Physical activity, self-acceptance, and body perception among Peruvian university students: an analysis using partial least squares structural equation modeling

Actividad física, autoaceptación y percepción corporal en universitarios peruanos: un análisis mediante modelado de ecuaciones estructurales por mínimos cuadrados parciales

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Abstract

Introduction: University students face challenges related to body image, pressure to meet appearance standards, and sedentary lifestyles. Evidence examining these factors together with psychological well-being remains limited in Peru.
Objective: The study examined relationships between physical activity, self-acceptance, personal growth, and the subjective importance of appearance and fitness among Peruvian university students.
Methodology: A quantitative, nonexperimental, cross-sectional study included 400 students from Peru, primarily from Lima and Chiclayo, selected through convenience sampling. Questionnaire data were analyzed using partial least squares structural equation modeling.
Results: Most constructs showed adequate convergent and discriminant validity, although the Physical Activity construct showed limited internal consistency. Self-acceptance was significantly associated with personal growth, and the subjective importance of appearance was significantly associated with self-acceptance. Physical activity was not significantly associated with self-acceptance directly. Predictive performance was limited.
Discussion: The findings were considered alongside research on eudaimonic well-being, body-related experiences, and university sport participation. Differences in constructs and measurement limited direct comparisons across studies.
Conclusions: The findings support considering physical activity, body-related perceptions, and self-acceptance together in university well-being initiatives, while highlighting the need for improved measurement and further predictive validation.

Keywords

Physical activity; physical appearance; self-acceptance; SmartPLS; structural equation modeling.

Resumen

Introducción: Los universitarios enfrentaron desafíos relacionados con la imagen corporal, la presión estética y el sedentarismo. La evidencia integrada sobre estos factores y el bienestar psicológico fue limitada en Perú.
Objetivo: El estudio examinó las relaciones entre actividad física, autoaceptación, crecimiento personal e importancia subjetiva de la apariencia y condición física en universitarios peruanos.
Metodología: Se realizó un estudio cuantitativo, no experimental y transversal con 400 estudiantes de Perú, principalmente de Lima y Chiclayo, seleccionados por conveniencia. Los cuestionarios se analizaron mediante modelado de ecuaciones estructurales por mínimos cuadrados parciales.
Resultados: La mayoría de los constructos mostró adecuada validez convergente y discriminante, aunque la actividad física presentó limitada consistencia interna. La autoaceptación se relacionó significativamente con el crecimiento personal, y la importancia de la apariencia, con la autoaceptación. La actividad física no se relacionó directamente con la autoaceptación. El desempeño predictivo fue limitado.
Discusión: Los hallazgos se contrastaron con investigaciones sobre bienestar eudaimónico, experiencias corporales y práctica deportiva universitaria. Las diferencias entre constructos y mediciones limitaron las comparaciones directas entre estudios.
Conclusiones: Los hallazgos respaldan integrar actividad física, percepciones corporales y autoaceptación en iniciativas de bienestar universitario, junto con mejores mediciones y validación predictiva.

Palabras clave

Actividad física; apariencia física; autoaceptación; SmartPLS; modelado de ecuaciones estructurales.

Introduction

Physical activity and sport participation are relevant to research on psychological well-being among university students. In a cross-sectional study of 1,012 students, Pérez-Albéniz et al. (2026) found that those participating in competitive sport reported lower psychological distress, higher life satisfaction, and greater perceived competence than students in the comparison groups. These findings concern associations with specific indicators of psychological functioning rather than causal effects, and do not encompass all dimensions of well-being. Núñez et al. (2025), in a systematic review, examined physical activity in relation to eudaimonic psychological well-being, highlighting the relevance of self-acceptance and personal growth. Together, these contributions support examining behavioral and psychological dimensions within a common framework.

