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Ana Garcia-Megias
Universidad Loyola Andalucía
Carmen Santín Vilariño
santin@dpsi.uhu.es
Universidad de Huelva
Raquel Remesal-Cobreros
Universidad de Huelva
Sofía Ruiz-Curado
Universidad de Huelva
Diego Diaz-Milanes
Universidad Loyola Andalucía

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Mapping University Adjustment Through a Salutogenic Lens: Network and Latent Profile Evidence from Spanish University Students

Authors:

Ana Garcia-Megias [1,2,*] (agarciamegias@al.uloyola.es)

Carmen Santín Vilariño [3] (santin@dpsi.uhu.es)

Raquel Remesal-Cobreros [3,4] (mariar.remesal.sspa@juntadeandalucia.es)

Sofía Ruiz-Curado [5] (sofia.ruiz@dpee.uhu.es)

Diego Diaz-Milanes [1,2,6] (ddiaz@uloyola.es)

Affiliation:

[1]Department of Quantitative Methods, Universidad Loyola Andalucía, Sevilla, Spain

[2] Loyola Health Policy Institute, Universidad Loyola Andalucía, Sevilla, Spain

[3] Department of Clinical and Experimental Psychology, University of Huelva, Huelva, Spain

[4] Mental Health Inpatient Unit, Juan Ramón Jiménez Hospital, Andalusian Health Service, 21005 Huelva, Spain

[5] Department of Social, Developmental and Educational Psychology, University of Huelva, Huelva, Spain

[6] Health Research Institute, University of Canberra, Canberra, ACT, Australia

***Corresponding author:** Carmen Santín Vilariño[5] (email: santin@dpsi.uhu.es)

ABSTRACT

Background: University students face academic, social, and personal demands that may challenge adjustment and well-being. From a salutogenic perspective, this study examined how personal, social, and evaluative resources are organized, whether this organization differs by gender, and whether adjustment profiles emerge. Methods: A cross-sectional sample of 821 Spanish university students completed measures of life satisfaction, sense of coherence, self-esteem, body image concerns, curiosity, perceived social support, and friendship quality. Gaussian graphical models, network comparison tests, Bayesian network modelling, and latent profile analysis were conducted. Results: The strongest associations linked social support with friendship quality, sense of coherence with self-esteem, and self-esteem with body image concerns. Self-esteem was the most central node, whereas sense of coherence emerged as a parental node. No significant differences in network structure or global strength were found across gender. Four profiles were identified, ranging from psychosocial vulnerability to high adjustment. Conclusions: Findings support a systemic and heterogeneous view of university adjustment and may help inform tailored approaches to promoting student well-being.

Keywords: positive adjustment; salutogenesis; sense of coherence; network analysis; latent profile analysis.

1. Background

The university stage constitutes a critical transitional period in emerging adulthood, characterized by the convergence of new academic, social, and personal demands [1]. During this period, students must adapt to more autonomous forms of learning, reorganize their support networks, redefine their social roles, and progressively build a sense of belonging within the university community. In this sense, the transition to higher education should not be understood as a single event associated with university entry, but rather as a dynamic and cumulative process of adaptation, integration, and academic and social identity construction [2]. Understanding which personal and social resources facilitate this process is especially relevant in the current context, where university students' mental health and well-being have become central priorities in higher education and public health research [3].

From the salutogenic model, university adaptation can be conceptualized as a process through which students mobilize personal, social, and contextual resources to cope with environmental demands and move toward greater psychological adjustment and well-being [4,5]. Unlike approaches focused exclusively on risk or symptomatology, the salutogenic perspective shifts the focus toward the factors that allow individuals to maintain, recover, or strengthen health in demanding contexts [6]. Within this framework, sense of coherence (SOC) occupies a central position, as it reflects the extent to which individuals perceive their lives as comprehensible, manageable, and meaningful [7]. Higher SOC has been consistently associated with better health indicators, greater coping capacity, lower stress, and higher subjective well-being, including in university populations [8].

Applied to the university context, SOC helps explain why some students are able to interpret academic demands as structured and predictable, perceive that they have sufficient resources to cope with them, and attribute personal meaning to their educational experience [9,10]. In this regard, self-esteem, body image concerns,

curiosity, perceived social support, relationship quality, and life satisfaction can all be situated within the broader salutogenic framework, as they reflect psychological, relational, and evaluative components involved in positive university adjustment [11–13]. Examining these variables as a network is particularly relevant because it allows their interdependencies to be modeled as part of an integrated system rather than as isolated predictors [14].

Among intrapersonal resources, self-esteem constitutes a key indicator of the global evaluation of one's personal worth [15], and has been robustly associated with life satisfaction, psychological well-being, and coping capacity [16]. Closely related to self-concept, body image may also play an important role during the university stage, particularly in a developmental period in which personal identity, social comparison, and self-perception become highly salient [17,18]. Positive body image has been linked to greater well-being and adaptive psychological functioning, whereas body dissatisfaction has been associated with greater emotional distress and psychological vulnerability [19–23].

Curiosity may also be considered a relevant motivational resource for university adaptation, as it promotes exploration, active learning, and openness to new experiences. From this perspective, curiosity is not only related to knowledge acquisition, but also to active engagement with the environment and personal growth [24]. This approach is also consistent with self-determination theory, which highlights the role of autonomous motivation, competence, and relatedness in optimal psychological functioning [25].

Alongside these intrapersonal resources, social resources play a fundamental role in university adaptation. Perceived social support has been defined as the perceived availability of emotional, instrumental, or informational help from significant others, and acts as a protective factor against academic and psychological stress [26,27]. Complementarily, relationship quality reflects subjective satisfaction with social ties and

contributes to belonging, personal validation, and the strengthening of self-esteem [28,29]. Although both constructs are closely related, it is important to distinguish them conceptually: perceived social support refers to the perceived availability of social resources, whereas relationship quality refers to the subjective evaluation of the relationships maintained.

Within this network of resources, life satisfaction can be considered an evaluative indicator of positive adjustment, as it reflects the global cognitive judgment individuals make about their own lives [30]. In university students, life satisfaction has been associated with multiple personal and social factors, including self-esteem, social support, coping with academic stress, and SOC [31]. Thus, rather than constituting an isolated phenomenon, life satisfaction may be understood as a global expression of how students integrate their personal and social resources throughout the university adaptation process.

Although previous studies have provided valuable evidence on the links between personal and social resources and student well-being, most have relied on variable-centered approaches focused on average associations [3,27]. These approaches may not fully capture how resources are interrelated within a system or how they combine into distinct configurations across students.

To complement this evidence, the present study adopts an integrative approach aligned with the salutogenic perspective. Network analysis was used to examine the relational architecture among the variables and identify central resources [32,33], whereas latent profile analysis was used to identify student profiles based on different configurations of intrapersonal, social, and adjustment-related resources [34].

Accordingly, the present study aimed to characterize positive adjustment in university students from a salutogenic perspective by examining how personal and social resources are interrelated and how they form distinct adaptation profiles. Specifically, the

objectives were: (a) to analyze the relational structure among SOC, self-esteem, body image concerns, curiosity, perceived social support, friendship quality, and life satisfaction; (b) to evaluate whether this structure was invariant by gender; and (c) to identify latent profiles of students based on their personal, social, and evaluative resources.

2. Method

2.1. Sampling method and participants

The present research is part of the Health Behavior in University (HBU) study, which follows a cross-sectional survey design [35]. The HBU study adhered to the ethical principles established in the Declaration of Helsinki. In addition, the study was approved by the Research Ethics Committee of the Huelva Centers (CEI) of the Regional Government of Andalusia (0846-N-19/P1027/19), and written informed consent was obtained from all participants.

The sample was recruited through a stratified random cluster sampling procedure, as described in previous studies, reaching an initial sample of 970 participants [36]. After excluding individuals who did not provide informed consent, minors, participants outside the typical university age range, and cases with missing data, the final sample comprised 821 university students. Of these, 74.45% identified as female and 25.55% as male, with ages ranging from 18 to 26 years (M = 20.65, SD = 2.15).

