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MEASUREMENT OF PHYSICAL SELF-CONCEPT AND ITS RELATIONSHIP WITH SPORTS PRACTICE IN UNIVERSITY STUDENT-ATHLETES

**MEDICIÓN DEL AUTOCONCEPTO FÍSICO Y SU
RELACIÓN CON LA PRÁCTICA DEPORTIVA EN
ESTUDIANTES-ATLETAS UNIVERSITARIOS**

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Measurement of Physical Self-Concept and Its Relationship with Sports Practice in University Student-Athletes

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ABSTRACT

The aim of this study was to analyze the relationship between physical self-concept and variables associated with sports practice, gender, and age in a sample of 86 university students-athletes from the Universidad Veracruzana (Mexico). A mixed, cross-sectional, non-experimental design was used. Physical self-concept levels were assessed using a standardized questionnaire and grouped into three categories: low, moderate, and high. Chi-square tests of independence were used to determine associations between variables, and a simple correspondence analysis (CA) was subsequently developed to explore multivariate relationships. The results showed that high levels of physical self-concept are associated with older age, male gender, and previous competitive experience, while low levels are mainly related to young women without sporting achievements. The correspondence analysis explained 78.4% of the total inertia, highlighting Dimension 1 (56.2%) as the axis of self-efficacy and sports experience. The findings confirm the influence of the competitive context and personal development on body perception and underscore the need to promote institutional programs aimed at strengthening physical self-concept in the university population.

Keywords: physical self-concept, sports practice, correspondence analysis, university students, chi-square

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Medición del Autoconcepto Físico y su Relación con la Práctica Deportiva en Estudiantes-Atletas Universitarios

RESUMEN

El presente estudio tuvo como objetivo analizar la relación entre el autoconcepto físico y variables asociadas a la práctica deportiva, el sexo y la edad en una muestra de 86 estudiantes deportistas universitarios de la Universidad Veracruzana (México). Se aplicó un diseño mixto, transversal y no experimental. Los niveles de autoconcepto físico se evaluaron mediante un cuestionario estandarizado y se agruparon en tres categorías: bajo, regular y alto. Para determinar asociaciones entre variables se utilizaron pruebas de Ji cuadrada de independencia, y posteriormente se desarrolló un análisis de correspondencias simples (AC) para explorar las relaciones multivariadas. Los resultados evidenciaron que los niveles altos de autoconcepto físico se asocian con mayor edad, sexo masculino y experiencia competitiva previa, mientras que los niveles bajos se relacionan principalmente con mujeres jóvenes sin logros deportivos. El análisis de correspondencias explicó un 78.4 % de la inercia total, destacando la Dimensión 1 (56.2 %) como eje de autoeficacia y experiencia deportiva. Los hallazgos confirman la influencia del contexto competitivo y del desarrollo personal en la percepción corporal, y subrayan la necesidad de promover programas institucionales orientados al fortalecimiento del autoconcepto físico en la población universitaria.

Palabras clave: autoconcepto físico, práctica deportiva, análisis de correspondencias, estudiantes universitarios, Ji cuadrada

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INTRODUCTION

Physical self-concept—understood as an individual's perception of their own physical abilities, body appearance, strength, physical condition, body self-esteem, and motor competence—has been identified in the literature as a key factor in promoting healthy lifestyles, particularly with regard to sports practice (Fox & Corbin, 1989; Moreno, Moreno, & Cervelló, 2007). In university settings, where students undergo cognitive, social, and lifestyle changes, the relationship between physical self-concept and sports activity is of particular interest: on the one hand, because it can influence motivation, persistence, and performance; on the other, because sports practice can positively reinforce that self-concept, improving psychological well-being and overall health.

In Mexico, although studies have been conducted on physical self-concept in adolescents and young people (e.g., psychometric studies of the Physical Self-Concept Questionnaire in university students; Blanco et al., 2015), there is still little scientific evidence directly linking specific sports disciplines, frequency or intensity of practice, and particular dimensions of physical self-concept within representative samples of university students from different sports areas. This article aims to contribute in this regard: it includes 86 records of students from a Mexican university, belonging to more than ten different sports disciplines, and it includes a record indicating whether or not they have achieved sporting success in competition, which allows us to explore how physical self-concept varies depending on diversified sports practice and not only as general physical activity.

