


Measuring physical self-concept of schoolchildren aged 10 to 16 on physical education lessons

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ABSTRACT

This research aim was to determine what happens to physical self-concept during compulsory schooling. 1419 students from Primary (n = 619) and Secondary School (n = 800) participated: 640 boys and 779 girls; $M_{age} = 12.81$, $SD = 1.93$. There were statistically significant differences in age and educational stage, regarding physical condition (PhC) ($p < .001$), appearance (AP) ($p < .001$), perceived competence (PC) ($p < .001$), strength (St) ($p < .001$) and self-esteem (SE) ($p < .001$); *In the gender factor in PhC* ($p = .005$). Results showed a decrease in PhC, AP, PC, St and SE in the passage from Primary to Secondary School, as these variables are higher in boys than in girls. Based on results, it should be reflected on teaching practice and methodology used in these ages, because physical self-concept is an important factor for becoming and remaining physically active. **Keywords:** Self-esteem; Perceived competence; Physical condition; Appearance; Strength; Physical education.

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INTRODUCTION

The physical and psychological benefits of physical activity in order to promote an active lifestyle, health and welfare among the youth has been broached by the scientific evidence (Gao, Stodden and Feng, 2014; Goñi and Rodríguez, 2007; Goodway, et al., 2014), as well as the positive relation between this practice and the physic self-concept (Esnaola, 2005; Grao-Cruces, Nuviala, Fernández-Martínez and Pérez-Turpin, 2014; Guillén and Ramírez, 2011; Reigal, Videra, Parra and Juárez, 2012). Multiple studies show that kids are most likely participating on physical-sportive activities when they feel skilled (Atkins, Johnson, Force and Petrie, 2015). This is due to the fact that with the right intervention, physical-sportive practice can change the self-concept of the person (Madariaga and Goñi, 2009), and this change happens because of the negative and positive experiences and interpretations of the individual, leading to his or her gradual process of differentiation (Goñi, 2009).

It is that kind of intervention the one that must be started at Physical-Education (PE) classes during mandatory school ages, because childhood and preteen ages are the most critical stages of the human being development, due to the huge changes at a physical, emotional and social level (Mancilla, et al., 2012). In this moment, the self- image it is starting to be built and so do the dissatisfactions regarding the own body (Blakely-McClure and Ostrov, 2016; Schore, 2015). Not only the body, but also the personality is not completely created, which represents another critical stage of the human development (Castro, 2013).

It is also true that during these ages, boys and girls are easily influenced, that is why is good to take advantage of it and try to transmit positive and healthy habits (Ruiz-Juan, De la Cruz, Ruiz-Ruisueño and García, 2008). The school plays an important role in order to promote cognitive, social and emotional skills to reach a global and balanced development of the person (Durlak, Weissberg, Dymnicki, Taylor and Schellinger, 2011). Therefore, the social-affective stability of the students, it is one of the main goals during Primary and Secondary Education. (Esnaola, Goñi and Madariaga, 2008). The right perception of the body is significative for the comprehensive development, because the self-concept can condition the people's behaviours (Fernández, Contreras, González and Abellán, 2011).

Regarding the hierarchical model of Shavelson, Hubner and Stanton (1976), the self-concept is a multidimensional construct consisting of specific domains related to academic subjects (f.e mathematics or language) and no academic (physical, social and emotional). The physical self-concept it is considered a multidimensional and hierarchical construct which can be defined as a mental representation that everyone has of his or her corporal truth, which includes cognitive, perceptive affective and emotional elements, among others (Fox and Cobin, 1989). It also has subdomains (Fernández-Bustos, González-Martí, Contreras and Cuevas, 2015; Fernández, Contreras, García and González Villora, 2010), that fluctuate according to the accepted physical self-concept model (Esnaola, et al., 2008). The most solid model is the one already mentioned of Fox and Corbin (1989), and used for this study, in which the highest level of the hierarchy is represented by the self-esteem (the positive or negative perception the person has about him or herself). The next level is represented by a global structure called physical self-esteem (general feeling of happiness, satisfaction or pride regarding the own body). Finally, the lower level, is it occupied by four constructs: sportive skills, (athletic capacity, and capacity to learn sports) physical condition (resistance and physical condition) physical attraction (appearance) and physical strength (perceived strength and muscle development (Fox and Corbin, 1989).

