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Are self-concept and emotional intelligence associated with healthy habits and school performance? A structural model according to sex

¿Se asocia el autoconcepto y la inteligencia emocional con los hábitos saludables y el rendimiento escolar? Un modelo estructural según sexo

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Abstract

The promotion of academic performance through healthy physical habits has been the subject of studies in recent decades. This study aims to know the relationships between several psychosocial factors, the degree of adherence to the Mediterranean diet (MD), the practice of physical activity (PA), and academic performance according to the sex of 1650 Secondary Education students [$\sigma^2 = 50.42\%$ ($n = 832$); $\varphi = 49.57\%$ ($n = 818$)], with an average age of 14.47 years ($SD = 1.41$; $R = 9$). The methodological design is descriptive-exploratory, cross-sectional and ex post-facto, through a structural equation model. The CAF questionnaire was used for physical self-concept, the PAQ-A questionnaire was used to evaluate PA, the KIDMED test for adherence to MD, and the TMMS-24 scale for emotional intelligence. The results reflected that

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there is an association between the dimensions of physical self-concept, with greater strength for physical condition and ability in both sexes. A positive relationship was observed between PA and the physical condition, strength and physical ability dimensions of physical self-concept, especially for boys, with the quality of nutrition being more relevant to physical condition in the case of girls. In turn, EI and healthy habits were positively related, with no findings found between EI and academic performance specifically. Finally, a positive and slight relationship was determined between healthy habits and academic performance, reflecting some of the benefits of these habits for the cognitive function.

Keywords: school performance; adolescence; physical activity; mediterranean diet.

Resumen

La promoción del desempeño académico a través de hábitos físico-saludables ha sido objeto de estudios en las últimas décadas. Este estudio pretende conocer las relaciones entre varios factores psicosociales, el grado de adherencia a la dieta mediterránea (DM), la práctica de actividad física (AF) y el rendimiento académico según el sexo de 1650 estudiantes de Educación Secundaria [$\sigma^2 = 50,42\%$ ($n=832$); $\rho^2 = 49,57\%$ ($n=818$)], con una edad media de 14,47 años ($DT = 1,41$; $R = 9$). El diseño metodológico es descriptivo-exploratorio, de corte transversal y ex post-facto, a través de un modelo de ecuaciones estructurales. Se utilizó el cuestionario CAF para el autoconcepto físico, el cuestionario PAQ-A para evaluar la AF, el test KIDMED para la adherencia a la DM y la escala TMMS-24 para la inteligencia emocional. Los resultados reflejaron que existe asociación entre las dimensiones del autoconcepto físico, con mayor fortaleza para la condición y habilidad física en ambos sexos. Se observó una relación positiva entre la AF y las dimensiones condición física, fuerza y habilidad física del autoconcepto físico, en especial para los chicos, siendo la calidad en la alimentación más relevante para la condición física en el caso de las chicas. A su vez, la IE y los hábitos saludables estuvieron positivamente relacionados, sin encontrar hallazgos entre IE y rendimiento académico de forma específica. Por último, se determinó una relación positiva y leve entre hábitos saludables y rendimiento académico, reflejando algunas de las bondades de estos hábitos para la función cognitiva.

Palabras clave: rendimiento académico; adolescencia; actividad física; dieta Mediterránea.

Introduction and objectives

Adolescence occurs between the onset of puberty and the onset of adulthood, i.e. between approximately 10 and 25 years of age (Biosca, 2021; Curtis, 2015). This is considered one of the most relevant stages in the human life cycle as it coincides with the time when young people build their own identity and personality, and when they experience most of the physical, cognitive, social and emotional changes (Dorn et al., 2019). In addition, a multitude of behaviours and habits that will be projected into adulthood are established and shaped at this stage.

In this sense, it has been found that self-concept plays a decisive and central role in the correct development of adolescents, as it favours the sense of identity and constitutes a frame of reference from which to interpret reality, one's own experiences, and condition

parameters that help to achieve well-being, correct psychosocial adjustment, quality of life, academic success and avoid future psychological problems (Hernández-Martínez et al., 2023; Mendo-Lázaro et al., 2017; Van der Aar et al., 2022).

Specifically, the physical dimension of self-concept, defined as the set of ideas and beliefs in relation to our competence in physical strength, physical ability, condition, and attractiveness (Fox and Corbin, 1989; Goñi et al., 2006), is considered, among the scientific community, to be one of the psychosocial factors with the greatest influence on the well-being and health of individuals, as well as being a relevant marker of global health during adolescence (Conde-Pipó et al., 2022). This aspect is supported by numerous studies that have found a positive link between physical self-concept and the maintenance of healthy habits, all of which highlight the importance of practicing PA and eating well (González-Valero et al., 2022; Pérez-Mármol et al., 2021).