To collect data on physical self-concept, the Questionnaire for Measuring Physical Self-Concept was used, taken from Moreno, J. A., Moreno, R., and Cervelló, E. (2007), which has been adapted into Spanish and used in multiple studies in Spanish-speaking populations. This questionnaire defines dimensions such as physical condition, physical appearance, motor skills, strength, and physical self-esteem, providing evidence that physical self-concept predicts the intention to be physically active.

The overall objective of this study is to measure physical self-concept in university students who are athletes in various disciplines and to analyze its relationship with variables related to sports practice, such as gender, age, number of hours of training, and athletic achievement, among others.



In recent years, several studies have been conducted that address the relationship between physical self-concept and physical or sports practice in young university students, as well as in nearby populations (Burgueño et al., 2025), which allows us to frame the findings of the present work (Muñoz & Burgueño, 2025). For example, Estrada-Araoz, Quispe-Mamani, and Noblega-Reinoso (2024) conducted a cross-sectional study with 222 university students from a public university, selected through probabilistic sampling, to determine the relationship between physical self-concept and motivation toward physical activity. These students were administered the Physical Self-Concept Questionnaire and the PALMS scale, both of which have good metric properties. The results indicated that the level of physical self-concept was average and motivation toward physical activity was moderate; they also found a high Spearman correlation between the two variables ($\rho = 0.816$, $p < 0.05$). It was also observed that men reported higher levels of both physical self-concept and motivation compared to women.

Another relevant study was that of the University of Murcia (Cardozo-Duarte & Cadena-Duarte, 2021), which analyzed the perception of physical self-concept during COVID-19 lockdown by applying the Physical Self Questionnaire to 499 university students in Bogotá, Colombia, selected through stratified random sampling. The instrument showed high internal reliability (overall Cronbach's $\alpha = 0.943$) and also good values by dimension. It was found that men obtained higher scores than women overall and by dimension; likewise, students from higher socioeconomic strata had lower scores than those from lower strata, and older students had lower scores in self-esteem, muscle strength, physical condition, and perceived competence.

In Chile and Spain, Gatica-Simpson et al (2024) conducted a study with 671 university students from the Valparaíso region (Chile) to analyze differences in physical self-concept according to gender. Using the short version of the Physical Self Description Questionnaire (PSDQ-s) in online format, the authors compared women and men using nonparametric Mann-Whitney tests and calculated effect sizes. The results revealed significant differences in all dimensions of physical self-concept evaluated ($p < 0.05$) with moderate effects in favor of men in overall physical self-concept, endurance, sports, and strength. In relation to scales and instrument construction, Galán-Arroyo, Batista da Silva, and Rojo Ramos (2024) validated a multidimensional instrument to measure self-concept in the context of physical education in secondary school adolescents in Spain.



In their sample of 1,155 students from public high schools, exploratory and confirmatory factor analyses were performed, finding a five-factor structure with 30 items, with good fit indices and internal reliabilities between $\alpha = 0.76$ and 0.88 for the different factors. This type of instrumental study ensures that the specific dimensions of physical self-concept are measured adequately and can be distinguished when related to physical activity or sports practices.

Also, in Mexico, during the COVID-19 lockdown, the psychometric properties of the Physical Self-Concept Questionnaire (PSCQ) were evaluated with middle school students who were taking online physical education classes. Large samples (more than 1,900 students, aged 12 to 19) were used and divided for exploratory and confirmatory factor analysis; a KMO of 0.96 was obtained, with reasonable model fit (RMSEA = 0.07, CFI and NFI = 0.97), high overall reliability ($\alpha = 0.95$), and also for the dimensions of physical fitness, motor skill, and strength. In addition, significant differences were identified in the measurement model by gender.

These studies show relatively consistent patterns: first, that men tend to report higher levels of overall physical self-concept and in dimensions such as strength, physical fitness, motor skill, endurance, or body appearance, compared to women; second, that sociodemographic variables such as age, socioeconomic status, or even time in confinement (or pandemic restrictions) have an effect on physical self-concept; third, that the instruments used recently (Physical Self-Concept Questionnaire, Physical Self Questionnaire, PSDQ-s, QAF, etc.) have demonstrated good psychometric properties (reliability, factor structure, model fit) in contemporary samples, allowing for greater certainty when comparing results; And fourth, physical activity, motivation toward it, and frequency/intensity of physical activity are variables that correlate positively with dimensions of physical self-concept, although there is variability in how much they explain these effects, and some differences by gender or context.

