Original Paper

Sociocultural Appearance-Related Attitudes and Psychological Resources and Their Associations With Moderate-Intensity Exercise, Body Size Perception, and Screen Time Among Female University Students: Cross-Sectional Latent Profile Analysis

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Abstract

Background: Female university students encounter appearance ideals, comparison cues, and appearance-related pressure across traditional and digital media environments. These sociocultural influences may coexist with psychological resources such as body appreciation and weight-control self-efficacy. However, variable-centered analyses may obscure heterogeneity in how these characteristics are combined within individuals. The measures used in this study assessed broader sociocultural appearance-related attitudes rather than platform-specific digital exposure.

Objective: This study aimed to identify latent profiles characterized by ideal-body internalization, appearance comparison, perceived media pressure, body appreciation, and weight-control self-efficacy among female university students and to examine whether these profiles differed in moderate-intensity exercise duration, self-perceived body size, and screen-based sedentary behavior.

Methods: A cross-sectional online survey was conducted between May and June 2025 among 2034 female students recruited by convenience sampling from 1 comprehensive university in China. Latent profile analysis compared 1- through 6-profile solutions. Model selection considered information criteria, likelihood-ratio tests, entropy, profile size, parsimony, and substantive interpretability. Distal outcomes were compared using the Bolck-Croon-Hagenaars (BCH) procedure for continuous outcomes and the distal categorical outcome (DCAT) procedure for categorical outcomes. Sensitivity analyses examined alternative exercise definitions, transformations, extreme-value handling, sociodemographic adjustment, and self-reported BMI. Conventionally calculated weekly moderate-to-vigorous physical activity (MVPA) outcomes were examined among 1056 participants with complete activity data. The primary analysis preserved classification uncertainty, and supplementary models assessed the robustness of associations without treating most-likely profile membership as error-free. No population-prevalence inference was intended.

Results: A 4-profile solution was retained (entropy=0.874): very low sociocultural attitudes—higher body appreciation (137/2034, 6.74%), average sociocultural attitudes (1081/2034, 53.15%), lower sociocultural attitudes (452/2034, 22.22%), and higher sociocultural attitudes (364/2034, 17.9%). Solutions with 5 and 6 profiles each contained a very small class of approximately 1.7% (35/2034), and the adjusted Lo-Mendell-Rubin test comparing 6 vs 5 profiles was nonsignificant (*P*=.47). The profiles were differentiated primarily by a low-to-high gradient in appearance comparison, ideal-body internalization, and perceived media pressure. Moderate-intensity exercise duration differed across profiles in the primary analysis (BCH Wald χ^2_3=15.3; *P*=.002), but complete-case weekly MVPA did not (*P*=.52). Body-size perception differed in the unadjusted analysis (DCAT χ^2_9=20.4; *P*=.02), although the overall association was not independent of sociodemographic characteristics and self-reported BMI. Weekly screen-use categories did not differ significantly across profiles (DCAT χ^2_{12}=16.7; *P*=.16).

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Conclusions: The retained profiles were sample-specific statistical configurations that largely represented a sociocultural low-to-high gradient rather than 4 clearly discrete psychological types. Associations with exercise and body-size perception were modest and sensitive to outcome definition or covariate adjustment. The cross-sectional findings do not establish causal direction or digital media mechanisms. Longitudinal, multisite studies incorporating direct measures of digital exposure, exercise motivation, objectively assessed activity, and measured anthropometry are needed.

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KEYWORDS

sociocultural appearance-related attitudes; appearance comparison; body appreciation; moderate-intensity exercise; body size perception; screen time; latent profile analysis; female university students

Introduction

Regular physical activity is widely recognized as a key lifestyle factor promoting both physical and mental health. The World Health Organization Guidelines on Physical Activity and Sedentary Behaviour indicate that achieving recommended levels of moderate-to-vigorous physical activity (MVPA) significantly reduces the risk of chronic diseases and improves mental health outcomes [1,2]. However, a growing body of research suggests that the health implications of physical activity depend not only on behavioral volume but also on the underlying psychological motivations and sociocultural context. In other words, similar levels of activity may correspond to distinct psychological functions and health meanings.

Exercise may be undertaken for different reasons, including enjoyment, health, appearance, weight control, social participation, and responses to internal or external pressure. Recent self-determination theory-informed research distinguishes relatively autonomous motivation from controlled motivation and indicates that motivational quality may be relevant to physical activity participation and related health outcomes, although effect sizes vary across interventions and populations [3]. A systematic review further suggests that exercise motives may be associated with different body image and eating-related outcomes, but the predominantly observational evidence does not establish that particular motives cause these outcomes [4]. Body dissatisfaction is also associated with problematic or compulsive exercise behavior, although the direction of influence remains uncertain [5]. Accordingly, similar amounts of physical activity may have different psychological meanings, and activity volume alone cannot determine whether exercise is health-oriented, appearance-oriented, or problematic.

In highly digitalized social environments, appearance ideals and comparison cues are highly visible across social media and other channels. Sociocultural models propose that media, peers, and family are related to body evaluation through processes including appearance-ideal internalization and appearance comparison [6]. Meta-analytic evidence indicates moderate associations between online social comparison and body image concerns, but these findings are dominated by correlational studies and should not be interpreted as proof of causation [7]. Meta-analytic evidence also indicates that short-term experimental exposure to appearance-ideal social media content can adversely affect body image outcomes, whereas longitudinal associations involving general social media use are substantially smaller [8]. Studies of Chinese female university students similarly report associations among social network appearance comparison, body shame, body appreciation, and restrained eating [9], while longitudinal evidence suggests that exposure and internalization may show reciprocal or construct-specific temporal relations rather than a simple 1-way pathway [10]. Therefore, digital influence should be distinguished by content, comparison processes, and mode of engagement rather than inferred from total use duration. This study did not directly measure platform-specific exposure, edited-image content, or interpersonal feedback and treats digitalization only as contextual background.

Sociocultural appearance-related attitudes may coexist with positive psychological resources. Body appreciation refers to accepting, respecting, and holding favorable attitudes toward one's body and is conceptually distinct from merely having low body dissatisfaction [11,12]. Meta-analytic evidence links body appreciation with more favorable psychological correlates, although most available studies are cross-sectional [12]. Recent longitudinal research among Chinese university students suggests that body appreciation and physical activity may prospectively predict one another over time [13]. Another study reported an association between body appreciation and physical activity through exercise identity [14]. However, these findings do not establish an experimental causal effect or demonstrate that body appreciation necessarily produces greater moderate-intensity exercise among female students. Weight control self-efficacy refers here specifically to confidence in resisting eating across weight-management situations, as assessed using the Weight Efficacy Lifestyle Questionnaire [15]. It should not be interpreted as general exercise self-efficacy. Examining these indicators jointly may therefore describe how sociocultural risks and selected resources co-occur without assuming moderation or protection.

