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DIFFERENCES IN STUDENTS' PHYSICAL SELF-PERCEPTION IN PE CLASSES ACCORDING TO GENDER AND NUTRITIONAL STATUS

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Abstract/Izvleček

The purpose of the study was to examine the level of physical self-perception (PSP) in the Physical Education class, and to determine differences in dimensions of PSP according to gender and nutritional status. On a sample of 283 4th- and 8th-graders in primary school, an anonymous questionnaire was applied. Fourth-graders made higher assessments of their coordination, sport competences, strength, flexibility and endurance than 8th graders. Moreover, significant differences were obtained in certain dimensions of PSP with regard to gender and nutritional status. A low level of PSP may be an obstacle to physical activity. These results indicate that PSP decreases by age and by gender.

Razlike v telesnem samozaznavanju učencev pri pouku športne vzgoje glede na spol in prehranski status Namen raziskave je bil preveriti stopnjo telesnega samozaznavanja (angl. physical self-perception – PSP) pri pouku športne vzgoje ter ugotoviti razlike v dimenzijah telesnega samozaznavanja glede na spol in prehranjenski status. Na vzorcu 283 učencev 4. in 8. razreda osnovnih šol smo izvedli anonimni vprašalnik. Učenci 4. razreda so bolje ocenili svojo koordinacijo, športne kompetence, moč, gibčnost in vzdržljivost kot učenci 8. razreda. Prav tako so bile pridobljene pomembne razlike v nekaterih dimenzijah telesnega samozaznavanja glede na spol in prehranski status. Nizka raven telesnega samozaznavanja je lahko ovira za telesno dejavnost. Ti rezultati kažejo, da se telesno samozaznavanje zmanjšuje s starostjo in spolom.

Keywords:
individual perception, motor abilities, primary school, BMI, physical activity

Ključne besede:
posameznikova percepcija, gibalne sposobnosti, osnovna šola, BMI, telesna dejavnost

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Introduction

There are numerous definitions of self-perception, all of which unite a set of opinions and attitudes that an individual has about himself (Neljak, 2013). The different dimensions of self-perception may not necessarily be related. Specifically, a high level of self-perception in one dimension does not necessarily mean that it will be high in other dimensions. There are several dimensions to self-perception, and the relation of those dimensions with healthy behaviour can determine self-improvement actions (Marsh and Redmayne, 1994; Pastor, Balaguer and Garcia-Merita, 2006) such as taking part in PA and having adequate nutrition, in the pursuit of quality of life. For physical education classes (PE), the primary meaning is physical self-perception, more precisely self-perception of one's own motor abilities, which can contribute to better or worse performance on certain motor tasks that are set in front of the student. Physical self-perception is defined as an individual's perception of himself or herself in aspects of physical domains such as strength, endurance, sport ability, and physical appearance (Fox and Corbin, 1989) and is a reflection by students about their capacity to meet the physical limits in PA and sports (Murcia, Gimeno, Vera Lacárcel and Ruiz Pérez 2007). Physical self-perception can contribute to better or worse performance on certain motor tasks that are assigned. It has a significant impact on the development of students' motivation for better motor performance, but also on the frequency of physical exercise. Numerous studies indicate differences in the level of self- perception with regard to gender: male students have better physical self-perception than do female students (Ruiz-Montero, Chiva-Bartoll, Baena-Extremera and Hortigüela-Alcalá, 2020; Palenzuela-Luis, Duarte-Clíments, Gómez-Salgado, Rodríguez-Gómez and Sánchez-Gómez, 2022). Male students perceive better physical self- perception because of the high satisfaction in everything related to the physical activity inside and outside of the school context (Murcia et al. 2007). Authors indicate that strategies focused to improve physical self-perception are necessary in female adolescent students, because personal physical self-perception must be considered as an important social cognitive perspective to provide suitable mental health in children and adolescents (Ruiz-Montero et al. 2020).

Better physical self-perception is mostly related to regular physical exercise (Haugen, Ommundsen and Seiler 2013) and participation in PE classes and sport.

