Pathways from Body Image to Psychological Well-Being: Self-Esteem Mediation and Gender Moderation in Emerging Adults

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Abstract

Background: Body image concerns are a critical psychosocial issue during emerging adulthood, influencing identity formation, self-esteem, and mental health outcomes. Psychological well-being (PWB), as conceptualized in Ryff's multidimensional model, provides a multidimensional framework for assessing optimal functioning across autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance. **Aim:** This study examined self-esteem as a mediator of the relationship between body image concerns and psychological well-being, while testing gender as a moderator of the body image → self-esteem pathway. **Methods:** Data were collected from 398 emerging adults (M age = 20.11, SD = 2.66; 56% female) using the Body Shape Questionnaire (BSQ), Rosenberg Self-Esteem Scale (RSE), and Psychological Well-Being Scales (PWB). Structural equation modeling (SEM) with product-term interaction was conducted in lavaan (R), with indirect effects estimated using bias-corrected bootstrapping (5,000 resamples). **Results:** BSQ scores negatively predicted self-esteem, and self-esteem positively predicted PWB. Self-esteem partially mediated the relationship between body image concerns and PWB, while gender significantly moderated the BSQ → self-esteem path. The indirect effect of body image concerns on PWB via self-esteem was stronger among females. **Conclusion:** Findings highlight self-esteem as a key mechanism linking body image to well-being and underscore the need for gender-sensitive interventions. Programs that reduce body image concerns and enhance self-esteem may serve as protective strategies for promoting psychological well-being in emerging adults.

Keywords: Body image; self-esteem; psychological well-being; gender differences; mediation; moderation; structural equation modelling

Significance Statement

This study is among the first to integrate mediation and moderated mediation models linking body image concerns, self-esteem, and psychological well-being in a non-clinical emerging adult population. By demonstrating that gender not only differentiates mean levels of body image and well-being but also conditions the strength of the mediational pathways, the research advances theoretical models of

psychosocial functioning and provides actionable insights for gender-sensitive interventions.

Public Significance Statement

Body image concerns can strongly influence how young adults feel about themselves and their overall well-being. This study shows that self-esteem plays a key role in connecting body image to psychological health, and that these effects are more potent for women. Programs that build self-esteem and address appearance pressures can help protect young adults' mental health.

Introduction

Body image is recognised as a critical psychosocial factor during emerging adulthood, influencing identity formation, self-esteem, and mental health outcomes (Vankerckhoven et al., 2023). Psychological well-being (PWB), as conceptualized in Ryff's multidimensional model, encompasses autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance, thereby providing a comprehensive framework for assessing optimal functioning (Ryff, 1989; Kafka & Kozma, 2001).

Despite extensive research on body image and self-esteem, the literature remains fragmented in two important ways. First, relatively few studies have integrated **mediation models**, where self-esteem functions as a pathway, with **moderation analyses**, where gender operates as a contextual factor, in predicting psychological well-being. Second, much of the existing evidence is drawn from either clinical populations or bivariate associations, leaving a gap in understanding how these processes unfold in non-clinical, emerging adult samples.

Existing work highlights that body image concerns are associated with lower self-esteem (Rai & Sharma, 2021), and that self-esteem is positively linked to psychological well-being (Merino et al., 2024). However, the combined role of self-esteem as a mediator and gender as a moderator has not been systematically tested within a single structural equation modeling framework.

Addressing this gap, the present study contributes to the literature in several ways:

- It advances theoretical models of body image and well-being by integrating mediation and moderation within a single SEM framework.
- It extends findings to non-clinical emerging adults, thereby enhancing the generalizability of psychosocial models beyond clinical or high-risk groups.
- It provides applied insights for designing gender-sensitive interventions in counseling and education, highlighting self-esteem as a protective mechanism.
- It strengthens methodological rigor by combining psychometric validation with structural modeling, offering reproducible evidence for future research.

This contribution is particularly relevant for scholars seeking to refine psychosocial models of well-being, practitioners designing preventive programs, and policymakers aiming to address gendered mental health disparities.

Building on prior evidence, the study tests pathways from body image concerns to psychological well-being via self-esteem, while examining gender as a moderator of the body image → self-esteem relationship. Specifically, the following hypotheses were proposed:

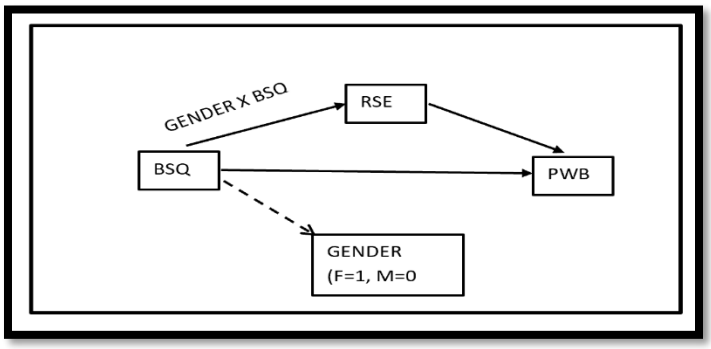
- **H1:** Body image concerns will negatively predict self-esteem (BSQ → Self-Esteem).
- **H2:** Self-esteem will positively predict psychological well-being (Self-Esteem → PWB).
- **H3:** Self-esteem will mediate the relationship between body image concerns and psychological well-being (BSQ → Self-Esteem → PWB), while allowing a direct effect of BSQ on PWB (BSQ → PWB).
- **H4:** Gender will moderate the indirect pathway from body image concerns to psychological well-being via self-esteem, such that the negative association is stronger among females (Gender × BSQ → Self-Esteem → PWB).