Public health research increasingly considers physical activity and sedentary behavior across the day rather than as isolated behaviors [1,2,16]. However, self-reported screen or internet duration is not equivalent to device-measured sedentary time, and self-report and device estimates can differ systematically [17]. Reviews of digital-media research also emphasize that duration alone cannot capture platform, content, active or passive engagement, or appearance-comparison processes [18,19]. Subjective body size perception likewise should be distinguished from measured adiposity. Recent longitudinal evidence among young Chinese females indicates that actual BMI and the gap between actual and ideal BMI are related to

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body shape concerns, but it does not justify treating a single perceived size response as objective distortion [20].

Although previous studies have documented linear associations among media internalization, body image, and health behaviors, 2 key limitations remain. First, most research has adopted variable-centered approaches, assuming homogeneous effects of risk factors across individuals and overlooking psychological heterogeneity. Second, relatively few studies have simultaneously integrated multidimensional outcomes, including physical activity, screen-based sedentary behavior, and body-size perception, thereby constraining a comprehensive understanding of lifestyle differentiation patterns in digitalized sociocultural contexts. In particular, screen time is often simplified as a proxy for digital influence, neglecting the underlying structure of sociocultural exposure. Latent profile analysis (LPA), a person-centered analytic approach, enables the identification of latent subgroups characterized by similar structural patterns across multiple continuous psychological indicators, thereby revealing combinations of risks and resources at the individual level [21]. In contemporary contexts marked by pervasive digital media exposure, adopting a structural perspective may therefore help describe heterogeneity in sociocultural internalization and psychological resource configurations.

Accordingly, this study focused on female university students and integrated ideal body internalization, appearance comparison, perceived media pressure, body appreciation, and weight control self-efficacy. LPA was used to identify sample-specific profiles reflecting different combinations of these sociocultural and psychological resource indicators and to compare the profiles in moderate-intensity exercise duration, screen-based sedentary behavior, and body size perception. Consistent with the person-centered rationale, the analysis examined heterogeneity while also evaluating whether the profiles primarily reflected a graded sociocultural dimension. Because the design was cross-sectional and the media measures were not digital-specific, the study aimed to describe associations rather than establish causal pathways or mechanisms in digital environments.

Methods

Study Design and Participants

This study used a cross-sectional online survey design. Data were collected between May and June 2025 via an online survey platform. Female university students were recruited from a comprehensive university in China. The survey link was disseminated through course-based messaging groups, class announcements, and campus online platforms. Participation was voluntary, and convenience sampling was adopted.

To reduce the risk of duplicate responses, submission restrictions were implemented for the same account and device. Technical metadata, including IP addresses and response duration, were used only for data-quality screening. Direct identifiers and technical identifiers were removed before analysis, and the deidentified analytic dataset contained no names, student identification numbers, telephone numbers, or IP addresses.

Eligible participants were currently enrolled female university students who provided informed consent and completed all 5 core profile indicators and the primary distal outcomes. Responses were excluded when gender information was missing or inconsistent, completion time was implausibly short, or response patterns indicated probable invalid responding, including prolonged invariant responding or logical inconsistencies across key items. Age was not required for inclusion in the primary LPA; for analyses involving age, missing values and values outside the prespecified 18- to 29-year analytic range were coded as missing.

Ethical Considerations

The study was reviewed and approved by the Academic Ethics Committee of Guizhou Normal University (approval 2025030012). Before beginning the survey, all participants reviewed an electronic study information sheet and provided electronic informed consent. Participation was voluntary. No monetary compensation, cash transfers, gifts, prize-draw opportunities, course credit, or other incentives were provided. Direct personal and technical identifiers were removed before analysis, and the deidentified analytic dataset contained no names, student identification numbers, telephone numbers, IP addresses, or other information that could directly identify an individual participant. Neither the paper nor the supplementary materials contain participant photographs, screenshots, or other images from which an individual participant could be identified.

A total of 2034 valid responses from female university students were included. Age was valid and within the prespecified 18- to 29-year range for 2016 participants (mean age 20.67, SD 1.32 y); invalid or missing age entries were retained as missing in analyses involving age. The sample consisted primarily of second-year (734/2034, 36.09%) and third-year (640/2034, 31.47%) students. Most reported average family economic status (1656/2034, 81.42%); 80.14% (1630/2034) had rural household registration, and 53.98% (1098/2034) were of Han ethnicity. Given the convenience sample from one university, no population-prevalence inference is made.

Sample Size and Participant Flow

No formal a priori power calculation was used to determine the sample size because the primary analysis was an exploratory LPA and the number and separation of profiles were not known in advance. All responses available from the recruitment period that met the stated eligibility and data-quality criteria were included, yielding an analytic sample of 2034. The survey platform did not retain a denominator for students who viewed the invitation but did not submit a questionnaire; therefore, a participation rate could not be calculated. Precision and stability were evaluated using profile size, entropy, likelihood-ratio tests, replication of the best log-likelihood, and sensitivity analyses.

Measures

Sociocultural Appearance-Related Attitudes

A total of 3 sociocultural appearance-related indicators were included—ideal-body internalization, perceived media pressure, and appearance comparison. The items assessing ideal-body internalization and perceived media pressure were adapted from

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the Sociocultural Attitudes Toward Appearance Questionnaire-3 (SATAQ-3) [6]. Ideal-body internalization reflects the extent to which culturally promoted appearance ideals are adopted as personal standards, whereas perceived media pressure reflects perceived pressure from media to change one's appearance, weight, or body shape.

Appearance comparison was assessed using 6 items included in the study questionnaire. These items measured the tendency to compare one's physical appearance or body shape with that of other people. Because the 6 items did not constitute a standard SATAQ-3 subscale, the resulting score is referred to throughout this study as an appearance-comparison composite.

Appearance comparison, perceived media pressure, and ideal-body internalization were calculated as the means of 6, 7, and 8 items, respectively. All items were rated on 5-point scales, with higher scores indicating greater appearance comparison, perceived media pressure, or ideal-body internalization. In the present sample, Cronbach α values were 0.929, 0.935, and 0.941, respectively.

Body Appreciation

Body appreciation was assessed using the 10-item Body Appreciation Scale-2 (BAS-2) [11]. Items were rated on a 5-point scale ranging from 1 (never) to 5 (always). A mean score was calculated, with higher scores indicating greater acceptance of, respect for, and appreciation of one's body. The BAS-2 has demonstrated satisfactory psychometric properties in previous studies, including research conducted in Chinese populations [11,22]. Cronbach α was 0.891 in the present sample.