However, some gaps remain: few recent studies have used university samples of athletes from various disciplines to differentiate between type of sport, intensity, or specific competition and competitive athletic achievements; and although there are studies in pandemic contexts (with lockdowns), there are fewer that include post-pandemic follow-up or comparisons between those who practice competitive sports and achieve some athletic success and those who do not. These gaps justify the need for the present study, which incorporates 86 records of university students from more than ten sports



disciplines, measuring physical self-concept using the questionnaire by Moreno, J. A., Moreno, R., and Cervelló, E. (2007), to explore these relationships in greater detail.

Considering recent findings, it seems clear that physical self-concept is not a uniform construct, but rather a multifaceted one, with dimensions that may respond differently to specific sports variables (type of discipline, frequency, intensity), gender, and the university cultural context. In Mexico, with fewer studies exploring these relationships taking into account the diversity of sports disciplines, it is necessary to fill this gap. This work adds value by investigating a sample of real students practicing various disciplines, using a validated instrument (Moreno, Moreno, R., and Cervelló, (2007), which will allow for a more detailed analysis of which aspect of physical self-concept is most strengthened by sports practice in the Mexican university context.

MATERIALS AND METHODS

The research was conducted with 86 individuals (40 males and 46 females) aged between 17 and 24 ($\bar{X}$ =20.3, SD =1.84), all enrolled in undergraduate programs at the Universidad Veracruzana in Mexico. This population also forms part of the university's representative sports teams in various disciplines (basketball, soccer, volleyball, judo, karate, table tennis, triathlon, university wrestling, among others). Participation was voluntary, with respondents completing an electronic form designed for the purposes of the research. The main element of the form was the Physical Self-Concept Questionnaire (PSC) proposed by Moreno et al. (2007), as well as general variables (age, sex, sport, training hours) and one more variable on whether or not they had achieved first, second, or third place in any sports competition as a university representative.

The PCQ used here consists of 28 items distributed across four specific dimensions of physical self-concept (perceived competence, physical attractiveness, strength, and self-confidence) that are conceptually aligned with those proposed by Fox and Corbin (1989). All items are written in a direct manner and are scored from 1 to 10. The dimension called perceived competence contains 10 items, physical attractiveness 6, strength and self-confidence also 6 each. Finally, the score for each dimension would be found by adding the scores of all the items belonging to each dimension, and the total CAF score by adding the results of all the dimensions.



In this way, the CAF distinguishes a low level when the total sum is less than or equal to 132 points, a medium level when it ranges from 133 to 152, and a high level for greater than or equal to 153.

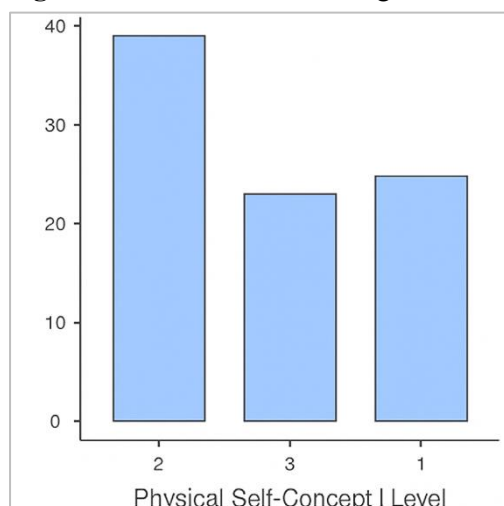
Statistical analysis was performed using jamovi software (2022), version 2.3, as well as Rstudio (Posit team, 2025), performing exploratory statistics, chi-square tests, and correspondence analysis to study whether the level reported by physical self-concept is associated with age, sex, athletic achievement, and training schedules.

RESULTS AND DISCUSSION

This section presents the main findings derived from the statistical analysis performed to explore the relationships between physical self-concept and sociodemographic and sports variables such as gender, age, and competitive achievement in university students. First, chi-square tests of independence were performed to determine the existence of significant associations between levels of physical self-concept (low, moderate, and high) and the categorical variables considered. Subsequently, a simple correspondence analysis (CA) was applied in order to visually represent the interrelationships between the categories, identifying the underlying axes or dimensions that explain the structure of the data. The results obtained allow us to recognize relevant patterns of correspondence between physical self-concept, sports experience, and the individual characteristics of the participants, offering a comprehensive interpretation of the configuration of self-concept in the university context.