2.2. Variables and instruments

Sociodemographic variables were collected using an *ad hoc* questionnaire designed for the present study.

Life satisfaction was assessed using the *Satisfaction With Life Scale* [37], in its Spanish adaptation by [38]. This instrument consists of five items with a 7-point Likert-type response format, with higher scores reflecting greater life satisfaction. The Spanish

version has shown adequate psychometric properties, with an internal consistency of α = .84 in the original validation study.

SOC was measured using the 13-item *Sense of Coherence Scale* (SOC-13) [4,39], obtained from the HBSC study in its Spanish version [40]. The scale consists of 13 items with a 7-point Likert-type response format, where higher scores indicate a greater SOC. In the present study, the scale showed an internal consistency of α = .80.

Self-esteem was assessed using the *Rosenberg Self-Esteem Scale* (RSES) [15], in its Spanish adaptation for university students [41]. The scale consists of 10 items with a Likert-type response format and assesses the global evaluation individuals make of their own personal worth. This version has shown adequate psychometric properties in Spanish university students [41]. In the present sample, internal consistency was α = .87.

Body image concerns were assessed using the *Body Image* subscale of the *Body Investment Scale* (BIS) [42], in its Spanish adaptation [43]. In this instrument, higher scores indicate a more negative evaluation of one's own body image; therefore, the scale is reverse-oriented relative to the other psychological adjustment variables.

Curiosity was assessed using the total score of the *Curiosity and Exploration Inventory-II* (CEI-II) [44], an instrument that measures the tendency to actively seek novel experiences and engage in exploratory behaviors. This instrument consists of 10 items rated on a 5-point Likert-type scale and measures the tendency to actively seek novel experiences and engage in exploratory behaviors. Previous studies have shown that the Spanish adaptation presents a robust unidimensional structure and adequate psychometric properties in university populations [45,46]. Higher scores reflect higher levels of curiosity. In the present study, the scale showed an internal consistency of α = .89.

Perceived social support from friends was assessed using the friends subscale of the *Multidimensional Scale of Perceived Social Support* (MSPSS) [47], in its Spanish adaptation [48]. This subscale consists of four items assessing the extent to which participants perceive support from their friends. Items are answered using a 6-point Likert-type response format, with higher scores indicating greater perceived social support from friends. The scale has shown adequate psychometric properties in Spanish populations.

Finally, relationship with friends was assessed using a single item extracted from the HBSC study [40], in which participants were asked to rate the quality of their relationship with their friends on a scale from 1 to 10, where 1 represents a very low rating and 10 a very high rating.

2.3. Statistical Analysis

All analyses were performed using R version 4.2.3 (R Core Team, 2018). The required packages were psych (Version 2.2.3), EGAnet (Version 2.0.2), qgraph (Version 1.9.5), bootnet (Version 1.5.6), mgm (Version 1.2.14), NetworkComparisonTest (Version 2.2.2), bnlearn (Version 4.9), caret (Version 6.0.94), and tidyLPA (Version 1.1.0). Statistical significance was set at $p < .05$ (two-tailed) when applicable.

2.3.1. Descriptive analyses

Descriptive statistics (means, standard deviations, ranges, skewness, and kurtosis) were computed for all study variables in the full.

2.3.2. Variable communities estimation

Variable communities (dimensions) were identified using bootstrap Exploratory Graph Analysis (EGA), which detects clusters of nodes with strong mutual associations [49]. Community stability was assessed via structural consistency across bootstrap samples;

variables were retained only when their stability coefficients exceeded 0.70, and less stable variables were excluded to preserve dimensional robustness [50].

2.3.3. Partial-correlation network estimation

Network structure was estimated using Gaussian Graphical Models (GGMs), where edges represent conditional associations between pairs of variables after controlling for all remaining variables in the network [51] . To obtain a parsimonious network and reduce spurious connections, edge estimation was regularized using the graphical least absolute shrinkage and selection operator (graphical LASSO; Epskamp & Fried, 2018). Networks were estimated for the full sample and separately for females and males.

2.3.4. Centrality estimation and stability

Centrality indices were computed to quantify the relative importance of nodes within the network. Four measures were estimated: strength, closeness, betweenness, and expected influence [33,52,53]. Strength reflects the sum of edge weights connected to a node; closeness represents the inverse of the total distance from a node to all others; betweenness captures how often a node lies on the shortest paths between other nodes; and expected influence incorporates the direction (sign) of connections. The stability of centrality metrics was evaluated using subset bootstrapping with 1,000 samples and summarized using the Correlation Stability (CS) coefficient, which indicates the maximum proportion of cases that can be dropped while retaining a correlation of at least 0.70 with 95% certainty [52] CS values above 0.25 were considered acceptable and values above 0.50 indicated good stability [54,55].

2.3.5. Network structure invariance by sex

Network invariance across gender was tested using the Network Comparison Test (NCT) [56]. This procedure evaluates structural differences in network associations (edges/partial correlations) and therefore reflects structural (network) invariance, not measurement invariance in latent-variable models. The NCT assessed differences in

overall network structure, global strength (total connectivity), and individual edge weights between female and male networks. P-values for multiple edge comparisons were adjusted using the Benjamini–Hochberg procedure [57].

2.3.6. Bayesian Network model

In addition to GGMs, a Bayesian Network (BN) was estimated in two steps. First, the directed acyclic graph (DAG) structure was learned using the PC-stable algorithm. To improve the stability of the learned structure, bootstrap resampling was applied, and only arcs with high empirical support were retained in the final averaged network. Second, the BN was fitted to the data and evaluated using 10-fold cross-validation, in which models were trained on 90% of the data and tested on the remaining 10%, repeating the procedure until all folds served as the test set [58].

2.3.7. Explanatory capacity

Explanatory capacity and estimation error were quantified for both the GGM and BN models using the coefficient of determination (R^2) and the root-mean-square error (RMSE). In the GGM, the explained variance of each node was estimated from its conditional associations with the remaining nodes in the network. In the BN, explained variance was estimated exclusively from the set of parent nodes identified by the DAG structure. For the BN, these indices were summarized as means across 10-fold cross-validation splits.

2.3.8. Latent Profile Analysis

To examine patterns of psychological and social adjustment, a latent profile (LPA) was conducted using tidyLPA [59]. LPA is a categorical latent-variable approach that identifies latent subpopulations based on multivariate response patterns. Competing solutions specifying two to twelve profiles were estimated and compared using multiple complementary criteria. Model selection was guided by the log-likelihood and information criteria (AIC, BIC, SABIC), which are interpreted comparatively: lower values indicate a

248 better balance between fit and parsimony. Likelihood-ratio tests (BLRT/LMR) were also
249 considered, where a non-significant test for the (k + 1)-profile model supports retaining
250 the more parsimonious k-profile solution. Classification quality was evaluated using
251 entropy (values ≥ 0.80 indicating good separation and 0.60-0.80 considered acceptable),
252 and the final solution was selected based on the convergence of statistical evidence and
253 substantive interpretability [34,60]

254 ## 3. Results

255 ### 3.1. Descriptive analysis

256 Table 1 presents the means, standard deviations, skewness, and kurtosis of the study
257 variables. Most variables showed approximately symmetric and mesokurtic distributions,
258 except for perceived social support and relationship with friends, which showed negative
259 skewness and a leptokurtic distribution.