Weight-Control Self-Efficacy

Weight-control self-efficacy was assessed using the 20-item Weight Efficacy Lifestyle Questionnaire (WEL) [15]. The WEL measures confidence in resisting eating across a range of weight-management situations. Items were rated from 0 (not confident at all) to 9 (very confident), and a mean score was calculated, with higher scores indicating greater eating-related weight-management self-efficacy. Cronbach α was 0.879 in the present sample.

Moderate-Intensity Exercise

Participants reported physical activity during the preceding 7 days. The primary exercise outcome was the reported number of minutes spent in moderate-intensity exercise on a typical active day. A supplementary weekly estimate was calculated as the reported number of moderate-intensity exercise days multiplied by the corresponding minutes per active day.

Weekly MVPA was calculated for participants with complete information on vigorous- and moderate-intensity exercise frequency and duration. Weekly MVPA was calculated as vigorous-intensity days×vigorous-intensity minutes+moderate-intensity days×moderate-intensity minutes. Moderate-equivalent MVPA was calculated as 2×vigorous-intensity weekly minutes+moderate-intensity weekly minutes. Participants with missing components were excluded from these calculations rather than having missing values recoded as zero. Complete-case MVPA outcomes were available for 1056 participants and were examined in sensitivity analyses.

Screen-Based Sedentary Behavior

Weekly internet and screen use was assessed using 5 ordered response categories: ≤10, 11-30, 31-50, 51-100, and >100 hours per week. The original response categories were retained for analysis. This measure represented overall screen-use duration and did not distinguish device type, platform, media content, active or passive use, or appearance-related digital exposure.

Body Size Perception

Body-size perception was assessed using a single item asking participants to classify their current body size as underweight, normal weight, overweight, or obese. Responses were coded from 1 to 4, with higher values representing perception of a heavier body size. The measure was treated as a subjective body-size evaluation rather than an assessment of perceptual distortion.

Self-Reported BMI

BMI was calculated from self-reported weight and height as weight in kilograms divided by the square of height in meters. Height and weight entries were screened for implausible values before BMI calculation, and values that did not satisfy the data-cleaning rules were coded as missing. Valid BMI data were available for 2024 participants and were used only in sensitivity and covariate-adjusted analyses. Because height and weight were self-reported rather than directly measured, BMI was regarded as a self-reported anthropometric indicator.

Statistical Analysis

Before statistical modeling, the data were examined for completeness, implausible values, missingness, and distributional characteristics. Complete data for the 5 LPA indicators and the primary distal outcomes were available for 2034 participants. Age data were available for 2016 participants and BMI data for 2024 participants; analyses including both age and BMI were based on 2007 complete cases. The 4 activity components required to calculate conventional weekly MVPA were complete for 1056 participants. Missing activity components were not coded as zero. Accordingly, outcome-specific analytic sample sizes are reported for the descriptive and inferential analyses.

All principal constructs were assessed by self-report at a single time point. The potential influence of recall error, social desirability, and shared measurement method was therefore considered when interpreting the findings.

Spearman rank correlations were calculated among the principal study variables because several variables had nonnormal distributions. The Benjamini-Hochberg procedure was applied to control the false discovery rate (FDR) across correlation tests, and 95% CIs were reported for the principal coefficients. An absolute Spearman correlation coefficient of 0.70 or greater was considered indicative of potential indicator redundancy. Correlations were interpreted as descriptive associations rather than causal relationships.

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The 5 continuous LPA indicators—appearance comparison, perceived media pressure, ideal body internalization, body appreciation, and weight-control self-efficacy—were standardized as *z* scores before analysis. Conditional independence of the indicators within profiles was assumed. Given the correlations among the sociocultural indicators, profile patterns were also examined to determine whether the identified profiles reflected primarily quantitative differences in overall severity or qualitatively distinct configurations of characteristics.

LPA was conducted in Mplus (version 8.3; Muthén & Muthén) using robust maximum likelihood estimation. Models with 1-6 profiles were estimated using 4000 random sets of starting values and 1000 final-stage optimizations (STARTS=4000 1000). Replication of the best log-likelihood value was confirmed for each model. The number of profiles was selected by jointly considering the Akaike information criterion, Bayesian information criterion, sample-size-adjusted Bayesian information criterion, entropy, adjusted Lo-Mendell-Rubin likelihood-ratio test, bootstrap likelihood-ratio test, profile sizes, parsimony, and substantive interpretability [21]. On the basis of these criteria, a 4-profile solution was retained. Because profile enumeration involves statistical and substantive judgment and small profiles may be sample dependent, the selected solution was interpreted as a sample-specific representation of heterogeneity rather than a definitive classification of the population.

Following selection of the 4-profile solution, auxiliary-variable methods were used to compare distal outcomes while minimizing changes to the latent profile measurement model [23,24]. The Bolck-Croon-Hagenaars (BCH) method was used for continuous distal outcomes, whereas the distal categorical outcome (DCAT) procedure was used for categorical outcomes. Reported moderate-intensity exercise minutes per active day was specified as the primary continuous distal outcome. Additional BCH analyses examined weekly moderate-intensity exercise, conventional weekly MVPA, and moderate-equivalent weekly MVPA. Holm correction was applied to post hoc pairwise comparisons following significant omnibus tests. Sensitivity analyses based on most-likely profile membership examined outcome transformations, extreme-value handling, covariate adjustment, and the exclusion of selected profile indicators. These analyses were reported separately from the BCH and DCAT analyses.

For the categorical outcomes of screen time and perceived body size, the DCAT procedure was used to estimate profile-specific conditional probabilities and test overall differences in outcome distributions across profiles. Supplementary analyses based on most-likely profile membership included Pearson chi-square tests, corresponding effect sizes, and Holm-adjusted pairwise comparisons. Perceived body size was also examined using multinomial logistic regression, first without covariate adjustment and subsequently with adjustment for age, year of study, broad academic-major category, family economic status, household registration, ethnicity, and BMI. Robust linear regression with heteroskedasticity-consistent SEs with the HC3 correction was used in the covariate-adjusted sensitivity analyses of exercise outcomes. The available academic-major variable represented only broad disciplinary categories and did not permit the separate identification of physical education, sport-related, or health-related majors.

All statistical tests were 2-sided, with $P<.05$ indicating statistical significance. Interpretation considered effect sizes, 95% CIs, adjustments for multiple comparisons, explained variance, consistency across sensitivity analyses, profile size, classification uncertainty, and the cross-sectional study design. Associations were not interpreted as causal effects or as evidence of motivational mechanisms that were not directly measured.

Transparency and Reproducibility

The study and analysis plan were not preregistered. The manuscript reports the measures used for the analyses of this study, the stated data exclusions, outcome-specific missingness, and the models having 1-6 profiles that were estimated. Deidentified data and the analysis syntax are available from the corresponding author on reasonable request, subject to applicable ethics and privacy requirements.

