore be appropriate to conduct similar research when new data is available. Second, it would make sense to upgrade the study with assessments of the cost effectiveness of measures to increase leisure time physical activity, and their comparison with the costs of physical inactivity. Third, although the theory suggested hypothesized causal directions, the sectional nature of this study cannot prove causation, especially for variables such as health and sociability, but can only support a set of hypothesized paths (Kline 2005: 99). Therefore, we cannot eliminate the possibility of reverse causality. As Kline (2005: 109) noted, to eliminate the possibility of reverse causality, longitudinal research is needed to determine the direction of causality of the relationships and to detect possible reciprocal causation.

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