260 *Table 1.* Descriptive statistics for psychological and social variables

Variable	mean	sd	min	max	skew	kurtosis
Satisfaction with Life	25.091	5.824	5	35	-0.855	0.618
SOC	57.705	11.894	19	85	-0.244	-0.208
Self-esteem	37.633	7.118	11	50	-0.551	-0.007
Body Image	13.223	5.453	6	30	0.876	0.204
Curiosity	33.524	7.312	13	50	-0.289	-0.197
Perceived Social Support	6.101	1.282	1	7	-1.926	3.774
Relationship with friends	8.395	1.389	1	10	-1.354	3.532

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3.2. Network Stability Assessment

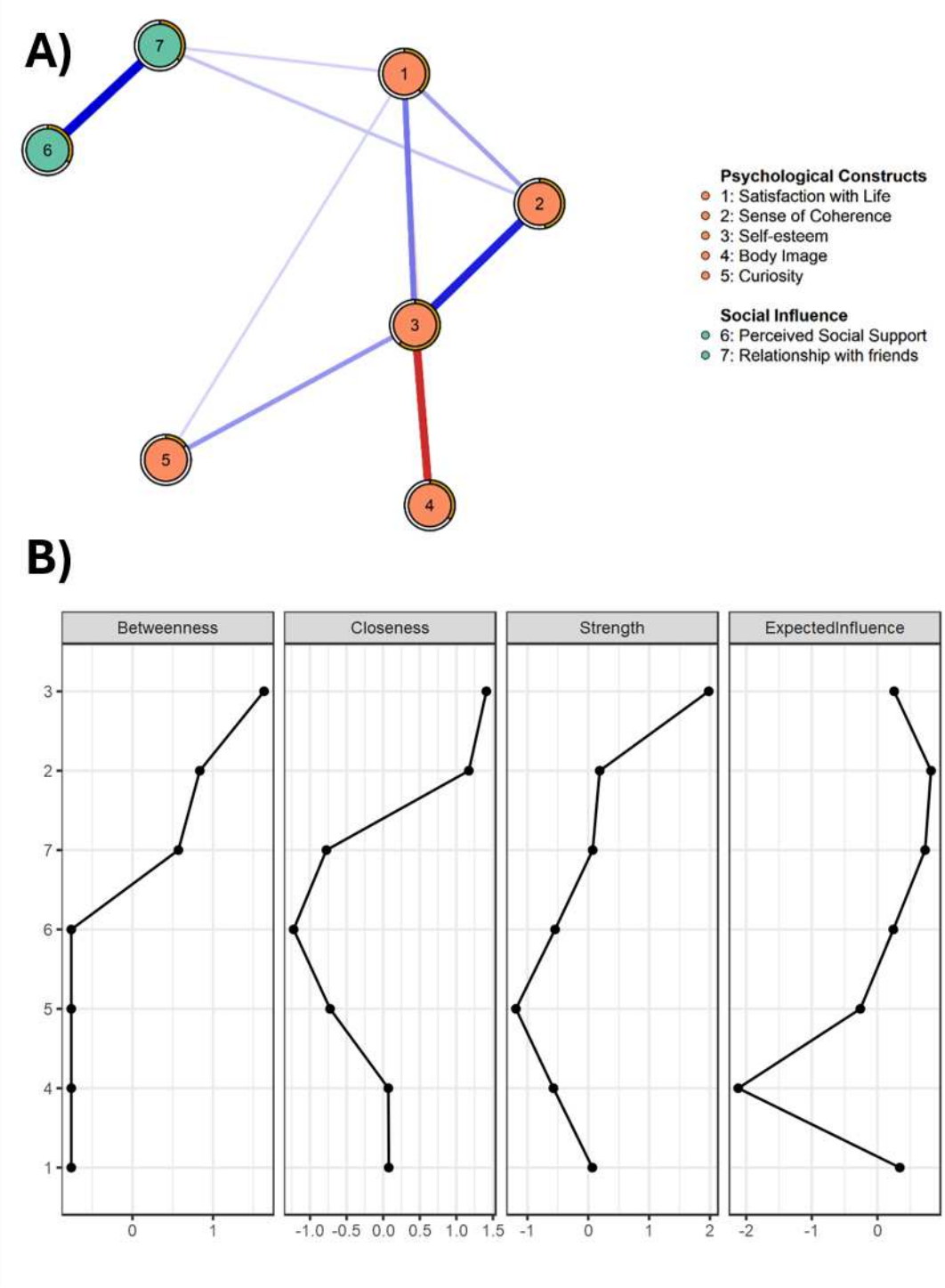
A bootstrap Exploratory Graph Analysis (EGA) was conducted, showing a highly consistent community assignment. All nodes presented replication coefficients ≥ 0.98, with most values equal to 1.00, exceeding the 0.70 threshold. This supports the stability of the two-community solution identified: a larger community associated with psychological constructs and a second community composed of social variables (Fig. 1A).

In addition, the centrality stability coefficients indicated adequate stability for *closeness*, *strength*, and *expected influence* (CS = 0.750), exceeding the recommended threshold of 0.50 and suggesting robust estimates. In contrast, *betweenness* showed low stability (CS = 0.128), and should therefore be interpreted with caution.

3.3. Network Structure and Centrality

The network included 10 of the 21 possible edges (density = 47.62%), indicating a moderate level of connectivity among the variables. The mean edge weight was low (M = 0.139; SD = 0.258), with values ranging from −0.410 to 0.498, reflecting the presence of both positive and negative associations. The strongest associations were the positive relationship between perceived social support and relationship with friends (w = 0.498), the positive relationship between SOC and self-esteem, and the negative relationship between self-esteem and inversely coded body image (w = −0.410). The latter association indicates that higher levels of self-esteem were related to a more favorable body image (Fig. 1A).

Fig. 1. A) Gaussian Graphical Model characterization. B) Estimation of network centrality measures — betweenness, closeness, strength, and expected influence — for each item.



Regarding the centrality measures presented in Fig. 1B, item 3, corresponding to self-esteem, showed the highest values in *strength*, *expected influence*, and *closeness*, suggesting that it occupied the most central position within the network. Its higher *strength* indicates stronger direct associations with the remaining nodes, whereas its

higher *expected influence* reflects greater overall influence when both positive and negative associations are considered. In addition, its high *closeness* indicates greater structural proximity to the overall system. Although self-esteem also showed the highest value in *betweenness*, this metric showed low stability and should therefore be interpreted with caution.

Item 7, relationship with friends, stood out mainly in *strength* and *expected influence*, whereas item 2, SOC, showed relatively high values in *closeness* and *expected influence*. In contrast, items 4, body image, and 5, curiosity, showed lower values across most centrality metrics. Overall, these results indicate self-esteem and SOC as the nodes with the greatest structural relevance within the analyzed network.

3.4. Network comparison

The NCT results indicated no statistically significant differences in network structure between women and men ($M = 0.157$, $p = .373$), nor in global network strength (female network: $S = 2.455$; male network: $S = 2.712$; $p = .243$). Therefore, the GGM can be considered structurally comparable across gender groups.