However, both in the maintenance of healthy behaviours (PA and adherence to DM) and in the development of physical self-concept, a multitude of intervening factors have been found, including gender, academic qualifications and socioemotional skills. In the first case, authors such as Beck et al. (2022) or de Fátima et al. (2020) point out that adolescent boys are 10.6% more physically active than girls, but in general, the global prevalence has identified 81% of the adolescent population as insufficiently active (Guthold et al., 2020). In terms of DM, it has been observed that adolescents tend towards a detachment from this dietary pattern, especially in boys, an issue justified by the increase in social behaviours and obesogenic environment (García-Pérez et al., 2021; Iaccarino et al., 2017).

Similarly, girls show a worse physical self-concept compared to boys, especially in those dimensions that have to do with physical appearance, i.e. physical attractiveness and strength; and with sport competences, physical condition and skill (Guerrero et al., 2020). This fact reinforces the importance of carrying out effective psycho-pedagogical interventions that reduce the consequences of inequality, since both physical-sport typology, appearance and body image, as well as dietary choices, are culturally and stereotypically loaded in our society.

On the other hand, EI, defined as the ability to attend to, clarify and repair emotional states (Fernández-Berrocal et al., 2004; Salovey et al., 1995) acquires special prominence in the educational environment as it is considered to be another of the modulating and key factors in academic health and achievement (Jiménez-Blanco et al., 2020; Llamas-Díaz et al., 2022). In this context, higher EI is associated with a healthier emotional and physiological response, with the maintenance of a more active lifestyle, with a more adequate coping with stressful academic demands, and with a higher self-concept (Fernández-Lasarte et al., 2019; Sánchez-Zafra et al., 2022).

However, in adolescence, characterised by this susceptibility, numerous emotional ups and downs occur, which can lead to an increase in disruptive, impulsive or unhealthy behaviour (Bailen et al., 2019; Cherniss and Roche, 2020). In this sense, according to authors such as Sanchis-Sanchis et al. (2020), women attach greater importance to emotional control than men, leading to an improvement in educational, social and mental well-being. In contrast, other authors such as Melguizo-Ibáñez et al. (2022) have stated that it is men who show greater emotional skills and, in turn, greater PA practice, better physical self-concept and greater adherence to DM.

Consequently, this research aims to analyse, firstly, the direct and indirect or spurious relationships between the dimensions of physical self-concept -physical ability, attractiveness or physical condition- on the level of adherence to DM, PA practised and academic performance; and secondly, to determine how these three factors operate directly on EI in adolescents; all of them according to the sex of the young people as a modulating variable. In this way, we hope to test the following two unilateral alternative hypotheses:

- There will be a positive relationship between self-concept, emotional intelligence and healthy habits.
- Academic performance will be positively related to self-concept, emotional intelligence and healthy habits.

Method

Population and Sample

This research follows a quantitative, non-experimental, descriptive-exploratory, cross-sectional and ex post facto methodological design, with a single group measurement. Participants were selected by means of multi-stage sampling, constituting a final sample of secondary school students from different public secondary schools in the province of Granada in the 2019/2020 academic year. Specifically, the study population was a total of 30,021 students enrolled in Compulsory Secondary Education (E.S.O) for the province of Granada in the academic year described.

The criteria for the selection of the sample were as follows. Firstly, we chose to involve students who had obtained the informed consent of their legal guardians. In this sense, the following inclusion criteria were proposed: (a) being enrolled in a public E.S.O. course in the 2019/2020 academic year; (b) not being under 11 or over 20 years of age; and (c) the presentation of informed consent for the processing of the data. On the other hand, the exclusion criteria were: (a) presenting difficulties and/or pathologies, which negatively affected the correct completion of the questionnaire; (b) incomplete questionnaires, or with amendments and crossings out.

After controlling for these criteria, a sample of 1650 students, aged 11 to 20 ($M = 14.48$, $SD = 1.41$), was obtained. 50.4% ($n = 832$) were male and 49.6% ($n = 818$) female. Finally, a sampling error of 0.023 was obtained on the total population of students for the province, maintaining a 95% confidence interval.

Instrument

Physical Activity Questionnaire for Adolescents (PAQ-A). Martínez-Gómez et al. (2009) developed this instrument in its validation in Spanish, dividing it into nine questions. In this sense, questions one to six provide information on the PA practised, while questions seven and eight indicate the levels of PA and question nine is based on

interpreting the existing reasons for not doing PA. Finally, the described is constituted by a five-point Likert-type scale, where the value 1 is equivalent to "Strongly disagree" and 5 to "Strongly agree". The internal consistency of this instrument for the global scale was $\alpha = 0.770$ and $\omega = 0.889$.

