



## PHYSICAL SELF-CONCEPT OF NORMAL-WEIGHT AND OVERWEIGHT ADOLESCENTS: GENDER SPECIFICITIES\*

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*Abstract.* Previous researchers have described the relation between physical self-concept and body mass in adolescents, but those relationships have not been clearly specified by gender. The purpose of this study is to explore physical self-concepts of normal-weight and overweight Serbian adolescents with respect to gender. The sample consisted of 417 primary school students (229 boys and 188 girls) with the average age 13.6 (SD=0.73) years who were divided into normal-weight and overweight groups according to body mass index. To assess the multidimensional physical self-concept, Physical Self-Description Questionnaire (PSDQ) was administered. Results showed that overweight adolescents had significantly lower scores than normal-weight on all PSDQ scales except Health and Strength. Differences were greater among girls than boys. Discriminant analysis showed that the scales Body Fat, Endurance and Sports Competence best differentiated normal-weight boys from other students. Also, discriminant analysis showed that, besides the scale Body Fat, scales Flexibility, Self-Esteem, and Coordination best differentiated normal-weight girls from other students. Results indicate that for better understanding of the relationship between adolescent's physical self-concept and body mass one must take gender into account. Results are potentially valuable for preventing overweight through physical education.

*Key words:* physical self-concept, overweight, adolescents, healthy lifestyle, physical education.

### *Introduction*

In recent years, the problem of overweight and obesity in children and adolescents has become increasingly prevalent worldwide and now represents one of our most significant public health challenges (Anderson & Butcher,

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2006; Wang & Lobstein, 2006; Li & Hooker, 2010). Results of research conducted on the representative sample of Serbian adolescents show that 19% of youth is overweight, which indicates the presence of this health problem in Serbia (Nedeljković, 2006). Authors agree that besides genetics, among the most significant factors responsible for overweight and obesity in children and adolescents are inadequate “energy balance” (i.e. energy intake – more “empty calories” and energy expenditure – insufficient level of physical activity) (Anderson & Butcher, 2006; Li & Hooker, 2010). Overweight and obesity during childhood and adolescence lead to a variety of clinical health problems (e.g. type 2 diabetes and a variety of risk factors for cardiovascular disease) (Fagot-Campagna *et al.*, 2001; Sinha *et al.*, 2002). Moreover, research has shown that overweight and obese youth are more likely to become obese adults (Whitaker *et al.*, 1997; Anderson & Butcher, 2006). Also of great concern are the negative social and psychological ramifications of childhood obesity and overweight, including being less liked by one’s peers (O’Dea & Abraham, 1999; Strauss, 2000) or being rejected by them (Goldfield & Chrisler, 1995) and being the victim of various forms of peer aggression (Janssen *et al.*, 2004). Numerous studies strongly support the idea that sport and physical exercise will benefit adolescents who face challenges such as health problems, delinquency, and addictions (Pate *et al.*, 2000). For overweight children and adolescents, research indicates that participating in sport may reduce their weight (Li & Hooker, 2010). However, overweight and obese adolescents show lower sport participation and have a less positive attitude towards physical activity compared to normal-weight adolescents (Deforche *et al.*, 2006).

When discussing the development of active and healthy lifestyle of youth, authors stress the importance of psychological factors (US Department of Health and Human Services, 1996; Liukkonen *et al.*, 2007). A positive self-concept is one of the psychological constructs that is valued as a desirable outcome in many disciplines of psychology, such as educational, developmental, sport/exercise, health, social, and personality psychology, as well as in other disciplines of social sciences (Marsh & Craven, 2006). In addition, a positive self-concept is frequently posited as a mediating variable that facilitates the attainment of desired outcomes such as regular physical activity, adherence to exercise, or participation in health-related physical fitness (Marsh, 2001; 2006, Gašić-Pavišić *et al.*, 2006; Marsh & Craven). Self-concept can be defined as person’s self-perceptions that are formed through experience with and interpretations of one’s environment (Marsh, 2001). In discussing the relation of self-concept and physical exercise behaviours and sport, researchers have stressed the importance of physical self-concept as one

of the domains of general self-concept in the multidimensional hierarchical self-concept model (Marsh *et al.*, 1994; Marsh *et al.*, 1997; Fox, 2002; Marsh & Craven, 2006; Peart *et al.*, 2007). This model was developed by Herbert Marsh with associates, according to Shavelson's model of self-concept (Marsh *et al.*, 1994). Hierarchically highest is General self-concept, while lower order factors are Academic self-concept and Non-academic self-concept (which includes Social self-concept, Emotional self-concept and Physical self-concept) (Marsh *et al.* 1994). In conceptualising of measurement of multidimensional Physical self-concept, Marsh *et al.* have developed Physical Self-Description Questionnaire (PSDQ). Besides nine specific dimensions of physical self-concept (Strength, Body Fat, Physical Activity, Endurance, Sports Competence, Coordination, Health, Appearance, and Flexibility), this instrument assesses two general dimensions, General Physical Self-Concept and Self-Esteem. Various research studies using PSDQ confirmed multidimensional structure of Physical Self-Concept (Marsh *et al.*, 1994; Marsh, 1996; Marsh, 1998; Klomsten, 2002; Nigg *et al.*, 2001; Marsh & Craven, 2006).