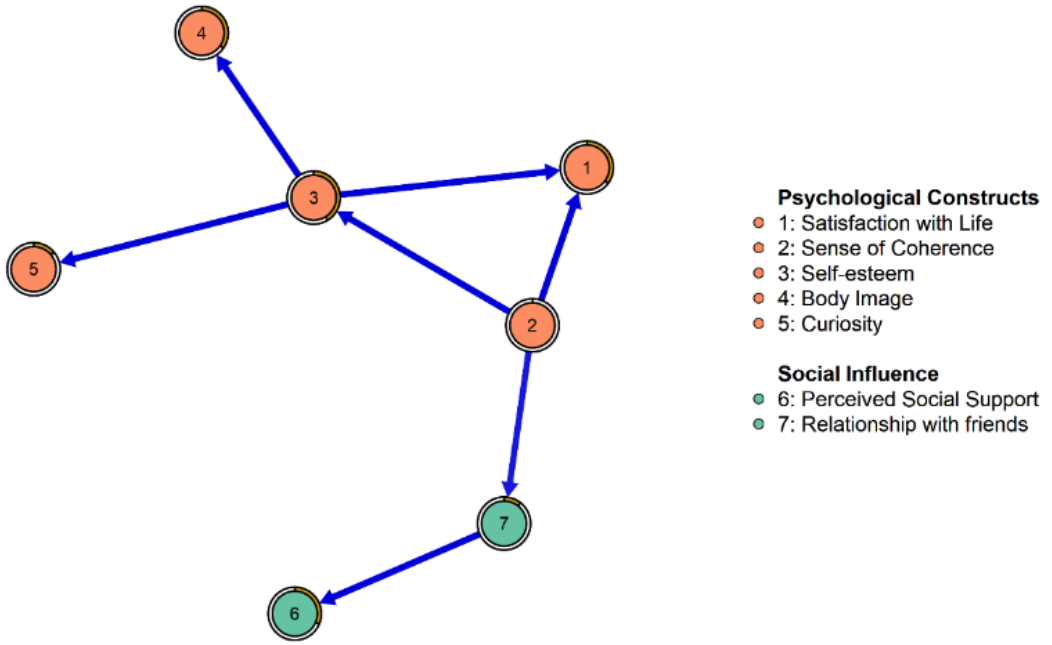
3.5. Bayesian network

The Bayesian Network (BN) was used to estimate the probable direction of the relationships among the network nodes. The resulting model identified SOC (item 2) as the main parent node, as it had no preceding nodes, suggesting a higher probability of activating the rest of the network. From this node, directed relationships were observed toward relationship with friends (item 7), self-esteem (item 3), and satisfaction with life (item 1).

In turn, items 1 (satisfaction with life) and 3 (self-esteem) played a dual role as both parent and child nodes, forming indirect pathways through which SOC was related to other components of the system. Self-esteem was also associated with body image (item 4) and, more distally, with curiosity (item 5), which appeared only as a child node within

the network (see Fig. 2). Overall, the structure suggests a probabilistic flow from SOC toward more specific psychological and social well-being variables.

Fig. 2. Directed Acyclic Graph (DAG).



3.6. Explanatory capacity

The explanatory capacity and estimation error of each variable in the network were estimated using the partial-correlation network model (GGM) and the Bayesian Network (BN), with the results presented in Table 2. In the GGM models, self-esteem showed the highest explanatory capacity in the total sample, as well as among women and men, whereas curiosity showed the lowest explanatory capacity values in all cases. Conversely, the error followed the opposite pattern, with the lowest values for self-esteem and the highest values for curiosity.

In the BN model, self-esteem again showed the highest explained variance, followed by satisfaction with life and body image, whereas relationship with friends showed the

lowest explanatory capacity. Regarding estimation error, perceived social support showed the lowest RMSE and curiosity the highest. No explanatory capacity or error values were reported for SOC, as it appeared only as a parent node.

Table 2. Predictability and estimation error of the partial-correlation network model (GGM) and Bayesian Network (BN).

Variable	GGMs						BN	
	General		Female		Male			
	R^2	RMSE	R^2	RMSE	R^2	RMSE	R^2	RMSE
Satisfaction with Life	0.38	0.79	0.38	0.79	0.45	0.74	0.352	4.664
SOC	0.46	0.73	0.48	0.72	0.43	0.76	-	-
Self-esteem	0.61	0.63	0.6	0.63	0.61	0.62	0.412	5.439
Body Image	0.35	0.81	0.33	0.82	0.42	0.76	0.348	4.404
Curiosity	0.15	0.92	0.12	0.94	0.23	0.87	0.139	6.808
Perceived Social Support	0.33	0.82	0.3	0.84	0.47	0.73	0.313	1.056
Relationship with friends	0.36	0.8	0.32	0.82	0.47	0.72	0.107	1.302

3.7. Latent Profile Analysis (LPA)

Latent profile solutions ranging from two to twelve profiles were estimated under a model with equal variances and covariances fixed to zero (Table 3). The final solution was selected by jointly considering model fit and classification quality, including AIC, BIC, and SABIC, with lower values indicating better relative fit, as well as entropy, the minimum posterior probability of class assignment, and the minimum class size. Although the information criteria decreased progressively up to the 12-profile solution (AIC = 13943.32; BIC = 14423.79; SABIC = 14099.88), these solutions included very small classes (*n_min* between 1.3% and 1.8%) and showed less robust classification (*prob_min* ≤ .443 for *k* = 11–12). In contrast, the four-profile solution showed a more appropriate balance between fit and interpretability, with entropy = .77, *prob_min* = .814, and an acceptable minimum class size (*n_min* = 9.3%). In addition, the BLRT was

significant (p = .01), indicating improved model fit when increasing the number of classes compared with less complex solutions (Table 3).

Table 3. Fit indices for different models with number of profiles ranging from 2 to 12.

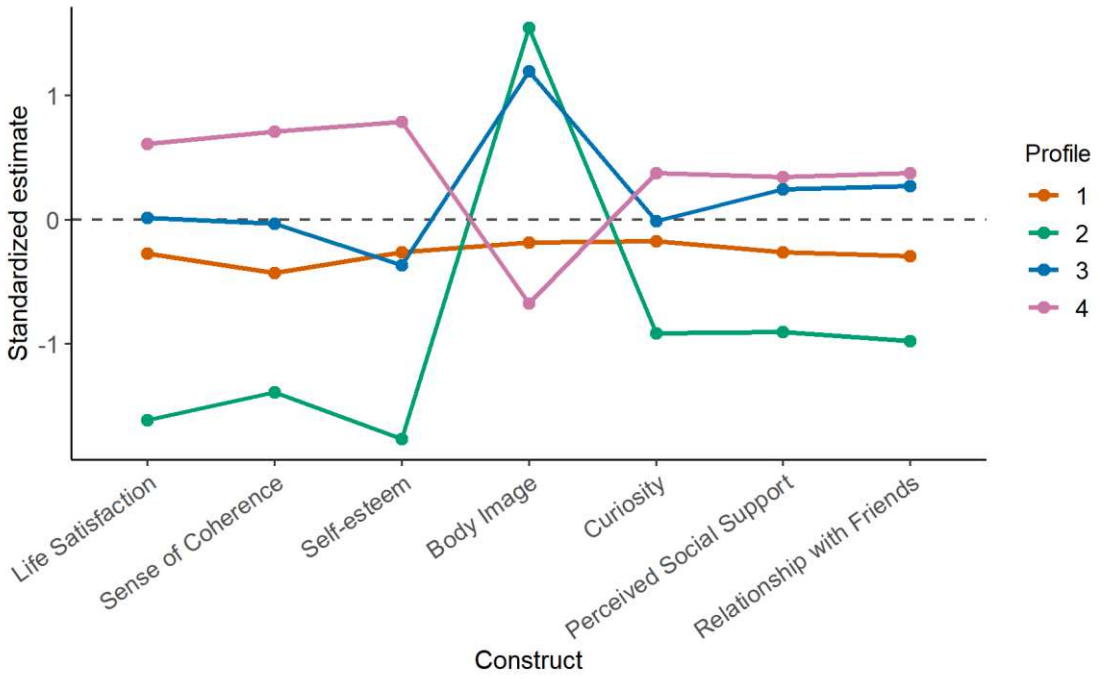
Profile	AIC	BIC	SABIC	Entropy	prob_min	n_min	BLRT
2	15323.62	15427.25	15357.39	0.812	0.894	0.286	0.01
3	14977.84	15119.15	15023.88	0.785	0.883	0.106	0.01
4	14903.43	15082.43	14961.76	0.77	0.814	0.093	0.01
5	14511.53	14728.21	14582.13	0.839	0.872	0.039	0.01
6	14351.09	14605.46	14433.98	0.839	0.869	0.034	0.01
7	14306.49	14598.54	14401.65	0.82	0.674	0.032	0.01
8	14111.66	14441.39	14219.1	0.833	0.787	0.018	0.01
9	14077.82	14445.24	14197.55	0.813	0.66	0.018	0.01
10	13997.59	14402.7	14129.59	0.815	0.676	0.015	0.01
11	14016.08	14458.87	14160.36	0.809	0.395	0.015	1
12	13943.32	14423.79	14099.88	0.814	0.443	0.013	0.01

The distribution of participants across profiles was as follows: Profile 4 was the largest group (n = 332; 40.4%), followed by Profile 1 (n = 281; 34.2%), Profile 3 (n = 132; 16.1%), and Profile 2 (n = 76; 9.3%), with the latter being the least represented group.