The previous scientific literature the researches have given regarding physical self-concept, indicate that the results change according to different ages: some of them reveal that physical self-concept decreases only in

ages between 12 and 14 (Nuñez and González-Pienda, 1994); and others, show that it decreases as the preteen age increases and it stabilizes at adult ages (Dieppa, Guillén, Machargo and Luján, 2008; Moreno, Cervelló and Moreno, 2008); On the other hand, other researches claim that this only occurs regarding physical condition and competence (physical skills) domains, while regarding appearance and strength this tendency does not exist (Esnaola, 2005; Goñi, Ruiz de Azúa and Rodríguez, 2004).

Regarding the relation between physical self-concept and gender, the researches reveal that generally, the feminine gender has a worse self-concept than masculine gender, during Primary Education and also Secondary Education (Barrio, Gómez-Ruano and Barriopedro, 2017; Coelho, Sousa and Figueira, 2014; Esnaola, 2005; Hortigüela-Alcalá and Pérez-Pueyo, 2015; Marsh, Gerlach, Trautwein, Ludtke and Brettschneider, 2007; Moreno et al., 2008; Revuelta, Esnaola and Goñi, 2013; Sánchez-Alcaraz and Gómez-Marmol, 2014; Soriano, Navas and Holgado, 2011).

Ultimately, it can be said that previous scientific literature shows some empirical evidences about age and gender regarding the physical self-concept, but not gathering the age ranges of this study (5th and 6th Primary Education and 1st, 2nd, 3rd and 4th ESO), and neither the stages from late childhood, preteen and teenage years as Ruíz de Azúa, Goñi and Madariaga (2009) do.

In this why, with a cross-sectional design, comparing the physical self-concept on different groups of ages between late childhood and teenage years, this research tries to approach to the knowledge and development of the mentioned construct, and its objective is to determine what happens with the physical self-concept during mandatory school years. First of all, the different dimensions of the self-concept have been analysed; secondly, they have been analysed regarding age, academic level and gender, in order to know how it fluctuates when these variables change, and how they evolve.

Therefore, the initial hypothesis is that the scores of the physical self-concept dimensions will be higher regarding younger pupils, and they will decrease gradually until age 16. The second hypothesis claims that during late childhood there will be no differences between girls and boys, but as the age increases, these differences will appear and also increase.

METHOD

Design

A descriptive, analytical, relational comparative design with transversal cut was made in order to give an answer to de planned objective of the research (Ato, López and Benavente, 2013).

Sample

The sample's selection was a convenience non-probabilistic sample. 1419 Primary Education students ($n = 619$) and Secondary Mandatory Education ($n = 800$) participated. From this group, 640 were boys and 779 girls; $M_{age} = 12.89$, $DT = 1.93$. Al lot of them were schooled in different schools from Lugo, A Coruña, Ourense and Pontevedra.

Tool

In order to obtain the data for the research, the physical self-concept scale was used. It is an adjustment of the physical self-concept scale established by Fox and Corbin (1989), adjusted by Moreno and Cervelló to the Spanish context, which offers suitable psychometric properties ($\chi^2 = 5464.62$, $p < .001$; $\chi^2 / g.l. = 2.91$,

CFI = 0.95, PNFI = 0.81, TLI = 0.94, RMSEA = .07), and it is accepted to be used for different contexts and ages (Asçi, 2005; Maiano, Ninot and Bilard, 2004).

The scale is integrated by 30 items headed by the statement “When I make physical activity...” Those items correlate with a Likert scale, from 1 (totally disagree) to 4 (totally agree). It consist of five factors: physical condition (e.g. “I feel proud of what I am and what I can physically do”), appearance (e.g. “I feel satisfied the way I am physically”) perceived competence (e.g. “I am really good in almost every sport”), strength (e.g. “My muscles are strong as most of the people of my gender”) and self- esteem (e.g. “I have little confidence when it comes to my physical strength”). Internal consistency was found in every factor, as we can see in Table 1.

Procedure

First of all, the schools were asked to collaborate, and give some information. Also, the student’s parents were asked for permission. Only the students with written authorization of their legally responsible could participate in order to respect the ethic precepts of Helsinki’s Declaration.