Research has demonstrated that physical self-concept is an important facilitator of physical activity and exercise (Peart *et al.*, 2007) and that it has relevance for the development of an active and healthy lifestyle (Marsh *et al.*, 2006). Research has also given support to the idea that physical self-concept and physical exercise behaviour are reciprocally related and mutually reinforcing (the reciprocal effects model – REM) (Marsh & Craven, 2006; Marsh *et al.*, 2006). In brief, a more positive prior level of physical self-concept leads to a higher level of exercise behaviour, and a higher prior level of exercise behaviour leads to a higher level of physical self-concept (Marsh & Craven, 2006; Marsh *et al.*, 2006). Hence, according to REM, physical education teachers and health care professionals should strive to improve simultaneously both physical self-concept and exercise behaviour (Marsh *et al.*, 2006).

Research shows that the adolescent period is especially relevant to the development of both a positive self-concept and a healthful lifestyle (e.g., good eating habits, regular physical activity, and the absence of health-compromising behaviours in three areas: cigarette smoking, use of alcohol and drugs, and sexual activity) (McDevitt & Ormrod, 2002). Good eating habits (i.e. eating high-quality food and regular meals) and physical activity are of special relevance when we discuss risk factors for overweight and obesity in adolescence, and consequently prevention of the problems in development of positive self-concept.

When discussing adolescence, there is a consensus among the authors that the self-concept of adolescents depends on their beliefs about their ap-

pearance and their popularity; accordingly, the physiological and physical changes that occur with puberty should be considered as factors that influence the decrease in self-concept at this age (McDevitt & Ormrod, 2002). Boys and girls alike tend to think of themselves as being somewhat less attractive once they reach adolescence. Physical appearance is a highly influential factor in self-esteem of all ages. Several studies researching adolescent period have shown that certain aspects of pubertal development (e.g. pubertal timing) are related to satisfaction with body image and with self-esteem (Blyth *et al.*, 1985; Goldfield & Chrisler, 1995; Williams & Currie, 2000). Although results about early, on-time and late bloomers are not completely consistent, authors conclude that late-bloomers suffer in almost every area of their self-concept, while early and on-time score almost equally (Williams & Currie, 2000).

Overweight during the pubertal period contributes to negative self-evaluations (Alsaker, 1992) and to low perceptions of physical appearance, particularly for girls (Craft *et al.*, 2003). In comparison with those of normal-weight, overweight children and adolescents have a lower physical self-concept (Strauss, 2000; Sung *et al.*, 2005; Marsh *et al.*, 2007). Of great concern currently are the results of research indicating that with greater age there is a decrease in physical exercise, especially during adolescence (Crocker *et al.*, 2006). Among young people, the decrease in physical activity level is greater among girls. Moreover, many studies demonstrate that girls, in general, score lower than boys on physical self-concept, but research results are inconsistent with respect to both the number and specific dimensions of physical self-concept on which boys and girls differ (Marsh *et al.*, 1997; Klomsten *et al.*, 2004; Marsh *et al.*, 2006; Lazarević *et al.*, 2008). These inconsistencies, however, might be the result of cultural differences. Research on the relation of physical self-concept to weight status with respect to differences by gender is scarce, but some authors state that relationship between adolescents' body weight and physical self-concept and the culture in which they grow up is complex (Marsh *et al.*, 2007).

Various researchers describe the relation between physical self-concept and body mass, but those relationships have not been clearly specified by gender. Given this background, the purpose of the present study was to explore the physical self-concept on the sample of Serbian normal-weight and overweight adolescent boys and girls. We expected the results to indicate whether there were differences within and between the two genders with respect to the dimensions of physical self-concept.

We hypothesized that the findings showing that there are differences in physical self-concept between normal-weight and overweight, favouring

normal-weight adolescents, obtained in previous research studies would be replicated in our sample. Because of the specificities of physical and psychological development among boys and girls in early adolescence (e.g., girls reaching puberty earlier than boys, and being more sensitive to physical appearance and physical characteristics than boys) and based on previous results, we assumed that there would be specificities by gender in normal-weight and overweight adolescents in terms of physical self-concept.

Since the quality of physical education potentially has a strong impact on the development of a positive physical self-concept, and due to the importance of physical self-concept in developing an active and healthy lifestyle (i.e. regular physical activity and healthy eating habits), the results of research from studies such as the one reported here are potentially valuable for the development of school programmes in physical education for prevention of overweight and obesity.

