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Self-Concept in Physical Education for Post-Pandemic School Health Improvement

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Abstract

Self-concept is one of the key aspects of personality development. It is relevant because it affects how a person sees him/herself and how he/she relates to others. During adolescence, self-perception tends to be highly variable due to the inherent changes of this stage, being a critical period in which to foster a healthy and confident personality. Add to this the critical circumstances experienced during the pandemic and it becomes a bombshell. Physical education classes, can promote the self-concept and improve school health. The aim of the study was to analyse self-concept in Spanish adolescents of physical education by sex, school location, age, educational level and body mass index (BMI) after the pandemic. A cross-sectional study of 961 students' physical education classes in public schools in Extremadura (Spain) was obtained and administered the Self-Concept Questionnaire version 5 (AF-5). The results showed that there is an association between AF-5 and sex, where adolescent girls have lower self-concept; there is a slight inverse relationship between AF-5 with age and BMI and there is no significant association between AF-5 and school location. In conclusion, knowing the relevant factors of self-concept after covid allows the educational community to implement tools for the optimal development of self-concept in Physical Education students, thus performance of adolescents.

Keywords

Self-esteem; Adolescence; Physical Education; Covid; Mental health.

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Autoconcepto en educación física para mejorar la salud escolar pospandemia

Resumen

El autoconcepto es uno de los aspectos clave del desarrollo de la personalidad. Es relevante porque afecta cómo una persona se ve a sí misma y cómo se relaciona con los demás. Durante la adolescencia la autopercepción suele ser muy variable debido a los cambios inherentes a esta etapa, siendo un periodo crítico para fomentar una personalidad sana y segura. Si a esto le sumamos las circunstancias críticas vividas durante la pandemia, se convierte en un bombazo. Las clases de educación física, pueden favorecer el autoconcepto y mejorar la salud escolar. El objetivo del estudio fue analizar el autoconcepto en adolescentes españoles de educación física según sexo, localización escolar, edad, nivel educativo e índice de masa corporal (IMC) tras la pandemia. Se realizó un estudio transversal de 961 alumnos de clases de educación física de colegios públicos de Extremadura (España), a los que se les aplicó el Cuestionario de Autoconcepto versión 5 (AF-5). Los resultados mostraron que existe asociación entre AF-5 y el sexo, donde las adolescentes tienen un menor autoconcepto; existe una ligera relación inversa entre AF-5 con la edad y el IMC y no existe una asociación significativa entre AF-5 y la ubicación de la escuela. En conclusión, conocer los factores relevantes del autoconcepto post covid permite a la comunidad educativa implementar herramientas para el óptimo desarrollo del autoconcepto en los estudiantes de Educación Física y con ello del desempeño de los adolescentes.

Palabras clave

Autoconcepto; Adolescencia; Educación física; Covid; Salud Mental.

Introduction

The COVID-19 pandemic has affected large numbers of people around the world since late 2019, in many cases leaving sequelae that persist to this day. COVID-19 has had a major impact globally, resulting in millions of deaths and disease sequelae that affect the quality of life of those who experienced it, not only because of the disease but also because of the effects of isolation (Koc, Xiao, Liu, Li, & Chen, 2022; Paules, Marston, & Fauci, 2020).

Self-concept is a key aspect of mental health (Haquin, Larraguibel, & Cabezas, 2004) and, as such, is of considerable importance in today's society, where mental disorders and illnesses are on the rise (Pupo-González, Nogueras-Reyes, de-Prada-Justel, & Labrada-Pupo, 2018). It refers to how a person sees him/herself and perceives his/her own value and ability (Lamoutte, 1993). During adolescence, self-concept can be particularly vulnerable due to social pressure, comparison with others and identity development (De Gracia, Marcó, Fernández, & Juan, 1999).