Profile interpretation was based on class-specific standardized means (Fig. 3). Profile 1 (Low-to-Moderate Psychosocial Resources) was characterized by slightly below-average scores in life satisfaction, SOC, self-esteem, curiosity, perceived social support, and relationship quality with friends, together with relatively low negative body image. Profile 2 (Global Psychosocial Vulnerability) showed the most unfavorable pattern, with markedly low scores in life satisfaction, SOC, self-esteem, curiosity, and social resources, alongside the highest levels of negative body image. Profile 3 (Body-Image Vulnerability with Preserved Social Resources) displayed average or slightly favorable levels of life satisfaction, curiosity, perceived social support, and relationship quality with friends, but elevated negative body image, indicating a more specific vulnerability in the

bodily self-concept domain. Finally, Profile 4 (High Psychosocial Adjustment) was characterized by high levels of life satisfaction, SOC, self-esteem, curiosity, and social resources, together with low negative body image.

Fig. 3. Graphical representation of class-specific standardized means in the four-profile latent profile analysis (LPA).



4. Discussion

The present study examined personal and social resources associated with positive adjustment among university students from a salutogenic perspective, integrating network analysis, Bayesian network modeling, and latent profile analysis. Overall, the findings support a systemic understanding of university adjustment, in which intrapersonal, social, and evaluative resources do not operate in isolation but rather as interrelated components, in line with recent evidence emphasizing the interplay of personal and contextual resources in students' adaptation and well-being [13,61]. This approach made it possible to examine both the structure of associations among variables and the existence of differentiated configurations of students, providing a more nuanced

understanding of university adaptation than models focused exclusively on bivariate associations or average effects.

One of the main findings was the central position of self-esteem within the network. This node showed the highest values in *strength*, *expected influence*, and *closeness*, as well as the highest explanatory capacity in the GGM models. These results are consistent with literature positioning self-esteem as an intrapersonal resource closely linked to subjective well-being, life satisfaction, and psychological adjustment [16,30]. In the university context, global self-worth may function as a point of integration between perceived competence, life satisfaction, body image, and the quality of social relationships.

From an applied perspective, this finding is relevant because self-esteem has been shown to be modifiable through interventions targeting university students. For instance, psychoeducational and group-based programs focused on self-knowledge, self-acceptance, and self-regulation have shown improvements in self-esteem among university students [62]. Similarly, digital interventions based on cognitive-behavioral components, mindfulness, acceptance, and metacognitive training have shown favorable effects on self-esteem in students with depressive symptoms [63]. Therefore, although centrality in a cross-sectional network does not allow causal inference, these findings suggest that self-esteem may represent a strategic target for university adjustment programs, a hypothesis that should be further tested through longitudinal studies and controlled trials.

Alongside self-esteem, SOC emerged as a key element in the network models. Although in the GGM its relevance was shared with self-esteem, the Bayesian network identified SOC as the main parental node, with directed associations toward life satisfaction, self-esteem, and relationship with friends. This pattern is theoretically consistent with the salutogenic model, which conceptualizes SOC as a global orientation through which individuals perceive life as comprehensible, manageable, and meaningful [5,64]. In the

university context, higher SOC may help students interpret academic and social demands as more structured, perceive available resources as sufficient, and attribute meaning to their educational trajectory. This interpretation is consistent with previous studies linking SOC to better health, coping, and well-being indicators in university populations [8].

From an applied standpoint, some interventions have aimed to strengthen resources closely aligned with the salutogenic framework in university students. Davidson et al., [67], for example, evaluated a focused intervention for first-year students aimed at promoting hope, SOC, and self-efficacy. Recent reviews of salutogenic interventions also suggest that SOC can be strengthened through programs that promote the identification, mobilization, and active use of personal and contextual resources, although the available evidence remains heterogeneous and depends on the design, population, and intensity of the intervention [68]. Accordingly, the directions estimated by the Bayesian network should be interpreted as probabilistic and exploratory, but they provide a theoretically plausible basis for considering SOC as an organizing resource in university adjustment.

Social resources also played a relevant role in the network models. The EGA solution differentiated a social community composed of perceived social support and relationship with friends, supporting its conceptual specificity within the adjustment system. Relationship with friends showed relatively high values in *strength* and *expected influence*, whereas perceived social support showed moderate explanatory capacity. These findings are consistent with evidence emphasizing the role of social support, belonging, and the quality of interpersonal relationships in university adaptation and psychological adjustment [26–29]. They also reinforce the need to distinguish between the perceived availability of support and subjective satisfaction with social ties, as both constructs may contribute complementarily to university adjustment.

From a salutogenic perspective, this distinction is particularly relevant, as SOC may facilitate not only the perception that social resources are available but also the ability to

identify, mobilize, and use them meaningfully during the university experience. In this regard, brief social-belonging interventions have shown positive effects on academic and health outcomes among university students, particularly in groups at higher risk of institutional disconnection [69]. Similarly, health-promoting university and salutogenic approaches in higher education emphasize the importance of creating institutional environments that foster social connection, participation, access to meaningful resources, and a university culture oriented toward well-being [70].

The network comparison analysis showed no significant differences between women and men in either network structure or global strength. This suggests that the relational organization of the analyzed resources was broadly similar across gender groups. Importantly, this does not rule out gender differences in mean levels of specific variables, such as body image or self-esteem, but indicates that their pattern of conditional associations remained structurally comparable [71,72].

Body image and curiosity showed a more peripheral position within the network. Regarding body image, its negative association with self-esteem should be interpreted considering that the variable was inversely coded: higher self-esteem was associated with a more favorable body image. Although body image did not occupy a central position in the network, the profile characterized by preserved general adjustment with body-related vulnerability suggests that body image may represent a specific source of vulnerability even when other adjustment indicators appear adequate, in line with evidence linking body dissatisfaction to greater psychological distress in young populations [20,23]. Curiosity showed the lowest explanatory capacity and a more distal position, which may indicate that its role depends on academic or motivational variables not included in the model, such as *engagement*, teaching climate, or opportunities for exploration. Nevertheless, curiosity remains relevant as a resource linked to active learning, personal growth, and autonomous motivation [24,25]. In profiles with specific body-related vulnerability, preventive modules focused on body image could be

considered, given that previous university-based interventions have shown efficacy in reducing body dissatisfaction and related risk factors [73,74].

Latent profile analysis complemented the network findings by showing that students do not present homogeneous combinations of resources. Whereas the network identifies which variables occupy structurally relevant positions in the overall system, LPA shows that this system is not expressed uniformly across students. This methodological combination makes it possible to distinguish between average relationships among variables and individual configurations of resources, which is especially relevant from a person-centered perspective [34].

The four-profile solution revealed distinct patterns of university adjustment: a low-to-moderate resources profile with relatively favorable body image, a global psychosocial vulnerability profile, a selective body-image vulnerability profile with preserved social resources, and a high psychosocial adjustment profile. This heterogeneity shows that university adjustment cannot be fully captured by average scores alone. In particular, the global vulnerability profile may represent a priority group for preventive interventions, whereas the selective body-image vulnerability profile indicates that specific difficulties may remain hidden when only global well-being or social support indicators are considered.