### *Methods*

*Subjects.* The sample consisted of 417 primary school students (229 boys and 188 girls) with a mean age of 13.6 years ( $SD=0.73$ ). The participants were 7<sup>th</sup>- and 8<sup>th</sup>-graders from two public elementary schools in Belgrade, one from the centre and one from a suburb Belgrade area. All students had three school classes per week (3 x 45 min) of physical education from the 1<sup>st</sup> grade on in accordance with the Serbian national curriculum (the syllabus mainly consists of physical exercises, athletics, gymnastics and sports games).

*Instruments and Procedures.* To assess physical self-concept, the authors used the Physical Self-Description Questionnaire (PSDQ), which is presented in full by its authors along with the permission for researchers to use it (Marsh *et al.*, 1994). The PSDQ is a 70-item questionnaire designed to measure 9 specific components of physical self-concept (Strength, Body Fat, Physical Activity, Endurance, Sports Competence, Coordination, Health, Appearance, and Flexibility) as well as General Physical Self-Concept and Self-Esteem. Each PSDQ item is a simple declarative statement, to which participants respond using a 6-point true-false Likert-type scale (1-false, 2-mostly false, 3-more false than true, 4-more true than false, 5-mostly true, 6-true). The PSDQ instrument, which is designed for adolescents aged 12 and older, is psychometrically strong and has demonstrated good reliability, validity, and cross-cultural validity (Marsh *et al.*, 1994; Marsh, 2001; Klomsten, 2002; Marsh *et al.*, 2002; Marsh *et al.*, 2007; Lazarević *i sar.*, 2008). The PSDQ was translated into Serbian and back-translated into English by

an expert fluent in both Serbian and English. On the basis of responses from the present investigation, each of the 11 PSDQ scales was found to have an acceptable level of reliability, with Cronbach's  $\alpha$  estimates for the scales ranging from .78 for Self-Esteem to .92 for Sports Competence. These results accord with the results of previous research that used the PSDQ in studies of Serbian adolescents (Lazarević *et al.*, 2007; Lazarević *et al.*, 2008).

*Anthropometric Measures.* The age of the subjects (accurate to 1 month) was recorded. Standing height was measured to the nearest 0.5 cm using a Seca Stadiometer 208 (Seca, Hamburg, Germany) with shoes removed, feet together, and head in the Frankfurt horizontal plane. Body mass (weight) was measured to the nearest 0.5 kg using a Seca Beam Balance 710 (Seca, Hamburg, Germany) with shoes, sweaters, coats, and jackets removed.

*Measurement of Body Mass and Its Classification.* The body mass index (BMI) was calculated as body mass (weight)/height<sup>2</sup> (kg/m<sup>2</sup>). The international age- and gender-specific BMI cut off points for children developed by the Childhood Obesity Working Group of the International Obesity Task Force were used to define subjects as normal-weight, overweight or obese (Cole *et al.*, 2000). These cut off points were derived from a large international sample using regression techniques by passing a line through the health-related adult cut off points at 18 years (Cole *et al.*, 2000). Children with BMI values that corresponded to an adult BMI under 25 were classified as normal-weight, those whose BMI corresponded to an adult BMI between 25 and 30 were considered as overweight, and children with a BMI corresponding to an adult BMI of  $\geq 30$  were categorized as obese.

Data were collected from mid-November to mid-December 2008. During the first 2 weeks of research, anthropometric measures were collected, and in the next 2 weeks PSDQ data were collected during physical education classes in a setting adapted for testing. For every student who agreed to participate, parental permission was obtained. Anthropometric measurements and assessment with PSDQ were conducted by the authors of this research with assistance of physical education teachers in selected schools.

Treatment of the subjects in this research was in accordance with ethical standards of the American Psychological Association (American Psychological Association, 2007) and was approved by the institutional review board of the Faculty of Sport and Physical Education, University of Belgrade, Serbia.

*Data Analysis.* For this study, students were classified into 2 categories, normal-weight or overweight, with overweight including both overweight and obese children (because only 4 students were obese in this sam-

ple) (Cole *et al.*, 2000). The PSDQ scores for normal and overweight students were compared by T-test using a level of significance of  $p < .05$  both overall (both genders) and then by gender. Discriminant analysis was used to determine which dimensions of physical self-concept would discriminate groups of adolescent students who were defined by gender and weight status.

### Results

Based on BMI, the sample consisted of 334 (80.1%) normal-weight and 83 (19.9%) overweight students (including 4 who were obese) with an average BMI of 20.56.