Self-concept is a person's perception of him/herself, including his/her characteristics, abilities, values and goals (Gonzales, 2019). This self-perception is generated through life experience and feedback from others, and can affect how a person behaves and relates to others (González-Pienda, Pérez, Pumariiega, & García, 1997). A positive self-concept can lead to higher self-esteem and emotional well-being (Roa García, 2013), while a negative self-concept can be a risk factor for psychological problems and personality disorders (Muñoz García, Navas Collado, & Graña Gómez, 2005).

During adolescence, self-concept is often highly variable due to the physical, emotional and social changes that are occurring at this stage (Wenz-Gross, Siperstein, Untch, & Widaman, 1997). Young people's views of themselves are often influenced by external factors such as school performance, social relationships and physical appearance (Rosenberg, 2017). However, it is important to foster a positive self-concept in adolescents to help them face life's challenges with more confidence and security (Mallette, 2021).

In this sense, physical activity (PA) can have a positive impact on self-concept (Babic et al., 2014), as it often leads to a sense of achievement and improvement in physical health and well-being (Lubans, Plotnikoff, & Lubans, 2012). In addition, PA can help improve self-confidence and increase self-esteem (Sonstroem, 1984), as it is associated with a greater sense of control over one's body and health (Paluska & Schwenk, 2000). It can also be a way of challenging oneself and pushing limits, which can lead to greater personal satisfaction and improved self-perception (Natacha Palenzuela-Luis, Gonzalo Duarte-Clímets, Juan Gómez-Salgado, José Ángel Rodríguez-Gómez, & Maria Begoña Sánchez-Gómez, 2022).

However, it is important to keep in mind that the effect of PA on self-concept may vary from person to person and may be influenced by factors such as age, sex, culture and previous experience with exercise (McConnell, 2011). Therefore, it is important to find a type of PA that is enjoyable and sustainable, and to adopt a healthy and positive approach to exercise (Teixeira, Carraça, Markland, Silva, & Ryan, 2012) rather than focusing on physical appearance or competition with others (Martins et al., 2021).

So, physical education (PE) can be the key to positive self-concept management (Curran & Standage, 2017) by improving confidence in physical abilities and a sense of achievement in completing challenging PA (J. G. Fernández-Bustos, Infantes-Paniagua, Cuevas, & Contreras, 2019). However, it is important that the emphasis in PE is on skill development and not on comparison with others, to avoid damaging self-concept, so it is paramount to foster a supportive and non-comparative environment in PE (Babic et al., 2014).

Self-concept assessment is critical in adolescence for a number of reasons (Dusek, Flaherty, & Hill, 1981):

1. Personal development: Self-concept assessment helps adolescents understand their strengths and weaknesses, which can contribute to their personal growth and emotional development (Hamachek, 1988).
2. Mental health: A positive self-image can improve self-esteem and prevent mental health problems such as anxiety and depression (M. Mann, Hosman, Schaalma, & De Vries, 2004).
3. Interpersonal relationships: A healthy self-concept is fundamental to establishing positive and healthy relationships with others (Natacha Palenzuela-Luis, Gonzalo Duarte-Clímets, Juan Gómez-Salgado, José Ángel Rodríguez-Gómez, & María Begoña Sánchez-Gómez, 2022).
4. Decision-making: Adolescents with a good understanding of themselves are better equipped to make informed decisions about their education, career and personal lives (L. Mann, Harmoni, & Power, 1989).

In summary, self-concept assessment is essential to the well-being and positive development of adolescents (McCullough, Huebner, & Laughlin, 2000).

Moreover, for PE teachers, it is vital to know the self-concept of students in their classrooms because, when it is ascertained, individualized and/or collective attention patterns can be established (Mato Medina, Ambris Sandoval, Llergo Young, & Mato Martínez, 2020). Self-concept should be understood as a factor that is part of the students' conception (physical, social and spiritual) of themselves. However, the difference with self-esteem should be

emphasised. Self-esteem has an inner analytical component and is manifested externally through emotions. (Alsaker & Kroger, 2020; Sepúlveda, Gómez, & Matsudo, 2016).