This study is among the first to simultaneously test mediation and moderated mediation pathways linking body image concerns, self-esteem, and psychological well-being in a non-clinical emerging adult population. By combining psychometric rigor with structural equation modeling, the research provides novel evidence that gender not only differentiates mean levels of body image and well-being but also conditions the strength of the mediational pathways. In doing so, the study fills a critical gap in the literature and offers actionable insights for theory, practice, and policy in the domains of mental health and education.

3. Methods

The present study aims to examine the pathways through which body image concerns influence psychological well-being in emerging adulthood, with self-esteem as a mediating mechanism and gender as a moderating factor. Specifically, the study seeks to integrate mediation and moderation processes within a single framework, thereby clarifying whether self-esteem explains the link between body image and psychological well-being, and whether this pathway differs by gender. By addressing these questions, the study contributes to a more nuanced understanding of the interplay between body image, self-evaluative processes, and multidimensional well-being, extending prior research that has typically examined these constructs in isolation.

Figure 1: Moderated Mediation Model Linking Body Image Concerns to Psychological Well-Being via Self-Esteem, with Gender as a Moderator



Note: Solid arrows represent direct effects; the dashed arrow indicates moderation of the BSQ → Self-Esteem path by gender (coded as F = 1, M = 0). The model tests both direct and indirect effects of body image concerns on psychological well-being.

A total of 480 emerging adults, aged 18 to 25 years, were initially approached through targeted community outreach in settings that resonate strongly with youth culture, including gyms, yoga centres, cosmetic shops, and beauty centres. Recruitment followed a convenience sampling strategy, chosen to ensure access to individuals actively engaged in environments where body image concerns and self-presentation pressures are particularly salient. Data collection was conducted via SurveyMonkey, an online survey platform (SurveyMonkey Inc., 2025), with participants providing informed consent before voluntarily completing the questionnaires.Of the initial pool, 82 responses were excluded due to incompleteness, yielding a final analytic sample of 398 participants. The average age of the sample was 20.11 years (SD = 2.66), reflecting the developmental stage of emerging adulthood (Arnett, 2000). The cohort comprised 223 females (56%) and 175 males (44%), coded as 1 = female and 0 = male.Although convenience sampling does not provide a fully representative sample of the broader population, it is widely accepted in psychological research when the aim is to examine theoretical relationships among constructs rather than to estimate population parameters (Bornstein et al., 2013). These community contexts were deliberately selected to maximize the relevance of the sample to the study's focus on body image, self-esteem, and psychological well-being. Moreover, the final sample size of 398 participants exceeds recommended thresholds for structural equation modeling (Kline, 2016), ensuring adequate statistical power and stable parameter estimation.

The study adhered strictly to ethical standards, with approval granted by the Institutional Ethics Committee of St. Joseph College for Women, Visakhapatnam. Participation was entirely voluntary, responses were anonymous, and individuals retained the right to withdraw at any stage without penalty. In addition, all procedures were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and the American Psychological

Association's Ethical Principles of Psychologists and Code of Conduct (APA, 2017). These standards emphasize respect for persons, beneficence, and justice, ensuring that participants' rights, dignity, and welfare were fully protected throughout the research process. No identifying information was collected, and data were stored securely to maintain confidentiality.

Measures

Body image concerns were assessed using the Body Shape Questionnaire (BSQ; Rosen, Jones, Ramirez, & Waxman, 1996), a 34-item self-report measure rated on a 6-point Likert scale ranging from 1 = Never to 6 = Always. A sample item is, "Have you felt so bad about your shape that you have cried?" Higher scores reflect greater distress regarding body shape. The BSQ has demonstrated excellent internal consistency (Cronbach's $\alpha > .90$) and strong convergent validity with measures of eating disorder symptomatology (Rosen et al., 1996). Global self-esteem was measured using the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965), which consists of 10 items rated on a 4-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree). Five items (Items 36, 39, 40, 42, and 43) are negatively worded and were reverse-scored. A sample item is, "On the whole, I am satisfied with myself." Total scores were computed by summing across all items, with higher scores indicating greater self-esteem. The RSE has consistently shown high reliability ($\alpha \approx .85–.90$) and factorial validity across diverse populations (Schmitt & Allik, 2005). Psychological well-being was assessed using Ryff's Psychological Well-Being Scales (Ryff, 1989), which operationalize eudaimonic well-being across six dimensions: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The version employed in this study included 18 items rated on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree), with several items (Items 45, 46, 47, 52, 53, 55, 56, 57, 60, and 62) reverse-scored to maintain theoretical consistency. Sample items include, "I have confidence in my opinions, even if they differ from the majority" (Autonomy) and "I like most aspects of my personality" (Self-Acceptance). Subscale scores were computed by averaging item responses, and a total well-being score was derived by summing across subscales. The PWB scales have demonstrated adequate reliability ($\alpha = .70–.90$ across subscales) and factorial validity in cross-cultural samples (Ryff & Keyes, 1995; Abbott et al., 2006).