More precisely, physical and motor self-perception can be predictors of satisfaction or boredom in PE (Morales-Sánchez et al. 2021). To create a positive environment that includes student engagement in PE class, it is important to understand how outcomes such as motor skills influence motivation for PE class. Both real and perceived approaches to understanding motor skills have implications for healthy lifestyles in childhood and adolescence (Estevan et al. 2021). During early adolescence, PE programs should not be focused only on teaching movement skills but should also foster perceived motor competence to promote motivation for PE, especially among students with lower levels of self-perception (Estevan et al. 2021). The results of numerous studies indicate a positive relationship between the dimensions of self-perception in general and the level of physical activity, and a negative relationship between the dimensions of self-perception and the amount of time an adolescent spends sitting (Fernández-Bustos, Infantes-Paniagua, Cuevas and Contreras 2019; Onetti-Onetti, Chinchilla-Minguet, Martins and Castillo-Rodriguez 2019). We are witnessing an increasingly prevalent sedentary lifestyle among children and young people, and a decreasing level of daily physical activity. Low levels of physical activity are associated with the development of obesity among children and adolescents (Hills, Andersen, and Byrne, 2011; Hong, Coker-Bolt, Anderson, Lee and Velozo 2016), as well as decreasing levels of motor skills (McDonough, Liu, and Gao, 2020). Obesity has become a global public health problem. Of particular concern is the increase in obesity among children and young people, which has increased dramatically over the last few decades. Numerous studies highlight the interaction of multiple factors that contribute to the development of obesity (Sahoo et al. 2015). One of the factors that indirectly contributes to the development of obesity is a low level of physical self-perception. More precisely, a low level of physical self-perception decreases motivation, commitment, and participation in physical activity (Borrego-Balsalobre, Cavas-García, Díaz-Suárez and Martínez-Moreno 2023), and physical activity (PA) is a significant factor in the prevention of childhood obesity (Wyszyńska et al. 2020).

The purpose of this study was to examine the level of physical self-perception (PSP) among lower and upper primary school students in the Physical Education class (PE), and to determine differences in the dimensions of PSP with regard to gender and nutritional status.

Methods

We conducted the study on a sample of 283 participants (134 participants from the 4th grade of primary school (10 ± 6 month) and 149 participants from the 8th grade of primary school (14 ± 6 month)) in Zadar County in Croatia. The research was approved in advance by the Faculty Council of the Department of Teacher and Preschool Teacher Education of the University of Zadar, Croatia. For each participant, the guardian's permission for voluntary participation in the research was requested.

For the purposes of the research, we created an anonymous survey questionnaire, which was completed by fourth- and eighth-grade primary school participants. We aimed the first part of the questionnaire at collecting general data on gender, grade and school and the second part of the questionnaire at examining students' self-perception in the PE class. Items for self-perception were taken from The Physical Self-Description Questionnaire (Marsh, 1996) in Neljak (2013). The questionnaire comprises 47 items and has good metric characteristics (Marsh, 1996). For the implementation of this research, we used only the items for assessment of participants' coordination, sports competence, strength, flexibility and endurance in PE class. We asked the participants to rate their degree of agreement with a particular statement on the Likert scale (I strongly disagree, mostly disagree, not sure, mostly agree, completely agree). Furthermore, for the purposes of the study, we calculated body mass index (BMI) as an indicator of nutritional status and categorized participants by their BMI values into two groups (normal weight and overweight/obese). Categorization was performed according to Cole, Bellizzi, Flegal and Dietz (2004).

We processed the collected data with the Statistica 7.0 program and calculated basic descriptive indicators: arithmetic mean, and standard deviation, as well as response frequencies for individual items. We tested the normality of the distribution by the Kolmogorov-Smirnov test. Since the distributions of all variables deviated significantly from normality, we applied the Mann-Whitney U test to determine statistically significant differences in self-perception dimensions depending on gender and nutritional status. For this purpose, we calculated the median and quartile rank, z-values and significance level (p).

Results

We calculated basic descriptive indicators of self-perception dimensions, which are shown in Table 1. Based on the high values of the arithmetic means, it is evident that most participants estimate that in most physical activities they perform movements harmoniously (4th graders 4.56 ± 0. 97 vs. 8th graders 4.14±0.90) and that they easily control their body movements (4th graders 4.54 ± 0. 74 vs. 8th graders 4.39 ± 0.84). Also, most participants estimate that they are good at most sports (4th graders 4.34 ± 0. 96 vs. 8th graders 3.91 ± 1.19). Only 22.53% of participants believe that they are completely stronger than most of their peers, and an arithmetic mean of 4th graders 3.35 ± 1. 29 and 8th graders 3.28 ± 1.25 was determined.