To assess self-concept, the AF-5 the AF-5 (Self-Concept Form 5) scale is used (García & Musitu, 1999), which assesses different self-concept variables in adolescents and adults. This test has a high reliability of $\alpha=.810$.

There are systematic reviews where this scale has been used in adolescents (Babic et al., 2014), several studies also in the education system but with another ages (Cachón-Zagalaz, Sanabrias-Moreno, Sánchez-Zafra, Zagalaz-Sánchez, & Lara-Sánchez, 2020) and few works with this specific area and sample: Spanish secondary school physical education students. In addition, there is no unanimity in the findings (Cachón-Zagalaz et al., 2020), because although most authors agree that there are significant differences between sex (Herrera, Al-Lal, & Mohamed, 2020) in the academic, emotional and social domains of self-concept (Babic et al., 2014; Cachón-Zagalaz et al., 2020; Méndez, 2022; Ramirez-Granizo et al., 2020), there are discrepancies as to which sex predominates in one dimension or another. With respect BMI, there is evidence that a lower BMI is associated with a better self-concept (J. G. Fernández-Bustos et al., 2019) Moreover, it is not known whether there are differences in terms of school location because self-concept is closely related to bullying and there are recent studies where children from rural environments are more likely to suffer bullying (Rodríguez Álvarez, Navarro, & Yubero Jiménez, 2022). For all these reasons, and given the importance of addressing this concept in the education system, the aim of this research is to analyse the perception of self-concept of secondary school adolescents in physical education classrooms in post covid, as a function of sex, age, educational level, BMI and school location.

Methods

Participants

The non-probability sampling method was (Salkind, 1999); the sample consisted of a total of 961 pupils; with a fairly even sex balance: 591 girls and 564 boys. In relation to school location, 368 pupils were from rural schools and 787 from urban schools. According to the Diputación de Cáceres, the region of Spain where the sample was drawn (<https://www.dip-caceres.es/>), it defined the context, considering rural schools as those located in villages with less than 20,000 inhabitants and urban schools as those located in a population of more than 20,000 inhabitants. , The mean age was 14.71 years and the mean body mass index (BMI) was 20.61 (normal weight).

Inclusion criteria to be considered for participation in the study: 1. To be registered as a Physical Education student in a public or public school, at any stage of Secondary Education, Level 1 E.S.O. (Education Secondary Obligatory) with 12-13 years old; 2 E. S.O. (13-14 years old); 3 E.S.O. (14-15 years old); 4 E.S.O. (15-16 years old); 1 Bacallaureate (Bac.) with (16-17 years old); 2 Bac. (17-18 years old); 2) Having previously signed informed consent from the parents.

The research was carried out under the guidelines of the Helsinki Declaration and the project was approved by the Biosafety Committee of the UEx (186/2021).

Table 1 shows the socio-demographic characterization of the sample, by sex, educational level and school location.

Table 1.

Socio-demographic characterization of the sample.

Variable	Categories	N	%
Sex	Male	564	48.8
	Female	591	51.2
Educational Level	1° E.S.O.	221	19.1
	2° E.S.O.	213	18.4
	3° E.S.O.	166	14.4
	4° E.S.O.	277	24
	1° Bac.	247	21.4
	2° Bac.	21	2.7
	School Location	Rural	368
	Urban	787	68.1
Variable		M	SD
Age		14.71	1.58
Body Mass Index		20.61	3.36

Note: N: number; %: percentage; SD: standard deviation; M: Mean; E.S.O.: Education Secondary Obligatory; Bac: Baccalaureate

Procedure

The research procedure was carried out through the directory of public schools developed by the Consejería de Educación de la Junta de Extremadura, contacting the schools where the students studied at the E.S.O. and Bac. stage.