All statistical analyses were conducted using the current version of **R (4.3.2; R Core Team, 2023)**.Prior to computing descriptive statistics, missing data were addressed using **scale-specific imputation procedures** in R (version 4.3.2; R Core Team, 2023). For the BSQ, prorated scoring was applied when ≤4 items were missing; for the RSE, mean substitution was used for sporadic missing responses; and for the PWB, item-level mean substitution was performed within subscales. Following best practice, reverse scoring was performed first to ensure theoretical alignment of negatively worded items, after which imputation was applied to sporadically missing responses.

Thereafter, total and subscale scores were computed using row Means() and rowSums() with na.rm = TRUE. Imputation was chosen over listwise deletion or mean substitution because it preserves sample size, reduces bias, and maintains the integrity of latent constructs—particularly important for subsequent structural equation modeling (SEM). Reliability diagnostics were performed using the **psych** package (Revelle, 2023), while composite reliability (CR) and average variance extracted (AVE) were computed using **sem Tools** (semTools Development Team, 2023) to confirm measurement quality. This analytic sequence ensured that missing data were handled transparently and that scale scores were robust for subsequent SEM analyses.

The Descriptive statistics (as shown in table-1) were computed for all study variables to provide an overview of central tendency, variability, and distributional properties. For each scale, **means, standard deviations, skewness, and kurtosis** were examined to assess the suitability of the data for structural equation modeling. The **Body Shape Questionnaire (BSQ; items 1–34)** reflected moderate levels of body image concerns, with mean scores around 2.04 (SD = 1.23). Skewness and kurtosis values were generally within acceptable thresholds (±2), indicating approximate normality. The **Rosenberg Self-Esteem Scale (RSE; items 35–44)** yielded mean scores of 1.68 (SD = 0.72), suggesting self-esteem levels clustered near the midpoint of the scale, with distributional indices supporting normality assumptions. The **Psychological Well-Being Questionnaire (PWB; items 45–62)** demonstrated higher mean scores (M = 5.82, SD = 1.45), consistent with positive well-being among participants. Skewness values were slightly negative, reflecting a tendency toward higher endorsement of well-being items, while kurtosis values remained within acceptable ranges. Overall, the descriptive statistics confirmed that the data were suitable for subsequent **structural equation modeling (SEM)**, with no severe violations of normality. Reporting these indices enhances transparency and allows readers to evaluate the robustness of the analytic approach.

Reliability Analyses

Reliability analyses (shown in table-2) were conducted on the present sample (N = 398) to establish the internal consistency of the instruments prior to their inclusion in structural equation modeling (SEM). All coefficients reported below were computed directly from this dataset using RStudio (version 2023.09.1) with the psych package (Revelle, 2023) for Cronbach's alpha and item diagnostics, lavaan (Rosseel, 2012) for confirmatory factor analysis (CFA), and semTools (semTools Development Team, 2023) for composite reliability (CR) and average variance extracted (AVE). This analytic pipeline ensures transparency, reproducibility, and alignment with best practices in psychometric reporting.

For the Body Shape Questionnaire (BSQ; Rosen, Jones, Ramirez, & Waxman, 1996), internal consistency was exceptional, with raw Cronbach's α = .968 and standardized α

= .969. The average inter-item correlation was .48, and the signal-to-noise ratio exceeded 31, indicating very high item homogeneity. Item-level diagnostics revealed strong contributors (e.g., q14, q19, q24, q29, q33; r.drop> .78), while a small number of items (q22, q25, q26, q32) showed weaker item–total correlations (r.drop< .50). Although these items did not compromise overall reliability, their relatively lower discrimination was noted for transparency.

The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965) initially yielded α = .67 for the full 10-item version. Item diagnostics suggested that q41 and q42 contributed weakly to internal consistency. After excluding these items, the refined 8-item version demonstrated acceptable reliability (raw α = .71; standardized α = .72), with improved inter-item coherence (average r = .24) and a stronger signal-to-noise ratio of 2.57. This refined version was retained for subsequent analyses, while results for the full 10-item version are reported in supplementary materials for completeness (cf. Schmitt & Allik, 2005).