Body image encompasses individuals' perceptions and evaluations of their bodies. Research highlights its relevance to psychological well-being and participation in physical activity among university students (Gomez-Paniagua et al., 2023). Blanco Vega et al. (2022) examined the relationships between body dissatisfaction, physical activity, and psychological well-being, contributing to an understanding of how bodily experiences and exercise relate to psychological functioning. Olvera-Ruvalcaba and Gómez-Peresmitré (2021) addressed body dissatisfaction through an intervention involving compassionate attitudes and mindful eating, drawing attention to the psychological relevance of negative body evaluations. Together, these contributions support examining body-related perceptions alongside physical activity and internal dimensions of well-being.

Self-acceptance and personal growth provide a theoretical foundation for understanding these internal dimensions. Within Ryff's (1989) psychological well-being framework, self-acceptance involves a positive attitude toward oneself, including recognition and acceptance of personal strengths and limitations. Personal growth concerns continued development, openness to new experiences, and the realization of individual potential. Although conceptually distinct, these dimensions provide a basis for examining whether a more accepting relationship with oneself is associated with greater perceived personal development. Self-determination theory also emphasizes the relevance of autonomy, competence, and relatedness to motivation and well-being, offering a complementary perspective on psychological functioning (Deci & Ryan, 2008).

The subjective importance attached to physical appearance and physical fitness concerns the value individuals assign to these aspects of themselves, rather than objective physical characteristics or measured fitness. These constructs should also be distinguished from body dissatisfaction, which concerns discomfort with body shape or appearance. In a cross-sectional study of 654 Peruvian university students, Estrada-Araoz et al. (2025) found that social media addiction and daytime sleepiness were positively associated with body dissatisfaction. Although that study did not examine the subjective importance of appearance or self-acceptance, it provides contextual evidence that body-related distress is associated with aspects of university students' everyday experiences. The present study examines a different question: how the importance assigned to appearance and fitness relates to self-acceptance and physical activity.

Physical activity may relate to these perceptions through different motivations and experiences. Bisquert-Bover et al. (2020) examined exercise motivations and their relationships with physical and mental health from a gender perspective, suggesting the importance of considering why individuals participate in exercise. Quirumbay Vera et al. (2022) described sedentary behavior and physical activity among university students, emphasizing the relevance of examining activity patterns in this population. These contributions support investigating physical activity as one component of student well-being without if participation alone necessarily corresponds to greater self-acceptance or personal growth.

Gender also warrants consideration within this framework. Pérez-Albéniz et al. (2026) reported differences in sport participation, with female students showing a higher proportion of nonparticipation and lower participation in competitive sport. Gomez-Paniagua et al. (2023) also reported gender differences in body-related perceptions among university students. These findings provide a basis for considering gender as a sociodemographic variable potentially associated with physical activity and body-related evaluations. They do not imply that gender differences will be present for every construct or in every university population.

Studies in Peru have examined university students' psychological well-being and its relationships with social and academic factors (Arhuis-Inca & Ipanaqué-Zapata, 2023; Cuba Sancho et al., 2023). However, these contributions do not fully resolve how physical activity, self-acceptance, personal growth, and the subjective importance of appearance and fitness relate within a single analytical framework. Examining these constructs together provides context-specific evidence and helps identify associations that separate analyses may overlook.

Accordingly, the proposed model integrates behavioral, perceptual, and psychological dimensions. Ryff's (1989) framework establishes self-acceptance and personal growth as distinct dimensions of psychological well-being, while Núñez et al. (2025) discuss their relevance to research on physical activity. Studies by Blanco Vega et al. (2022) and Blanco Ornelas et al. (2023) bring physical activity, body-related perceptions, and psychological well-being into a common analytical framework. These contributions provide a rationale for examining the proposed associations in Peruvian university students without if the relationships observed in other populations will necessarily be reproduced.

The study therefore aims to examine the relationships between physical activity, self-acceptance, personal growth, and the subjective importance attached to physical appearance and physical fitness among university students from Peru, primarily from Lima and Chiclayo. Using partial least squares structural equation modeling, it evaluates theoretically grounded associations within a single model. Its contribution lies in integrating these dimensions to inform university well-being strategies adapted to the participating population. The cross-sectional design and convenience sample limit its scope to assessing associations, without establishing causal effects or determining the effectiveness of interventions.