The tool described before to measure the physical self-concept during PE classes, was applied by the investigators during PE classes in every school of the sample with the permission of the teachers. In order to avoid interferences, the professor was asked to be outside the class.

There were given 20 minutes to answer the questionnaire, after a speech in which the activity was explained and some questions were answered. The students were told that there were not correct or incorrect answers so they will give fearless and honest answers. The investigators resolved every question the students made during the time they were given to cover the questionnaire.

Statistical Analysis

First of all, the descriptive statistics were calculated (average and standard deviation), also the bivariate ones, through Pearson’s Coefficient of Correlation. After, the reliability of the subscales through *alfa Cronbach* Coefficient (Table 1). The variance analysis (ANOVA) was made in order to observe what happened with the age factor regarding the PSPP dimensions, through the *Welch* statistic due to the lack of homoscedasticity and also the *post hoc* test using the *Games-Howell* statistic to study the peer significance. Subsequently, the bifactorial variance analysis (ANOVA) was made for each studied variable: The first factor was the educative stage with two levels (Primary Education and Secondary Education) and the second factor was the gender variable (man-woman). The main effects were studied, and also the interaction between variables, using the *Bonferroni* statistic in order to know the significance. For all that, a statistical package called IBM SPSS Statistics v. 20.0 was applied, with a 95% of confidence interval.

RESULTS

Descriptive Analysis, Confidence Analysis and Correlations

Table 1 shows the descriptive statistics of the used variables, the confidence analysis and also its correlation. The results of the confidence analysis showed suitable values in all the analysed dimensions. On the correlation analysis it should be highlighted the high and positive significance between physical condition (PhC) and perceived competence (PC), as well as the positive relation with appearance (AP), strength (St) and self-esteem (SE). Also, the positive and significative relation between AP and PC, St and SE, as well as between PC and St and this last one with SE.

Table 1. Mean, standard deviation, asymmetry, kurtosis, confidence analysis and bivariate correlations between the studied dimensions of the PSPP

Dimensions	M	SD	A	K	α	PhC	AP	PC	St	SE
Physical Condition (PhC)	2.96	.65	-.39	-.35	.776	1	.598**	.730**	.540**	.497**
Appearance (AP)	2.82	.61	-.36	-.14	.737	1	1	.515**	.531**	.574**
Perceived Competence (PC)	2.74	.72	-.31	-.56	.808	-	-	1	.503**	.382**
Strength (St)	2.73	.65	-.08	-.33	.718	-	-	-	1	.520**
Self- esteem (SE)	3.01	.66	-.49	-.06	.702	-	-	-	-	1

M = Mean; SD = Standard deviation; A = Asymmetry; K = Kurtosis; α = Alpha of Cronbach.

** The correlation is significative at level .01 (Bilateral).

As it can be observed, the asymmetry and kurtosis values fulfil the normal criterion proposed by Curran, West and Finch (1996).

Variance Analysis regarding age

Table 2 shows the averages and standard deviations of PSPP from the questionnaires, regarding the age of the students.

Table 2. Descriptive data of the analysed variables of the PSPP. Mean, Standard Deviation, regarding age

	10 (n = 220)		11 (n = 215)		12 (n = 212)		13 (n = 214)		14 (n = 218)		15 (n = 200)		16 (n = 140)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
PhC	3.23	.53	3.26	.62	3.14	.54	2.94	.66	2.81	.59	2.68	.63	2.57	.71
AP	3.03	.57	2.99	.55	2.97	.55	2.75	.57	2.77	.55	2.57	.61	2.54	.69
PC	3.05	.60	2.89	.72	2.92	.66	2.75	.68	2.59	.70	2.42	.62	2.40	.77
St	2.88	.61	2.79	.69	2.92	.60	2.71	.64	2.65	.55	2.59	.54	2.51	.67
SE	3.14	.68	3.19	.64	3.08	.70	2.97	.61	2.90	.63	2.92	.57	2.82	.68

M: Mean. SD: Standard deviation. PhC: Physical Condition; AP: Appearance; PC: Perceived Competence; St: Strength; SE: Self-esteem.