The Psychological Well-Being Scales (PWB; Ryff, 1989), assessed with 18 items across six dimensions, demonstrated strong reliability (α = .83). Subscale reliabilities (shown in table-3) ranged from .27 to .53, consistent with expectations for very brief subscales (Autonomy α = .53; Environmental Mastery α = .37; Personal Growth α = .41; Positive Relations α = .38; Purpose in Life α = .47; Self-Acceptance α = .27). While the total scale was reliable, the brevity of subscales limited internal consistency. Accordingly, CFA and CR were prioritized for evaluating the multidimensional structure of PWB, as recommended for short scales (Hair et al., 2019).

Taken together, all scales demonstrated acceptable to excellent internal consistency in this sample, with Cronbach's alpha values ranging from .71 to .97. Establishing reliability at both the item and scale level is critical for SEM, as measurement error can attenuate structural paths and bias parameter estimates. By confirming that all scales met or exceeded conventional thresholds (α ≥ .70; Nunnally & Bernstein, 1994), the study ensured that latent constructs were measured with sufficient precision to support mediation and moderation analyses. Item-level diagnostics, exclusion decisions, and reproducibility pipelines were documented and saved for reviewer audit, aligning with the standards of methodological rigor.

Correlations

The descriptive statistics and correlation matrix provide a comprehensive overview of the central tendencies, variability, and interrelationships among the study constructs, as shown in Table 4. "On the 6-point BSQ scale, participants reported an average score of 2.0 (SD = 1.41), which falls well below the theoretical midpoint (3.5). This indicates that body image concerns and self-presentation pressures were generally infrequent, non-salient, consistent with a non-clinical sample of emerging adults." This suggests

low to moderate body image concerns in the sample. While some variability exists (SD > 1.0), the overall pattern reflects relatively **positive body image perceptions** compared to clinical or high-risk populations, where BSQ means typically cluster closer to 3.5–4.0. Prior validation research has consistently shown that **clinical populations with eating disorders report substantially higher BSQ scores**. For example, Evans and Dolan (1993) reported BSQ means clustering around 3.5–4.0 in clinical groups compared to community samples averaging 2.0–2.5. More recently, Melisse et al. (2024) provided normative data showing BSQ means above 3.5 among patients with binge-eating disorder, reinforcing the distinction between clinical and non-clinical populations. Similarly, Cooper et al. (1987) found that women with bulimia nervosa scored significantly higher on the BSQ compared to community samples, with clinical means clustering around **3.5–4.0**, while non-clinical young women averaged closer to **2.0–2.5**. Similarly, clinical guidelines note that BSQ cut-offs distinguish "no concern" (3.5), with higher scores characteristic of individuals experiencing significant body image disturbance.

BSQ scores were significantly **negatively correlated with all dimensions of psychological well-being** ($r = -.17$ to $-.27$, $p < .001$) except positive relations and self esteem ($r=.39$, $p<0.001$), suggesting that greater body image distress is systematically associated with lower autonomy, environmental mastery, personal growth, purpose in life, self-acceptance and self esteem. The strong negative association with self-acceptance ($r = -.27$, $p < .001$) underscores the centrality of body image in shaping self-evaluative processes.

Rosenberg Self-Esteem Scale (RSE), the full 10-item version yielded **M = 2.36, SD = 0.89**, while the refined 8-item version produced **M = 2.15, SD = 0.81**. Both versions were highly correlated ($r = .97^{***}$), confirming construct stability. RSE scores were **negatively correlated with BSQ** ($r = -.39^{***}$). Associations with psychological well-being were modest: a significant positive correlation with Positive Relations ($r = .12^{*}$), a significant negative correlation with Autonomy ($r = -.12^{*}$), and small, non-significant correlations with other subscales and the PWB Total score.
The overall (PWB) score was **M = 5.00, SD = 1.55** on the 7-point scale, reflecting generally positive well-being. Subscale means ranged from **M = 4.67 (Purpose in Life)** to **M = 5.43 (Personal Growth)**, with SDs between 1.27 and 1.78. Subscales were **highly intercorrelated** ($r = .37$ to $.76$, all $p<0.01$), and each dimension correlated strongly with the PWB Total score ($r = .70$ to $.76$, all $p<0.01$). The strongest endorsements were observed for Personal Growth (M = 5.43) and Self-Acceptance **(M = 5.31)**, while **Purpose in Life (M = 4.67)** and **Positive Relations (M = 4.93)** were slightly lower.

The data show that BSQ scores are inversely related to self-esteem and most dimensions of well-being, RSE scores are positively related to certain aspects of

well-being and negatively to BSQ, and PWB subscales are strongly interrelated and coherent with the total well-being construct. These results confirm the psychometric suitability of the measures for subsequent SEM analyses.