Results

Descriptive Statistics and Correlational Structure

The analytic sample included 2034 female university students. Age was valid for 2016 participants (18-29 y; mean age 20.67, SD 1.32 y). Second- and third-year students comprised 36.09% (734/2034) and 31.47% (640/2034), respectively. Most reported average family economic status (1656/2034, 81.42%); 80.14% (1630/2034) had rural household registration, and 53.98% (1098/2034) identified as Han. Descriptive statistics are reported in Table S1 in Multimedia Appendix 1.

Spearman correlations with FDR correction are presented in Figure S1 and Table S2 in Multimedia Appendix 1. Ideal body internalization was strongly associated with appearance comparison (ρ=0.781, 95% CI 0.758-0.803; FDR-adjusted $P<.001$), exceeding the prespecified $|\rho|>=0.70$ indicator-redundancy signal. Appearance comparison correlated with perceived media pressure (ρ=0.610, 95% CI 0.579-0.640; FDR-adjusted $P<.001$), and ideal body internalization correlated with perceived media pressure (ρ=0.533, 95% CI 0.498-0.568; FDR-adjusted $P<.001$). These findings indicated a closely related sociocultural core but did not establish that the measures were interchangeable.

Body appreciation correlated positively with weight control self-efficacy (ρ=0.306, 95% CI 0.264-0.345; FDR-adjusted $P<.001$) and negatively with perceived media pressure (ρ=–0.132, 95% CI –0.175 to –0.089; FDR-adjusted $P<.001$). Moderate-intensity exercise duration correlated weakly and negatively with screen-time category (ρ=–0.133, 95% CI –0.178 to –0.089; FDR-adjusted $P<.001$). The correlation between the primary duration variable and the derived weekly moderate-intensity exercise time was strong (ρ=0.852, 95% CI 0.833-0.869), as expected because weekly time was calculated partly from duration.

Self-perceived body size correlated negatively with body appreciation (ρ=–0.302, 95% CI –0.342 to –0.263; FDR-adjusted $P<.001$) and positively with perceived media pressure (ρ=0.165, 95% CI 0.123-0.206; FDR-adjusted $P<.001$). BMI correlated

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positively with self-perceived body size. Most associations outside the sociocultural indicator correlations were small. These bivariate results supported further description of sample heterogeneity but did not establish causal direction or prove that latent profiles represented naturally discrete categories.

Latent Profile Model Comparison

Models containing 1-6 profiles were estimated (Table 1 and Figure S2 in Multimedia Appendix 1). Information criteria decreased as profiles were added. Lo-Mendell-Rubin adjusted likelihood ratio (LMR) and bootstrap likelihood ratio tests were significant through the 5-profile solution, whereas the adjusted LMR test for 6 vs 5 profiles was nonsignificant (P=.47). Fit indices alone therefore did not uniquely identify 4 profiles.

Entropy was 0.819, 0.867, 0.874, 0.898, and 0.889 for the solutions with 2-6 profile. Although the 5-profile model had slightly higher entropy and lower information criteria than the 4-profile model, both the 5- and 6-profile solutions contained a class of approximately 1.7%, raising concerns about stability and reproducibility. The 6-profile solution also had a nonsignificant adjusted LMR test. The 4-profile solution contained no class smaller than 5%.

Considering information criteria, entropy, minimum profile size, parsimony, and substantive interpretability, the 4-profile model was retained as the most useful description of this sample. This choice does not imply that 4 profiles constitute the only possible population structure. The high intercorrelations and graded standardized means were considered when interpreting the solution as substantially dimensional.

Indicator-exclusion sensitivity analyses showed that removing weight-control self-efficacy produced essentially unchanged classifications (agreement 99.8%, adjusted Rand index 0.995), whereas removing appearance comparison reduced entropy to 0.784 and agreement with the primary solution to 76.6% (adjusted Rand index 0.509; Table S13 in Multimedia Appendix 1).

Table 1. Fit indices and profile proportions for the latent profile models. Lo-Mendell-Rubin adjusted likelihood ratio test and bootstrap likelihood ratio test compare a k-profile model with the corresponding "k–1" profile model and are not applicable to the 1-profile model. Lower Akaike information criterion, Bayesian information criterion, and sample-size–adjusted Bayesian information criterion indicate better relative fit, whereas entropy closer to 1 indicates more precise classification. The 4-profile solution was retained after considering information criteria, entropy, likelihood-ratio tests, minimum profile size, parsimony, and substantive interpretability. The 5- and 6-profile solutions each contained a profile representing 1.72% of the sample.

Model	k	LL[a]	AIC[b]	BIC[c]	aBIC[d]	Entropy	LMR[e], *P* value	BLRT[f], *P* value	Profiles, n (%)
1-profile	1	–14428.104	28876.209	28932.386	28900.615	—[g]	—	—	• 2034 (100)
2-profile	2	–13551.892	27135.785	27225.669	27174.836	0.819	<.001	<.001	• 1482 (72.86) • 552 (27.14)
3-profile	3	–12937.765	25919.530	26043.121	25973.226	0.867	<.001	<.001	• 1238 (60.87) • 407 (20.01) • 389 (19.12)
4-profile	4	–12703.343	25462.686	25619.983	25531.025	0.874	<.001	<.001	• 452 (22.22) • 1081 (53.15) • 137 (6.74) • 364 (17.9)
5-profile	5	–12554.294	25176.588	25367.592	25259.572	0.898	<.001	<.001	• 455 (22.37) • 147 (7.23) • 1021 (50.2) • 376 (18.49) • 35 (1.72)
6-profile	6	–12490.388	25060.775	25285.485	25158.403	0.889	.47	<.001	• 77 (3.79) • 435 (21.39) • 978 (48.08) • 134 (6.59) • 35 (1.72) • 375 (18.44)

[a]LL: log-likelihood.

[b]AIC: Akaike information criterion.

[c]BIC: Bayesian information criterion.

[d]aBIC: sample-size–adjusted Bayesian information criterion.

[e]LMR: Lo-Mendell-Rubin adjusted likelihood ratio test.

[f]BLRT: bootstrap likelihood ratio test.

[g]Not applicable.

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Latent Profile Characteristics and Labeling

Figure 1 presents standardized means and 95% CIs for the 5 indicators. The greatest separation occurred in appearance comparison, ideal body internalization, and perceived media pressure. Body appreciation differences were less pronounced except in class 1, and weight control self-efficacy remained near the sample mean in every profile. Thus, the 4-profile solution was characterized primarily by a sociocultural low-to-high gradient with more limited resource variation.

Class 1 included 137 (6.74%) participants. It showed markedly below-average appearance comparison, ideal-body internalization, and perceived media pressure, above-average body appreciation, and near-average weight control self-efficacy. It was labeled very low sociocultural attitudes–higher body appreciation (VLS-HBA). This label is descriptive and does not imply clinically validated protection.

