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Urban and rural adolescents' behavioral regulation in exercise according to body weight status

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Abstract

The purpose of this study was to examine urban and rural adolescents' behavioral regulation in exercise according to their body weight status. The sample size consisted of 513 adolescents (51.5% males, 48.5% females) aged 15-18 (M = 16.49, SD = 1.11) years old and living in urban and rural areas in Turkey. The Turkish Version of Behavioral Regulation in Exercise Questionnaires-2 was used as a measurement tool for the study. The study demonstrated a significant difference in the sub-domain of amotivation toward exercise between urban and rural groups ($p < .05$). However, the mean scores of external, intrinsic and introjected sub-domains and the relative autonomy index were not significantly different ($p > .05$). Our results indicated that urban adolescents were less motivated to do exercise than rural adolescents. Obese adolescents living in rural areas had higher amotivation to exercise than normal weight ones.

Keywords: Exercise; behavioral regulation; body weight status, relative autonomy

INTRODUCTION

Many communities are experiencing rapid modernization with dramatic lifestyle changes for residents. Modernization has both biological and social effects on people (McMichael, 2016). Several researchers have suggested that various social and environmental factors inherent in the process of modernization may play a causative role in the development of cardiovascular and metabolic disease such as diabetes mellitus, hypertension and coronary heart disease (Lintowska et al., 2017; Salıcı et al., 2017). Scientists have also revealed the magnitude and seriousness of the problem, showing increasing rural/urban trends in the prevalence of cardiovascular, metabolic disease and obesity (Legetic et al., 2016; Taylor et al., 1992). Regular physical exercise regularly is clearly helpful for health, physical and psychological wellness. On the other hand, physical inactivity can have serious implications for people's health such as; cardiovascular diseases, diabetes, and obesity, and increase the risks of colon cancer, high blood pressure, osteoporosis, lipid disorders, depression and anxiety (WHO, 2010). Regular exercise is a significant component of obesity treatment and successful weight management, but low participation rates are quite evident in many modern industrialized countries (Cavill et al., 2006; Waters et al., 2014). Previous studies have indicated that many people lack sufficient motivation to participate in the regular exercise (CDC, 2007; Sisson and Katmarzyk, 2008). Considering these low participation ratios, it is important to know why some people engage in exercise whilst others remain less active.

Self-Determination Theory is beneficial for better comprehending the "why" of motivated behavior (Deci and Ryan, 2000). It is the most well-known theory of motivation that examining the impacts of different types of motivation on human behavior (Ryan and Deci, 2000). This theory has been commonly studied in sport science (Teixeira et al., 2012). According to self-determination theory, human behavior can be regulated by amotivation, external, introjected, identified, integrated, and intrinsic regulation (Deci et al., 1991). These six forms of behavioral regulation are allocated along a self-determination process from non-self-determined to high self-determination. *Amotivation* is related to having no intention to engage in a behavior. *External regulation* refers to engaging in a behavior only in order to meet external expectations or requirements (e.g., punishments, rewards). *Introjected regulation* refers to a behavior enacted in order to enhance self-esteem or to avoid guilty feelings. *Identified regulation* is considered to a volitional behavior enacted in order to obtain personally valuable outcomes. *Introjected regulation* is considered an assimilation of identified regulation and individuals act completely congruent with aspects of one's self and values. *Instrinsic regulation* is considered that a person engages in the behaviour to participating in an activity for the feelings of fun and satisfaction (Markland and Ingledew, 2007). Introjected, identified and intrinsic regulation have positively influenced the exercise behaviour in adolescents, whereas AM has negatively influenced their exercise behaviour (Markland and Ingledew, 2007). Behavioral Regulation in Exercise Questionnaire (BREQ) has been advanced to measure self-determined motivation in the matter of sport, exercise, and physical education (Deci and Ryan, 2000). In recent years, many researches have been investigated to determine the effects of different types of motivation on health, physical activity and exercise psychology (Daley and Duda, 2006; Gillison et al., 2006; Hassel et al., 2015; Sparud-Lundin and Andersson, 2015; Ersöz et al.,2016).