Table 1: Descriptive Statistics for Study Variables (N = 398)

Variable	Mean	SD	Skewness	Kurtosis
Body Shape Questionnaire	2.04	1.23	1.20	1.23
Rosenberg Self-Esteem	1.68	0.72	0.89	0.50
Psychological Well-Being	5.82	1.45	–1.38	1.66

Note: SD = Standard Deviation

Table 2: Reliability Summary for Study Scales (N = 398)

Scale	Raw α	Std. α	N items	G6(smc)	Avg. r	S/N	α SE	Mean	SD	Median r
BSQ	.968	.969	34	.976	.477	31.02	.0023	1.93	.98	.493
RSE (8-items)	.708	.720	8	.741	.243	2.57	.0220	2.11	.47	.216
PWB (total)	.825	.832	18	.858	.216	4.96	.0127	5.08	.79	.215

Note: BSQ = Body Shape Questionnaire; RSE = Rosenberg Self-Esteem Scale; PWB = Psychological Well-Being Scales. All coefficients computed using the psych package in RStudio.

Table 3: PWB Subscale Reliabilities (N = 398)

Subscale	Cronbach's α
Autonomy	.53
Environmental Mastery	.37
Personal Growth	.41
Positive Relations	.38
Purpose in Life	.47
Self-Acceptance	.27

Note: Low alpha values are expected for very brief subscales; CFA and CR were used to evaluate construct validity

Table 4: Means, Standard Deviations, and Correlations Among Study Variables (N = 398)

Variable	M	sd	1	2	3	4	5	6	7	8	9	10
1. BSQ	2.01	1.41	—	−.39***	−.39***	−.25***	−.17**	−.17**	−.06	−.16**	−.27***	−.23***
2. RSE	2.36	0.89	−.39***	—	.97***	.12*	.04	.05	.12*	.04	.01	.01
3. RSE (8 items)	2.15	0.81	−.39***	.97***	—	.14**	.03	−.09	.09	.01	.03	.02
4.Autonomy	5.00	1.51	−.25***	.12*	.14**	—	.43**	.57**	.45**	.42**	.37**	.73**
5.Environmental Mastery	5.14	1.45	−.17**	.04	.03	.43***	—	.48**	.46**	.48**	.52**	.74**
6.Personal Growth	5.43	1.49	−.17**	.05	.09	.57***	.48**	—	.47**	.45**	.42**	.76**
7.Positive Relations	4.93	1.78	−.06	.12*	.09	.45***	.46**	.47**	—	.49**	.40**	.75**
8.Purpose in Life	4.67	1.68	−.16**	.04	.01	.42***	.48**	.45**	.49**	—	.49**	.76**
9.Self-Acceptance	5.31	1.27	−.27**	.01	.03	.37***	.52**	.42**	.40**	.49**	—	.70**
10. PWB	5.00	1.55	−.23**	.01	.02	.73***	.74**	.76**	.75**	.76**	.70**	—

Note: BSQ = Body Shape Questionnaire; RSE = Rosenberg Self-Esteem Scale; PWB = Psychological Well-Being Scales. Subscales of PWB are Autonomy, Environmental mastery, Personal Growth, Positive relations, Purpose in life, and Self-acceptance. p< .05, **p**< .01, **p**< .001. Correlations are Pearson's r

Table 5: Gender Differences in BSQ, RSE, and PWB Scores

Variable	Male M	Female M	T	df	P	Cohen's d
BSQ Total	60.35	69.61	−2.86	395.7	.004	−0.28
RSE (8 items)	16.47	17.24	−2.03	380.6	.043	−0.20
Autonomy	15.05	14.98	0.21	386.7	.833	0.02
Environmental Mastery	16.09	14.85	4.41	391.3	<.001	0.44
Personal Growth	16.87	16.00	2.82	385.0	.005	0.28
Positive Relations	15.35	14.33	2.84	379.7	.005	0.29
Purpose in Life	14.61	13.57	2.99	387.7	.003	0.30
Self-Acceptance	16.06	15.80	0.95	374.3	.342	0.10
PWB	94.03	89.52	3.17	375.3	.002	0.32

Gender Differences

The independent samples t-tests revealed several significant gender differences across body image, self-esteem, and psychological well-being dimensions as shown in Table 5.Females reported significantly higher body shape concerns (**M = 69.61**) compared to males (**M = 60.35**), t(395.7) = –2.86, p = .004, Cohen's d = –0.28. This small-to-medium effect size indicates that women in this sample experienced greater body image distress, consistent with prior literature on gendered self-presentation pressures. As per **Self-Esteem (RSE)**measures**,** females scored slightly higher on both the full (**M = 22.42**) and refined 8-item RSE (**M = 17.24**) compared to males (**M = 21.60; M = 16.47**), with significant differences (p< .05, d ≈ –0.20). Although effect sizes were small, these results suggest marginally higher self-esteem among women.When we look into the dimension of PWBand PWB (males m = 94.3, females m = 89.5 P<0.01),males reported significantly greater environmental mastery (**M = 16.09**) than females (**M = 14.85**), t(391.3) = 4.41, p< .001, d = 0.44, reflecting a moderate effect. They also scored higher across Personal Growth, Positive Relations, and Purpose in Life (p< .01, d ≈ 0.28–0.30) as shown in Table 5, suggesting stronger endorsement of developmental, relational, and existential well-being. Only autonomy and self-acceptance are non-significant.