Method

The study used a quantitative, nonexperimental, cross-sectional design with correlational and predictive analyses. Partial least squares structural equation modeling (PLS-SEM) was used to examine relationships between physical activity, body-related perceptions, and psychological well-being. This technique was selected because it allows relationships among multiple constructs to be assessed simultaneously without requiring multivariate normality for model estimation. It was appropriate for the study's objective of examining associations among physical activity, self-acceptance, personal growth, and the subjective importance of physical appearance and physical fitness. Given the observational design, the relationships were interpreted as associations rather than causal effects.

Participants

The available dataset comprised 400 survey responses from students who reported affiliations with Peruvian universities. The largest groups were affiliated with Universidad Señor de Sipán (n = 206), Universidad Nacional Mayor de San Marcos (n = 110), Universidad Antonio Ruiz de Montoya (n = 28), and Universidad Ricardo Palma (n = 27). Additional participants reported affiliations with Universidad Privada del Norte, Universidad Nacional Federico Villarreal, Universidad César Vallejo, Universidad Peruana de Ciencias Aplicadas, Universidad Privada San Juan Bautista, Universidad Peruana Cayetano Heredia, Universidad Nacional San Luis Gonzaga, Universidad de Ingeniería y Tecnología, Universidad Tecnológica del Perú, and Universidad Continental. Four responses contained institutional labels that could not be conclusively identified.

The most frequently reported cities were Lima (n = 177) and Chiclayo (n = 173), followed by Pimentel (n = 10), Lambayeque (n = 5), and Piura (n = 5). Other reported localities included Motupe, Olmos, Monsefú, Ica, Callao, Bellavista, Túcume, Tumán, Chepén, San José, Santa Eulalia, Arequipa, Bagua, and Ferreñafe. These locations reflected participants' responses and were not interpreted as university campus locations.

Participants were recruited through non-probability convenience sampling, with institutional support for distributing the online questionnaire. Eligibility criteria included being enrolled at a university, being at least 18 years old, and agreeing to participate voluntarily. University affiliation, city, and gender were collected to characterize the sample. Gender was recorded as a categorical variable and included as an observed exogenous variable in the proposed model.

Procedure

Data were collected through an online questionnaire distributed with the support of the participating institutions. The administration followed the project's institutional schedule. A pilot administration was conducted to identify difficulties in understanding the questions and completing the online form. This stage informed semantic and technical adjustments to the final questionnaire.

Participants were informed about the anonymity of their responses and the confidentiality of the information collected, in accordance with the ethical principles described for the study. The responses were subsequently organized and numerically coded for statistical analysis.

Instrument

Data collection combined three questionnaires addressing physical activity, body-related perceptions, and psychological well-being. Their integration followed the approach described in the reference study by Blanco Vega et al. (2022), with adaptations for administration in the Peruvian university context.

Body-related perceptions were assessed using items from the modified Multidimensional Body Self-Relations Questionnaire, based on the work of Blanco Ornelas et al. (2017). The questionnaire included eight items addressing physical appearance and body satisfaction and six addressing attitudes and behaviors related to maintaining physical fitness. These dimensions were designated in the proposed model as the subjective importance of physical appearance and physical fitness.

Psychological well-being was assessed using the abbreviated questionnaire described by Jurado García et al. (2017), which drew on Ryff's psychological well-being framework. The dimensions included in the structural model were self-acceptance and personal growth, each represented by three items.

Responses to the body-related and psychological items were recorded on five-point agreement scales, ranging from 1, strongly disagree, to 5, strongly agree. Physical activity questions used numerical responses for frequency and duration rather than agreement scales. The questionnaire content was reviewed by experts in psychology and research methodology, and the measurement properties of the retained indicators were subsequently assessed in SmartPLS 4.

Physical activity questionnaire

Physical activity was assessed using questions adapted from the International Physical Activity Questionnaire developed by Craig et al. (2003). Participants reported activities performed during the preceding seven days. The questions recorded activity frequency and daily duration and included separate sections for physical activity, moderate-intensity activity, walking, and time spent sitting. Frequency was expressed as days per week. Duration was recorded in hours and minutes per day and subsequently expressed in decimal hours by adding the reported hours to the minutes divided by 60.