An e-mail was sent to the physical education teachers informing them about the research: objectives, methodology and informed consent for the parents of the students. Parents were informed about the study: The procedure to which their child will be subjected is to answer the questions in the questionnaires in physical education related to self-concept in digital format, which will be passed only once. The findings will be used exclusively for non-profit research purposes. At the end of the study, the parents will be informed of the overall finding if they wish, but not of their personal finding, which will be treated with complete confidentiality in accordance with the Declaration of Helsinki and the Biomedical Research Act 14/2007. Before the possibility of participating, they were advised to respond to their acceptance by e-mail. One of the members of the evaluation team would go to the school and administer the questionnaires to the physical education students who had signed the parental consent form.

On the planned day, the evaluator gave the students an electronic device (Tablet), which they connected to the internet, to answer the questionnaires via a link to a digital platform (Google Forms). First, they read aloud all the tests and asked questions about them. Then, through the e-questionnaire, they marked their answers, whose data were recorded on the platform. The test lasted around 10 minutes. These data were collected anonymously in 2022.

Instruments

Sociodemographic Questionnaire: A questionnaire was designed with six sociodemographic questions (sex, age, grade, school location, height and weight), through a self-reported form. The body mass index (BMI) was obtained by applying the following formula: $BMI = \text{weight in kilograms} / (\text{height in meters})^2$.

AF-5 self-concept scale (García & Musitu, 1999) : the academic self-concept dimension; the social self-concept dimension; the emotional self-concept dimension; the family self-concept dimension; and the physical self-concept dimension. A Likert scale 1-5 is used, with 1 being strongly disagree and 5 being strongly agree. With respect to the psychometric properties of the instrument, the authors reported that the AF5 offers internal reliability indices above 0.71 on each of the five dimensions. Furthermore, it was reported that taking all items of the scale together, a value of 0.78 was obtained, showing that all items measure the same construct: self-concept. The table below shows the questionnaire items distributed in each of the dimensions of the AF-5.

Table 2.

Distribution of the items according to the dimensions of AF-5 questionnaire.

Dimension	Items
Academic-labour	1, 6, 11, 16, 21, 26
Social	2, 7, 12, 17, 22, 27
Emotional	3, 8, 13, 18, 23, 28
Familiar	4, 9, 14, 19, 24, 29
Physical	5, 10, 15, 20, 25, 30

Note: Items 4 and 14 were reversed.

Statistical Analysis

In order to look at the statistical tests to be used, it was checked whether the distribution of the data met the assumption of normality with the Kolmogorov-Smirnov test. But this was not the case, so it was decided to use non-parametric tests.

The Mann Whitney U was used to determine the differences between variables according to sex and school location, where p is significant at <0.005 .

Hedges' g was used to determine the effect of sex or school location. The results were interpreted according to Cohen (Cohen, 2013), where 0 to 0.20 was no effect, 0.21 to 0.49 was a mild effect, 0.50 to 0.80 was moderate and 0.80 and above was a strong effect.

Spearman's Rho test was used to find the degree of relationship between the variables with respect to the variables age and BMI. Its interpretation was made according to Mondragón Barrera (2014), where from 0.01 to 0.10 there was a low correlation, from 0.11 to 0.50 medium correlation, from 0.51 to 0.75 strong correlation, from 0.76 to 0.90 high correlation and over 0.91 perfect correlation.

The Bonferroni correction was used to find the p-value in the item analysis, according to sex and school location, which was set at $p < 0.001$.

Results

Table 3 shows the descriptive data for each item of the AF-5 instrument based on the mean and standard deviation and the differences obtained using the Mann-Whitney U-test according to sex and school location.

Significant differences by sex were obtained for a large number of items. This was not the case in the analysis of school environment, as no statistically significant differences were found.

Table 3.

Scores obtained according to sex and specialty in each of the items of the instrument.