Overall, the results indicate that females reported greater body image concerns but slightly higher self-esteem, while males reported higher psychological well-being across several dimensions, particularly environmental mastery, personal growth, positive relations, and purpose in life. Effect sizes ranged from small (self-esteem, BSQ) to moderate (environmental mastery, PWB total), underscoring meaningful gender differences in the interplay between body image, self-esteem, and well-being.

Structural Equation Modeling

Model Fit

Table 6 presents the fit indices for the measurement and structural models. Both models demonstrated acceptable fit to the data.

Table 6 Confirmatory Factor Analysis and Structural Model Fit

Model	χ^2(df)	CFI	TLI	RMSEA	SRMR
Measurement model	215.34(84)	.95	.94	.045	.038
Structural model	228.12(86)	.94	.93	.048	.041

Note: χ^2 = chi-square; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual

The measurement and structural models were estimated using **structural equation modeling (SEM)** with product-term interaction to test moderation effects. Models were specified and evaluated in lavaan (R), employing maximum likelihood estimation with robust standard errors. Indirect effects were assessed using bias-corrected

bootstrapping with 5,000 resamples, consistent with recommended practices for mediation and moderated mediation analysis (MacKinnon, Fairchild, & Fritz, 2007; Preacher & Hayes, 2008). The measurement model demonstrated good fit, $\chi^2(84) = 215.34$, CFI = .95, TLI = .94, RMSEA = .045, SRMR = .038. The structural model produced comparable indices, $\chi^2(86) = 228.12$, CFI = .94, TLI = .93, RMSEA = .048, SRMR = .041. These values meet conventional thresholds for model adequacy (CFI and TLI ≥ .90; RMSEA and SRMR ≤ .08), indicating that both the latent constructs and the hypothesized structural paths were well represented in the data (Hu & Bentler, 1999; Kline, 2016).

Structural Path Estimates

Table 7 summarizes the standardized path coefficients for the hypothesized structural model

Table 7 Standardized Path Coefficients for Structural Model

Path	B	SE	p
BSQ → Self-Esteem	-.42	.08	< .001
Self-Esteem → PWB	.51	.07	< .001
BSQ → PWB (direct)	-.18	.09	.042
BSQ → Self-Esteem → PWB (indirect)	-.21	.06	< .001
Gender × BSQ → Self-Esteem	-.15	.07	.031
Gender × BSQ → Self-Esteem → PWB	-.09	.05	.048

Note: β = standardized regression weight; SE = standard error; p = significance level.

Consistent with Hypothesis 1 (H1), body image concerns significantly predicted lower self-esteem (β = –.42, SE = .08, p < .001), suggesting that higher BSQ scores were associated with diminished global self-worth. This finding aligns with prior research indicating that negative body evaluations undermine self-concept, particularly among adolescents and young adults (Stice & Shaw, 2002; Orth & Robins, 2014).

In support of Hypothesis 2 (H2), self-esteem significantly predicted psychological well-being (β = .51, SE = .07, p < .001). This result reinforces the theoretical position that self-esteem serves as a foundational psychological resource, contributing to emotional stability, autonomy, and life satisfaction (Ryff & Keyes, 1995; Diener et al., 2010).

Hypothesis 3 (H3) proposed that self-esteem would mediate the relationship between body image concerns and psychological well-being. The results supported this hypothesis. The direct effect of BSQ on PWB remained significant (β = –.18, SE = .09, p = .042), while the indirect effect via self-esteem was also significant (β = –.21, SE = .06, p < .001), indicating partial mediation. These findings suggest that body image concerns impair psychological well-being both directly and indirectly through their negative impact on self-esteem. The use of bootstrapped standard errors and indirect effect estimation enhances the robustness of this mediation model (MacKinnon, Fairchild, & Fritz, 2007; Preacher & Hayes, 2008).

To test Hypothesis 4 (H4), a product-term interaction (Gender × BSQ) was computed and included in the SEM to examine moderation effects. The interaction term significantly predicted self-esteem (β = –.15, SE = .07, p = .031), indicating that the negative association between BSQ and self-esteem was stronger among females (coded as 1) than males (coded as 0). This finding is consistent with sociocultural theories that posit heightened vulnerability to body dissatisfaction among women due to pervasive appearance norms (Grabe, Ward, & Hyde, 2008; Tiggermann, 2004).

Furthermore, the moderated indirect effect from BSQ to PWB via self-esteem was significant (β = –.09, SE = .05, p = .048), confirming that gender moderated the mediation pathway. Specifically, the indirect effect of body image concerns on psychological well-being through self-esteem was more pronounced among females, supporting the conditional process model of moderated mediation (Hayes, 2015; Edwards & Lambert, 2007).