The results showed that participants generally felt that they could lift heavy objects (4th graders 3.89 ± 1. 17 vs. 8th graders 3.90 ± 1.04) and were considered flexible enough for most sports (4th graders 4.16 ± 1. 08 vs. 8th graders 3.71 ± 1.14). Participants generally thought that they could run for a long time without stopping (4th graders 3.80 ± 1. 25 vs. 8th graders 3.36 ± 1.34) and that they could run for a long time without getting tired (4th graders 3.36 ± 1. 37 vs. 8th graders 3.08 ± 1.41). According to the results (Table 1), most participants have a high level of self-perception. More precisely, most participants consider themselves extremely coordinated and flexible, which is evident from the high arithmetic means, and the large share of students who gave the maximum answer. The lowest average values were obtained in the variables by which participants assessed their strength and endurance.

Table 1. Descriptive Parameters (Mean and Standard Deviation) and Response Frequencies to Individual Self-Perception Variables in the Total Sample of Participants

	4th M±SD	8th M±SD	I don't agree at all	Mostly disagree	I'm not sure	Mostly agree	I totally agree
			%	%	%	%	%
In most physical activities, I perform movements harmoniously	4.56±0.79	4.14±0.90	1.02	3.41	10.24	32.76	52.22
I easily control my body movements	4.54±0.74	4.39±0.84	0.68	2.73	6.48	29.69	60.70
I'm good at most sports	4.34±0.96	3.91±1.19	3.07	6.83	16.38	22.53	50.85
I am stronger than most of my peers	3.35±1.29	3.28±1.25	11.26	10.58	35.49	19.79	22.53
I can lift heavy objects	3.89±1.17	3.90±1.04	3.75	6.14	24.23	27.99	37.54
I think I am flexible enough for most sports	4.16±1.08	3.71±1.14	4.44	6.48	21.16	26.96	40.61
I can run for a long time without stopping	3.80±1.25	3.36±1.34	10.72	9.56	21.84	26.28	31.06
I think I could run for a long time without getting tired	3.36±1.37	3.08±1.41	17.41	11.60	25.60	22.18	22.87

We applied the Mann-Whitney U test to define significant differences in the dimensions of PSP with regard to gender (Table 2) and specifically calculated the analysis of differences on subsamples by age.

On a sample of 4th grade participants, we obtained statistically significant differences in two variables. Fourth-grade male participants have significantly better results than female participants in the variables used to assess strength. Male participants rate their strength significantly higher than do female participants (*I am stronger than most of my peers* (Z=3,90; p=0,00); *I can lift heavy objects* (z=3,32; p=0,00)). On the sample of 8th-grade participants, we obtained statistically significant differences in all variables**.** Male 8th-grade participants rate their coordination, strength, flexibility, sports competences and endurance significantly higher than female participants do.

Table 2. Differences among Participants in PSP Dimensions Relevant for the Subject of PE by Gender (at the Age Subsamples)

	4th grade				8th grade			
	Male MED (QR)	Female MED (QR)	Z	p	Male MED (QR)	Female MED (QR)	Z	p
In most physical activities, I perform movements harmoniously	5.00/ 1.00	5.00/ 1.00	-1.02	0.31	4.00/ 1.00	4.00/ 2.00	2.62	0.01*
I easily control my body movements	5.00/ 1.00	5.00/ 1.00	-0.91	0.36	5.00/ 1.00	4.00/ 1.00	2.68	0.01*
I'm good at most sports	5.00/ 1.00	5.00/ 1.00	0.55	0.58	5.00/ 1.00	4.00/ 1.00	4.36	0.00*
I am stronger than most of my peers	4.00/ 2.00	3.00/ 2.00	3.90	0.00*	3.00/ 2.00	3.00/ 2.00	3.61	0.00*
I can lift heavy objects	5.00/ 1.00	4.00/ 2.00	3.32	0.00*	5.00/ 1.00	3.00/ 1.00	5.05	0.00*
I think I am flexible enough for most sports	5.00/ 2.00	5.00/ 1.50	-0.30	0.77	4.00/ 2.00	4.00/ 1.00	2.62	0.01*
I can run for a long time without stopping	4.00/ 2.00	4.00/ 2.00	0.97	0.33	4.00/ 2.00	3.00/ 3.00	5.83	0.00*
I think I could run for a long time without getting tired	4.00/ 2.00	3.00/ 2.00	0.79	0.43	4.00/ 2.00	3.00/ 2.00	4.84	0.00*

MED- QR- median-quartile range; Z-z score; p- statistical significance (<0,05)

Table 3 shows the results of the Mann-Whitney U test used to define significant differences in the dimensions of PSP relevant for the subject of PE with regard to nutritional status. We specifically calculated the analysis of differences on subsamples by age.