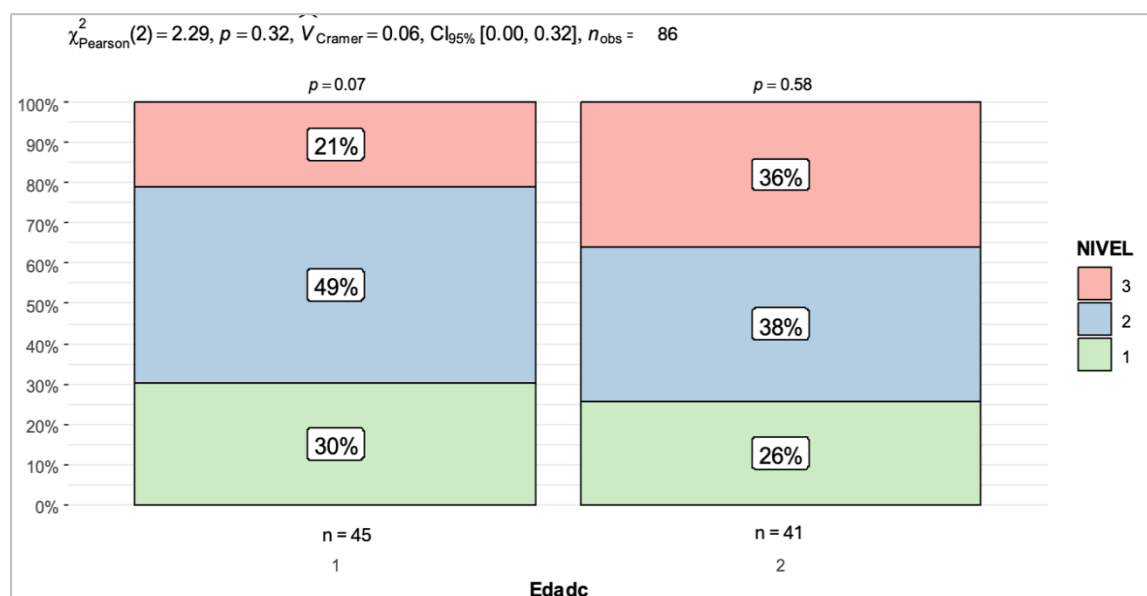
Initially, the distribution of the population for the measurement of physical self-concept derived from the questionnaire applied is presented.

Figure 1. Distribution according to level of physical self-concept.



Applying the CAF and the total score scale, it was found that 39 students had a regular level of physical self-concept (level 2), 23 had a high level (3), and the remaining 24 had a low level or level 1. This is an expected or normal distribution according to the scale of the instrument applied.

Figure 2. Chi-square test: self-concept level-age



In order to analyze the possible association between the level of physical self-concept and the age of the participants, a Pearson's chi-square (χ^2) test of independence was performed. The physical self-concept variable was classified into three levels: low (1), average (2), and high (3), while the age variable was grouped into two categories: 20 years old or younger ($n = 45$) and older than 20 years old ($n = 41$). In total, the analysis included 86 participants. The results of the hypothesis test indicated that there is no statistically significant relationship between the level of physical self-concept and the age of the students.

The effect size statistic, represented by Cramer's V ($V = 0.06$, 95% CI [0.00, 0.32]), showed a very weak association, suggesting that the differences observed between groups could be explained by chance rather than by a real dependence between the variables.

At a descriptive level, the results showed that in the group aged 20 years or younger (group 1), 49% of participants were at the regular level of physical self-concept, 30% at the low level, and 21% at the high level. In contrast, in the group aged 20 years and older, 38% were at the average level, 26% at the low level, and 36% at the high level.

This distribution suggests that, although there is a slightly greater tendency toward high physical self-concept in older students, the difference is not statistically significant.

In interpretive terms, the results show that age is not a determining factor in the configuration of physical self-concept within this university sample. Although some previous studies have pointed to a possible relationship between psychological maturity, bodily experience, and a more positive self-image (Contreras-Jordán, Martínez-Gómez, F., & Ruiz-Montero., 2023), in the present analysis, the differences between age groups were minimal. This finding coincides with recent research reporting relative stability in physical self-concept during the university stage, where contextual, social, and sports practice factors tend to influence more than chronological age (Ruiz-Juan & Gómez-López, 2020; Burgueño et al., 2025).