Data analysis

Data were analyzed using SmartPLS 4 in two stages. The first stage assessed the measurement model by examining indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. The reference criteria were outer loadings above 0.708, Cronbach's alpha and composite reliability values of at least 0.70, and average variance extracted values above 0.50. Discriminant validity was examined using the Fornell–Larcker criterion and cross-loadings.

The physical activity block initially contained four indicators. One indicator was excluded because its outer loading fell below the reference threshold, leaving three indicators in the final model. The final measurement model also included four physical appearance indicators, two physical fitness indicators, three self-acceptance indicators, and three personal growth indicators.

The second stage assessed the structural model. Standardized path coefficients, t statistics, and p values were estimated using bootstrapping with 5,000 resamples. Statistical significance was evaluated at the 0.05 level. Coefficients of determination (R^2) and effect sizes (f^2) were examined to assess explanatory capacity and the contribution of individual predictors, respectively. Predictive assessment was interpreted using the reported Q^2predict statistics, with zero as the reference for comparison against mean-based predictions (Shmueli et al., 2019). These statistics were distinguished from Stone–Geisser's Q^2 obtained through blindfolding.

Results

Following the guidelines of Hair and Alamer (2022), indicator loadings were assessed, with values above 0.70 considered adequate. Cross-loadings were also examined to assess discriminant validity by checking whether each indicator loaded more highly on its assigned construct than on the other constructs.

The initial assessment examined the indicator cross-loadings before the exclusion of AF4. The Physical Activity indicators AF1, AF2, AF3, and AF4 had loadings of 0.816, 0.779, 0.728, and 0.498, respectively. The Personal Growth indicators PGT1, PGT2, and PGT3 had loadings of 0.941, 0.963, and 0.961. Self-Acceptance indicator loadings ranged from 0.932 to 0.947, Subjective Importance of Physical Appearance loadings ranged from 0.879 to 0.905, and Subjective Importance of Physical Fitness loadings were 0.987 and 0.986. Each indicator loaded more highly on its assigned construct than on the other constructs.

AF4 had an outer loading of 0.498, below the reference threshold of 0.708, and was therefore excluded from subsequent analyses. The final model retained AF1, AF2, and AF3 and was re-estimated after this exclusion. Consequently, the final Physical Activity loadings reported in Table 2 differ from the initial values. Tables 2–4 report assessments of the final model, while the initial cross-loadings before the exclusion of AF4 are presented in Table 1.

Table 1. Initial model cross-loadings before exclusion of AF4

	Discriminant validity: cross-loadings					
	Gender	Personal Growth	Physical Activity	Self-Acceptance	Subjective Importance of Physical Appearance	Subjective Importance of Physical Fitness
AF1	0.118	0.144	0.816	0.157	0.200	-0.511
AF2	0.071	0.132	0.779	0.166	0.243	-0.372
AF3	0.085	0.060	0.728	0.067	0.128	-0.391
AF4	0.008	0.069	0.498	0.088	0.069	-0.202
GEN	1.000	-0.102	0.111	-0.025	0.015	-0.051
PGT1	-0.073	0.941	0.145	0.840	0.666	-0.116
PGT2	-0.104	0.963	0.135	0.821	0.644	-0.123
PGT3	-0.117	0.961	0.145	0.816	0.636	-0.118
SAC1	-0.017	0.760	0.150	0.932	0.749	-0.102
SAC2	-0.014	0.858	0.171	0.947	0.721	-0.134
SAC3	-0.039	0.811	0.164	0.932	0.676	-0.140
SIA1	-0.008	0.689	0.162	0.756	0.904	-0.075
SIA4	0.030	0.659	0.227	0.686	0.893	-0.143
SIA6	-0.014	0.585	0.239	0.686	0.905	-0.092
SIA7	0.051	0.482	0.232	0.590	0.879	-0.081
SIF1	-0.053	-0.111	-0.545	-0.123	-0.109	0.987
SIF2	-0.048	-0.135	-0.524	-0.142	-0.107	0.986

Source: Authors' analysis using SmartPLS 4.