On the sample of 4th-grade participants, we obtained statistically significant differences in five variables. Normal weight 4th-grade participants rate their coordination (*In most physical activities, I perform movements harmoniously* Z=-3,22; p=0,00; *I easily control my body movements* (Z=-2,49; p<0,01); flexibility (*I think I am flexible enough for most sports* z=-2,49; p<0,01) and endurance (*I can run for a long time without stopping* Z=-2,61; p<0,01; *I think I could run for a long time without getting tired* Z=-2,22; p<0,03) significantly higher than overweight participants. On the sample of 8th-grade participants, we obtained statistically significant differences in two variables.

Overweight 8th-grade participants rate their strength (*I am stronger than most of my peers* Z=2,82; p=0,00; *I can lift heavy objects* Z=3,32; p=0,00) significantly higher than normal weight participants. There were no statistically significant differences in the other variables.

Table 3. Differences among Participants in PSP Dimensions Relevant for the Subject of PE by Nutritional Status (at the Age Subsamples)

	4th grade				8th grade			
	Normal weight	Over-weight			Normal weight	Over-weight		
	MED (QR)	MED (QR)	Z	p	MED (QR)	MED (QR)	Z	p
In most physical activities, I perform movements harmoniously	5.00/ 0.00	4.00/ 1.00	-3.22	0.00*	4.00/ 1.00	5.00/ 1.00	1.18	0.24
I easily control my body movements	5.00/ 1.00	4.00/ 1.00	-2.49	0.01*	5.00/ 1.00	5.00/ 1.00	0.28	0.78
I'm good at most sports	5.00/ 1.00	4.00/ 2.00	-1.86	0.06	4.00/ 2.00	5.00/ 2.00	1.31	0.19
I am stronger than most of my peers	3.00/ 1.00	4.00/ 2.00	1.59	0.11	3.00/ 2.00	4.00/ 2.00	2.82	0.00*
I can lift heavy objects	4.00/ 2.00	4.00/ 2.00	0.78	0.43	4.00/ 2.00	5.00/ 1.00	3.32	0.00*
I think I am flexible enough for most sports	5.00/ 1.00	3.00/ 2.00	-2.49	0.01*	4.00/ 2.00	4.00/ 2.00	0.43	0.66
I can run for a long time without stopping	4.00/ 2.00	3.00/ 1.00	-2.61	0.01*	4.00/ 2.00	3.50/ 2.00	0.01	0.99
I think I could run for a long time without getting tired	4.00/ 3.00	3.00/ 2.00	-2.22	0.03*	3.00/ 2.00	3.00/ 2.00	-0.18	0.85

MED- QR- median-quartile range; Z-z score; p- statistical significance (<0,05)

Discussion

Assessment of one's own abilities gives a significant contribution to the performance of certain motor tasks, but also to general participation in physical activity.

Studies have shown that a high level of physical self-perception is positively associated with the motivation for participation in physical activity (Biddle and Wang, 2003; Palacios-Cartagena, Parraca, Mendoza-Muñoz, Pastor-Cisneros, Muñoz-Bermejo and Adsuar, 2022). In addition, a high level of self-perception contributes to the achievement of better results on individual motor tests (Carraro, Scarpa, and Ventura, 2010; Cecić Erpič and Bezjak, 2021).

In this paper we examined individual dimensions of students' self-perception relevant to PE classes. The results showed that most participants rate themselves as sufficiently coordinated, strong, flexible and skilful in performing motor tasks. We obtained significant differences in certain dimensions of self-perception with regard to gender. These results are consistent with other studies that have also found differences in self-perception with respect to gender (Klomsten, Skaalvik and Espnes, 2004; Williams, 2013; Ruiz-Montero et al. 2020). Some authors found that male students have a higher level of self-perception in those dimensions that are socially imposed as more acceptable to a particular gender (Klomsten et al. 2004, according to Beasley and Garn, 2013). With increasing age, the number of items on which students differ by gender with respect to age also increases. In the fourth grade, male students' self-rate their strength significantly better than their female peers do, while in the eighth grade, this difference is significant in all variables. Testing the differences in physical self-perception by age after controlling for gender, the research results of Cecić Erpić and Bezjak (2021) pointed to significant differences in the dependent variables of body fat, strength, flexibility, and global self-esteem. The results of our research indicate that body self-concept significantly decreases with increasing age, especially in girls, which has been confirmed by the results of other studies (Inchley, Kirby and Currie, 2011; Nobre and Valentini, 2019; Navarro-Patón, Pazos-Couto, Rodríguez-Fernández and Arufe-Giraldez, 2020).