The Mediterranean Diet Adherence Test (KIDMED). It is an instrument developed by Serra-Majem et al. (2004), which focuses on assessing an individual's adherence to the MD. This instrument consists of 16 dichotomous questions, 12 of which are scored positively and 4 negatively. The results obtained are interpreted as follows: (a) from 8 to 12 points, optimal DM; (b) from 2 to 7 points, medium adherence to DM; (c) from -4 to 1, very low quality diet. Finally, the Cronbach's Alpha coefficient of this instrument was $\alpha = 0.854$ and $\omega = 0.654$.

Physical Self-Concept Questionnaire (CAF). This instrument was designed by Goñi et al. (2006). The CAF is an instrument composed of 36 items, divided into several subscales, which assess the dimensions of physical self-concept (Physical Ability -items 1, 6, 17, 23, 28 and 33-, Physical Condition -items 2, 7, 11, 18, 24 and 29-, Physical Attractiveness - items 8, 12, 19, 25, 30 and 34- and Strength - items 3, 9, 13, 20, 31 and 35-, in addition to the general physical self-concept - items 5, 10, 15, 22, 27 and 32- and general self-concept - items 4, 14, 16, 21, 26 and 36-). The overall internal consistency of this instrument is $\alpha = 0.927$ and $\omega = 0.927$, which is excellent. By dimensions, the reliability values were as follows: physical ability ($\alpha = 0.754$; $\omega = 0.756$); physical condition ($\alpha = 0.778$; $\omega = 0.831$); physical attractiveness ($\alpha = 0.803$; $\omega = 0.803$); strength ($\alpha = 0.751$; $\omega = 0.751$); general physical self-concept ($\alpha = 0.765$; $\omega = 0.725$); and finally, for general self-concept ($\alpha = 0.722$; $\omega = 0.823$).

Trait Meta-Mood Scale (TMMS-24), modified version of Fernández-Berrocal et al. (2004) based on the parameters of Salovey et al. (1995). This instrument is a psychometric scale whose purpose is to assess Perceived Emotional Intelligence (PEI), based on three dimensions (Perception/Attention, Clarity/Clarity/Comprehension, and Emotional Regulation/Repair). This questionnaire consists of twenty-four items, permeated by a five-point Likert scale, which are arranged as follows: (1 = "Disagree" to 5 = "Strongly Agree"). The distribution of the items by dimensions is as follows: emotional attention (items 1, 2, 3, 4, 5, 6, 7 and 8), understanding of emotional states (items 9, 10, 11, 12, 13, 14, 15 and 16) and emotion regulation (items 17, 18, 19, 20, 21, 22, 23 and 24). Finally, regarding the reliability of the instrument by dimensions, we obtained an $\alpha = 0.90$ and $\omega = 0.85$ for emotional attention, $\alpha = 0.90$ and $\omega = 0.84$ for emotional clarity, and $\alpha = 0.86$ and $\omega = 0.81$ for emotional repair. The overall internal consistency for the whole scale was $\alpha = 0.88$ and $\omega = 0.88$.

Ad Hoc Questionnaire for the assessment of academic and socio-demographic variables, of a categorical and nominal nature, presenting intervals of interest such as age, academic grade, vocation or gender.

Data collection and analysis procedure

First of all, the research design and the request for permission to carry out the research is carried out. This procedure is carried out by the Department of Research and Diagnostic Methods in Education and the Department of Musical, Plastic and Corporal Expression

of the University of Granada. To begin the sample collection, an informative letter was drafted for the educational centres, in order to subsequently request the informed consent of those legally responsible for the participants in those schools that agreed to participate. In this sense, by means of an informative letter, the nature of the research was specified, detailing the instruments and the treatment that would be given to the data. It should be noted that this study has adhered to the Declaration of Helsinki (2008 modification) and the participants' right to confidentiality (Law 15/1999 of 13 December) has been respected, and the research has been approved by the Research Ethics Committee of the University of Granada with code 2150/CEIH/2021.

After receiving the approval of the questions discussed above, the data were collected in person and manually in the schools. The sample consisted of students from seven public secondary schools in the province of Granada in the months of January-March of the 2019/2020 academic year. Finally, the responses were verified by means of data cleaning, carried out in the IBM SPSS® 22.0 software (IBM Corp, Armonk, NY, USA) and in this way the final matrix was created. This review and transcription process was carried out and supervised by the principal investigator, thus ensuring a correct and positive statistical treatment, as well as avoiding errors of omission or commission, among others.