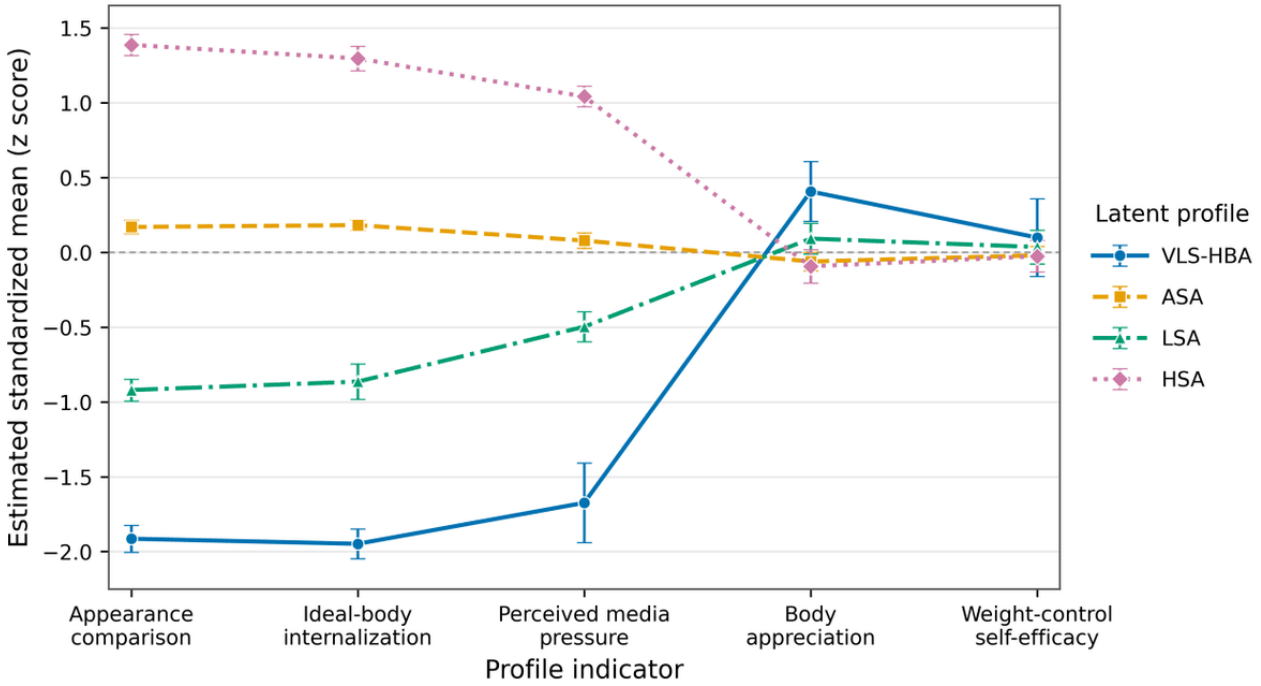
Class 2 included 1081 (53.15%) participants. Its sociocultural indicators were slightly above the sample mean, whereas body appreciation and weight control self-efficacy were close to the mean. It was labeled average sociocultural attitudes (ASA), reflecting its relative position in this sample rather than a normative diagnosis.

Class 3 included 452 (22.22%) participants. It showed below-average appearance comparison, ideal body internalization, and perceived media pressure, with body appreciation and weight control self-efficacy near the sample mean. It was labeled lower sociocultural attitudes (LSA). The label refers to lower scores on the measured sociocultural attitudes and does not imply directly measured digital-media exposure.

Class 4 included 364 (17.9%) participants. It showed markedly above-average appearance comparison, ideal body internalization, and perceived media pressure, while body appreciation and weight control self-efficacy remained close to the sample mean. It was labeled higher sociocultural attitudes (HSA).

Overall, the profiles were more clearly differentiated by quantitative levels of the 3 correlated sociocultural indicators than by qualitatively different configurations across all 5 variables. They are therefore interpreted as sample-specific statistical groupings and not as fixed psychological types. External replication and alternative dimensional or factor-mixture models are needed.

Figure 1. Standardized means and 95% CIs of appearance comparison, ideal-body internalization, perceived media pressure, body appreciation, and weight-control self-efficacy across the 4 retained latent profiles. Error bars represent 95% CIs calculated as the estimated profile mean ± 1.96 × SE; their apparent lengths can differ across profiles because profile-specific SEs differ. Positive values indicate scores above the sample mean, and negative values indicate scores below the sample mean. ASA: average sociocultural attitudes; HSA: higher sociocultural attitudes; LSA: lower sociocultural attitudes; VLS-HBA: very low sociocultural attitudes–higher body appreciation.



Between-Profile Differences in Moderate-Intensity Exercise, Body Size Perception, and Screen-Based Sedentary Behavior

Following selection of the 4-profile solution, distal outcomes were examined with BCH or DCAT as appropriate (Table 2; Tables S4-S11 in Multimedia Appendix 1). These primary procedures accounted for uncertainty in latent-profile classification. Separate sensitivity and covariate analyses based on most-likely profile membership were used to examine robustness and were not interpreted as BCH or DCAT analyses.

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Table 2. Differences in moderate-intensity exercise duration, body-size perception, and screen-based sedentary behavior across the 4 latent profiles (Bolck-Croon-Hagenaars or distal categorical outcome). Exercise values are Bolck-Croon-Hagenaars–estimated profile-specific means with standard errors (SEs) and, where reported, 95% CIs. Body-size perception and screen-time values are distal categorical outcome–estimated conditional probabilities of each response category within each profile, rather than counts or means. Profile counts in the column headings refer to the full analytic sample; weekly moderate-to-vigorous physical activity analyses include only the 1056 participants with complete activity data. Reported pairwise conclusions are based on Holm-adjusted *P* values.