Table 1: Physical Characteristics of Normal-Weight and Overweight Students (M, SD)

	N	Age (Years) (M, SD)	Height (cm) (M, SD)	Weight (kg) (M, SD)	BMI (kg/m <sup>2</sup> ) (M, SD)
<b>Boys</b>					
Normal-weight	183	13.67 (0.72)	167.85 (8.80)	54.67 (9.03)	19.27 (1.87)
Overweight	46	13.41 (0.69)	170.82 (10.56)	72.89 (13.23)	24.85 (3.01)
<b>Girls</b>					
Normal-weight	151	13.71 (0.74)	163.80 (5.81)	52.63 (6.94)	19.57 (2.04)
Overweight	37	13.55 (0.75)	165.67 (6.49)	70.23 (8.79)	25.60 (3.19)
<b>Total</b>	417	13.65 (0.73)	166.52 (8.21)	57.32 (11.64)	20.56 (0.73)

M: mean; SD: standard deviation; BMI: body mass index.

Table 2: Comparison of PSDQ Scores Between Normal-Weight and Overweight Students (T-test)

PSDQ Scale	Normal (n=334)		Overweight (n=83)		t	df	p
	M	SD	M	SD			
Health	4.86	(0.89)	4.87	(1.12)	-0.156	415	NS
Coordination	4.57	(1.05)	4.03	(1.16)	4.140	415	<.001
Physical Activity	4.29	(1.28)	3.93	(1.43)	2.268	415	<.03
Body Fat	5.39	(0.92)	4.15	(1.18)	10.377	415	<.001
Sports Competence	4.52	(1.24)	3.96	(1.49)	3.549	415	<.001
General Physical Self-Concept	5.07	(1.03)	4.64	(1.33)	3.167	415	<.01
Appearance	4.88	(0.99)	4.54	(1.18)	2.690	415	<.01
Strength	4.50	(1.05)	4.43	(1.19)	0.535	415	NS
Flexibility	4.26	(1.21)	3.79	(1.29)	3.122	415	<.01
Endurance	4.12	(1.33)	3.43	(1.36)	4.188	415	<.001
Self-Esteem	5.15	(0.80)	4.89	(1.01)	2.502	415	<.02

PSDQ: Physical Self-Description Questionnaire; M: mean; SD: standard deviation; t: T-test; p: level of significance; NS: not significant.

In the subgroup of boys (Table 1), 183 (79.9%) were of normal weight and 46 (20.1%) were overweight. Among the girls, 151 (80.3%) were normal-weight and 37 (19.7%) were overweight.

T-tests on the overall sample showed that overweight students had significantly lower scores than normal-weight students on all PSDQ scales except Health and Strength (Table 2). In comparisons of the boys with the girls without considering weight status, boys had significantly higher scores on 4 PSDQ scales (Physical Activity, Sports Competence, Strength, and Endurance), and girls scored significantly higher on Self-Esteem. Significant differences by gender were not found on the other 6 scales (Table 3).

Table 3: Comparison of PSDQ Scores Between Boys And Girls (T-test)

PSDQ Scale	Boys (n=229)	Girls (n=188)	t	df	p
	M (SD)	M (SD)			
Health	4.87 (0.86)	4.86 (1.02)	-0.064	415	NS
Coordination	4.49 (1.07)	4.44 (1.11)	0.480	415	NS
Physical Activity	4.37 (1.28)	4.03 (1.35)	2.595	415	<.01
Body Fat	5.18 (1.03)	5.10 (1.17)	0.765	415	NS
Sports Competence	4.76 (1.13)	3.98 (1.39)	6.304	415	<.001
General Physical Self-Concept	5.06 (1.03)	4.89 (1.20)	1.504	415	NS
Appearance	4.83 (1.04)	4.78 (1.04)	0.389	415	NS
Strength	4.72 (1.05)	4.20 (1.04)	5.044	415	<.001
Flexibility	4.12 (1.22)	4.24 (1.26)	-1.001	415	NS
Endurance	4.37 (1.29)	3.50 (1.30)	6.805	415	<.001
Self-Esteem	5.01 (0.87)	5.20 (0.82)	-2.274	415	<.03

PSDQ: Physical Self-Description Questionnaire; M: mean; SD: standard deviation; t: T-test; p: level of significance; NS: not significant.

In comparisons by gender between normal-weight and overweight students (Table 4), overweight boys scored significantly lower than normal-weight boys on 4 scales (Body Fat, Sports Competence, Appearance, and Endurance), and overweight girls scored significantly lower than their normal-weight counterparts on 7 scales (Coordination, Physical Activity, Body Fat, Sports Competence, General Physical Self-Concept, Flexibility, and Endurance). For both boys and girls, between normal-weight and overweight, there were no significant differences on Health, Strength, and Self-Esteem.