Construct reliability and convergent validity were assessed using factor loadings (FL), Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE). CA and CR assess internal consistency reliability, with values of at least 0.70 considered acceptable (Hair & Alamer, 2022). Although Cronbach's alpha is widely used, composite reliability accounts for differences in indicator loadings (Hair et al., 2019).

Subjective Importance of Physical Appearance, Subjective Importance of Physical Fitness, Self-Acceptance, and Personal Growth all had CA and CR values above 0.70. For Subjective Importance of Physical Fitness, CA and CR were 0.973 and 0.987, respectively.

Convergent validity was assessed using indicator loadings and AVE. The reference thresholds were outer loadings above 0.708 and AVE above 0.50 (Hair & Alamer, 2022). Personal Growth and Self-Acceptance exceeded the AVE threshold, with values of 0.912 and 0.879, respectively.

The high AVE for Self-Acceptance (0.879) should be interpreted alongside the strong correlations among its indicators and the conceptual coherence of the items used to measure the construct. This value reflects the variance captured in the indicators and should not be treated, on its own, as evidence of overall model superiority.

Physical Activity had a Cronbach's alpha of 0.689, below the reference threshold of 0.70. Indicators AF1, AF2, and AF3 may therefore require review to improve internal consistency. However, composite reliability (CR = 0.827) and average variance extracted (AVE = 0.616) exceeded their respective reference thresholds. Thus, the construct met the AVE criterion for convergent validity despite its lower Cronbach's alpha. The reliability and convergent validity results for the final model are presented in Table 2.

Table 2. Convergent validity and reliability of the model

Construct	Indicator	FL	CA	CR	AVE
Gender	GEN	1.000			
Physical Activity	AF1	0.854	0.689	0.827	0.616
	AF2	0.778			
	AF3	0.717			
Subjective Importance of Physical Appearance	SIA1	0.904	0.918	0.942	0.802
	SIA4	0.893			
	SIA6	0.905			
	SIA7	0.879			
Subjective Importance of Physical Fitness	SIF1	0.987	0.973	0.987	0.974
	SIF2	0.986			
Self-acceptance	SAC1	0.932	0.931	0.956	0.879
	SAC2	0.947			
	SAC3	0.932			
Personal Growth	PGT1	0.941	0.952	0.969	0.912
	PGT2	0.963			
	PGT3	0.961			

Source: Authors' analysis using SmartPLS 4.

Table 3 presents the evaluation of discriminant validity using the Fornell-Larcker criterion. This criterion establishes that the square root of each construct's AVE (average variance extracted)—located on the diagonal of the table—must be greater than its correlations with the other constructs. The diagonal values obtained were higher than the correlations with other constructs. For example, Personal Growth presented a value of 0.955, greater than its correlations with Physical Activity (0.147) and Self-Acceptance (0.865). Self-Acceptance presented a value of 0.937, which was greater than all its correlations, including that with Personal Growth (0.865). Physical Activity showed a diagonal value of 0.785, greater than its correlations with the other constructs. The Subjective Importance of Physical Appearance and the Subjective Importance of Physical Fitness showed values of 0.895 and 0.987, respectively, both greater than their correlations with the other constructs. Finally, the construct "Gender" presented a value of 1.000, corresponding to its representation as a categorical variable.

Table 3. Discriminant validity of the model

Discriminant validity: Fornell–Larcker criterion						
	Gender	Personal Growth	Physical Activity	Self-Acceptance	Subjective Importance of Physical Appearance	Subjective Importance of Physical Fitness
Gender	1.000					
Personal Growth	-0.102	0.955				
Physical Activity	0.118	0.147	0.785			
Self-Acceptance	-0.025	0.865	0.170	0.937		
Subjective Importance of Physical Appearance	0.015	0.680	0.245	0.763	0.895	
Subjective Importance of Physical Fitness	-0.051	-0.125	-0.547	-0.134	-0.109	0.987

Source: Authors' analysis using SmartPLS 4.