Overweight and obesity in childhood and adolescence is an important public health issue because of its rapidly increasing prevalence and associated adverse medical and social consequences (Fowler-Brown and Kahwati, 2004). World Health Organization (WHO) and other international organizations

reported that the increasing physical inactivity and sedentary lifestyle is a primary cause of cardiovascular diseases, diabetes, and obesity. These organizations seek to encourage all the people to participate in physical activity and exercise (Biswas et al., 2015; Fine, 2014; WHO, 2010). Participation in regular physical activity and exercise includes a complex interaction between psychological, biological, social, and environmental factors (Bryant et al., 2014). Motivation is an important factor in the decision to participation in physical activity and exercise and taking concrete steps to becoming more physically active (Teixeira et al., 2012). Body weight status (BWS) among adults is one of the most influential factors on exercise motivation. Many scientific studies reported significant associations with body weight status influences on adults' exercise behavior and motivation (Lahti-Koski et al., 2002; Dumith et al., 2007; Ersöz et al., 2016) However, a few researcher studied adolescents' exercise behavior related to body weight status (Gillison et al., 2006; Markland and Ingledew, 2007; Voelker et al., 2015). In order to increase the participation rate in exercise, it is important to have a better understanding of the factors impacting an individual's motivation and behavioral regulation to engage in exercise (Roberts et al., 2007). In this context, the body weight status, urban and rural lifestyle are the important factors that affected human psychology and behavior (Ilesanmi et al., 2010; Markland and Ingledew, 2007). These factors may also affect the individuals' exercise motivation and behavioral regulation. Therefore, the aim of this study was to examine urban and rural adolescents' exercise behavioral regulation according to their body weight status (BWS). We hypothesized that: (H1) There would be differences in the behavioral regulation in exercise between urban and rural adolescents. (H2) There would be differences in behavioral regulation in exercise according to the urban and rural adolescents' BWS. To test our hypothesis, we compared the behavioral regulation in exercise in the adolescents.

METHODS

Procedure

This study was carried out in 2013-2014 in metropolitan cities (Ankara, İstanbul, and İzmir) and rural districts around Kars, Kilis, and Malatya in Turkey. Permission to conduct the study was obtained from relevant authorities. The participants voluntarily consented to participate in the study. Adolescents in our study reported living in the same area (urban/rural) in Turkey for the last 10 years. Written informed consent was obtained from each parent or participant aged 18 years old. Participants were informed about the instruments. They were assured that all information obtained would be held in confidence and informed consent was obtained. The names of participants were not recorded. Questionnaire forms were distributed to participants. Participants were requested to fill in the questionnaires. The questionnaire booklet took approximately 10-15 min to complete. The participants also provided demographic information regarding their age and sex and their body weight and height were measured by research assistants. In the end, participants were thanked for their participation. The data collection lasted for about five months. This research was conducted in accordance with the 1964 Helsinki Declaration.

Participants

The study sample was composed of 513 adolescents aged 15-18 years old and living in urban or rural areas in Turkey.The disproportionate stratified random sampling method was used to determine our study sample. Our strata criterions were gender (male and female), age group (15, 16, 17 and 18 years old) and the place of residence (rural and urban). The study sample selected from metropolitan cities (İstanbul, Ankara, and İzmir) for the urban group and from villages and districts in Kars, Malatya and Kilis for the rural group. The sample size for this study was determined by using G-Power 3.1.7 demo

packet program for an expected effect size of 0.25. The sample size was found to be at least 305 people when using conventional power values of 0.05 for alpha and 0.20 for beta (a power of 0.80). Age and gender standardization for urban and rural groups were undertaken using case-weight method for adjustment of mean values with the age and gender structure of the total population. This method adjusts the variable to the overall mean age and gender in the two (or more) samples being compared. Therefore, the following statistical analyses were only performed between rural and urban groups. The number and percentage of samples can be seen in Table 1.

Table 1. Demographic characteristics as a percentage of the sample.