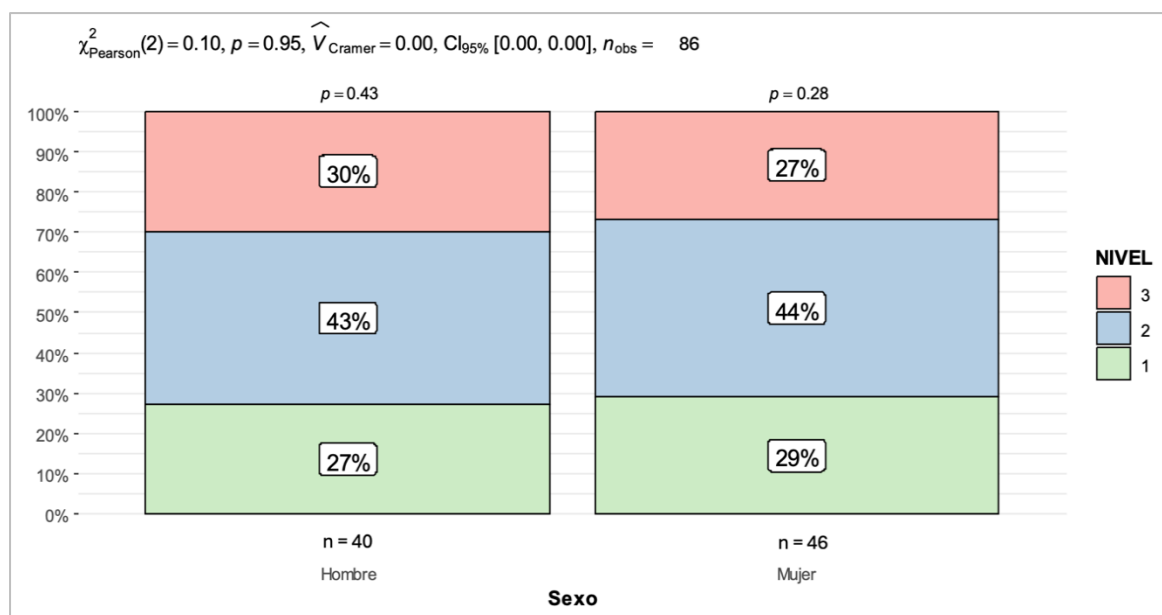
From a practical perspective, the absence of significant differences suggests that interventions aimed at strengthening physical self-concept can be applied across different age groups within the university setting. However, the descriptive trend observed—a higher proportion of high self-concept in those over 20 years of age—could be explored in future research with larger samples or using multivariate models that simultaneously consider variables such as physical activity level, body composition, and psychological well-being.

Overall, the results allow us to conclude that, although descriptive variations by age group are identified, there is no statistically significant relationship between age and level of physical self-concept in the sample analyzed.

The low Cramer's V value (0.06) reinforces the interpretation of a weak association, supporting the idea that physical self-concept in university contexts may depend more on personal and contextual factors than on age-related development itself.



Figure 3. Chi-square test: self-concept level-gender



In order to determine whether there are statistically significant differences in the level of physical self-concept between men and women, a Pearson's chi-square (χ^2) independence test was applied (). The dependent variable, physical self-concept, was classified into three levels: 1 = low, 2 = average, and 3 = high, while the independent variable corresponded to biological sex, coded as 1 = women and 2 = men.

The results of the analysis revealed that there were no statistically significant differences between men and women in levels of physical self-concept. The effect size statistic, measured using Cramer's V ($V = 0.00$, 95% CI [0.00, 0.0]), indicates a weak association, suggesting that the discrepancies observed between groups do not reflect a real dependence between the variables, but rather variability attributable to sampling error.

At a descriptive level, the results show that among women, 44% were at the regular level of physical self-concept, 29% at the low level, and 27% at the high level. In the case of men, 43% were concentrated at the average level, 27% at the low level, and 30% at the high level. These differences, although slight, show a tendency toward a slightly more favorable physical self-concept among men, who have a higher proportion of high levels and a lower proportion of low levels compared to women.

Analysis of the results allows us to conclude that, from a statistical perspective, physical self-concept does not differ significantly by gender in the population studied. However, descriptive patterns suggest a structural trend consistent with the scientific literature, which indicates that men tend to have a more positive perception of their body image and physical abilities, while women tend to experience greater body self-criticism and social pressure toward aesthetic ideals (Castañeda-Vázquez et al., 2022; Moreno-Murcia et al., 2021).