Variable (method)	VLS-HBA[a] (n=137, 6.74%)	ASA[b] (n=1081, 53.15%)	LSA[c] (n=452, 22.22%)	HSA[d] (n=364, 17.9%)	Wald chi-square (*df*)	*P* value	Pairwise comparisons
Moderate-intensity exercise duration, min/active day (BCH[e])	Mean 47.361 (SE 5.477; 95% CI 36.626-58.096)	Mean 64.676 (SE 2.527; 95% CI 59.723-69.629)	Mean 54.561 (SE 3.122; 95% CI 48.442-60.680)	Mean 68.197 (SE 4.989; 95% CI 58.419-77.975)	15.3 (3)	.002	Holm-adjusted: VLS-HBA<HSA; VLS-HBA<ASA
Body-size perception (DCAT[f])	U[g]=0.174; N[h]=0.624; OW[i]=0.187; O[j]=0.016	U=0.126; N=0.537; OW=0.293; O=0.044	U=0.148; N=0.551; OW=0.263; O=0.038	U=0.116; N=0.501; OW=0.336; O=0.047	20.4 (9)	.02	Holm-adjusted: VLS-HBA vs HSA; VLS-HBA vs ASA
Weekly screen-use category, h/week (DCAT)	≤10=0.099; 11-30=0.268; 31-50=0.306; 51-100=0.254; >100=0.073	≤10=0.116; 11-30=0.210; 31-50=0.331; 51-100=0.277; >100=0.066	≤10=0.095; 11-30=0.209; 31-50=0.365; 51-100=0.292; >100=0.040	≤10=0.151; 11-30=0.166; 31-50=0.315; 51-100=0.301; >100=0.067	16.7 (12)	.16	No Holm-adjusted pairwise differences
Weekly MVPA[k], min/week (BCH; n=1056)	Mean 269.100 (SE 36.496)	Mean 329.302 (SE 20.424)	Mean 302.055 (SE 27.627)	Mean 314.399 (SE 28.044)	2.3 (3)	.52	No significant pairwise differences
Moderate-equivalent MVPA, min/week (BCH; n=1056)	Mean 396.987 (SE 53.152)	Mean 490.239 (SE 30.736)	Mean 448.046 (SE 39.987)	Mean 477.964 (SE 42.502)	2.7 (3)	.44	No significant pairwise differences

[a]VLS-HBA: very low sociocultural attitudes–higher body appreciation.

[b]ASA: average sociocultural attitudes.

[c]LSA: lower sociocultural attitudes.

[d]HSA: higher sociocultural attitudes.

[e]BCH: Bolck-Croon-Hagenaars.

[f]DCAT: distal categorical outcome.

[g]U: self-perceived underweight; estimated probability of reporting underweight in the VLS-HBA profile.

[h]N: self-perceived normal weight; estimated probability of reporting normal weight in the VLS-HBA profile.

[i]OW: self-perceived overweight; estimated probability of reporting overweight in the VLS-HBA profile.

[j]O: self-perceived obesity; estimated probability of reporting obesity in the VLS-HBA profile.

[k]MVPA: moderate-to-vigorous physical activity.

Moderate-Intensity Exercise Duration

BCH indicated an overall profile difference in moderate-intensity exercise duration (Wald χ^2_3=15.3; *P*=.002). Estimated means were 47.361 (SE 5.477; 95% CI 36.626-58.096) minutes per active day for VLS-HBA, 64.676 (SE 2.527; 95% CI 59.723-69.629) minutes per active day for ASA, 54.561 (SE 3.122; 95% CI 48.442-60.680) minutes per active day for LSA, and 68.197 (SE 4.989; 95% CI 58.419-77.975) minutes per active day for HSA.

After Holm correction of the 6 BCH pairwise comparisons, moderate-intensity exercise duration was higher in HSA than in VLS-HBA (adjusted *P*=.03) and higher in ASA than in VLS-HBA (adjusted *P*=.02). The remaining pairwise comparisons were not significant after correction. These differences do not identify the motives or psychological function of exercise.

Most-likely-profile sensitivity analyses supported a profile difference for the primary duration outcome on raw and log scales, but weekly estimates were sensitive to transformation and extreme-value handling. In the complete-case sample, BCH showed no profile difference in weekly MVPA (n=1056; Wald χ^2_3=2.3; *P*=.52) or moderate-equivalent MVPA (Wald χ^2_3=2.7; *P*=.44). Thus, the primary duration finding did not generalize to conventionally calculated weekly MVPA.

Body Size Perception

DCAT indicated an overall difference in body-size perception across profiles (χ^2_9=20.4; *P*=.02). After Holm correction, VLS-HBA differed from HSA (adjusted *P*=.006) and ASA (adjusted *P*=.02); the remaining pairwise comparisons were not significant. Normal weight remained the most probable category in every profile.

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The estimated probability of normal weight perception was 0.624 in VLS-HBA, 0.537 in ASA, 0.551 in LSA, and 0.501 in HSA. The probability of overweight perception was 0.187, 0.293, 0.263, and 0.336, respectively. These conditional probabilities describe unadjusted distributions and do not demonstrate perceptual distortion or a causal influence of profile membership.

In sensitivity analyses based on most-likely profile assignment, the joint profile effect on body-size perception was not significant after sociodemographic adjustment (n=2016; *P*=.09) or after adding BMI (n=2007; *P*=.26). Because height and weight were self-reported, these models are sensitivity analyses rather than objective calibration.

Screen-Based Sedentary Behavior

DCAT did not identify an overall difference in the original weekly screen-use categories across profiles (χ^2_{12}=16.7; *P*=.16). The most common response band overall was 31-50 hours/week. The nonsignificant omnibus test indicates that broad screen-use duration did not reliably distinguish the profile distributions.

No pairwise screen-time comparison was significant after Holm correction. A supplementary most-likely-profile analysis similarly showed no overall association (χ^2_{12}=16.0; *P*=.19) and a small Cramér V of 0.051 (95% CI 0.044-0.091).

Accordingly, the study found no reliable evidence that total screen-time duration differed across profiles. Because only overall duration was measured, the results cannot determine whether profiles differed in platform choice, active vs passive use, appearance-focused content, interpersonal feedback, appearance comparison during media use, or exposure to digitally altered images.

Discussion

Principal Findings

This study identified patterns of sociocultural appearance-related attitudes and psychological resources among female university students and examined their associations with moderate-intensity exercise, body-size perception, and screen-based sedentary behavior. The 4-profile solution provided a statistically interpretable description of the sample, but the profiles were differentiated mainly by a graded increase in appearance comparison, ideal-body internalization, and perceived media pressure. Body appreciation contributed most clearly to the small VLS-HBA profile, whereas weight control self-efficacy remained close to the sample mean across profiles. The distal-outcome findings were more limited than the profile labels alone might imply; moderate-intensity exercise duration differed in the primary BCH analysis, but the derived weekly outcome was sensitive to transformation and extreme-value handling, and adjusted models explained only a small proportion of variance. Body-size perception differed in the unadjusted DCAT analysis, but the overall profile effect was no longer significant after measured sociodemographic variables and self-reported BMI were considered, while the total screen-time category did not differ overall. The contemporary media context remains relevant because appearance ideals and comparison cues can be encountered across digital and nondigital settings; nevertheless, this study did not measure social media frequency, active or passive use, platform characteristics, appearance-focused content, or digitally modified images. The findings therefore support cautious sample-level associations concerning broader sociocultural appearance-related attitudes rather than a structural theory of women's health behavior or a specifically digital mechanism.