Item	Sex			School Location		
	Male	Female	p	Rural	Urban	P
	M(SD)	M(SD)		M(SD)	M(SD)	
1. I do my school and/or academic work well.	3.93 (0.81)	4.14 (0.76)	<0.001*	4.02 (0.81)	4.04 (0.79)	0.919
2. I make friends easily	4.08 (0.91)	2.74 (1.08)	<0.001*	3.95 (1.02)	3.88 (1.01)	0.278
3. I am afraid of some things	2.62 (1.02)	3.28 (1.09)	<0.001*	2.91 (1.07)	2.98 (1.12)	0.326
4. I am criticised a lot at home	4.12 (1.08)	3.98 (1.14)	0.038	4.15 (1.11)	4.00 (1.12)	0.007
5. I take care of myself physically	3.91 (1.01)	3.69 (0.96)	<0.001*	3.79 (1.04)	3.80 (0.97)	0.791
6. My teachers consider me to be a good student	3.50 (1.08)	3.72 (1.07)	<0.001*	3.63 (1.06)	3.60 (1.09)	0.779
7. I am a friendly person	4.42 (0.74)	4.22 (0.93)	0.002	4.36 (0.81)	4.30 (0.87)	0.232
8. Many things make me nervous	3.01 (1.14)	3.62 (1.16)	<0.001*	3.32 (1.19)	3.33 (1.19)	0.937
9. I feel happy at home	4.38 (0.93)	4.10 (0.98)	<0.001*	4.32 (0.92)	4.02 (0.99)	0.059
10. I am wanted for sports activities	3.60 (1.25)	2.83 (1.28)	<0.001*	3.20 (1.28)	3.21 (1.34)	0.737
11. I work hard in class	3.51 (1.00)	3.80 (0.94)	<0.001*	3.68 (0.98)	3.66 (0.98)	0.575
12. It is difficult for me to make friends	3.93 (1.17)	3.69 (1.28)	0.002	3.77 (1.30)	3.82 (1.20)	0.891
13. I get scared easily	2.14 (0.99)	2.82 (1.19)	<0.001*	2.55 (1.18)	2.46 (1.13)	0.289

14. My family is disappointed in me	4.44 (0.89)	4.29 (1.03)	0.030	4.47 (0.84)	4.32 (1.01)	0.051
15. I consider myself elegant	3.48 (1.07)	3.35 (1.05)	0.049	3.34 (1.09)	3.45 (1.05)	0.075
16. My teachers think highly of me	3.36 (1.04)	3.44 (1.02)	0.174	3.51 (1.00)	3.35 (1.04)	0.023
17. I am a cheerful person	4.30 (0.80)	4.08 (0.92)	<0.001*	4.24 (0.79)	4.16 (0.91)	0.377
18. When grown-ups tell me something, I get very nervous.	2.14 (1.07)	2.58 (1.15)	<0.001*	2.25 (1.11)	2.42 (1.14)	0.010
19. My family would help me in any kind of problem.	4.60 (0.76)	4.53 (0.87)	0.617	4.60 (0.76)	4.55 (0.85)	0.610
20. I like myself physically	3.84 (1.11)	3.19 (1.25)	<0.001*	3.57 (1.22)	3.48 (1.23)	0.207
21. I am a good student	3.66 (1.01)	3.80 (1.00)	0.021	3.74 (1.02)	3.73 (1.00)	0.762
22. I find it hard to talk to strangers	2.71 (1.16)	2.60 (1.25)	0.070	2.51 (1.18)	2.72 (1.22)	0.007
23. I get nervous when the teacher asks me questions.	2.42 (1.16)	2.90 (1.31)	<0.001*	2.51 (1.27)	2.73 (1.25)	0.002
24. My parents give me confidence	4.38 (0.94)	4.11 (1.10)	<0.001*	4.30 (0.99)	4.22 (1.05)	0.306
25. I am good at sports	4.08 (1.01)	3.31 (1.13)	<0.001*	3.75 (1.06)	3.65 (1.18)	0.335
26. My superiors consider me intelligent and hard-working	3.51 (1.05)	3.66 (1.04)	0.007	3.65 (1.02)	3.56 (1.06)	0.198
27. I have many friends	4.05 (0.99)	3.61 (1.18)	<0.001*	3.90 (1.11)	3.79 (1.12)	0.089
28. I feel nervous	2.21 (0.50)	2.79 (1.21)	<0.001*	2.49 (1.17)	2.52 (1.17)	0.653
29. I feel loved by my parents	4.62 (0.76)	4.45 (0.90)	0.001	4.61 (0.78)	4.50 (0.86)	0.016
30. I am an attractive person	3.63 (1.10)	3.23 (1.20)	<0.001*	3.41 (1.14)	3.36 (1.18)	0.588