These results are partially aligned with the findings of previous studies that document slight or moderate differences between sexes in physical self-concept, depending on contextual variables such as sports practice, type of physical activity, and body satisfaction (Fernández-García, Cecchini, & Méndez-Giménez et al., 2021; Ruiz-Juan & Gómez-López, 2020). In university contexts, where body socialization is balanced between both genders, the difference tends to be reduced, which could explain the absence of statistical significance observed in this analysis.

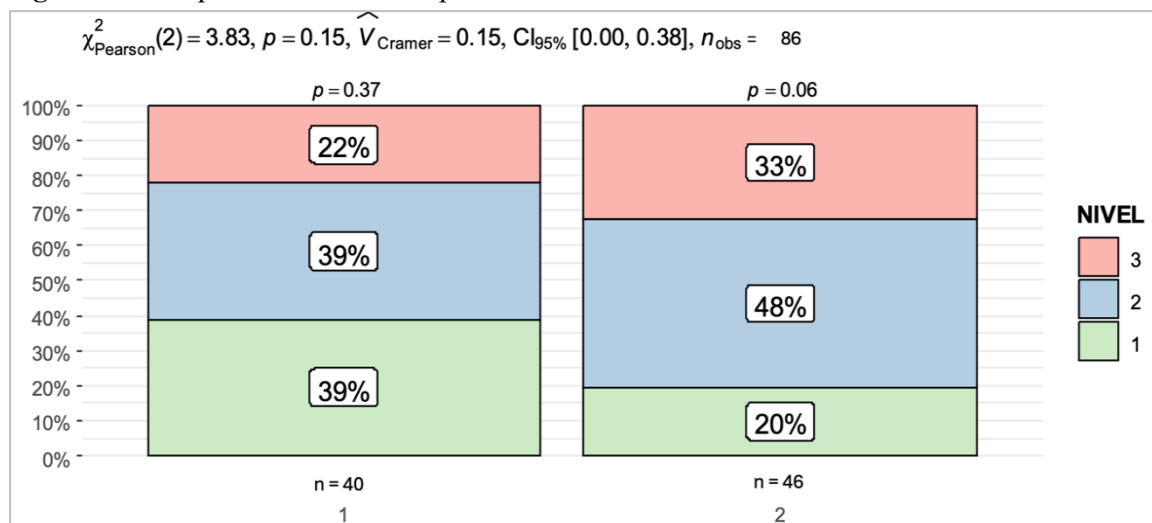
From a theoretical perspective, the lack of a significant association can be interpreted in terms of the homogeneity of the university context, where values of self-image, perceived physical condition, and physical activity habits tend to converge, reducing gender differences. Furthermore, emerging evidence suggests that physical self-concept is influenced by more complex factors—such as perceived motor competence, emotional well-being, and bodily self-efficacy—than by basic sociodemographic variables such as gender (Contreras-Jordán, Martínez-Gómez, & Ruiz-Montero, 2023; Burgueño et al., 2025).

Taken together, these results allow us to conclude that, in the sample analyzed, gender is not a determining factor in the configuration of physical self-concept. Although men report slightly higher percentages at the high level, the magnitude of the effect ($V = 0.00$) and the $p\text{-value} > 0.05$ confirm that the difference is not statistically significant.

However, this descriptive trend could be explored in future studies with larger samples or through multivariate analyses that include mediating variables such as sports practice, self-determined motivation, and perception of physical competence.



Figure 4. Chi-square test: self-concept-athletic achievement level



To analyze the possible association between the level of physical self-concept (categorized into three levels: low = 1, average = 2, and high = 3) and athletic achievement (classified into two groups: group 1 = students who have not placed in competitions and group 2 = those who have placed first, second, or third in athletic events), the chi-square test of independence (χ^2) was applied.

The test results showed that there were no statistically significant differences between the two variables, indicating that the level of physical self-concept does not vary significantly based on athletic achievement. However, descriptive analysis of the proportions allows us to identify trends of interest. In the group of students without competitive achievements (group 1), the highest concentration was found in the regular and low levels of physical self-concept, while a smaller proportion was in the high level. On the other hand, in the group of students with athletic achievements (group 2), there was an increase in the proportion of participants with high physical self-concept, accompanied by a relative decrease in the low level.