Variable	Group					
	Urban (n = 264)		Rural (n = 249)		Total (n = 513)	
	n	(%)	n	(%)	n	(%)
Age (Year)						
15	66	(25.0)	62	(24.9)	128	(24.9)
16	68	(25.8)	64	(25.7)	132	(25.7)
17	65	(24.6)	62	(24.9)	127	(24.8)
18	65	(24.6)	61	(24.5)	126	(24.6)
Gender						
Male	136	(51.5)	126	(50.6)	262	(51.1)
Female	128	(48.5)	123	(49.4)	251	(48.9)
Body Weight Status						
Normal weight	82	(46.3)	95	(53.7)	177	(34.5)
Owerweight	66	(46.8)	75	(53.2)	141	(27.5)
Obese	116	(59.5)	79	(40.5)	195	(38.0)

Note. Normal wieght = <85th percentile of BMI; Overweight = >85th percentile of BMI; Obese = >95th percentile of BMI (Onis et al., 2007).

A total of 513 participants were recruited. They were 262 male (51.1%) and 251 female (48.9%) from urban (n=249, 47.9%) and rural (n=264, 52.1%) areas. They were aged 15 (n=128, %24.9), 16 (n=132, %25.7), 17 (n= 127, %24.9) and 18 years old (n=126, %24.5). The mean age of the participants was 16.49±1.11 years old. Furthermore, participants' BWS were 177 (34.5%) normal weight (NW), 141 (27.4%) overweight (OW), and 195 (38.1%) obese (OB) according to BMI reference values of World Health Organization (WHO)-Multicentre Growth Reference Study (MGRS) for 5-19 ages' group children (Onis et al., 2007).

Data Collection

Anthropometry and body composition

To determine the age of the participants, "National Identity Card" information was used. Participants' ages were calculated from the date of birth on the card. Body weight and height measurements of participants were measured after an overnight fast. Measures of weight (in light clothing) and height (without shoes) were determined to the nearest 0.1 kg and 0.1 cm by "SECA, Germany" device. Body mass index (BMI) of the participants were calculated using the following formula: body mass (kg) / height^2 (m). BWS of participations were classified as a NW, OW and OB according to BMI reference values of WHO-MGRS for 5-19 ages' group children. NW is defined as a BMI below the 85th percentile, OW is defined as a BMI above 85th and below 95th percentile, OB is defined as a BMI above the 95th percentile for adolescents of the same age and sex (Onis, et al., 2007).

The Behavioral Regulation in Exercise Questionnaire- 2 (BREQ-2)

BREQ was originally developed to evaluate reasons for engaging in exercise by Mullan et al. (1997). The original BREQ contained four subscales that measured external, introjected, identified and intrinsic regulations. BREQ was followed by a revised version after the addition of an amotivation subscale (BREQ-2; Markland & Tobin, 2004). The BREQ-2 has been adapted to Turkish by the translation-back translation method (Ersöz et al., 2012). The BREQ-2 is the most commonly used measure for this purpose, and it has been demonstrated to have good factorial validity (Markland and Tobin, 2004; Hassel et al., 2015). Cronbach's α coefficients for the Markland and Tobin's study ranged from .73 and .86 for the five scales (Amotivation, external, introjected, identified and intrinsic regulation). Moreover, Ersöz et al. (2012) reported that the alphas ranged from .67-.81 for the four scales (Amotivation, external, introjected and intrinsic regulation) in Turkey. Similarly, past research have provided support for the validity and reliability of the BREQ-2 in different societies (Wilson et al., 2004; Daley and Duda, 2006). The questionnaire uses a 5-point likert scale rating, ranging from 0 (not true for me) to 4 (very true for me) on four dimensions: Amotivated domain (AM), 4 items: e.g., *"I can't see why I should bother exercising;"* External regulation (ER) domain, 4 items: e.g., *"I feel under pressure from my friends/family to exercise;"* Introjected regulation (INR) domain, 4 items: e.g., *"I feel like a failure when I haven't exercised in a while"* Intrinsic regulation (IR) domain; 7 items: e.g., *"I find exercise a pleasurable activity."* The Relative Autonomy Index (RAI) was used to get information about the level of relative autonomy of participants' motivation types on the self-determination continuum. An overall RAI was calculated using the weighted subscale procedure developed by Mullan et al. (1997): [(AM* -2) + (ER* -1) + (INR* +1) + (IR* +2)]. The minimum score for the RAI is –48 [RAI_{min} = (-32) + (-16)+0+0] and the maximum score is 72 [RAI_{max} = 0+0+16+56] Higher positive scores for the RAI indicate more autonomous motivation whereas lower negative scores indicate less autonomous motivation.