Note: p is significant < 0.001*. M = mean value; SD = Standard deviation. Each score obtained is based on a Likert scale (1-5): 1 "Strongly disagree", 2 "Strongly disagree", 3 "Indifferent", 4 "Strongly agree", 5 "Strongly agree".

Table 4 shows the descriptive data for each of the dimensions of the AF-5 as a function of sex and school environment based on the mean and standard deviation. The p-value was obtained from the Mann-Whitney U-test to analyse differences between groups and the Hedges'g value is presented to assess the effect size. Girls scored higher than boys in the

academic-work and emotional dimensions and boys scored higher in the social and family dimensions. Significant sex differences were obtained in all dimensions and the effect size was low in the academic-work, social and family dimensions and moderate in the emotional and physical dimensions. With respect to the school environment, students from rural schools scored higher on the academic-work, social, family and physical dimensions, although no statistically significant differences or effect sizes were obtained on any of the dimensions.

Table 4.

Descriptive analysis, differences and effect sizes of the AF-5's dimensions.

Item	Gender		School Location					
	Male	Female	Rural		Urban			
	M (SD)	M (SD)	p	g	M (SD)	M (SD)	p	g
Academic-labour	3.57 (0.77)	3.76 (0.78)	<0.001*	0.232*	3.70 (0.79)	3.65 (0.78)	0.263	0.062
Social	3.91 (0.61)	3.65 (0.78)	<0.001*	0.334*	3.78 (0.70)	3.77 (0.72)	0.923	0.012
Emotional	2.42 (0.71)	2.99 (0.84)	<0.001*	0.681*	2.67 (0.84)	2.74 (0.82)	0.191	0.085
Familiar	4.42 (0.68)	4.24 (0.81)	<0.001*	0.221*	4.40 (0.70)	4.29 (0.78)	0.015	0.142
Physical	3.73 (0.74)	3.26 (0.75)	<0.001*	0.624*	3.50 (0.79)	3.49 (0.78)	0.560	0.022

Media; SD = standard deviation. Obtained is based on a Likert scale (1–5). p is significant < 0.001*.

There is a small effect when $g > 0.21$, a medium effect $g > 0.5$ and a large effect $g > 0.8$

Spearman's Rho test was used to analyse the relationship between each of the dimensions and between age and BMI (Table 5). There was a small yet significant inverse relationship between age and the academic work dimension as well as the family dimension" About BMI, there was a small yet significant inverse relationship between BMI and the physical dimension.

Table 5.

Correlations between the dimensions and the age group and BMI variable.

Dimensions	Age ρ (p)	BMI
Academic-labour	-0.11 (<0.001)*	-0.06 (0.030)
Social	0.01 (0.812)	-0.04 (0.124)
Emotional	0.06 (0.029)	-0.03 (0.304)
Family	-0.10 (<0.001)*	-0.03 (0.204)
Physical	-0.03 (0.234)	-0.15 (<0.001)*

Note: The correlation is significant at the * $p < 0.001$. Each score obtained on the dimensions is based on a Likert scale (1–4): 1 being “Strongly Disagree”, 2 “Partially Disagree”, 3 “Partially Agree” and 4 “Strongly Agree”.