Sociocultural Appearance-Related Attitudes and the Interpretation of the Profiles

The strong co-occurrence of ideal-body internalization, appearance comparison, and perceived media pressure is broadly consistent with sociocultural and objectification perspectives linking internalization and appearance comparison with body evaluation [6,25]. Recent meta-analyses indicate that appearance-ideal internalization, self-objectification, body shame, and body dissatisfaction are moderately associated, although the predominantly observational evidence does not establish causal direction or demonstrate that these processes produced the profiles observed here [26,27]. Reviews of social media and body image further indicate that appearance comparison and content-specific engagement may be more informative than overall exposure duration [7,8,19]. However, the correlation between internalization and the study-specific comparison composite exceeded the prespecified redundancy signal, strengthening the alternative interpretation that the profiles largely reflect positions along a shared sociocultural dimension. The presence of both VLS-HBA and LSA nevertheless indicates that low sociocultural scores did not always coexist with the same body-appreciation level. VLS-HBA combined very low comparison, internalization, and pressure with comparatively higher body appreciation, whereas LSA had moderately low sociocultural indicators but body appreciation and self-efficacy closer to the sample mean. This distinction is compatible with positive body image theory, which treats body appreciation as more than the absence of dissatisfaction [11,12]. Person-centered research among Chinese university students has also identified heterogeneity in body-appreciation levels [28]. However, that study examined body appreciation rather than the broader configuration of sociocultural attitudes and psychological resources assessed here, and the findings of this study should not be described as evidence that resources moderated sociocultural risk because no interaction or longitudinal buffering process was tested.

The comparatively limited variation in weight control self-efficacy also deserves attention. The indicator was retained because the study question concerned the joint configuration of sociocultural appearance-related attitudes and selected psychological resources, and the WEL assessed eating-related confidence in weight-management situations rather than general exercise self-efficacy. Nevertheless, removing this indicator produced almost identical profile assignments, indicating that it contributed little to empirical profile separation in this sample. Although self-efficacy is often conceptualized as a resource, confidence in controlling eating or weight may coexist with either health-oriented or appearance-oriented goals. Future research should distinguish general health self-efficacy, eating self-efficacy, and appearance-management efficacy and test

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whether their meaning changes across motivational contexts. Taken together, the findings are better summarized as a sociocultural gradient accompanied by modest variation in selected psychological resources than as a confirmed risk-resource embedded system. Recent methodological guidance emphasizes that latent profiles should be interpreted on the basis of their shape, separation, size, stability, and substantive meaning rather than statistical fit indices alone [29,30]. In this study, the largely parallel low-to-high pattern of the sociocultural indicators raises the possibility that the profiles partly represent discretized positions along an underlying continuous dimension. Person-centered analysis remains useful for describing combinations observed in the sample, but it does not establish mechanisms, developmental trajectories, or naturally bounded categories. Comparisons with factor-mixture and latent-trait models would help clarify whether categorical and continuous sources of heterogeneity coexist [29].

Moderate-Intensity Exercise Differences and Alternative Explanations

The higher BCH-estimated moderate-intensity exercise duration in ASA and HSA was unexpected. Exercise may be motivated by health, enjoyment, appearance, weight control, social participation, or emotion regulation. Review evidence indicates that these motives may be associated with different body image and eating-related outcomes, although the available literature is predominantly observational [4,31]. Recent evidence also suggests that appearance-based exercise can coexist with greater body shame and less favorable positive body image, but this evidence is cross-sectional and cannot establish causal direction [32]. A study among Chinese university students reported an association between media-internalized pressure and sports participation [33], while meta-analytic evidence links body dissatisfaction with problematic exercise behavior at a modest magnitude [5]. Therefore, a higher amount of reported exercise cannot by itself be equated with either psychological benefit or maladaptive appearance control. Objectification theory offers 1 possible framework because persistent external evaluation may encourage self-monitoring and body management [25,26]. However, the present data did not measure objectified body consciousness, exercise motivation, compulsive exercise, weight-loss attempts, fitness-culture participation, peer influence, athletic involvement, or emotion regulation. The observed association may reflect any combination of these factors, reverse direction, residual confounding, or chance, and it would be speculative to characterize HSA as a high-discipline active group. This caution is reinforced by the sensitivity analyses; the primary duration result did not extend to complete-case weekly MVPA or moderate-equivalent MVPA, weekly estimates were sensitive to transformation and extreme-value handling, and adjusted models explained little variance. Consequently, higher reported duration should not be interpreted as evidence of discipline, health benefit, or an appearance-driven mechanism.

Body Size Perception and the Role of Self-Reported BMI

The unadjusted DCAT results showed that HSA had a higher probability of selecting overweight than VLS-HBA, while normal weight remained the most frequent response in every profile. Sociocultural theory and meta-analytic evidence associate appearance-ideal internalization with body dissatisfaction and body evaluation [25,27], while longitudinal evidence among young Chinese females links BMI and the actual ideal BMI gap with body shape concern [20]. In the present data, body size perception was substantially associated with BMI calculated from self-reported height and weight, and the joint profile effect was not significant after BMI adjustment. These results do not support claims that the HSA profile displayed perceptual distortion or that sociocultural internalization influenced perception independently of weight status. Self-reported anthropometry provided a useful sensitivity analysis but is vulnerable to recall, reporting, and data-entry errors and cannot substitute for directly measured height, weight, or body composition. Future studies should combine measured anthropometry with validated multidimensional body image instruments to examine whether profile differences remain after objective weight status is considered.

Screen-Based Sedentary Behavior and the Limits of Digital-Specific Interpretation

The overall distribution of screen-time categories did not differ significantly across profiles, and the isolated unadjusted LSA-HSA comparison was not supported after multiplicity correction in the most-likely-profile analysis. Longitudinal reviews generally find small and heterogeneous associations between screen time and mental health in young people [18], while measurement reviews caution that total duration obscures the content, context, and mode of social media use [19]. Thus, the null finding for broad duration does not test whether appearance-focused digital content or online comparison differs across profiles. Digital experiences vary by platform, content, social context, comparison target, active or passive engagement, and exposure to edited images. Experimental meta-analysis supports short-term effects of appearance ideal imagery on body image outcomes, whereas longitudinal associations for general use are smaller [8]. Online appearance comparison shows more consistent associations with body image concerns than total duration [7], including among Chinese female university students [9]. Studies of appearance-related comments, image alteration, and photo editing further illustrate that these exposures are not captured by a single duration measure [34-36]. These processes were not measured and therefore cannot explain the observed profiles. Accordingly, the contribution of this study lies in describing sociocultural appearance-related profiles in a contemporary media context, not in demonstrating that digital media caused those profiles. Future research should measure platform type, active and passive use, appearance-focused content, image-editing awareness, media literacy, interpersonal appearance feedback, and momentary comparison processes. Intervention research could then evaluate whether content literacy, disclosure labels, functionality appreciation, or relationship-based feedback strategies reduce adverse outcomes [37,38].