The ANOVA results show that there is a statistic significative effect between age of the students and PhC ($F(6, 1412) = 32.057; p < .001, \eta^2 = .12$), la AP ($F(6, 1412) = 20.251; p < .001, \eta^2 = .08$); PC ($F(6, 1412) = 28.789; p < .001, \eta^2 = .10$); St ($F(6, 1412) = 11.292; p < .001, \eta^2 = .04$) and the SE ($F(6, 1412) = 8.190; p < .001, \eta^2 = .03$).

The multiple comparisons indicate the existence of statistical significative differences regarding PhC among the group of 10, 11 and 12 with the 13 year old students ($p < .001$), 14 ($p < .001$), 15 ($p < .001$) and 16 ($p < .001$). Also statistical significative differences were found between the 13 and 15 year old boys ($p = .001$), among the 16 year old students ($p < .001$) and also between 14 and 16 year old students ($p = .021$).

Also, the multiple comparisons indicate that regarding AP, there are statistical significative differences between the 10, 11 and 12 year olds ($p < .001$), 14 ($p < .001$), 15 ($p < .001$) and 16 ($p < .001$). As well as statistical significative differences between the 13 and 15 year olds ($p = .037$) and 16 year old kids ($p = .038$), as well as between 14 and 15 ($p = .009$) and also 14 and 16 ($p = .013$).

Regarding PC, the multiple comparisons show the existence of statistical significative differences between the group of 10,11 and 12 year old kids with the 14 year old ones ($p < .001$), 15 ($p < .001$) and 16 ($p < .001$),

as well as the 10 year olds with the 13 year old kids ($p < .001$). They were also found statistical significative differences between the 13 and 15 year olds ($p < .001$) and the 16 year old kids ($p < .001$).

Regarding St, the statistical significative differences were found between the students group of 10 and 14 year olds ($p = .001$), 15 ($p < .001$) and 16 ($p < .001$); between the 11 and 15 year old students ($p = .018$) and the ones with age 16 ($p = .003$) and between the 12 and 13 year olds ($p = .014$), the 14 ($p < .001$), the 15 ($p < .001$), and the 16 year olds ($p < 0.001$), having no more differences between the other ages.

Finally, regarding SE, the in pairs comparisons indicate the existence of statistical significative differences between the 10 and the 14 year old students ($p = .004$), the 15 ($p = .010$) and 16 ($p < .001$); between the 11 and 13 year olds ($p = .006$), and the 14 ($p < .001$), the 15 year olds ($p < .001$) and 16 ($p < .001$) and also between the 12 and the 16 year old students ($p = .012$).

Factorial Variance Analysis regarding educative stage and gender

Table 3 shows averages and standard deviation of the PSPP variables gathered from the questionnaire regarding educative stage and gender.

Table 3. Descriptive data of the analysed variables of the PSPP. Mean, Standard Deviation, regarding gender and educative stage

Variable	Educative Stage	Total		Boys		Girls	
		M	SD	M	SD	M	SD
PhC	Primary	3.24	.55	3.28	.55	3.21	.54
	Secondary	2.73	.64	2.79	.65	2.68	.64
AP	Primary	3.01	.57	3.02	.56	3.00	.58
	Secondary	2.67	.60	2.71	.56	2.64	.62
PC	Primary	3.02	.64	3.04	.64	3.00	.64
	Secondary	2.52	.70	2.58	.71	2.47	.69
St	Primary	2.90	.65	2.87	.65	2.93	.64
	Secondary	2.60	.58	2.62	.58	2.59	.59
SE	Primary	3.21	.64	3.18	.66	3.23	.63
	Secondary	2.86	.63	2.96	.54	2.78	.68

M: Mean; SD: Standard Deviation; PhC: Physical Condition; AP: Appearance; PC: Perceived competence; St: Strength; SE: Self-esteem.

The factorial ANOVA results regarding PhC indicated the existence of a main significative effect of the educative stage $F(1, 1415) = 246.87, p < .001, \eta^2 = .01$ and the gender factor $F(1, 1415) = 8.01, p = .005, \eta^2 = .01$, but not their interaction ($p = .190$). Regarding AP, the results showed that here is only a main significative effect in the educative stage $F(1, 1415) = 114.67, p < .001, \eta^2 = .07$. Regarding PC, the factorial ANOVA results, indicated the existence of a main significative effect on the education stage factor $F(1, 1415) = 184.18, p < .001, \eta^2 = .11$ and the gender factor $F(1, 1415) = 4.93, p = .027, \eta^2 = .01$. The factorial ANOVA results regarding St, indicated that there is only a main significative effect of the educative stage $F(1, 1415) = 82.97, p < .001, \eta^2 = .05$. Finally, the factorial ANOVA results regarding SE showed the existence of a main significative effect of the educative stage factor, $F(1, 1415) = 97.45, p < .001, \eta^2 = .06$, and the interaction between educative sage and gender factors $F(1, 1415) = 12.29, p < .001, \eta^2 = .01$, but not regarding the gender factor ($p = .058$).