Data analysis

Statistical analysis was performed using IBM SPSS® 22.0 (IBM Corp, Armonk, NY, USA) and IBM AMOS® 22.0 (IBM Corp, Armonk, NY, USA) software. Basic descriptive analyses were performed using frequencies and means, while the normality of the data was tested using the kurtosis and skewness values of each item in the questionnaires - values less than 2 indicate a normal distribution. The internal reliability of the instruments was tested using Cronbach's alpha coefficient, setting the Reliability Index at 95.5%. Finally, it should be noted that the theoretical model was tested by means of structural equation analysis (SEM), using the maximum likelihood method.

The empirical information from the data and the theoretical model developed was tested using various fit indices. According to Byrne (2016), non-significant values should be obtained for the p-value, although other indices should be used as this statistic is highly sensitive to sample size. Among these, the Comparative Fit Index (CFI), the Incremental Fit Index (IFI) and the Normalised Fit Index (NFI) are used, which should obtain values above 0.90 for acceptable fit and values above 0.95 for excellent fit indices. The Root Mean Squared Error of Approximation (RMSEA) is also used and will determine acceptable fit values below 0.08 and excellent fit values below 0.05.

Figure 1 shows the theoretical model, composed of the following observable and endogenous variables: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness. On the other hand, the variable EI (Emotional Intelligence) is constituted as a latent variable.

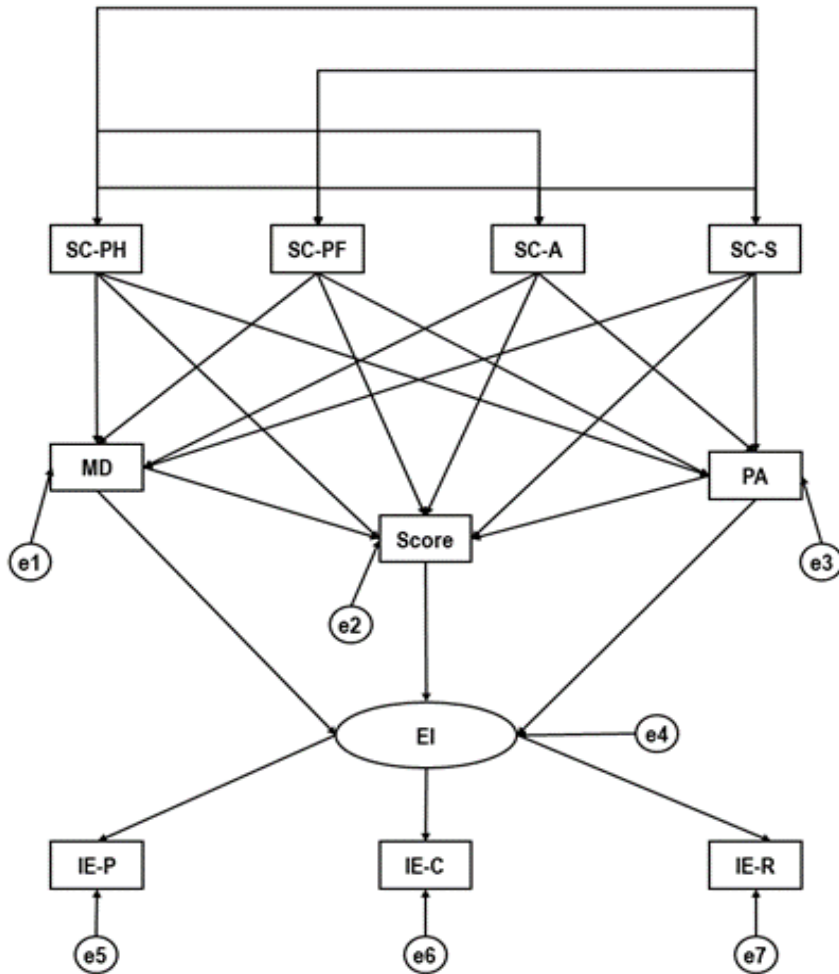


Figure 1. Theoretical model

Note: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness.

Results and discussion

The structural model determines the associations between the dimensions of physical self-concept, as well as their direct relationship with adherence to DM, PA and academic grade. Similarly, the last level of the model shows the relationships between these constructs and EI as a latent variable. The chi-square test revealed a significant value ($\chi^2 = 6.759$; $df = 38$; $p < 0.005$). However, given the sensitivity of this statistic to sample size, Byrne (2016) points out the relevance of using other standardised fit indices. Thus, the NFI obtained a value of 0.929, the IFI a value of 0.939 and the CFI a value of 0.938, all of which are acceptable. Likewise, the RMSEA obtained a value of 0.059, which was also acceptable and demonstrating an appropriate level of fit of the structural equation model.