Following the assessment of the measurement model, the proposed structural relationships were examined using standardized path coefficients (β), t statistics, and p values, with statistical significance evaluated at the 0.05 level. Gender was positively associated with Physical Activity (β = 0.118; t = 2.126; p = 0.034). Its associations with Subjective Importance of Physical Appearance (β = -0.015; t = 0.286; p = 0.775) and Subjective Importance of Physical Fitness (β = 0.014; t = 0.287; p = 0.774) were not statistically significant. The direct association between Physical Activity and Self-Acceptance was also not statistically significant (β = -0.065; t = 1.554; p = 0.120). Physical Activity was positively associated with

Subjective Importance of Physical Appearance (β = 0.266; t = 4.439; p < 0.001) and negatively associated with Subjective Importance of Physical Fitness (β = -0.549; t = 10.265; p < 0.001).

Self-Acceptance was positively associated with Personal Growth (β = 0.865; t = 39.709; p < 0.001). Subjective Importance of Physical Appearance was positively associated with Self-Acceptance (β = 0.770; t = 19.929; p < 0.001), whereas Subjective Importance of Physical Fitness was negatively associated with Self-Acceptance (β = -0.086; t = 2.063; p = 0.039). The relationship between Subjective Importance of Physical Fitness and Subjective Importance of Physical Appearance was not statistically significant (β = 0.035; t = 0.605; p = 0.545). Overall, six of the 10 proposed relationships were statistically significant, while four were not. The results of the hypothesis tests are presented in Table 4.

Table 4. Hypothesis testing

	β	t statistic	p value	Results
Gender -> Physical Activity	0.118	2.126	0.034	Supported
Gender -> Subjective Importance of Physical Appearance	-0.015	0.286	0.775	Not supported
Gender -> Subjective Importance of Physical Fitness	0.014	0.287	0.774	Not supported
Physical Activity -> Self-Acceptance	-0.065	1.554	0.120	Not supported
Physical Activity -> Subjective Importance of Physical Appearance	0.266	4.439	<0.001	Supported
Physical Activity -> Subjective Importance of Physical Fitness	-0.549	10.265	<0.001	Supported
Self-Acceptance -> Personal Growth	0.865	39.709	<0.001	Supported
Subjective Importance of Physical Appearance -> Self-Acceptance	0.770	19.929	<0.001	Supported
Subjective Importance of Physical Fitness -> Self-Acceptance	-0.086	2.063	0.039	Supported
Subjective Importance of Physical Fitness -> Subjective Importance of Physical Appearance	0.035	0.605	0.545	Not supported

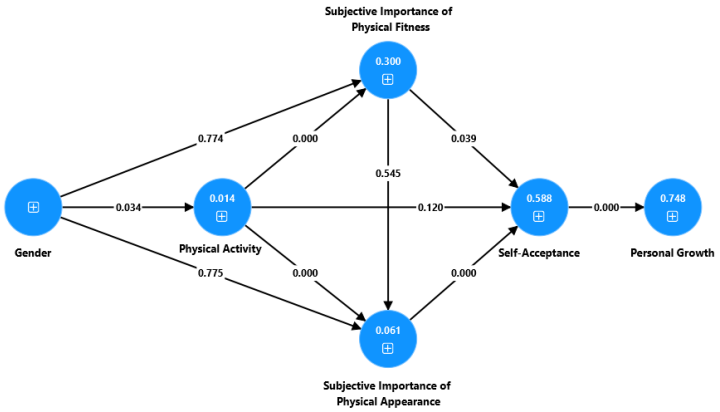
Source: Authors' analysis using SmartPLS 4.

The R^2 values indicate the proportion of variance in each endogenous construct explained by its predictors. Personal Growth obtained an R^2 of 0.748, indicating that its predictors explained 74.8% of its variance. Self-Acceptance reached an R^2 of 0.588, corresponding to 58.8% explained variance. In contrast, Physical Activity (R^2 = 0.014) and Subjective Importance of Physical Appearance (R^2 = 0.061) showed lower explained variance, at 1.4% and 6.1%, respectively, indicating limited explanatory capacity for these constructs.