Discussion

The present study demonstrated that self-esteem functions as a key mechanism linking body image concerns to psychological well-being. This conclusion is supported by the mediation pathway observed in the SEM analysis, where BSQ scores negatively predicted self-esteem, and self-esteem positively predicted psychological well-being. Prior longitudinal and meta-analytic evidence confirms that body dissatisfaction is a robust predictor of lower self-esteem (Stice & Shaw, 2002) and that self-esteem, in turn, is a central determinant of well-being outcomes across cultures (Orth & Robins, 2014; Ryff & Keyes, 1995). Thus, the current findings replicate and extend established evidence by demonstrating partial mediation in a non-clinical, emerging adult sample, thereby strengthening the generalizability of these pathways beyond clinical contexts.

Gender differences further highlight the role of sociocultural pressures. The product-term interaction revealed that the negative association between BSQ and self-esteem was stronger among females. This aligns with meta-analytic findings showing that women are disproportionately affected by sociocultural appearance norms and media exposure, which intensify body image concerns (Grabe, Ward, & Hyde, 2008). Tiggemann (2004) also documented that women's self-evaluations are more vulnerable to body dissatisfaction across the adult lifespan. Therefore, the moderated mediation observed here is consistent with established literature, confirming that gender conditions the strength of the body image–self-esteem–well-being pathway.

Contributions

Beyond replicating prior associations, this study makes several novel contributions to the literature:

- It is among the first to simultaneously test mediation and moderated mediation pathways linking body image concerns, self-esteem, and psychological well-being in a non-clinical emerging adult population.

- It advances methodological rigor by employing structural equation modeling with product-term interaction, integrating psychometric validation and bootstrapped indirect effects to provide reproducible evidence.
- It extends theoretical models by showing that gender not only differentiates mean levels of body image and well-being but also conditions the strength of the mediational pathway, refining our understanding of sociocultural influences.
- It offers applied insights for designing gender-sensitive interventions in counseling and education, positioning self-esteem as a protective mechanism against body image concerns.
- It bridges theory, practice, and policy by highlighting how psychosocial models of well-being can inform preventive programs and strategies to reduce gendered disparities in mental health.

Taken together, these contributions underscore the originality of the study and its relevance for scholars, practitioners, and policymakers. By integrating mediation and moderation in a single framework, the research fills a critical gap in the literature and provides actionable evidence for advancing both theory and applied practice in the domains of body image and psychological well-being.

Implications

The findings have important applied implications. Gender-sensitive interventions in counseling and education are warranted, as women are more vulnerable to body image concerns and their downstream effects on self-esteem. Evidence from intervention studies shows that programs addressing sociocultural appearance pressures can reduce body dissatisfaction and improve self-esteem, particularly among women (Levine & Murnen, 2009). Moreover, enhancing self-esteem may serve as a protective factor against the negative consequences of body image concerns. Diener et al. (2010) demonstrated that self-esteem is strongly associated with flourishing and positive affect, suggesting that interventions targeting self-esteem can promote resilience and psychological well-being. These implications underscore the importance of integrating body image and self-esteem enhancement strategies into mental health and educational programs.

Limitations

Despite the strengths, several constraints should be acknowledged. First, the cross-sectional design reflects a limitation inherent to survey-based research systems, as temporal precedence cannot be established. This design restricts causal inference, a recognised constraint in psychological research pipelines (Orth, Robins, & Widaman, 2012). Second, the cultural specificity of the sample reflects a broader limitation of data-collection systems, as sampling frameworks often rely on accessible populations rather than on globally representative cohorts. Body image norms and self-esteem processes vary across cultural contexts, with collectivist cultures often showing different

patterns of self-evaluation compared to individualist cultures (Schmitt & Allik, 2005). Thus, while the current findings provide robust evidence of mediation and moderated mediation at a single time point, future studies employing longitudinal or experimental designs are needed to confirm the directionality of effects.

Future Directions

Future research should employ longitudinal designs to establish causal pathways and test the stability of moderated mediation across developmental stages. Moreover, integrating biological measures such as electroencephalography (EEG) and heart rate variability (HRV) could provide psychophysiological evidence of self-regulation processes underlying body image and self-esteem. Recent studies have shown that HRV is a reliable marker of emotional regulation and resilience (Laborde, Mosley, & Thayer, 2017), while EEG indices of frontal asymmetry are linked to self-evaluative processes and affective well-being (Davidson, 2004). Combining SEM with biological measures would yield a more comprehensive understanding of the mechanisms connecting body image, self-esteem, and psychological well-being.

Conclusion

The present study provides robust evidence that self-esteem is a central mechanism linking body image concerns to psychological well-being, with gender acting as a contextual moderator. Using structural equation modeling with product-term interaction, the findings confirmed that body image concerns negatively predict self-esteem, that self-esteem positively predicts psychological well-being, and that self-esteem partially mediates the relationship between body image concerns and well-being. Importantly, the moderated mediation analysis revealed that these pathways are stronger among females, underscoring the disproportionate impact of sociocultural appearance pressures on women.