Table 1 and Figure 2 show the regression weights and standardised regression weights of the overall SEM developed for boys. The first level of the model reveals statistically significant relationships ($p < 0.005$) between the dimensions of physical self-concept, all of them positive and direct. From highest to lowest regression weight, the relationship between ability and physical fitness is shown ($b=0.691$; $p < 0.005$), followed by attractiveness and physical fitness ($b=0.564$; $p < 0.005$). The lowest correlation strength was between physical attractiveness and perceived strength ($b=0.402$; $p < 0.005$).

The second level of the structural model relates the various dimensions of physical self-concept with healthy habits and academic performance. In the case of adherence to DM, a positive relationship was found only with the perception of physical fitness ($b=0.121$; $p < 0.05$). In contrast, PA was more determinant for this psychosocial factor, obtaining positive and direct associations with physical fitness especially ($b=0.367$; $p < 0.005$), followed by perceived strength ($b=0.154$; $p < 0.05$) and physical ability ($b=0.123$; $p < 0.01$). Likewise, academic performance was only associated with perceived physical fitness with an indirect relationship ($b=-0.168$; $p < 0.01$).

Academic performance was directly associated with adherence to MD ($b=0.183$; $p < 0.005$), with no relationship found with PA or EI. It should also be noted that positive relationships were found between the latter construct, i.e. EI and the practice of PA ($b=0.190$; $p < 0.005$) and MD ($b=0.132$; $p < 0.01$). Finally, the last level of the model determines that emotional regulation ($b=0.655$; $p < 0.005$) and emotional understanding ($b=0.587$; $p < 0.005$) are the most relevant dimensions of EI for boys.

Table 1

Model of structural equations for boys

Relationships between variables			Regression weights (RP)				SPR
			EST	USA	RC	P	EST
MD	←	SC-PH	-0,004	0,027	-0,148	0,883	-0,007
MD	←	SC-PF	0,060	0,026	2,332	*	0,121
MD	←	SC-A	0,011	0,021	0,513	0,608	0,022
MD	←	SC-S	0,033	0,023	1,425	0,154	0,059
PA	←	SC-PH	0,265	0,092	2,881	**	0,123

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PA	←	SC-PF	0,728	0,089	8,213	***	0,367
PA	←	SC-A	-0,110	0,073	-1,513	0,130	-0,055
PA	←	SC-S	0,343	0,080	4,306	***	0,154
Score	←	SC-S	0,006	0,008	0,748	0,454	0,031
Score	←	SC-A	-0,001	0,008	-0,139	0,890	-0,006
Score	←	SC-PF	-0,030	0,010	-3,163	**	-0,168
Score	←	SC-PH	0,012	0,010	1,283	0,199	0,063
Score	←	MD	-0,066	0,012	5,365	***	0,183
Score	←	PA	-0,002	0,004	0,521	0,603	0,021
EI	←	MD	0,019	0,007	2,873	**	0,132
EI	←	PA	0,007	0,002	4,135	***	0,190
EI	←	Score	-0,022	0,018	-1,199	0,230	-0,054
EI-R	←	EI	1,000	-	-	***	0,655
EI-C	←	EI	1,015	0,140	7,248	***	0,587
EI-P	←	EI	0,657	0,094	6,963	***	0,396
SC-PF	←	SC-PH	19,006	1,160	16,382	***	0,691
SC-PH	←	SC-A	12,449	1,039	11,984	***	0,457
SC-PH	←	SC-S	12,639	0,955	13,234	***	0,517
SC-PF	←	SC-A	16,760	1,183	14,165	***	0,564
SC-PF	←	SC-S	13,142	1,032	12,738	***	0,493
SC-A	←	SC-S	10,624	0,987	10,761	***	0,402

Note: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness.