The f^2 values quantify the contribution of each predictor to the explained variance of an endogenous construct. Physical Activity had an f^2 of 0.424 for Subjective Importance of Physical Fitness. The f^2 for Self-Acceptance in relation to Personal Growth was 2.971, and that for Subjective Importance of Physical Appearance in relation to Self-Acceptance was 1.350. By comparison, gender made negligible contributions to the explained variance of Subjective Importance of Physical Appearance and Subjective Importance of Physical Fitness, with f^2 values of 0.000 for both relationships.

The reported Q^2predict values were 0.007 for Physical Activity, -0.004 for Personal Growth, -0.004 for Self-Acceptance, -0.006 for Subjective Importance of Physical Appearance, and -0.005 for Subjective Importance of Physical Fitness. The positive value for Physical Activity indicates a small improvement over the mean-based prediction benchmark. For the other constructs, the negative values indicate that the mean-based benchmark produced lower squared prediction error than the PLS model. These values alone do not establish overfitting or imply that the model cannot generate predictions. The proposed model relationships and R^2 values are presented in Figure 1.

Figure 1. Proposed model relationships and R^2 values.



Source: Authors' analysis using SmartPLS 4.

Q^2predict assesses prediction relative to a benchmark based on training-sample means; it is distinct from Stone–Geisser's Q^2 calculated using blindfolding. In PLSpredict, a positive Q^2predict indicates lower squared prediction error than the mean-based benchmark, whereas a negative value indicates poorer performance than that benchmark. Assessment of predictive power should also consider prediction errors, such as RMSE or MAE, and comparisons with linear-model benchmarks at the indicator level (Shmueli et al., 2019).

The Q^2predict results indicate that the model did not outperform the mean-based benchmark for four of the five endogenous constructs. Physical Activity showed only a small improvement over that benchmark. These findings should be interpreted alongside the explanatory associations identified in the structural model, without assuming that high explained variance necessarily implies strong predictive performance.

Discussion

The positive association between Self-Acceptance and Personal Growth (β = 0.865; p < 0.001) is consistent with examining both constructs within Ryff's (1989) psychological well-being framework. Núñez et al. (2025) likewise highlight these dimensions in their review of physical activity and eudaimonic well-being, while Blanco Ornelas et al. (2023) reported a positive association between self-acceptance and personal growth in Mexican university students. These contributions situate the present finding within the relevant literature, but the observed association does not establish that self-acceptance causes personal growth or mediates other relationships in the model.

The absence of a statistically significant direct association between Physical Activity and Self-Acceptance (β = -0.065; p = 0.120) should be considered alongside research reporting heterogeneous relationships between activity and well-being. Rodríguez Pinto et al. (2025), in a cross-sectional study of 193 Colombian university students, measured activity using pedometers and psychological well-being using Ryff's scale, and found no statistically significant association between overall physical activity and psychological well-being. Their finding is relevant to the present discussion but does not provide a direct comparison: the activity measures, populations, and psychological outcomes differ. Conversely, Pérez-Albéniz et al. (2026) observed more favorable psychological indicators among students participating in competitive sport. This contrast suggests that future research should examine the context of participation alongside activity levels. The present data do not establish which contextual factors account for the nonsignificant association.

Subjective Importance of Physical Appearance was positively associated with Self-Acceptance (β = 0.770; p < 0.001). This finding concerns the importance assigned to appearance and should not be interpreted as evidence that body dissatisfaction or external aesthetic pressure improves self-acceptance. Estrada-Araoz et al. (2025) reported a positive association between social media addiction and body

dissatisfaction in Peruvian university students, but neither variable was included in the present model. Their study therefore provides contextual evidence about body-related experiences rather than confirmation of the specific relationship estimated here. Interpretation of the positive coefficient requires attention to the wording and coding of the retained appearance indicators, while the cross-sectional design precludes determining the direction of the relationship.