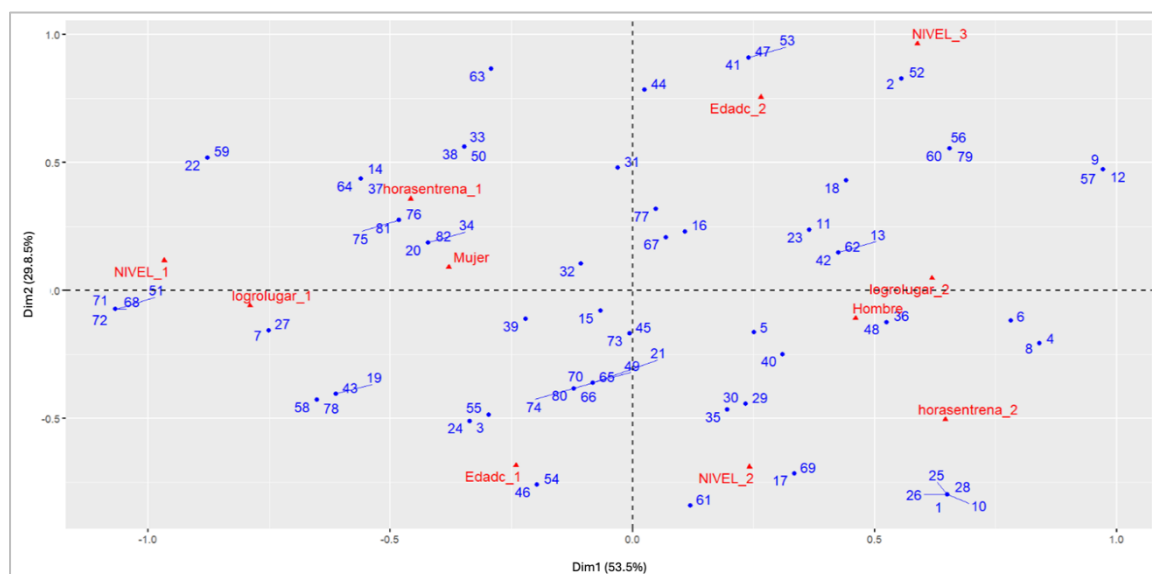
Cramer's V coefficient ($V = 0.15$) reflected a small effect size, confirming that the relationship between the two variables is weak, even though a favorable trend is observed in athletes with higher competitive performance. This result can be interpreted to mean that competitive success does not in itself determine a higher physical self-concept, although students with greater athletic experience or recognition tend to perceive themselves more positively in terms of their physical abilities, fitness, and appearance.

These results are in line with recent research highlighting that physical self-concept is influenced by multifactorial factors, including systematic practice, perceived self-efficacy, and a supportive social environment, rather than by specific competitive achievements (Gómez-López, Granero-Gallegos, Baena-Extremera 2022; Ríos-Risquez, García-Izquierdo, Martínez-Roche 2023). In this sense, physical self-concept could be consolidated more stably based on the training process and the perception of competence, rather than on the immediate results obtained in sports competitions (Burgueño et al., 2025).

In conclusion, although the data do not show significant differences between physical self-concept and athletic achievement, the observed trend suggests that students with higher achievements tend to develop more favorable perceptions of their bodies and physical abilities. These findings underscore the need to consider educational and psychological interventions that strengthen physical self-perception in students with lower competitive performance, promoting overall well-being and continued participation in sports.

A similar analysis was performed for the relationship between physical self-concept and training hours, reporting the same trend as the three tests reported above.

Figure 5. Correspondence analysis. Physical self-concept, age, gender, athletic achievement.



In order to examine the associations between the level of physical self-concept and the variables of gender, age, and athletic achievement, a simple correspondence analysis (CA) was applied. This method allows the relationships between qualitative categories to be represented graphically, facilitating the

identification of patterns of proximity and conceptual groupings between the observed variables (Greenacre, 2021).

The model obtained explained a cumulative percentage of inertia of 78.4%, distributed mainly across two factorial dimensions. Dimension 1 (Dim1) explained 53.5% of the total variability, while Dimension 2 (Dim2) contributed an additional 29.8%. Together, these two dimensions adequately summarize the structure of associations between the categories studied, allowing for a solid and statistically consistent visual interpretation.