From a practical standpoint, the findings support the development of multicomponent university interventions that are sensitive to student profiles. First, given that SOC appeared as a parental node in the BN, interventions aimed at increasing the comprehensibility of university demands, the manageability of available resources, and the meaningfulness of the academic experience may be particularly useful. This could translate into orientation programs, academic tutoring, clarification of expectations, coping skills training, and activities that help students connect their university trajectory with personal goals, in line with previous interventions aimed at promoting SOC, hope, and self-efficacy among first-year students [67]. Second, the centrality of self-esteem

supports the inclusion of components aimed at strengthening self-worth, perceived competence, and positive self-concept, given that brief digital and psychological interventions have shown favorable effects on self-esteem among university students [63]. Third, the relevance of relationship with friends and perceived social support supports the promotion of belonging spaces, peer mentoring, and social integration strategies, especially among first-year students or those with moderately low psychosocial resources, consistent with evidence on brief social-belonging interventions in higher education [69]. Finally, the identification of a profile with body-related vulnerability suggests the need for specific screening and support actions related to body image and physical self-concept, even among students who do not show globally low adjustment, considering previous evidence on university-based interventions aimed at reducing body dissatisfaction and related risk factors [73,74].

This study has several limitations. First, although the BN allows probable directions to be estimated, these should be interpreted as exploratory and should be verified in longitudinal studies. Second, the use of self-report measures may introduce social desirability, recall, or common method biases. Third, although the network comparison did not show significant differences between women and men, future research should examine these differences through stratified latent profiles and longitudinal trajectories. Moreover, it would be useful to incorporate additional academic and clinical variables, such as academic stress, anxiety-depressive symptoms, resilience, *engagement*, loneliness, emotion regulation, or institutional belonging. Such studies would also help validate the four-profile solution, which should be replicated in independent samples and supported by external academic, behavioral, or clinical criteria.

5. Conclusions

In conclusion, the findings support the systemic and heterogeneous nature of positive adjustment among university students. Self-esteem showed the greatest structural relevance within the network, whereas SOC emerged as a potential organizing resource

within the salutogenic framework. The latent profiles further revealed distinct configurations of strengths and vulnerabilities, highlighting the need for university interventions that combine universal well-being promotion with selective support tailored to specific student profiles. Overall, integrating undirected and directed network models with latent profile analysis provides a useful framework for understanding university adjustment beyond isolated associations among variables.

Statements and Declarations

Ethics approval and consent to participate

The study followed the core ethical principles set forth in the Declaration of Helsinki. Approval was granted by the Research Ethics Committee of Huelva Centers (CEI) of the Junta de Andalucía (0846-N-19/P1027/19), and the participants provided explicit permission through informed consent for the confidential and anonymous use and handling of their data. The research team was responsible for storing the data.

Consent for publication

Not applicable. The manuscript reports anonymized and aggregated data and does not include any identifiable individual information.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests.

The authors declare that they have no competing interests.

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Authors' Contributions

A.G.-M. and D.D.-M. contributed to the conception and design of the study. D.D.-M. led the methodology, formal analysis, and visualization, including the preparation of figures and tables. A.G.-M. wrote the original draft of the manuscript. D.D.-M., R.R.-C., C.S.V., and S.R.-C. contributed to the interpretation of the findings and critically reviewed and edited the manuscript. All authors read and approved the final version of the manuscript.

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References

1. Osafo AB, Ohene-Darko S, Agormedah EK, Omane-Adjekum C. Navigating the Transition to Higher Education: Understanding the Experience among First-Year University Students. J Tert Educ Learn. 27 de febrero de 2025;3(1):51-64. doi:10.54536/jtel.v3i1.4192

2. Tett L, Cree VE, Christie H. From further to higher education: transition as an on-going process. High Educ. 1 de marzo de 2017;73(3):389-406. doi:10.1007/s10734-016-0101-1

3. Worsley JD, Harrison P, Corcoran R. Bridging the Gap: Exploring the Unique Transition From Home, School or College Into University. Front Public Health. 17 de marzo de 2021;9. doi:10.3389/fpubh.2021.634285

4. Antonovsky, A. Unraveling the Mystery of Health: How People Manage Stress and Stay Well. CA: San Francisco.: Jossey-Bass; 1987.

5. Mittelmark MB, Sagy S, Eriksson M, Bauer GF, Pelikan JM, Lindström B, et al., editores. The Handbook of Salutogenesis [Internet]. Cham (CH): Springer; 2017 [citado 22 de abril de 2026]. Disponible en: http://www.ncbi.nlm.nih.gov/books/NBK435831/ PubMed PMID: 28590610.

6. Eriksson M. Salutogenesis. En: Encyclopedia of Quality of Life and Well-Being Research [Internet]. Springer, Dordrecht; 2014 [citado 16 de junio de 2026]. p. 5623-31. Disponible en: https://link.springer.com/rwe/10.1007/978-94-007-0753-5_3445 doi:10.1007/978-94-007-0753-5_3445

7. Lindström B, Eriksson M. The hitchhiker's guide to salutogenesis: Salutogenic pathways to health promotion. Helsinki: Folkhälsan Research Center, Health Promotion Research IUHPE Global Group on Salutogenesis; 2010.

8. Ballester-Ferrando D, Cáceres-Malagelada E, Rascón-Hernán C, Botigué T, Lavedán A, Masot O, et al. Sense of Coherence and Perceived Academic Stress Among Nursing Students: A Multicenter Cross-Sectional Study. Nurs Rep. 8 de agosto de 2025;15(8):288. doi:10.3390/nursrep15080288

9. da-Silva-Domingues H, Palomino-Moral PÁ, del-Pino-Casado R. Anxiety in young university students: the mediating role of sense of coherence and self-esteem. BMC Public Health. 3 de octubre de 2025;25(1):3240. doi:10.1186/s12889-025-24646-4

10. Karagiannopoulou E, Desatnik A, Rentzios C, Ntritsos G. The exploration of a 'model' for understanding the contribution of emotion regulation to students learning. The role of academic emotions and sense of coherence. Curr Psychol. 1 de octubre de 2023;42(30):26491-503. doi:10.1007/s12144-022-03722-7

11. Castelli L, Marcionetti J. Predicting trainee teachers' and nurses' academic adjustment and life satisfaction with psychological capital dimensions and

social support. Cogent Psychol. 31 de diciembre de 2025;12(1):2586809. doi:10.1080/23311908.2025.2586809

12. Lindström B, Eriksson M. Guía del autoestopista salutogénico: camino salutogénico hacia la promoción de la salud [Internet]. Documenta Universitaria; 2011 [citado 22 de mayo de 2026]. Disponible en: https://dialnet.unirioja.es/servlet/libro?codigo=754835

13. Liu X, Liu L. The mediating role of college students' body image and self-esteem in the impact of physical activity on life satisfaction and mental health. Acta Psychol (Amst). 1 de julio de 2025;257:105103. doi:10.1016/j.actpsy.2025.105103

14. Borsboom D, Deserno MK, Rhemtulla M, Epskamp S, Fried EI, McNally RJ, et al. Network analysis of multivariate data in psychological science. Nat Rev Methods Primer. 19 de agosto de 2021;1(1):58. doi:10.1038/s43586-021-00055-w

15. Rosenberg M. Society and the Adolescent Self-Image. Princeton, NJ: Princeton University Press; 1965.

16. Orth U, Robins RW. The Development of Self-Esteem. Curr Dir Psychol Sci. octubre de 2014;23(5):381-7. doi:10.1177/0963721414547414

17. Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. Am Psychol. 2000;55(5):469-80. doi:10.1037/0003-066X.55.5.469

18. Fardouly J, Vartanian LR. Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns. Body Image. 1 de enero de 2015;12:82-8. doi:10.1016/j.bodyim.2014.10.004

19. Ahadzadeh AS, Rafik-Galea S, Alavi M, Amini M. Relationship between body mass index, body image, and fear of negative evaluation: Moderating role of self-esteem. Health Psychol Open. 1 de enero de 2018;5(1):2055102918774251. doi:10.1177/2055102918774251

20. Griffiths S, Murray SB, Krug I, McLean SA. The Contribution of Social Media to Body Dissatisfaction, Eating Disorder Symptoms, and Anabolic Steroid Use Among Sexual Minority Men. Cyberpsychology Behav Soc Netw. marzo de 2018;21(3):149-56. doi:10.1089/cyber.2017.0375