The negative Q^2predict values for most endogenous constructs distinguish the model's explanatory associations from its predictive performance relative to the mean-based benchmark. Although the structural results describe associations among physical activity, body-related perceptions, self-acceptance, and personal growth, they do not establish strong predictive performance. Future research should refine the physical activity indicators, complement self-report data with objective measures, and evaluate the model in independent samples. Negative Q^2predict values alone should not be interpreted as proof of overfitting (Shmueli et al., 2019).

Measurement limitations also warrant consideration. Physical Activity showed a Cronbach's alpha of 0.689, although its composite reliability and average variance extracted exceeded the stated reference thresholds. This pattern warrants caution but does not establish the source of the lower internal consistency. Prince et al. (2008) and Lee et al. (2011) documented discrepancies between self-reported and objectively measured activity, supporting the use of complementary measurement approaches in future research. Those discrepancies do not, by themselves, explain the reliability coefficient observed in this sample. Objective measures also require careful selection: Rodríguez Pinto et al. (2025) noted that pedometers do not capture all forms of activity and that adherence to wearing the device can be problematic.

Gender was significantly associated with Physical Activity ($\beta = 0.118$; $p = 0.034$), whereas its associations with Subjective Importance of Physical Appearance ($p = 0.775$) and Subjective Importance of Physical Fitness ($p = 0.774$) were not statistically significant. Pérez-Albéniz et al. (2026) also identified gender differences in university sport participation, but the direction of the association in the present study cannot be interpreted without specifying the coding of gender. Moreover, the present findings do not support gender differences in the importance assigned to appearance or fitness, nor do they demonstrate that structural relationships differ between gender groups.

The study's contribution lies in examining physical activity, body-related evaluations, self-acceptance, and personal growth within an integrated model applied to the participating Peruvian university students. Its scope is limited by the cross-sectional design, convenience sampling, reliance on self-report data, and measurement limitations. Moreover, the model included only self-acceptance and personal growth from Ryff's broader framework; the results should not be generalized to all dimensions of psychological well-being. The associations identified and the reported predictive statistics also address different aspects of model performance, so explanatory findings should not be presented as evidence of strong out-of-sample prediction.

The findings suggest topics for university well-being initiatives and future intervention research, including self-acceptance and students' body-related experiences. Sport participation could be considered alongside these dimensions, informed by research such as Pérez-Albéniz et al. (2026), while recognizing that the present analysis did not identify a significant direct association between Physical Activity and Self-Acceptance. Neither the present study nor the cited cross-sectional studies establish that the proposed initiatives will improve well-being. Their effectiveness, and whether outcomes differ according to the context of sport participation, should be assessed through appropriately designed longitudinal or intervention studies.

Conclusions

The findings identify associations among physical activity, self-acceptance, personal growth, and the subjective importance of appearance and fitness in the participating Peruvian university students. Most constructs showed acceptable convergent and discriminant validity, although the internal consistency of the Physical Activity construct remained a limitation. Self-Acceptance was positively associated with Personal Growth, and Subjective Importance of Physical Appearance was positively associated with Self-Acceptance. These direct associations do not establish a mediating role for Self-Acceptance, which

would require an assessment of indirect effects. Cross-sectional design also precludes causal conclusions.

The positive association between Subjective Importance of Physical Appearance and Self-Acceptance should be interpreted according to the content and coding of the retained items. It does not establish that external validation or idealized appearance standards reduce self-acceptance, nor that physical activity modifies this relationship. Physical Activity was not directly associated with Self-Acceptance at the specified significance level. Its limited internal consistency supports reviewing the indicators and complementing self-report data with objective measures in future research.

Gender was significantly associated with Physical Activity, but not with the subjective importance assigned to appearance or fitness. The results therefore do not support conclusions about gender differences in these latter dimensions or differences in the model's relationships across gender groups. University well-being initiatives may consider gender and sociocultural context, while any differentiated recommendations should be supported by additional evidence.

The study adds context-specific evidence on associations among the constructs examined. Its findings may guide further research to inform university well-being programs, while the effectiveness of any proposed intervention remains to be evaluated. Future research should use longitudinal designs, improve the measurement of physical activity, and examine the context of participation alongside body-related perceptions. Replication in more diverse samples would help assess the stability and scope of the observed relationships.

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