In Dimension 1 (Dim1), there is a clear separation between the extreme levels of physical self-concept, where the high level is associated with the group of students who have achieved sporting success (group 2), as well as with a higher proportion of men and participants over the age of 20 (age group 2). This pattern suggests that the first dimension represents a gradient of positive physical perception, linked to competitive experience and biological and athletic maturity. In contrast, the points corresponding to the low level of physical self-concept are located at the opposite end of Dim1, close to the group without athletic achievements (group 1) and the group of women and younger participants (age group 1). This axis could be interpreted as a continuum reflecting perceived physical self-efficacy and exposure to sports competition, where body self-esteem improves with increasing age and participation in competitive events.

For its part, Dimension 2 (Dim2), which explains 29.8% of the inertia, mainly discriminates between low and regular levels of physical self-concept. In this dimension, the regular level appears closer to the center of the factorial plane, reflecting an intermediate or balanced condition between the characteristics of both extreme groups. This indicates that students with regular physical self-concept present heterogeneous patterns in terms of gender, age, and athletic achievement, without clearly aligning with a specific category.

The spatial distribution of the categories shows that high physical self-concept is more closely associated with men and those who have won first place in competitions, while low levels are related to young women without notable competitive experience. These associations are consistent with previous studies that indicate that systematic sports practice and competitive achievements tend to strengthen body perception and self-image (Gómez-López et al., 2022; Burgueño et al., 2025).

Likewise, the relationship between age and physical self-concept observed in the graph suggests that students over the age of 20 have a greater consolidation of their body identity, an aspect associated with a more advanced process of physical and psychological maturity (Ríos-Risquez et al., 2023). In contrast, young people under the age of 20 tend to show more fluctuating perceptions, possibly influenced by contextual and social factors or comparisons with their peers.

CONCLUSIONS

In summary, the correspondence analysis reveals that the structure of relationships between physical self-concept, gender, age, and athletic achievement is mainly organized around an axis of physical self-efficacy and competitive experience. Although Dim2 adds secondary nuances related to the internal variability of low and regular levels, Dim1 concentrates most of the variability, showing that high physical self-concept is a distinctive feature of the most experienced participants with the highest athletic achievements.

The results obtained through correspondence analysis confirm that physical self-concept is a central dimension in understanding the body identity and athletic performance of university students. The associations observed show that high physical self-concept tends to be concentrated in the group of men over 20 years of age with successful competitive experience, which coincides with previous findings linking positive body self-perception with self-efficacy and sustained sports practice (Gómez-López, Granero-Gallegos, Baena-Extremera 2022; Burgueño et al., 2025). In contrast, low levels of physical self-concept are associated with young women without sporting achievements, suggesting the persistence of gender and age differences in how individuals value their performance and physical condition.

From an interpretive perspective, the first factor dimension—which explains the largest proportion of total inertia—reflects an axis of self-efficacy and athletic competence, while the second dimension provides nuances about the internal variability between low and regular levels of physical self-concept. This structure reinforces the idea that body self-perception is not a one-dimensional phenomenon, but is shaped by psychosocial factors and competitive experience. In particular, students who have participated in competitions and achieved outstanding results seem to develop a more integrated and

stable physical identity, which may have positive implications for their psychological well-being and academic performance (Ríos-Risquez, García-Izquierdo, Martínez-Roche, 2023).

Taken together, the findings suggest the need to promote programs that foster positive physical self-concept in university settings, especially those aimed at women and young people who participate less in sports. Such interventions could help balance body perceptions and strengthen personal confidence in the physical and emotional spheres. Furthermore, future research should explore the mediating role of variables such as intrinsic motivation, regular practice, and social support in order to gain a deeper understanding of the mechanisms that link physical self-concept with athletic achievement and participation.

The results of this research allow us to conclude that physical self-concept is an essential component in understanding well-being and athletic performance in college, closely linked to personal variables and competitive experience. Correspondence analysis revealed a relationship structure in which high physical self-concept is associated with older age, male gender, and athletic achievement, while low and regular levels predominate among young women without competitive experience. These findings reflect not only the influence of the athletic context on body perception, but also the persistence of gender and developmental differences in physical self-assessment.

In applied terms, the results suggest the advisability of strengthening training and psychological strategies that promote a healthy physical self-concept, with special attention to groups that have lower perceptions of their own body capacity. It is also recommended that research be expanded to include multivariate models that integrate variables such as motivation, systematic practice, and the sociocultural environment, in order to gain a broader understanding of the factors that shape physical self-concept and its impact on athletic and academic performance. In summary, this study provides empirical evidence on the relevance of physical self-concept as a key indicator of personal and athletic development in the university setting and raises the need to address it as a cross-cutting theme in the comprehensive training of students.



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