Table 6 shows the reported values of Cronbach’s alpha for each of the dimensions of the AF-5. Satisfactory values (between 0.70 and 0.90) were obtained according to Nunnally and Bernstein (1994).

Table 6.

Cronbach’s alpha coefficients for each dimension

Dimension	Cronbach’s Alpha
Academic-labour	0.87
Social	0.75
Emotional	0.79
Family	0.87
Physical	0.76

Discussion and conclusions

The aim of the following manuscript was to analyse self-concept in Spanish secondary school adolescents in the physical education classroom.

(1) In relation to sex, the first finding was found. There are significant differences between adolescent boys and girls in self-concept, in all its dimensions, academic-work, social, emotional, family and physical. There is a great deal of scientific evidence that supports our research (Babic et al., 2014; Cachón-Zagalaz et al., 2020; Méndez, 2022; Ramirez-Granizo et al., 2020).

It is worth noting that in the emotional dimension (Items 3, 8, 13, 18, 23, 28) girls students have higher self-concept values than boys as do other authors (Méndez, 2022), contrary to a study conducted in Chile with university students (Cachón-Zagalaz et al., 2020), where boys showed higher self-concept in this dimension, perhaps due to the difference between cultures. However, with the physical dimension of Spanish adolescents (items 5, 10, 15, 20, 25, 30), it is the boys who have the highest self-concept value; here there is a consensus in the scientific community, which supports our findings (Cachón-Zagalaz et al., 2020; Méndez, 2022) where physical self-concept is higher in males than in females (Ramirez-Granizo et al., 2020). Both dimensions showed a moderate effect size.

On the other hand, in the social dimension, boys score higher on the self-concept test. Here, too, there is consensus in the research to date (Cachón-Zagalaz et al., 2020; Méndez, 2022; Ramirez-Granizo et al., 2020). In relation to the family dimension, boys obtain higher scores than girls; disagreeing with other authors (Ramirez-Granizo et al., 2020) where girl students obtained higher family self-concept values. Finally, in the academic-work dimension, it is girls who score higher, coinciding with Cachón-Zagalaz (Cachón-Zagalaz et al., 2020), which differs from some findings such as the work carried out with children in the third cycle of primary education (11-13 years) (Ramirez-Granizo et al., 2020), where boys scored higher, or in another study where no differences were found according to sex (Pinel Martínez, Pérez Fuentes, & Carrión Martínez, 2019). In these three dimensions the effect size was low.

(2) With respect to school location, however, while the findings show that students in rural schools show slightly higher self-concept scores on all dimensions than students in urban schools, no statistically significant differences were found between self-concept and school location. To date, this finding was unknown, but given the differences in adolescents from rural and urban environments (Boraita, Alsina, Ibort, & Torres, 2022), it was considered interesting to search for associations with self-concept.

(3) Another important finding were the associations between self-concept dimensions, age group and BMI. On the one hand, it found a slight and significant inverse association between age and the academic-work and family dimensions. That is to say, the younger the age or the lower the academic year, the higher the level of self-concept in the study/work area. This may be due to the inherent changes in the adolescent stage, where judgements are still developing and there are changes in the ideals established in the family environment and the field of study. Our findings adhere to the line of authors such as Vicent et al., 2015. (Vicent et al., 2015) or Inglés et al., 2009 (Inglés, Pastor, Torregrosa, Redondo, & García-Fernández, 2009), however, other studies such as Galindo-Domínguez, 2019 (Galindo-Domínguez, 2019) or the study by Arens y Hasselhorn (2014) (Arens & Hasselhorn, 2014), support the hypothesis that there are no differences by academic year. This phenomenon reinforces the idea that self-concept is a construct with a certain stability, which experiences few changes, which are also slight, smooth and very long-lasting (Fernández, 2005). Therefore, more research is needed to solve the enigma between age and the self-concept construct.