Statistical analysis

Data analysis was performed with the SPSS (SPSS Inc., Chicago, IL, USA) trial version 17.0 statistical package. Results were presented as mean (M) and standard deviations (SD) "*Skewness and Kurtosis"* scores, visual explanations of histogram plots and *"Kolmogorow Smirnov"* tests within normality analysis were used to determine that data was acceptable with regard to homogeneity. As variances showed a normal distribution,*"Independent-samples t-test and One-Way ANOVA"* were used to determine whether the participants' answers varied according to independent variables. A Least Significant Difference (*LSD)* test was used to define the differences between the groups. The significance level was set at 5% for all inferential statistics.

RESULTS

An independent-samples t-test was conducted to compare the all sub-domanin and RAI scores for urban and rural adolescents. The results of analyses were presented in Table 2.

Table 2. Comparison of sub-domains and RAI scores for urban and rural adolescents.

	Group					
	Urban (n= 264)	Rural (n= 249)	95% CI for Mean Difference	t(511)	*p*	*Cohen's d*
	M (SD)	M (SD)				
AM	3.96 (1.80)	3.46 (1.17)	[0.16, 3.21]	2.21	.03*	0.33
ER	5.08 (1.16)	5.22 (1.35)	[-0.67, 0.73]	0.08	.93	-0.11
INR	6.89 (2.09)	6.74 (2.11)	[-1.00, 0.76]	0.27	.79	0.07
IR	19.30 (4.37)	19.58 (3.91)	[-0.82, 4.50]	1.36	.18	-0.07
RAI	32.92 (11.60)	33.78 (12.75)	[-0.60, 7.46]	1.67	.09	-0.07

*Note. * = p < .05, AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.*

Results of the t-test show that there were significant differences on the AM sub-domain (t (513) = 2.21, p = .03, 95% CI [0.016, 3.21], d = 0.33) between urban and rural groups. AM scores of the urban group (M = 3.96, SD = 1.80) were significantly higher than the rural group (M = 3.46, SD = 1.17). However, the scores on ER, INR and IR sub-domains and the RAI were not significantly different between the two groups (p > .05).

Table 3. ANOVA and Post Hoc (LSD) comparison for sub-domains and rai scores of urban group according to BWS groups.

	Urban Group						
	NW (n= 82)	OW (n= 66)	OB (n= 116)				
Variable	M (SD)	M (SD)	M (SD)	F(2, 261)	*p*	η^2	LSD
AM	3.11 (1.45)	3.58 (1.45)	4.27 (2.13)	1.15	.22	.016	N/A
ER	4.88 (0.33)	5.15 (0.55)	5.18 (0.58)	0.12	.89	.001	N/A
INR	6.38 (0.28)	7.08 (0.35)	7.14 (0.46)	0.55	.58	.006	N/A
IR	20.31 (0.41)	19.06 (0.41)	18.72 (0.40)	1.10	.39	.010	N/A
RAI	35.89 (9.66)	32.88 (10.91)	30.84 (12.47)	1.13	.33	.012	N/A

Note. N/A= Not applicable. AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.

The one-way ANOVA analysis for the BWS groups of urban adolescents in Table 3 showed that there were no significant mean score differences between the BWS groups on subdomains of AM, ER, INR, IR, and RAI ($p > .05$).

Table 4. ANOVA and Post Hoc (LSD) comparison for sub-domains and rai scores of rural group according to BWS groups.

	Rural Group						
	NW (n= 95)	OW (n= 75)	OB (n= 79)				
Variable	M (SD)	M (SD)	M (SD)	F(2, 246)	*p*	η^2	LSD
AM	2.47 (0.93)	3.71 (0.93)	4.27 (2.13)	4.37	.01	.056	NW<OB
ER	4.91 (1.21)	5.15 (0.55)	5.18 (0.58)	0.75	.47	.010	N/A
INR	6.87 (2.17)	7.08 (0.35)	7.14 (0.46)	0.25	.78	.003	N/A
IR	20.60 (3.97)	19.06 (0.41)	18.72 (0.40)	1.63	.20	.021	N/A
RAI	38.20 (12.04)	33.54 (13.96)	28.68 (12.01)	2.59	.08	.034	N/A

Note. N/A= Not applicable. AM: Amotivation, ER: External regulation, INR: Introjected regulation, IR: Intrinsic regulation, RAI: Relative autonmy index.