In the discriminant analysis, which we employed to differentiate the four groups of students (normal-weight boys, overweight boys, normal-weight girls, and overweight girls) using the PSDQ scales, two canonical correlations were statistically significant ( $R_1=.545$ ,  $\lambda=.533$ ,  $\chi_1^2=257.019$ ,  $df=33$ ,  $p<.001$ ;  $R_2=.460$ ,  $\lambda=.759$ ;  $\chi_1^2=112.839$ ,  $df=20$ ,  $p<.001$ ). Analyses show that discriminant functions 1 and 2 (which are a linear combination of the interval variables), explain 57.9% and 36.7% of variance, respectively, and correctly classify 61% of the original groups.

Table 4: Comparisons of PSDQ Scores between Normal-Weight and Overweight Boys and Normal-Weight and Overweight Girls (T-test)

PSDQ Scale	Boys		t	df	p	Girls		t	df	p
	Normal (n=183)	Over- weight (n=46)				Normal (n=151)	Over- weight (n=37)			
Health	4.86 (0.80)	4.83 (1.10)	0.194	227	NS	4.85 (0.99)	4.92 (1.15)	- 0.396	186	NS
Coordination	4.54 (1.05)	4.28 (1.16)	1.447	227	NS	4.61 (1.05)	3.71 (1.11)	4.641	186	<.001
Physical Activity	4.41 (1.24)	4.20 (1.44)	0.989	227	NS	4.15 (1.33)	3.58 (1.37)	2.306	186	<.03
Body Fat	5.42 (0.86)	4.24 (1.12)	7.811	227	<.001	5.36 (0.99)	4.04 (1.24)	6.876	186	<.001
Sports Competence	4.86 (1.05)	4.37 (1.34)	2.651	227	<.01	4.11 (1.33)	3.45 (1.52)	2.657	186	<.01
General Physical Self-Concept	5.11 (0.97)	4.88 (1.22)	1.359	227	NS	5.03 (1.11)	4.36 (1.42)	3.122	186	<.01
Appearance	4.91 (0.97)	4.51 (1.24)	2.327	227	<.03	4.84 (1.01)	4.57 (1.13)	1.434	186	NS
Strength	4.72 (1.00)	4.69 (1.24)	0.205	227	NS	4.22 (1.04)	4.10 (1.05)	0.636	186	NS
Flexibility	4.16 (1.20)	3.95 (1.31)	1.058	227	NS	4.39 (1.21)	3.61 (1.27)	3.495	186	<.001
Endurance	4.53 (1.20)	3.74 (1.44)	3.436	227	<.001	3.62 (1.31)	3.04 (1.16)	2.431	186	<.02
Self-Esteem	5.06 (0.80)	4.81 (1.07)	1.781	227	NS	5.25 (0.78)	4.99 (0.94)	1.765	186	NS

PSDQ: Physical Self-Description Questionnaire; M: mean; SD: standard deviation; t: T test; p: level of significance; NS: not significant, df=227.

The standardized function coefficients and structure coefficients presented in Table 5 suggest that in terms of the first discriminant function, Body Fat, Endurance and Sports Competence discriminated normal-weight boys from other three groups. As for the second discriminant function, Body Fat, Flexibility, Self-Esteem, and Coordination discriminated normal-weight girls from other three groups. Hence, results showed that Body Fat had high coefficients on both discriminant functions and discriminated both groups of normal-weight students from overweight students.

*Table 5: Standardized Canonical Discriminant Function Coefficients and Structure Matrix*

PSDQ Scale	Standardized Function Coefficients		Structure Coefficients	
	1	2	1	2
Endurance	<b>.636</b>	-.303	<b>.615</b>	-.151
Sports Competence	<b>.496</b>	-.374	<b>.540</b>	-.135
Body Fat	<b>.753</b>	<b>.647</b>	<b>.586</b>	<b>.661</b>
Flexibility	-.344	<b>.330</b>	.097	<b>.318</b>
Self-Esteem	-.437	<b>.386</b>	.007	<b>.314</b>
Coordination	-.076	<b>.534</b>	.230	<b>.306</b>
General Physical Self-Concept	-.286	.050	.240	.157
Physical Activity	-.050	-.020	.255	.016
Strength	.094	-.399	.301	-.270
Appearance	.037	-.230	.165	.146
Health	-.084	-.309	-.009	-.016

The scales that contributed mostly to the first discriminant function (Body Fat, Endurance and Sports Competence), were best at discriminating normal-weight boys from overweight girls. Group centroids showed (Table 6) that on these scales normal-weight boys had the highest scores, followed by normal-weight girls, then overweight boys, and finally overweight girls. The difference between the highest and lowest group was 2 SD.

*Table 6: Functions at Group Centroids*

Weight status/Gender	Function	
	1	2
Normal-weight boys	0.670	-0.179
Overweight boys	-0.570	-0.823
Normal-weight girls	-0.320	0.624
Overweight girls	-1.299	-0.635

Scales that contributed mostly to the second discriminant function (Body fat, Flexibility, Self-Esteem and Coordination) best discriminated normal-weight girls from overweight boys (1.4 SD). No large differences (0.2 SD) were found between overweight boys and overweight girls.