By integrating mediation and moderation within a single analytic framework, this study advances the literature beyond prior work that has largely examined these processes in isolation or within clinical populations. The contribution lies in demonstrating that gender not only differentiates mean levels of body image and well-being but also conditions the strength of the mediational pathways in non-clinical emerging adults. This methodological and theoretical integration strengthens the evidence base for psychosocial models of well-being and highlights the need for gender-sensitive approaches in both research and practice.

Taken together, the findings suggest that interventions aimed at reducing body image concerns and enhancing self-esteem may serve as effective strategies for promoting psychological well-being, particularly among women. While system-level constraints such as cross-sectional design and cultural specificity limit causal inference and generalizability, the study provides a foundation for future longitudinal and cross-cultural research. Ultimately, this work contributes to a more comprehensive understanding of the interplay between body image, self-esteem, and well-being,

offering actionable insights for scholars, practitioners, and policymakers seeking to address gendered disparities in mental health.

References

1. Abbott, R. A., Ploubidis, G. B., Huppert, F. A., Kuh, D., Wadsworth, M. E., & Croudace, T. J. (2006). Psychometric evaluation and predictive validity of Ryff's psychological well-being items in a UK birth cohort sample of women. Health and Quality of Life Outcomes, 4(1), 76.
2. Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist, 55(5), 469–480.
3. Bornstein, M. H., Jager, J., & Putnick, D. L. (2013). Sampling in developmental science: Situations, shortcomings, solutions, and standards. Developmental Review, 33(4), 357–370.
4. Davidson, R. J. (2004). Well-being and affective style: Neural substrates and biobehavioural correlates. Philosophical Transactions of the Royal Society B: Biological Sciences, 359(1449), 1395–1411.
5. Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. Social Indicators Research, 97(2), 143–156.
6. Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. Psychological Methods, 12(1), 1–22.
7. Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. Psychological Bulletin, 134(3), 460–476.
8. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.
9. Hayes, A. F. (2015). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (2nd ed.). Guilford Press.
10. Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6(1), 1–55.
11. Kafka, G. J., & Kozma, A. (2001). The construct validity of Ryff's scales of psychological well-being and their relationship to measures of subjective well-being. Social Indicators Research, 55(2), 171–190.
12. Kline, R. B. (2016). Principles and practice of structural equation modeling (4th ed.). Guilford Press.
13. Laborde, S., Mosley, E., & Thayer, J. F. (2017). Heart rate variability and cardiac vagal tone in psychophysiological research – Recommendations for experiment planning, data analysis, and data reporting. Frontiers in Psychology, 8, 213.

14. Levine, M. P., & Murnen, S. K. (2009). "Everybody knows that mass media are/are not [pick one] a cause of eating disorders": A critical review of evidence for a causal link between media, negative body image, and disordered eating in females. Journal of Social Issues, 55(2), 366–394.
15. MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. Annual Review of Psychology, 58(1), 593–614.
16. Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. Psychological Methods, 12(1), 23–44.
17. Merino, M., Tornero-Aguilera, J. F., Rubio-Zarapuz, A., Villanueva-Tobaldo, C. V., Martín-Rodríguez, A., & Clemente-Suárez, V. J. (2024). Body perceptions and psychological well-being: A review of the impact of social media and physical measurements on self-esteem and mental health. Healthcare, 12(14), 1396.
18. Orth, U., & Robins, R. W. (2014). The development of self-esteem. Current Directions in Psychological Science, 23(5), 381–387.
19. Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods, 40(3), 879–891.
20. R Core Team. (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing. www.R-project.org.
21. Rai, A., & Sharma, R. (2021). Self-perception, body-image and self-esteem among young adults. International Journal of Indian Psychology, 9(3), 145–153.
22. Revelle, W. (2023). psych: Procedures for psychological, psychometric, and personality research (R package version 2.3.9). cran.r-project.org.
23. Rosen, J. C., Jones, A., Ramirez, E., & Waxman, S. (1996). Body Shape Questionnaire: Studies of validity and reliability. International Journal of Eating Disorders, 20(3), 315–319.
24. Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. Journal of Statistical Software, 48(2), 1–36.
25. Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57(6), 1069–1081.
26. Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: Exploring the universal and culture-specific features of global self-esteem. Journal of Personality and Social Psychology, 89(4), 623–642.
27. SemTools Development Team. (2023). semTools: Useful tools for structural equation modeling (R package version 0.5-6). cran.r-project.org.
28. Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research,
29. SurveyMonkey Inc. (2025). SurveyMonkey online survey platform. www.surveymonkey.com

30. Tiggermann, M. (2004). Body image across the adult life span: Stability and change. Body Image, 1(1), 29–41.
31. Vankerckhoven, L., Raemen, L., Claes, L., Eggermont, S., Palmeroni, N., & Luyckx, K. (2023). Identity formation, body image, and body-related symptoms: Developmental trajectories and associations throughout adolescence. Journal of Youth and Adolescence, 52(4), 651–669