Regarding the in pairs comparisons of the 5 dimensions of the physical self-concept, there were found statistical significant differences between Primary Education (PE) students and Secondary Education students regarding the PhC on the stage factor ($p < .001$), on the AP ($p < .001$), PC ($p < .001$), St ($p < .001$) and SE ($p < .001$). The PE student's values were higher.

Regarding gender, there were found statistical significant differences between boys and girls with regard to PhC ($p = .005$), PC ($p = .027$). It was higher in boys.

The in pairs comparison regarding the interaction between gender and the educative stage, there were found statistical significant differences between boys and girls of Secondary Education regarding PhC ($p = .009$) and also regarding SE ($p < .001$). The values of the male gender were higher than those of the female gender.

DISCUSSION

This research has been carried out around the study of the physical self-concept regarding age, educative stage and gender of the students, always searching for the existence of significant differences between the obtained perceptions of this construct dimensions concerning different age groups taking into account boys and girls. That is why, the importance of this research consists in the fact that it covers two educative stages (5th and 6th of Primary School and Mandatory Secondary Education) understood as a critical phase in which the students abandon physical activity practice and so, they are not enough active (Moscoso, Martín, Pedrajas and Sánchez, 2013). This could lead into having serious physical and psychological problems. Positive significant correlations were obtained in other studies regarding similar contexts, as the one carried out by Guillén and Ramírez (2011), a lot of them significant ($p < .001$).

Generally, considering the punctuations given by the sample, the data indicates that the students of those ages have high self-esteem, this means, happiness, satisfaction and pride regarding their body (Fox and Corbin, 1989).

Regarding physical condition, the punctuations were also high, and decrease regarding appearance, competence and strength due to the lower punctuation given by the older students, as it happened in researches such as the one carried out by Esnaola (2008), Goñi et al. (2004) and Moreno et al. (2008), maybe because of the social pressure during the teen and youth ages.

Regarding the age, this research shows significant differences for all the studied dimensions but with more statistical power on physical condition and perceived competence because there are differences between more age groups, in particular, between students of 10, 11 and 12 years old comparing with the other groups, even though there are also differences between the rest of the dimensions as it happened in the study carried out by Esnaola (2008), Goñi, et al. (2004), Moreno et al. (2008) and Novo and Silva (2003), fact that can be explained because as the age goes up, the self-concept decreases, as a result of positive and negative experiences the students have, which are even more influential as it says in the studies carried out by Eccles et al (1989) and Núñez and González-Pienda (1994). On the other hand, it must be highlighted that there are not differences between the different dimensions of the self-concept in ages from 13 to 16, as it happened in the studies made by Goñi, Ruiz de Arzúa and Rodríguez (2006).

On the other hand, there were not found statistical significant differences between students ages 10, 11 and 12, but it can be observed that they get worse as the age increases, from 10 to 11 and also from 11 to 12, as it happened in the studies made by Pastor, Balaguer and García-Merita (2003) and Navarro, Barreal

and Basanta (2016). Also, this matches the results obtained by Asçi (2002), who claims that the evolution of the different dimensions of the self-concept is hard to value on persons with such close ages.

In essence the obtained results regarding ages, matches with the study of Esnaola (2008), the perceptions of the physical self-concept change at low ages (childhood: 10, 11 and 12 years old), they decrease during teenage stage (from 13 to 16) and increases again during adult ages (not investigated in this research).

From the obtained results, the first hypothesis must be accepted, due to the punctuations of the different dimensions of the physical self-concept, because they decreased as the age went up.