The Anova analyses for the rural BWS groups in Table 4 showed statistically significant group differences on mean AM scores [$F(2, 246) = 4.37$, $p = .14$, $\eta^2 = .056$]. However, rural BWS groups did not differ significantly in terms of ER, INR, IR and RAI scores ($p > .05$). Post Hoc (LSD) analysis showed that the mean AM score of the OB group ($M = 4.41$, $SD = 1.41$) was significantly higher than for the NW participants ($M = 2.47$, $SD = 0.93$).

DISCUSSION

The purpose of the present study was to examine the exercise behavioral regulation in 513 adolescents living in urban and rural areas in Turkey. This research offers revelations in order to better understand the factors that influence behavioral regulation in exercise among urban and rural adolescents with different BWS. We found a significant difference with a moderate effect size between urban and rural groups in the mean Amotivation scores, while other sub-domains scale scores (external, introjected and intrinsic) and relative autonomy index scores were similar between the two groups. It appears from these results that urban participants' exercise amotivation are higher than rural ones, meaning that urban participants were less inclined to exercise. Our findings are consistent with reports by some investigators (Booth et al., 2006; Hume et al., 2012; Legetic et al., 2016; Lopez and Haynes, 2006). Because behavioral regulation in exercise is closely linked to physical fitness and lifestyle, these results for the urban group may be explained by environmental conditions and more sedentary behaviors (e.g., from excessive television watching and video game playing) (Legetic et al., 2016). Lopez and Haynes (2006) reported that urban environmental exposure during childhood was associated with decreased physical activity. This study is consistent with previous studies that reported more positive perceptions among rural people toward physical activity and exercise relative to urban people (Booth et al., 2006; Hume et al., 2012). Urbanization is one of the megatrends that are influential determinants of health in many communities. As urban populations grow, urban poor populations increase concurrently. The poorest residents of cities adopt unhealthy lifestyles but do not have access to health and sport services (Legetic et al., 2016). Recent researches have also revealed a rapid increase in chronic diseases and their associated risk factors in urban regions (Escobedo et al., 2009). For these reasons, there is a need to emphasize the importance of healthy behaviors and the health benefits of regular exercise in order to help decrease AM among urban adolescents. According to self-determination theory, amotivation should be tied to the most negative motivational

consequences (Daley and Duda, 2006). In this regard, our results indicated that urban adolescents were less motivated to do exercise when compared with the rural adolescents. As a result, our study demonstrated a difference in behavioral regulation to exercise between the urban and rural adolescents.

Our results revealed that amotivation scores were significantly different between normal weight and obese adolescents living in rural areas. However, no statistically significant difference among body weight status groups was detected in the other types of subdomain and relative autonomy index in both urban and rural adolescents. Amotivation among rural obese participants was significantly higher in comparison with the rural normal weight group. These findings were similar to results of previous studies in normal weight and obese adults (Gillison et al., 2006; Markland and Ingledew, 2007). Markland and Ingledew (2007) reported that amotivation was negatively associated with sports participation among obese adolescents. Previous studies showed that obese individuals were less engaged in sport and exercise than normal weight counterparts (Davis et al., 2006; Deforche et al., 2009). These results are in accordance with our findings that obese participants who living in rural areas were more amotivated than the rural normal weight group. Ingledew et al., (1995) reported that there was a bidirectional relationship between relative autonomy index and body mass index.

Limitations

While we believe these findings contribute meaningfully to the adolescent exercise or physical activity literature, there are limitations surrounding our research. First, as in other survey-based research, our findings may be influenced by recall error and social desirability motivations of respondents. Second, the sample was limited to participants aged 15-18 years old, thereby restricting our ability to generalize the findings outside this age range. Third, while BMI is widely used and considered to be one of the best ways to assess body composition, it is not necessarily the best method for all people. Future researches should examine the behavior regulation of subjects from different age groups in other regions.

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