21. Liu J, Dang J, Zou H. Exploring the longitudinal dynamics of self-esteem, body image, and psychological resilience in college students. J Pac Rim Psychol. 1 de septiembre de 2025;19:18344909251360073. doi:10.1177/18344909251360073

22. Shang Y, Xie HD, Yang SY. The Relationship Between Physical Exercise and Subjective Well-Being in College Students: The Mediating Effect of Body Image and Self-Esteem. Front Psychol. 28 de mayo de 2021;12. doi:10.3389/fpsyg.2021.658935

643 23. Tylka TL, Wood-Barcalow NL. What is and what is not positive body image?
644 Conceptual foundations and construct definition. Body Image. junio de
645 2015;14:118-29. doi:10.1016/j.bodyim.2015.04.001

646 24. Kashdan TB, Steger MF. Curiosity and pathways to well-being and meaning
647 in life: Traits, states, and everyday behaviors. Motiv Emot. 2007.
648 doi:10.1007/s11031-007-9068-7

649 25. Ryan RM, Deci EL. Self-determination theory: Basic psychological needs in
650 motivation, development, and wellness. New York, NY, US: The Guilford
651 Press; 2017. xii, 756 p. (Self-determination theory: Basic psychological
652 needs in motivation, development, and wellness).
653 doi:10.1521/978.14625/28806

654 26. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis.
655 Psychol Bull. 1985;98(2):310-57. doi:10.1037/0033-2909.98.2.310

656 27. Hefner J, Eisenberg D. Social support and mental health among college
657 students. Am J Orthopsychiatry. 2009;79(4):491-9. doi:10.1037/a0016918

658 28. Chu JJ, Jahn HJ, Khan MH, Kraemer A. Alcohol consumption among
659 university students: a Sino-German comparison demonstrates a much lower
660 consumption of alcohol in Chinese students. J Health Popul Nutr. 11 de
661 agosto de 2016;35(1):25. doi:10.1186/s41043-016-0062-0 PubMed PMID:
662 27515322; PubMed Central PMCID: PMC5026016.

663 29. Teixeira S, Ferré-Grau C, Canut TL, Pires R, Carvalho JC, Ribeiro I, et al.
664 Positive Mental Health in University Students and Its Relations with
665 Psychological Vulnerability, Mental Health Literacy, and Sociodemographic
666 Characteristics: A Descriptive Correlational Study. Int J Environ Res Public
667 Health. 8 de marzo de 2022;19(6):3185. doi:10.3390/ijerph19063185
668 PubMed PMID: 35328870; PubMed Central PMCID: PMC8949352.

669 30. Diener E, Oishi S, Tay L. Advances in subjective well-being research. Nat
670 Hum Behav. 2018. doi:10.1038/s41562-018-0307-6

671 31. Khadra FA, Aburub A, Amro A, Csapek Z, Kertai B, Jeges S, et al. Health
672 behavior and life satisfaction of university students: A comparative study
673 using optimal living profile-modified. J Int Stud. 2 de julio de 2025;15(7):41-
674 64. doi:10.32674/js6yx584

675 32. Borsboom D, Cramer AOJ. Network Analysis: An Integrative Approach to the
676 Structure of Psychopathology. Annu Rev Clin Psychol. 28 de marzo de
677 2013;9(Volume 9, 2013):91-121. doi:10.1146/annurev-clinpsy-050212-
678 185608

679 33. Epskamp S, Borsboom D, Fried EI. Estimating psychological networks and
680 their accuracy: A tutorial paper. Behav Res Methods. 1 de febrero de
681 2018;50(1):195-212. doi:10.3758/s13428-017-0862-1

682 34. Spurk D, Hirschi A, Wang M, Valero D, Kauffeld S. Latent profile analysis: A
683 review and “how to” guide of its application within vocational behavior

684 research. J Vocat Behav. 1 de agosto de 2020;120:103445.
685 doi:10.1016/j.jvb.2020.103445

686 35. Andrés-Villas M, Díaz-Milanés D, Remesal-Cobreros R, Vélez-Toral M,
687 Pérez-Moreno PJ. Dimensions of Leisure and Perceived Health in Young
688 University Students. Int J Environ Res Public Health. 25 de noviembre de
689 2020;17(23). doi:10.3390/ijerph17238750

690 36. Vélez-Toral M, Morales-Domínguez Z, Granado-Alcón M del C, Díaz-
691 Milanés D, Andrés-Villas M. Mediterranean Diet, Psychological Adjustment
692 and Health Perception in University Students: The Mediating Effect of
693 Healthy and Unhealthy Food Groups. Nutrients. 25 de octubre de
694 2021;13(11). doi:10.3390/nu13113769

695 37. Diener E, Emmons RA, Larsen RJ, Griffin S. The Satisfaction With Life
696 Scale. J Pers Assess. 1 de febrero de 1985;49(1):71-5.
697 doi:10.1207/s15327752jpa4901_13 PubMed PMID: 16367493.

698 38. Atienza FL, Pons D. Propiedades Psicométricas de la Escala de
699 Satisfacción con la Vida en Adolescentes. 2000.

700 39. Antonovsky A. The structure and properties of the sense of coherence scale.
701 Soc Sci Med. marzo de 1993;36(6):725-33. doi:10.1016/0277-
702 9536(93)90033-z PubMed PMID: 8480217.

703 40. Moreno C, Ramos P, Rivera F, Jiménez-Iglesias A, García-Moya I, Sánchez-
704 Queija I, et al. Informe Técnico de Los Resultados Obtenidos Por El Estudio
705 Health Behaviour in School-Aged Children (HBSC) 2018 En España.
706 Madrid, Spain: Ministerio de Sanidad; 2020.

707 41. Martín-Albo J, Núñez JL, Navarro JG, Grijalvo F. The Rosenberg Self-
708 Esteem Scale: Translation and Validation in University Students. Span J
709 Psychol. noviembre de 2007;10(2):458-67.
710 doi:10.1017/S1138741600006727

711 42. Orbach I, Mikulincer M. The Body Investment Scale: Construction and
712 validation of a body experience scale. Psychol Assess. 1998;10(4):415-25.
713 doi:10.1037/1040-3590.10.4.415

714 43. Diaz-Milanes D, Vilariño CS, Andrés-Villas M, Segura-Barriga A, Pérez-
715 Moreno PJ. Evidence of Validity, Invariance, and Reliability of the Body
716 Image Dimension in the Body Investment Scale: A Study in Spanish
717 University Students. Psych. 5 de marzo de 2024;6(1):345-55.
718 doi:10.3390/psych6010020

719 44. Kashdan TB, Gallagher MW, Silvia PJ, Winterstein BP, Breen WE, Terhar D,
720 et al. The curiosity and exploration inventory-II: Development, factor
721 structure, and psychometrics. J Res Personal. 1 de diciembre de
722 2009;43(6):987-98. doi:10.1016/j.jrp.2009.04.011

723 45. Tarilonte-Castaño I, Díaz-Milanés D, Andrés-Villas M, Morales-Domínguez
724 Z, Pérez-Moreno PJ. Validation of the Curiosity and Exploration Inventory-II

in Spanish University Students. Healthcare. 14 de abril de 2023;11(8). doi:10.3390/healthcare11081128

46. Navas-León S, Pérez-Moreno PJ, Santin Vilarino C, Diaz-Milanes D. Revalidation of the Curiosity and Exploration Inventory-II (CEI-II) using network analysis. Front Psychol. 30 de julio de 2025;16. doi:10.3389/fpsyg.2025.1514959

47. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional Scale of Perceived Social Support. J Pers Assess. 1988;52(1):30-41. doi:10.1207/s15327752jpa5201_2

48. Landeta O. Adaptation and validation of the Multidimensional Scale of Perceived Social Support. Vol. 8. 2002;8(2-3):173-82.