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Strengths and Limitations

This study has several strengths. The large sample supported the estimation and comparison of multiple latent profile solutions and enabled the identification of both common and relatively small profiles. Model selection was based on a combination of statistical fit, classification quality, profile size, parsimony, and substantive interpretability rather than any single criterion. The BCH and DCAT procedures incorporated classification uncertainty into the primary comparisons of continuous and categorical distal outcomes, respectively. Sensitivity analyses further examined alternative definitions of physical activity, outcome transformations, the influence of extreme values, sociodemographic covariates, self-reported BMI, and concordance between perceived and BMI-based body size categories.

Several limitations should be acknowledged. First, the cross-sectional design precludes conclusions regarding temporal ordering or causal direction. Second, participants were recruited using convenience sampling from a single university in southwestern China. The sample may therefore not represent female university students attending institutions in other regions or students with different educational, socioeconomic, cultural, and disciplinary backgrounds. The prevalence and composition of the profiles should consequently be regarded as sample-specific and evaluated through replication in multisite and more geographically diverse samples. Third, the 6-item appearance-comparison composite was not a standard SATAQ-3 subscale, and independent psychometric validation of this exact item set in the target population was unavailable. Although the composite demonstrated high internal consistency in this sample, internal consistency alone does not establish construct validity. A Chinese SATAQ-4 has been evaluated among college students [39], but it does not validate this 6-item composite. Future studies should use an appropriately translated and culturally validated appearance-comparison instrument, such as the Physical Appearance Comparison Scale-Revised [40], and evaluate its factor structure and measurement invariance before profile analysis.

Fourth, several potentially relevant mechanisms and confounders—including exercise motivation, mental health, eating behavior, athletic involvement, and the content and mode of digital media use—were not measured. The findings therefore cannot determine whether differences in physical activity or screen use reflected autonomous motivation, appearance-related pressure, emotional distress, participation in organized sport, or exposure to particular online content. Fifth, all variables were self-reported and may have been affected by recall error, social desirability, and common method bias. Age and physical activity variables contained missing or invalid responses, and complete data for calculating weekly MVPA were available for only 1056 participants. Vigorous exercise days and minutes were missing for 648 and 725 participants, respectively, and the questionnaire record could not determine whether a missing response meant no vigorous activity, an omitted item, or another response problem. Missing components were therefore not recoded as zero. Because activity-item completeness differed across profiles, the complete-case MVPA sample may have differed systematically in activity level, survey engagement, or other unmeasured characteristics. Screen time was measured using broad duration categories without distinguishing platform, content, or active vs passive use. Perceived body size was assessed using a single item, and BMI was calculated from self-reported rather than directly measured height and weight. These limitations are consistent with broader evidence concerning the measurement constraints of self-reported movement behaviors [41].

Finally, the high correlations and largely parallel low-to-high pattern among the sociocultural indicators suggest that the profiles may partly reflect quantitative differences along an underlying severity continuum rather than entirely distinct psychological configurations. Residual associations among indicators were not modeled, potential within-profile local dependence cannot be excluded, and the study did not compare the retained solution with factor-mixture or latent-trait models that simultaneously represent categorical and continuous heterogeneity [29,30]. It therefore remains uncertain whether the profiles represent qualitatively distinct configurations, discretized positions along a continuous dimension, or a combination of both. Sensitivity analyses based on most-likely profile membership also did not incorporate classification uncertainty as fully as the BCH and DCAT procedures and should be interpreted as supplementary evidence. Future longitudinal, multisite studies using more diverse sampling frames, validated instruments, objectively assessed physical activity and anthropometry, detailed measures of digital media use, and alternative mixture-model specifications are needed to evaluate the temporal stability, generalizability, measurement structure, and behavioral significance of these profiles.

Conclusion

This study retained 4 profiles of sociocultural appearance-related attitudes and psychological resources among female university students, although the profiles were differentiated mainly by a low-to-high gradient in appearance comparison, ideal-body internalization, and perceived media pressure. Body appreciation distinguished the small VLS-HBA profile to some extent, whereas weight-control self-efficacy varied little; therefore, the solution should be viewed as a sample-specific descriptive representation rather than evidence of 4 naturally discrete psychological types. Moderate-intensity exercise duration differed across profiles in the primary BCH analysis, but the result was sensitive to outcome definition and transformation, and the included predictors explained little variance. The unadjusted difference in body size perception was not independent of sociodemographic characteristics and self-reported BMI, while total screen-time duration did not reliably differentiate the profiles. These findings do not establish that appearance-related pressure causes exercise, that exercise reflects discipline, or that digital media produced the observed patterns. Future longitudinal and multisite research should directly assess social media platforms, content, comparison processes, edited-image exposure, interpersonal appearance feedback, exercise motives, and compulsive tendencies while incorporating device-assessed activity and measured anthropometry. Such evidence is needed before profile information can support targeted interventions; within the limits of the current design, the findings primarily emphasize cautious,

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multidimensional assessment rather than interpreting higher exercise or lower screen time as sufficient indicators of psychological health.

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The author declares the use of ChatGPT 5.6 (OpenAI) under full human supervision. In accordance with the GAIDeT taxonomy, the tool assisted with code generation and optimization, data-cleaning procedures, English translation and editing, document reformatting, and quality assessment. The author reviewed and verified all AI-assisted outputs and retains full responsibility for the data analysis, interpretation, accuracy, integrity, and final content of the manuscript. Generative AI was not used to collect data, make autonomous scientific decisions, or determine the study conclusions, and it is not listed as an author.

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Data Availability

The dataset generated and analyzed during this study is available from the corresponding author on reasonable request, subject to applicable ethics and privacy requirements.

Authors' Contributions

Conceptualization: LL
Methodology: LL
Investigation: LL
Formal analysis: LL
Writing – original draft: LL
Writing – review and editing: LL

Conflicts of Interest

None declared.

Multimedia Appendix 1

Descriptive statistics and other model data.
[DOCX File , 414 KB-Multimedia Appendix 1]

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Abbreviations

ASA: average sociocultural attitudes
BAS-2: Body Appreciation Scale-2
BCH: Bolck-Croon-Hagenaars
DCAT: distal categorical outcome
FDR: false discovery rate
HSA: higher sociocultural attitudes
LMR: Lo-Mendell-Rubin adjusted likelihood ratio test
LPA: latent profile analysis
LSA: lower sociocultural attitudes
MVPA: moderate-to-vigorous physical activity
SATAQ-3: Sociocultural Attitudes Toward Appearance Questionnaire-3
VLS-HBA: very low sociocultural attitudes–higher body appreciation
WEL: Weight Efficacy Lifestyle Questionnaire

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