### *Discussion*

In this study on a sample of adolescent boys and girls averaging 13.6 years of age, we found that 20% of both boys and girls were overweight although all of them had been participating in physical education classes from the 1<sup>st</sup>

grade. Thus, our findings indicate the presence of a substantial weight problem among early adolescents in Serbia, which is in accordance with the results of previous research studies (Nedeljković, 2006). These results are in accordance with other reports pointing out to problems with weight among youth in much of the world, especially in urban areas. As is widely known, overweight can have many undesirable consequences and negatively influence the quality of life in adulthood (Anderson & Butcher, 2006; Li & Ho-oker, 2010; Wang & Lobstein, 2006).

The results we obtained through the PSDQ confirm our assumption that overweight and normal-weight adolescents would differ with respect to the dimensions of their physical self-concepts. Previous research has found a relation between weight status and self-perception of physical abilities and appearance in both preadolescence and the adolescent period (Marsh *et al.*, 2007; O'Dea & Abraham, 1999; Sung *et al.*, 2005). Our results indicate that overweight adolescents have a poorer general physical self-concept and lower self-esteem, which are two general dimensions of physical self-concept. In addition, they perceive themselves as less physically active, with less coordination, more body fat, less competent in sports, with poorer appearance, less flexibility, and less physical endurance. Finally, we found that normal-weight and overweight students have similar perceptions in terms of their health and strength. This can be a consequence of the fact that the category of obese students (except four students with higher weight problems), in which we could expect more serious health problems followed by more negative self-perception in the domain of health and strength, was not present in our sample.

It is reasonable to assume from our study that overweight adolescent students will have lower levels of engagement in physical exercise and sport in their everyday life, which would have further negative consequences on their physical, psychological, and social functioning. It is possible that consequences of physical inactivity would be augmented by bad eating habits (e.g. fast-food consumption, non-regulated diet in school-time), which are very common in adolescents. A sedentary lifestyle leads to weight problems and related health problems, social isolation, a lower physical self-concept, and less self-esteem (Marsh *et al.*, 2006). In addition, research shows that a positive physical self-concept is important for students' engagement in physical exercise, which leads to a healthy lifestyle and normal weight (Marsh & Craven, 2006; Marsh *et al.*, 2006).

Since previous research has shown that within groups defined by gender there are differences in physical self-concept and that those differences vary by age and culture, one of the goals of the present study was to validate

those results on this sample of Serbian adolescents. Our results show that, regardless of weight status, there are gender differences in certain aspects of physical self-concept and that these differences are mainly in accordance with previous results (Marsh *et al.*, 1994; Marsh *et al.*, 1997; Marsh, 2001; Klomsten *et al.*, 2004; Marsh *et al.*, 2007). We should note that certain differences found in this research were probably due to specific aspects of the educational and social context in which the adolescents grow up (Janjetović, 1996; Klomsten *et al.*, 2004; Marsh *et al.*, 2007). Results show that gender differences in characteristics of physical self-concept are present in smaller number of dimensions in comparison to differences in weight status (gender differences are present on five dimensions, while weight-status differences are present in nine scales). Results from this research indicate that boys perceive themselves as more physically active, more competent in sport, stronger and with greater physical endurance than girls. These attributes are socially preferred as male characteristics (Janjetović, 1996; Klomsten *et al.*, 2004; Marsh *et al.*, 2007). Additionally, the results support the assumption that these dimensions of physical self-concept, especially strength and endurance, are those based on sports activity, something in which boys are more engaged than girls (McDevitt & Ormrod, 2002; Klomsten *et al.*, 2005; Lazarević *i sar.*, 2008). Our finding that girls have greater self-esteem than boys (regardless of body mass) is not in accordance with previous researches (Klomsten *et al.*, 2004; Lazarević *i sar.*, 2008). However, we should note that previous findings on the sample of Serbian students suggested a tendency that girls, on average, scored higher on Self-Esteem scale than boys (Lazarević *i sar.*, 2008). Possible explication for these results can be found in the content of the items designed for assessment of self-esteem. Those items are not related directly to self-perception of physical characteristics and competences but on general self-esteem (e.g. “Overall, most things I do turn out well”; “I don’t have much to be proud of”; “Most things I do, I do well” etc.). Marsh and his collaborators think that it is justifiable to consider self-esteem to be part of each aspect of general self-concept that is measured. The mechanism that allows us to measure same Esteem items in different contexts (e.g. Academic, Physical, Social self-concept) is *chameleon effect*. In other words, self-esteem items in a PSDQ instrument would be more “physical” than the same items in Academic Self-concept instrument, for example (Marsh, 2001; Marsh & Craven, 2006). However, based on our results, further investigation of relations between self-esteem and other dimensions in Marsh’s multidimensional model of physical self-concept, is needed. It is still unclear to what extent self-esteem in physical self-concept is based on physical domain, and on other domains of personal

functioning. With respect to that, a possible explanation of higher self-esteem in the sub-sample of girls can be found in their higher academic achievement in comparison to boys (Havelka *et al.*, 1990). In addition to this, higher academic achievement is usually accompanied by a positive feedback from parents and teachers, and it can also lead to higher self-esteem in adolescent girls. However, these hypotheses should be explored in a larger sample, including older adolescents, with a more systematic control of the level of sports activity and exercise.