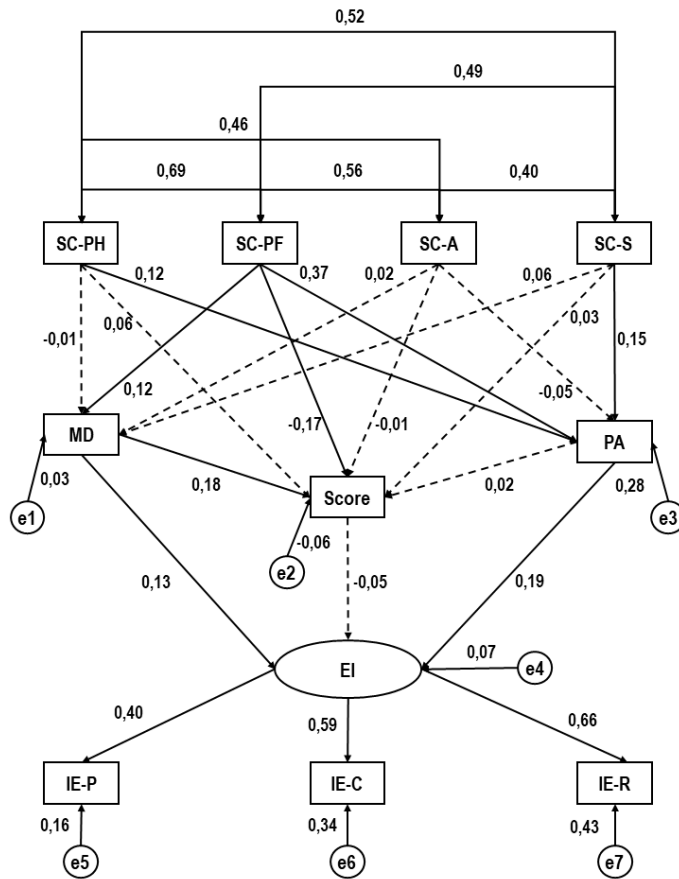


Figure 2. Structural model for boys

Note: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness.

Table 2 and Figure 3 show the regression weights and standardised regression weights of the overall SEM developed according to girls. The first level of the model reveals statistically significant relationships ($p < 0.005$) between the dimensions of physical self-concept, all of them being positive and direct. From highest to lowest regression weight, the relationship between physical ability and physical fitness is shown ($b=0.662$; $p<0.005$), followed by physical ability and strength ($b=0.563$; $p<0.005$). The lowest correlation strength was between physical attractiveness and perceived strength ($b=0.323$; $p<0.005$).

The second level of the structural model relates the various dimensions of physical self-concept with healthy habits and academic performance. In the case of adherence to

MD, a positive relationship was determined only with the perception of physical fitness ($b=0.168$; $p<0.005$). In contrast, PA was more determinant for this psychosocial factor, giving positive and direct associations with physical fitness especially ($b=0.304$; $p<0.005$), followed by physical ability ($b=0.264$; $p<0.005$). Physical attractiveness was negatively related to PA ($b=-0.066$; $p<0.05$). Likewise, academic performance was inversely associated with perceived physical fitness ($b=-0.151$; $p<0.01$), and with perceived strength directly ($b=0.085$; $p<0.05$).

Academic achievement was directly associated with MD ($b=0.136$; $p<0.005$), and PA ($b=0.118$; $p<0.01$), with no relationship with emotional intelligence. Furthermore, the latter construct was positively associated with BP ($b=0.104$; $p<0.05$) and MD ($b=0.260$; $p<0.005$). Finally, the last level of the model determines emotional regulation ($b=0.628$; $p<0.005$) and emotional understanding ($b=0.580$; $p<0.005$) as the most relevant dimensions of EI in girls.

Table 2

Structural education model for girls

Relationships between variables			Regression weights (RP)				SPR
			EST	USA	RC	P	EST
MD	←	SC-PH	0,039	0,026	1,494	0,135	0,072
MD	←	SC-PF	0,083	0,024	3,454	***	0,168
MD	←	SC-A	0,012	0,017	0,742	0,458	0,028
MD	←	SC-S	-0,007	0,023	-0,313	0,755	-0,013
PA	←	SC-PH	0,543	0,087	6,237	***	0,264
PA	←	SC-PF	0,578	0,081	7,154	***	0,304
PA	←	SC-A	-0,111	0,056	-1,963	*	-0,066
PA	←	SC-S	0,104	0,076	1,366	0,172	0,051
Score	←	SC-S	0,017	0,009	1,993	*	0,085
Score	←	SC-A	0,000	0,006	-0,028	0,977	-0,001
Score	←	SC-PF	-0,029	0,010	-3,006	**	-0,151
Score	←	SC-PH	0,014	0,010	1,358	0,174	0,067
Score	←	MD	-0,052	0,013	3,890	***	0,136
Score	←	PA	-0,012	0,004	2,955	**	0,118
EI	←	MD	0,040	0,008	5,241	***	0,260
EI	←	PA	0,004	0,002	2,238	*	0,104
EI	←	Score	-0,019	0,019	-0,987	0,323	-0,046
EI-R	←	EI	1,000	-	-	***	0,628
EI-C	←	EI	0,920	0,138	6,648	***	0,580
EI-P	←	EI	0,561	0,092	6,071	***	0,342
SC-PF	←	SC-PH	17,793	1,128	15,778	***	0,662
SC-PH	←	SC-A	10,171	1,117	9,109	***	0,336

SC-PH	←	SC-S	14,096	1,005	14,021	***	0,563
SC-PF	←	SC-A	14,324	1,251	11,445	***	0,437
SC-PF	←	SC-S	14,091	1,070	13,173	***	0,519
SC-A	←	SC-S	9,854	1,123	8,777	***	0,323

Note: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness.