In addition, small significant inverse associations were found between BMI and the physical self-concept dimension. In other words, the higher the BMI, the lower the level of physical self-concept. On this, there is a fair amount of scientific consensus. In a systematic review of schoolchildren and adolescents (Guillamón, Cantó, & López, 2019) shows that lower levels of body fat and normal BMI status are associated with a more positive self-concept than when BMI levels are higher. This was also found in another study on adolescent girls where it was reported that greater body dissatisfaction and higher BMI are associated with worse physical perceptions and a more devalued self-concept (J.-G. Fernández-Bustos, González-Martí, Contreras, & Cuevas, 2015).

Finally, Cronbach's alpha was analysed in each of the dimensions, with very satisfactory findings in all of them, according to the criteria established by Estévez, Martínez & Musitu (2006) or Cava et al., (2008) (Cava Caballero, Murgui Pérez, & Musitu Ochoa, 2008; López, Olaizola, Ferrer, & Ochoa, 2006). Our findings support those of García & Musitu (1999), whose reliability was $\alpha=.810$ (García & Musitu, 1999).

Limitations

There are a number of limitations to be taken into account for future studies.

The main limitation of the sample concerns representativeness. More specifically, although the sample used is quite large, the representativeness of rural schools is low. Similarly, the grade distribution was more representative of E.S.O. students than of Bac. students, so this imbalance may have led to a bias in the standardisation of the instrument. Although both limitations were known beforehand and were tried to be overcome by proposing the participation of an equal number of rural and urban schools, the initiative taken by urban schools turned out to be much higher than that of rural schools.

Moreover, it is a representative sample only for the south-west region of Spain and not for the whole of Spain. Extremadura is one of the regions of the so-called depopulated Spain, due to the fact that the number of inhabitants is below the Spanish average, and has defining qualities such as low income, less access to public services (educational, social and health)

which can affect the perception of self-concept. (Bandrés & Azón, 2021) It would therefore be interesting to extend the study to the rest of the country and other European countries and compare the findings for future lines of research.

Regarding the methodology, it is a cross-sectional study and causal relationships cannot be considered, so it would be interesting to know about it in future research.

Practical Implications

One of the main findings is that the overall self-concept in secondary physical education students is lower in girls than in boys. On the basis that self-concept is composed of different identities: physical, social, family, academic and emotional, it is important to know the level of the dimensions so that the competent administration can provide the educational community with tools to implement them not only in the physical education classroom but also in other subjects through individualised or collective attention guidelines (Mato Medina et al., 2020) in order to obtain optimum levels of self-concept in both girls and boys in favour of a positive self-perception that will improve the mental health of adolescents.

Another finding is in relation to age: in the lower educational stages, there is a higher self-concept in the academic and family sphere, which decreases as one moves up the educational level. For this reason, the educational community made up of teachers, parents, students and administrative and service staff must work together to achieve a common goal: to give stability to the self-concept construct (Fernández, 2005), seeking support networks that maintain the level of self-concept in the different educational stages.

The last finding showed an association between BMI and self-concept. The higher the BMI levels, the lower the levels of self-concept. Given that it is more than proven that PA decreases BMI values, in this sense, it would be interesting for the educational community to encourage the practice of PA not only during Physical Education classes, but also in the breaks between classes, creating active breaks and promoting extracurricular sports activities, especially in girls, in order to reduce dropout and serve to break sex stereotypes, offering alternatives that allow the creation and consolidation of healthy sports habits.

Conclusions

In conclusion, the factors of sex, age, educational level and BMI may influence self-concept in adolescent schoolchildren post covid in south-west Spain, however there is no evidence regarding school location. First-hand knowledge of the factors that influence the different dimensions of self-concept allows the administration of the educational area, teachers, parents and the entire educational community to lay the foundations of the construct and to be able to assess the tools and methodologies that can be implemented to improve the development of self-concept in secondary physical education students and reduce the mental consequences of covid in adolescents.

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