Our analyses show that among Serbian adolescents there are certain specific aspects of the physical self-concept on which normal-weight and overweight students differ within the two genders. The finding that within boys there were smaller differences by weight status than in the female group with respect to certain dimensions of the PSDQ, may be explained both by the fact that girls are more sensitive to pubertal physiological and physical changes (McDevitt & Ormrod, 2002; Klomsten *et al.*, 2004) and by the cultural ideal of thinness for women that is strongly present in Western cultures (Blyth *et al.*, 1985). A very interesting result is that within-gender groups no significant differences on Self-Esteem scale between normal-weight and overweight adolescents were found (although tendencies towards higher scores are present in the normal-weight group in comparison to the overweight group). This result is surprising having in mind the obtained differences between normal-weight and overweight students regardless of the gender. This level of analysis suggests that further investigation of the Self-Esteem scales position in multidimensional physical self-concept of adolescents would be recommendable. This kind of research should include a larger sample of adolescents of all ages and a larger number of students that could be classified in the obesity group, and we could expect larger and more consistent effects of weight-problems on self-esteem.

Discriminant analysis confirmed that there are certain specificities in the structure of physical self-concept of adolescent boys and girls. The differences we observed on the Body Fat scale among both boys and girls between normal-weight and overweight students were entirely expected, as this scale would be expected to correlate well with the classifications of weight status. Besides Body Fat, normal-weight adolescent boys are dominantly distinguished by better Endurance and Sport competence in comparison to other groups. Due to higher everyday physical activity and engagement in sport, normal-weight boys can be expected to perceive themselves as more sport competent and endurable. On the other side, besides Body Fat, normal-weight adolescent girls are dominantly distinguished by Flexibility and Coordination. Better self-perception in these aspects can be assumed to

stem from sports and exercises in which girls mostly participate (e.g. rhythmic gymnastics, ballet, dance etc.) (Klomsten *et al.*, 2005; McDevitt & Ormrod, 2002). The fact that Self-Esteem also discriminates normal-weight girls from other groups indicates that this general dimension of physical self-concept has larger impact on the structure of physical self-concept of normal-weight girls than in other three sub-groups. Since this general dimension of physical self-concept does not discriminate normal-weight boys from other three sub-groups, we can hypothesise that self-esteem is more supportive for positive physical self-concept in girls than in boys.

### *Conclusion*

Based on all results, our general conclusions are that in adolescence body weight (as measured by BMI) is negatively related to physical self-concept and that there are some specific differences by gender on various dimensions of the PSDQ. Relatively negative perceptions in the domain of physical self-concept that overweight adolescents have about themselves might have consequences for their willingness to engage in sport and physical exercise and their ability to acquire an active and healthy lifestyle.

This research provides insights into the relationships between weight status, gender, and physical self-concept among Serbian adolescents, but because the sample was restricted to youth in early adolescence it is necessary to be careful in making generalization of results to the whole adolescent period. During adolescence, certain changes in physical self-concept take place (Stiller & Alfermann, 2007), and thus future research should comprise assessment at several time-points, with more careful recording of pubertal changes in early adolescence. In addition, it would be necessary to further explore the position of self-esteem in physical self-concept in both gender groups and its possible changes during adolescence.

The results of the present study on the relation of physical self-concept and weight status in adolescence represent a solid basis for the development of school programmes that would prevent overweight and obesity in adolescence. Research indicates that gender differences in physical self-concept decrease with increased engagement in sport and physical exercise and that a higher level of physical activity leads to a more positive self-concept (Lazarević *i sar.*, 2007; Marsh *et al.*, 1997; Marsh *et al.*, 2002). According to the reciprocal effects model (REM), positive physical self-concept is important for engagement in physical exercise and sport, and it would be recommendable to develop strategies for improvement of physical self-concept of overweight students during the physical education classes. Results of this

research indicate that in creating these strategies it is necessary to take into account gender specificities in the structure of physical self-concept. In accordance with the opinion that the best way to influence self-concept is through improvement of competences and support to experiences of success (Stiller & Alfermann, 2007), it can be recommended to focus on the development of competences in particular skills for which overweight adolescent boys and girls have lower scores on the corresponding PSDQ scales than their normal-weight counterparts (for instance, endurance for boys and coordination and flexibility for girls). Optimal effects of programmes designed for the development of more positive physical self-concept and a higher level of engagement in sport and physical exercise of overweight adolescents are expected if teachers respect adolescent interests in specific sports activities (boys and girls are mostly interested in different sports) rather than forcing them to participate (Klomsten *et al.*, 2004; Deforche *et al.*, 2006; Marsh & Craven, 2006). Also, since eating habits are very important in prevention of weight problems and obesity, favourable effects of these programmes might be expected if they are in coordination with other school health programmes dealing with the importance of healthy food and the acquisition of healthy eating habits.