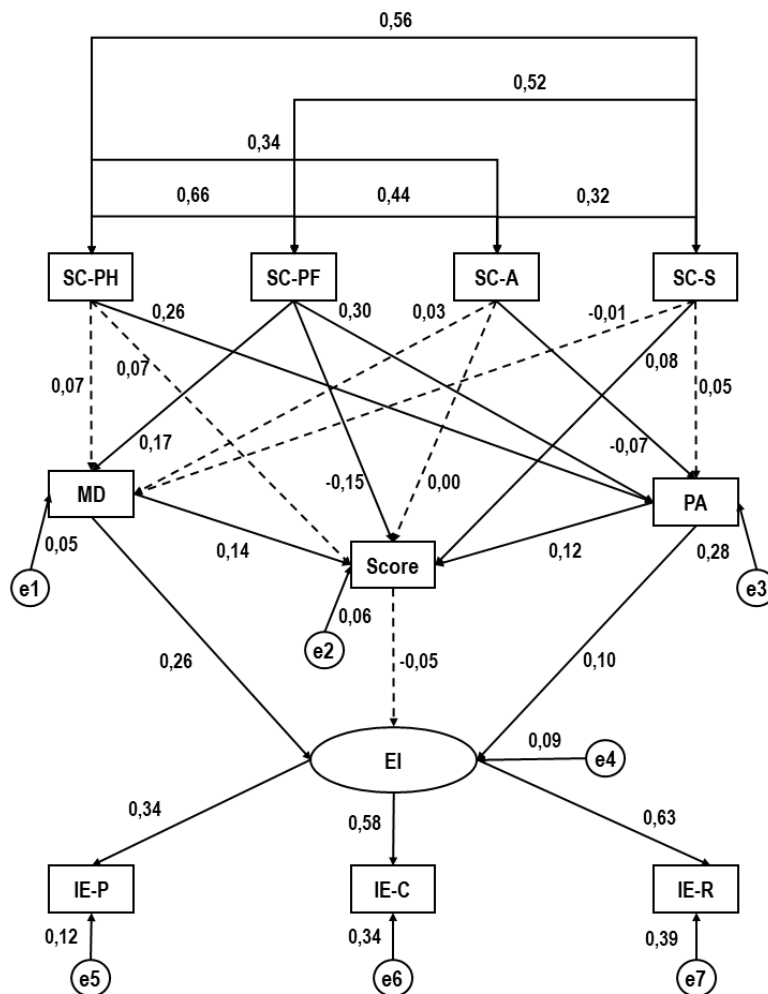


Figure 3. Structural model for girls

Note: MD, Mediterranean Diet; PA, Physical Activity; EI-R, Emotional Regulation; EI-C, Emotional Understanding; EI-P, Emotional Perception; SC-PF, Physical Condition; SC-PH, Physical Ability; SC-S, Strength; SC-A, Self-Concept - Attractiveness.

Addressing the discussion of the study carried out, it should be noted that the upper part of the model defines the associations between the different dimensions of the physical self-concept, revealing the greater strength of the relationship for physical fitness and physical ability in boys and girls, this being higher in the former. These premises seem evident, since physical fitness is understood as the set of abilities that allow an individual to practice PA; thus, those subjects who perceive themselves as having greater strength or endurance, for example, are those who perceive themselves as more skilled in this practice (Clevinger et al., 2020). In contrast, the association between physical ability and strength was stronger in females, making women perceive their physical ability as more dependent on strength - a quality that is not as developed in them as in men (Klomsten et al., 2004; Liu et al., 2015).

In line with the above, the lowest regression weight was found for the relationship between physical attractiveness and perceived strength, being much less relevant in girls. These premises determine that, for adolescent girls, the development of strength - which is often associated with muscle hypertrophy or increased myofibril cross-section (Clevinger et al., 2020; Janssen et al., 2020) - is not as relevant for the improvement of their attractiveness and physical self-concept. These findings, in their case, can be interpreted as a positive self-concept view linked to the perception of thinness, which, in many cases, is not linked to a healthy physical state (Gilchrist et al., 2020; Klomsten et al., 2004).

The intermediate zone of the model allows us to observe the patterns of relationship between physical self-concept and the healthy habits studied and academic performance. Specifically, it is revealed that following a better quality diet predicts a more positive perception of physical fitness -with special emphasis on girls-, while physical-sports practice does so with greater strength in boys. Fernández-Argüelles et al. (2022) and Garn et al. (2020) have demonstrated the beneficial effects of exercise and diet on body composition and physical fitness in the population, specifying the adaptations that occur in the organism. Thus, the modification of body composition, together with the aforementioned adaptations, will have an impact on improving the physical and general self-concept of the young person (Clevinger et al., 2020; Janssen et al., 2020).