The relationship between obesity and physical self-perception, especially in children and young adults, has important implications for physical performance and the systematic implementation of physical activity. Obesity has negative effects on both motor performance and physical self-perception (Morano, Colella, Robazza, Bortoli and Capranica, 2011). In this study we obtained significant differences in the dimensions of self-perception according to nutritional status.

In our study, participants with normal weight gave more positive assessments of their coordination, flexibility, and endurance, while obese participants gave more positive assessments of their strength, a finding which is similar to the research results of Lazarević, Radisavljević Janić, Milanović and Lazarević (2011).

Moreover, in a study by Monacis, Trecroci, Invernizzi and Colella (2022), the results showed significant differences in physical self-perception between normal-weight, overweight, and obese children. In other studies, overweight children have a poorer perception of most of their abilities, but also estimate their strength to be greater (Sung, Yu, So, Lam and Hau 2005). The authors point out that exercise programs for overweight children should be targeted according to better assessed dimensions of self-perception. This would improve the motivation to participate in physical activity. Otherwise, low levels of perceived physical competence, which are common in obese children, may result in less motivation to engage and persist in physical activities, resulting in fewer opportunities to improve their skills and their perception of competence (Stodden et al. 2008).

Numerous authors indicate that children with a higher degree of motor competence and higher self-perception have a higher level of physical activity (De Meester et al. 2016; Jaakkola et al. 2019; Britton, Issartel, Symonds and Belton 2020). The development of motor skills and the acquisition of motor competences during childhood contributes to the formation of experiences related to physical activity, a higher level of physical self-perception, and thus to the maintenance of their physical activity in the future (Loprinzi, Davis and Fu, 2015). A better assessment of physical self-perception increases motivation, commitment, and participation in physical activity (Borrego-Balsalobre et al. 2023) and is a significant predictive factor for their future physical activity (Utesch, Dreiskämper, Naul and Geukes, 2018). Research conducted on a sample of overweight children (Morano et al. 2020), shows that the systematic implementation of a multi-component exercise program can improve the level of PA, fitness and perception of competence among overweight participants. Authors Borrego-Balsalobre et al. (2023) indicate the need for diverse and motivating approaches in physical education classes for students with different nutritional status to acquire commitment to the practice of physical activity and thus to maintain healthy habits throughout life.

There are limitations in this study that could influence the interpretation of the main outcomes. The sample for this research comprised preadolescent and adolescent students who were in the period of maturation accompanied by multiple changes.

Maturation processes accompanied by multiple changes are not the same in all individuals, so it can be a confounding factor that needs to be minimized or eliminated in future studies. This is a relatively small sample of respondents from a certain region in Croatia, so the data cannot be extrapolated.

Despite the limitations, the present study contributes to better understanding of changes in physical self-perception according to gender and indicates a decrease in physical self-perception with age. The results of this study indicate risk groups that need strategies aimed to raise the level of PSP and thus to increase participation in physical activity. Low levels of PSP may be an obstacle to engaging in physical activity, so intensive work should be done to increase physical self-perception especially on the sample of female students who stood out as a risk group.

Conclusion

The results of this study indicate that most students make adequate evaluations of certain dimensions of self-perception high. However, comparing the evaluation of individual dimensions that are important for successful performance of motor tasks in PE class, we observed significant differences depending on gender and nutritional status. We also observed that the significant differences were more pronounced with age. In 4th grade, male students report better self-perception only on the dimension of strength, while in 8th grade, male students compared to female students report more positive assessments of all dimensions important for successful performance of motor tasks in PE class. The sample for this research consisted of preadolescent and adolescent students who are in the period of maturation accompanied by multiple changes. This period is also characterized by a decrease in the level of physical activity, so physical self-perception is an important determinant of adolescent physical activity. Strategies for raising the level of PSP should be focused on those dimensions that participants value highly. In this way, there will be no lack of motivation to participate, and a comprehensive approach will contribute to better physical fitness and an improved level of physical activity and will affect the raising of other dimensions of self-perception.

Future research should be aimed at the target group of adolescent students with similar characteristics. It would be desirable to assess the relationship between physical self-perception and the actual assessment of physical fitness.

Also, when assessing physical self-perception, the factors that should be taken into consideration and that could have a significant impact are the curriculum of the PE class as well as the student's previous involvement in sports activities.

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