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ФИЗИЧКИ СЕЛФ-КОНЦЕПТ АДОЛЕСЦЕНАТА НОРМАЛНЕ  
И ПРЕКОМЕРНЕ ТЕЛЕСНЕ ТЕЖИНЕ: ПОЛНЕ СПЕЦИФИЧНОСТИ  
*Анстракт*

Претходна истраживања су дала податке о односу физичког селф-концепта и телесне масе код младих, али тај однос није био јасно спецификован у погледу пола. Циљ овог истраживања јесте да се утврде карактеристике физичког селф-концепта адолесцената нормалне и прекомерне телесне тежине, као и полне разлике у погледу одлика њиховог физичког селф-концепта. Узорак се састојао од 417 ученика основне школе (229 дечака и 188 девојчица) просечног узраста 13 година и 6 месеци ( $SD=0.73$ ). На основу индекса телесне масе (BMI) узорак је подељен на групу адолесцената нормалне и групу адолесцената прекомерне телесне тежине. За процену физичког селф-концепта примењен је Упитник физичког селф-концепта (PSDQ). Резултати су показали да адолесценти прекомерне тежине имају значајно ниже скорове на свим скалама упитника PSDQ осим на скалама Здравље и Снага, као и да су разлике веће у субузурку девојчица. Дискриминативном анализом добијено је да се дечаци нормалне телесне тежине највише разликују, од осталих испитаника, на супскалама Телесна дебелина, Издржљивост и Спортска компетентност. Такође, дискриминативном анализом је добијено да се, поред скале Телесна дебелина, девојчице нормалне телесне тежине највише разликују од осталих испитаника и на скалама Флексибилност, Самоцењење и Координација. Резултати указују да је за боље разумевање односа физичког селф-концепта адолесцената и телесне масе важно узети у обзир и пол адолесцената. Резултати овог истраживања су потенцијално корисни за превенцију проблема прекомерне телесне тежине ученика кроз наставу физичког васпитања.

*Кључне речи:* физички селф-концепт, прекомерна телесна тежина, адолесценти, здрав стил живота, физичко васпитање.

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ФИЗИЧЕСКИЙ СЕЛЬФ-КОНЦЕПТ ПОДРОСТКОВ С НОРМАЛЬНЫМ  
И ПОВЫШЕННЫМ ТЕЛЕСНЫМ ВЕСОМ: ПОЛОВАЯ СПЕЦИФИКА  
*Резюме*

Предыдущие исследования дают четкое представление об отношении физического селф-концепта и телесной массы у молодых людей, однако, без ясной спецификации по критерию пола. Цель настоящего исследования – выявить характеристики физического селф-концепта подростков с нормальным и повышенным телесным весом, а также половые отличия в связи с особенностями их физического селф-концепта. Корпус включил 417 учащихся восьмилетних школ (229 мальчиков и 188 девочек) в среднем возрасте 13 лет 6 месяцев ( $SD=0.73$ ). На основании индекса телесной массы (BMI) корпус разделен на группу подростков с нормальным и группу подростков с повышенным телесным весом. Для оценки физического селф-концепта был применен Вопросник физического селф-концепта (PSDQ). Результаты показывают, что подростки с

повышенным весом имеют значительно более низкие постижения на всех шкалах вопросника PSDQ, за исключением шкал Здоровье и Сила, и что различия более выражены в субкорпусе девочек. На основании дискриминативного анализа обнаружено, что мальчики с нормальным телесным весом больше всего отличаются от прочих испытуемых на субшкалах Телесная полнота, Выносливость и Спортивная компетентность. На основании дискриминативного анализа также выявлено, что, помимо шкалы Телесная полнота, девочки с нормальным телесным весом больше всего отличаются от прочих испытуемых и на шкалах Флексибельность, Самоуважение и Координация. Результаты указывают на то, что в целях более качественного понимания соотношения между физическим селф-концептом подростков и телесной массой необходимо учесть и пол подростков. Результаты настоящего исследования потенциально полезны для профилактики проблемы повышенного телесного веса учащихся на занятиях по физическому воспитанию.

*Ключевые слова:* физический селф-концепт, повышенный телесный вес, подростки, здоровый стиль жизни, физическое воспитание.