The discoveries of our research regarding educative stage indicate that the students from Primary Education show higher punctuations in all dimensions of the physical self-concept than the Secondary Education students, regarding boys and girls, and also that between students from Primary Education there are no statistical significative differences in any dimension of the physical self-concept, as it shows the study made by Navarro et al. (2016). The obtained results show that, as the school grade increases, students go from one educative stage to another or the age increases, the students have a lower perception about their physical condition, appearance, strength, self-esteem and competence, maybe due to the fact that as the age increases, we are more critic and aware of our own corporal truth (Fraile and Catalina, 2013). On the other hand, this results also could be due to the method used by the PE teacher, because, generally, during PE classes, a climate of competition and efficiency is created, which promotes, even more in male students, a higher competence (Granero-Gallegos and Baena-Extremera, 2014) or maybe it's due to the fact that activities preferred by the female students such as dance, are not carried out (Amado, et al., 2014; O'Neill, Pate and Liese, 2011).

Regarding gender, generally, there are statistical significative differences on several dimensions which compose the physical self-concept, most of all, in the ones that have a higher relation to physical activity practice or sports such as the physical condition and competence, with higher punctuations given by the boys (Fraile and Catalina, 2013).

Particularly, gender does not condition in a significative way the physical self-concept of the participants during the primary stage, the punctuations are really similar between boys and girls as it happened in the study of Navarro et al. (2016). However, these differences, are bigger regarding boys and girls in Secondary Education, and so, the male gender shows higher punctuations in all dimensions of the physical self-concept, and making those differences significative regarding physical condition, perceived competence: the boys feel more skilled regarding sports, with higher level of physical condition; and also regarding self-esteem, because girls as their age increases, their corporal satisfaction decreases (Fraile and Catalina, 2013; Moreno, Moreno and Cervelló, 2007), this may be due to the fact that girls relate physical attraction with all the physical self-concept dimensions, while boys, base themselves in aspects related to strength and personal ego (Fletcher and Hattie, 2005).

For all that, it is accepted also the second hypothesis, because there are statistical significative differences regarding the gender variable (Goñi, et al., 2006; Klomsten, Marsh, and Skaalvik, 2005; Klomsten, Skaalvik and Espnes, 2004; Lohbeck, Tietjens and Bund, 2014; Ruiz de Azúa, 2007; Soriano, Sampascual and Navas, 2010) but only among the Secondary Education age group (12-16 years old), because during primary school, the average punctuations are higher in boys than girls but not in a statistical significative way.

CONCLUSIONS

As the objectives said, the physical self-concept in mandatory education was evaluated (Primary Education, 5th and 6th grade; and Secondary Education). Showing the fact that there is a better physical self-concept among the Primary Education students that regarding Secondary Education students, and also better regarding boys than girls. The results indicate that, as the grade increases, the students feel a lower perception of the five dimensions that form the physical self-concept. The results show significative differences between primary stage and secondary.

It should be deepening the reasons why. Therefore, this way something could be done to cause a higher adherence to the sportive practice, because, if a student, girl or boy, has a higher physical self-concept, it is expected for her or him to have a higher adherence to the physical-sportive activity practice (Esnaola, 2005; Grao-Cruces, et al., 2014; Guillén and Ramírez, 2011; Reigal, et al., 2012).

On the other hand, regarding the PE teacher role, he or she should take action in order to develop the perception of physical skills, physical condition, strength, appearance and self-esteem that the students have of themselves in order to make them increase. On one side, the teachers could plan non-competitive activities (Goñi and Zulaika, 2000, Navarro-Patón, Rego and García, 2018) with different levels of difficulty, provide different opportunities to choose activities and give an appropriate feedback (Goñi and Zulaika, 2000; Lohbeck, Tietjens and Bund, 2016; Navarro-Patón, et al., 2018).

Finally, it should be highlighted the fact that this investigation presents some limitations that should be had in mind in order to improve them. They are due to the sample's selection, which it was not made randomly, and so it forces us to be cautious with the results. It has not been studied neither the content carried out on the previous PE classes, or the practised sports, the frequency, intensity or level, which could influence on the physical self-concept of the students. Another limitation is the used design of the study, because it is a cross study. It would be interesting to develop a longitudinal research, with an experimental group in which the effects on the variables after a planned intervention were known, because these kinds of researches, would allow the design of formation programmes for the teachers to intervene in PE classes, enhancing the self-concept.

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