PA was positively associated with the perception of strength and physical ability in boys, while in girls no relationship was found with the perception of this component. Even this healthy habit was negatively linked to the perception of physical attractiveness. These findings deserve special attention, as adolescent girls develop a negative perception when physical-sports practice involves strength work, although its benefits are widely known (McKinlay et al., 2018; Nebot et al., 2022). Explaining this phenomenon, the canons of beauty defined by society and the media, which promote low-weight states based on extreme thinness, could justify why adolescent girls do not want to do strength-based practices, which produce changes in body morphology that involve an increase in muscle cross-section (Gillett et al., 2016; McKinlay et al., 2018).

In line with the above, the association of academic performance with the dimensions of self-concept implied the partial acceptance of the hypothesis of this study, which sought to specify the benefits of following an active lifestyle -and developing a positive physical self-concept-, for school performance as shown by Trigueros et al. (2020) or Tus (2020). Specifically, it was observed that students who had a better perception of their physical condition had poorer academic performance, which could be justified by a very active

adolescent profile and federated practice, eliminating non-school academic work time (Martínez and González, 2017). However, performance increased slightly when PA increased in girls, which could be explained by the cognitive benefits -attention, memory or anxiety reduction- of following an active lifestyle. Likewise, the perception of strength was positively associated with academic performance in girls, suggesting that a mild or moderate PA practice could benefit academic performance for the aforementioned reasons (Chacón-Cuberos et al., 2020). In turn, DM was positively associated with performance in both sexes, as it has been shown that following a healthy diet -low glycaemic index, low consumption of refined sugars or intake of foods rich in omega-3- could improve cognitive function (Kesse-Guyot et al., 2012).

Finally, the lower area of the structural model reveals the benefits of following a healthy lifestyle for young people's EI. Specifically, it was observed that, although EI was not associated with academic performance, it was associated with physical-sports practice and diet quality, showing a direct relationship. Studies such as the one by Trigueros et al. (2020) show how EI helps in the management of academic stress, anxiety and the improvement of resilience, indirectly intervening in the prevention of the deterioration of the level of adherence to DM in young people. In turn, Giusti et al. (2021), in a systematic review conducted on the relationship between EI and eating quality, concluded that the development of good levels of EI acted as a protective factor against weight problems and eating disorders; a positive relationship similar to that given with the practice of PA as demonstrated by Al sudani and Budzynska (2015) or Vaquero-Solís et al. (2020).

Based on the above, it has been revealed that following an active lifestyle brings benefits in some constructs associated with positive psychology such as physical self-concept and EI. In turn, the development of some dimensions of self-concept could benefit academic performance, and furthermore, the configuration of healthy habits in a particular way could benefit school performance. These findings have a very positive connotation for the highly complex life cycle stage of adolescence. Specifically, adolescents are in a stage of continuous exploration of possibilities and new peer group configuration, causing healthy habits to suffer or to be taken to the extreme because of the importance they attach to body image and physical attractiveness. Therefore, the extremely high development of these physical-healthy behaviours could be associated with non-adaptive behaviours in the school context, and even, at the level of health, lead to a deterioration of health. On the contrary, setting normal levels of PA and a healthy diet could benefit certain psychosocial factors and help their academic performance.

Conclusions

The structural model developed reveals the following findings. In relation to physical self-concept and its dimensions, the strongest relationship is between physical fitness and physical ability in boys and girls, being higher in the former. In contrast, the lowest regression weight was found for the relationship between physical attractiveness and perceived strength, being much less relevant in girls. Thus, it could be concluded that young women do not consider the development of strength to be relevant for the improvement of their perceived image.

A positive relationship was observed between PA and several dimensions of physical self-concept, such as physical fitness, perceived strength and physical ability, with special emphasis on males. On the other hand, the quality of food was more relevant for women when it came to the perception of physical fitness. This shows the existence of differentiated perceptions of two habits that allow for synergistic health improvement according to gender, which could shed light on various ways of structuring intervention programmes based on gender preferences.

Finally, EI had a positive influence on healthy habits, but no relationship was found with academic performance. Furthermore, the practice of PA and adherence to DM were directly and slightly related to academic performance in girls, with diet having a positive influence only in boys. It seems that these healthy habits could have a positive impact on the cognitive level in young people, in processes such as attention, memory or improvement of perceived well-being, processes that would benefit school performance.

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