49. Golino H, Shi D, Christensen AP, Garrido LE, Nieto MD, Sadana R, et al. Investigating the performance of exploratory graph analysis and traditional techniques to identify the number of latent factors: A simulation and tutorial. Psychol Methods. junio de 2020;25(3):292-320. doi:10.1037/met0000255 PubMed PMID: 32191105; PubMed Central PMCID: PMC7244378.

50. Christensen AP, Golino H. Estimating the Stability of Psychological Dimensions via Bootstrap Exploratory Graph Analysis: A Monte Carlo Simulation and Tutorial. Psych. 27 de agosto de 2021;3(3):479-500. doi:10.3390/psych3030032

51. Epskamp S, Waldorp LJ, Mõttus R, Borsboom D. The Gaussian Graphical Model in Cross-Sectional and Time-Series Data. Multivar Behav Res. 4 de julio de 2018;53(4):453-80. doi:10.1080/00273171.2018.1454823 PubMed PMID: 29658809.

52. Epskamp S, Fried EI. A tutorial on regularized partial correlation networks. Psychol Methods. 2018;23(4):617-34. doi:10.1037/met0000167

53. Opsahl T, Agneessens F, Skvoretz J. Node centrality in weighted networks: Generalizing degree and shortest paths. Soc Netw. 1 de julio de 2010;32(3):245-51. doi:10.1016/j.socnet.2010.03.006

54. Glück TM, Knefel M, Lueger-Schuster B. A network analysis of anger, shame, proposed ICD-11 post-traumatic stress disorder, and different types of childhood trauma in foster care settings in a sample of adult survivors. Eur J Psychotraumatology. 30 de noviembre de 2017;8(sup3):1372543. doi:10.1080/20008198.2017.1372543 PubMed PMID: 29038691.

55. Hevey D. Network analysis: a brief overview and tutorial. Health Psychol Behav Med. 1 de enero de 2018;6(1):301-28. doi:10.1080/21642850.2018.1521283 PubMed PMID: 34040834.

56. van Borkulo CD, van Bork R, Boschloo L, Kossakowski JJ, Tio P, Schoevers RA, et al. Comparing network structures on three aspects: A permutation test. Psychol Methods. 2023;28(6):1273-85. doi:10.1037/met0000476

765 57. Benjamini Y, Hochberg Y. Controlling the False Discovery Rate: A Practical
766 and Powerful Approach to Multiple Testing. J R Stat Soc Ser B Methodol. 1
767 de enero de 1995;57(1):289-300. doi:10.1111/j.2517-6161.1995.tb02031.x

768 58. Scutari M. Learning Bayesian Networks with the bnlearn R Package. J Stat
769 Softw. 16 de julio de 2010;35:1-22. doi:10.18637/jss.v035.i03

770 59. Rosenberg JM, Beymer PN, Anderson DJ, Lissa C j van, Schmidt JA.
771 tidyLPA: An R Package to Easily Carry Out Latent Profile Analysis (LPA)
772 Using Open-Source or Commercial Software. J Open Source Softw. 2 de
773 diciembre de 2019;3(30):978. doi:10.21105/joss.00978

774 60. Nylund-Gibson K, Choi AY. Ten frequently asked questions about latent
775 class analysis. Transl Issues Psychol Sci. 2018;4(4):440-61.
776 doi:10.1037/tps0000176

777 61. Castelli L, Marcionetti J. Predicting trainee teachers' and nurses' academic
778 adjustment and life satisfaction with psychological capital dimensions and
779 social support. Cogent Psychol. 31 de diciembre de 2025;12(1):2586809.
780 doi:10.1080/23311908.2025.2586809

781 62. Qian Y, Yu X, Liu F. Comparison of Two Approaches to Enhance Self-
782 Esteem and Self-Acceptance in Chinese College Students:
783 Psychoeducational Lecture vs. Group Intervention. Front Psychol. 7 de abril
784 de 2022;13. doi:10.3389/fpsyg.2022.877737

785 63. Bruhns A, Lüdtke T, Moritz S, Bücker L. A Mobile-Based Intervention to
786 Increase Self-esteem in Students With Depressive Symptoms: Randomized
787 Controlled Trial. JMIR MHealth UHealth. 12 de julio de 2021;9(7):e26498.
788 doi:10.2196/26498

789 64. Antonovsky A. Unraveling the Mystery of Health: How People Manage
790 Stress and Stay Well. San Francisco, CA, USA: Jossey-Bass; 1987.

791 65. Li M, Xu Z, He X, Zhang J, Song R, Duan W, et al. Sense of Coherence and
792 Mental Health in College Students After Returning to School During COVID-
793 19: The Moderating Role of Media Exposure. Front Psychol. 22 de julio de
794 2021;12:687928. doi:10.3389/fpsyg.2021.687928

795 66. Eriksson M, Lindström B. Antonovsky's sense of coherence scale and the
796 relation with health: a systematic review. J Epidemiol Community Health.
797 mayo de 2006;60(5):376-81. doi:10.1136/jech.2005.041616

798 67. Davidson OB, Feldman DB, Margalit M. A Focused Intervention for 1st-Year
799 College Students: Promoting Hope, Sense of Coherence, and Self-Efficacy.
800 J Psychol. 1 de mayo de 2012;146(3):333-52.
801 doi:10.1080/00223980.2011.634862 PubMed PMID: 22574424.

802 68. Langeland E, Vaandrager L, Nilsen ABV, Schraner M, Meier Magistretti C.
803 Effectiveness of Interventions to Enhance the Sense of Coherence in the
804 Life Course. En: Mittelmark MB, Bauer GF, Vaandrager L, Pelikan JM, Sagy
805 S, Eriksson M, et al., editores. The Handbook of Salutogenesis [Internet].

Cham: Springer International Publishing; 2022 [citado 3 de mayo de 2026]. p. 201-19. Disponible en: https://doi.org/10.1007/978-3-030-79515-3_20 doi:10.1007/978-3-030-79515-3_20

69. Walton GM, Cohen GL. A Brief Social-Belonging Intervention Improves Academic and Health Outcomes of Minority Students. Science. 18 de marzo de 2011;331(6023):1447-51. doi:10.1126/science.1198364

70. Jenny GJ, Bauer GF, Vinje HF, Brauchli R, Vogt K, Torp S. Applying Salutogenesis in the Workplace. En: Mittelmark MB, Bauer GF, Vaandrager L, Pelikan JM, Sagy S, Eriksson M, et al., editores. The Handbook of Salutogenesis [Internet]. Cham: Springer International Publishing; 2022 [citado 4 de mayo de 2026]. p. 321-36. Disponible en: https://doi.org/10.1007/978-3-030-79515-3_31 doi:10.1007/978-3-030-79515-3_31

71. Bleidorn W, Arslan RC, Denissen JJA, Rentfrow PJ, Gebauer JE, Potter J, et al. Age and gender differences in self-esteem-A cross-cultural window. J Pers Soc Psychol. septiembre de 2016;111(3):396-410. doi:10.1037/pspp0000078 PubMed PMID: 26692356.

72. He J, Sun S, Zickgraf HF, Lin Z, Fan X. Meta-analysis of gender differences in body appreciation. Body Image. 1 de junio de 2020;33:90-100. doi:10.1016/j.bodyim.2020.02.011

73. Ciao AC, Munson BR, Pringle KD, Roberts SR, Lalgee IA, Lawley KA, et al. Inclusive dissonance-based body image interventions for college students: Two randomized-controlled trials of the EVERYbody Project. J Consult Clin Psychol. 2021;89(4):301-15. doi:10.1037/ccp0000636

74. Stice E, Rohde P, Durant S, Shaw H. A preliminary trial of a prototype internet dissonance-based eating disorder prevention program for young women with body image concerns. J Consult Clin Psychol. 2012;80(5):907-16. doi:10.1037/a0028016