PHYSICAL EDUCATION OF STUDENTS

ORIGINAL ARTICLE

Evaluation of physical activity and perceived physical fitness as predictors of eating behavior regulation among Filipino collegiate young adults

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Abstract

Background and Study Aim: Regular physical activity is closely associated with both physical fitness and self-regulation of health-related behaviors. Among young adults, the balance between eating habits and physical activity often reflects lifestyle choices that influence long-term well-being. Although various forms of physical activity are practiced, their relative effectiveness in enhancing eating behavior regulation remains a matter of practical interest. The present study aimed to investigate the predictive influence of physical activity and perceived physical fitness on eating behavior regulation among Filipino collegiate young adults.

Material and Methods: A quantitative design was employed with 271 randomly selected students (88 females, 183 males) enrolled at a state university in Region III during the 2025–2026 academic year. Validated instruments were utilized, including the Self-Regulation of Eating Behaviour Questionnaire (SREBQ), the International Physical Activity Questionnaire (IPAQ), and the Self-Perception of Physical Fitness Scale (SPPFS). Each instrument demonstrated acceptable reliability and construct validity in previous research, and confirmatory factor analysis of the SPPFS in this study supported its structure (factor loadings = 0.530–0.809; Cronbach's α = 0.768–0.848). Data were gathered through an online survey following institutional ethical approval. Multiple regression analyses tested predictive relationships, while Welch's t-test was used to assess sex-based differences.

Results: Females reported significantly lower self-perceived fitness than males in muscle strength ($t = -5.03$, $p < .001$, $d = -0.68$), motor ($t = -4.43$, $p < .001$, $d = -0.59$), cardiovascular ($t = -4.57$, $p < .001$, $d = -0.60$), and total fitness ($t = -4.63$, $p < .001$, $d = -0.60$), but not in morphology ($p = .09$). Physical activity did not differ significantly by sex ($p > .05$), and eating behavior regulation was comparable ($t = 0.30$, $p = .77$, $d = 0.04$). Regression analyses showed that total days, total activity squared, and vigorous, moderate, and walking METs significantly predicted eating regulation, explaining 2–8.3% of the variance, primarily among males. Subjective fitness components such as muscle strength ($\beta = 0.130$, $p = .032$) and cardiovascular fitness ($\beta = 0.124$, $p = .041$) also predicted eating regulation, accounting for a small proportion of explained variance.

Conclusions: The findings emphasize the need for sex-sensitive health promotion strategies that integrate physical and psychological dimensions of fitness and eating regulation. Interpretations are limited to observed statistical relationships, as cultural mechanisms were not directly examined. Future research should include objective activity measures, multidimensional tools for eating regulation, and broader sampling to reflect diverse Filipino collegiate populations.

Keywords: eating regulation, physical activity, physical fitness, collegiate, Filipino

Introduction

Health-related behaviors among young adults are influenced by a complex interaction of physical, psychological, and social factors that shape long-term well-being. The transition to university life often challenges individuals' ability to maintain healthy habits, including regular physical activity and balanced eating. Regulation of eating behavior, in particular, is closely intertwined with perceived physical fitness and activity levels, reflecting broader mechanisms of self-control and motivation.

In context, eating is considered a fundamental biological process that provides the energy and nutrients necessary for survival, yet it does not occur in isolation from broader psychological, social, and cultural influences. Psychological, social, and cultural factors shape how individuals engage with food, and when these patterns are disrupted, eating disorders may develop. Such conditions are characterized by maladaptive thoughts and behaviors related to food, weight, and body image, and they pose significant threats to both physical and mental health [1, 2]. On a global scale, the lifetime prevalence of eating disorders is estimated between 2.6% and 8.4% among women and 0.7% to 2.2% among men, with up to 17.9% of young women

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experiencing an eating disorder by early adulthood [3, 4, 5]. Disorder-specific prevalence rates for women range from 0.8–6.3% for anorexia nervosa, 0.8–2.6% for bulimia nervosa, and 0.6–6.1% for binge eating disorder, while men report markedly lower rates of 0.1–0.3%, 0.1–0.2%, and 0.3–0.7%, respectively [5]. Global prevalence has more than doubled over the past two decades, rising from 3.4% in 2000–2006 to 7.8% in 2013–2018, with increases evident not only in Western countries but also in Asia and Latin America [3, 4, 5, 6, 7]. Children and adolescents are particularly vulnerable, with meta-analyses showing that 22.3% experienced an eating disorder between 1999 and 2022, and rates of disordered eating behaviors are even higher [6]. In the Philippines, the concern is equally pressing: Filipino college students have been found to be more than ten times as likely as their American peers to report disordered eating behaviors [7]. Other local studies indicate that prevalence rates among Filipino high school students mirror global figures, while regional data suggest that the Philippines and other Asian countries now report rates comparable to those in Europe and North America, with some Asian regions experiencing the steepest increases in disability related to eating disorders [7, 8].

Insufficient physical activity represents another global health concern. Defined as any bodily movement produced by skeletal muscles that requires energy expenditure, physical activity encompasses activities in work, play, household chores, travel, and leisure. Exercise, a subset of physical activity, is structured, repetitive, and intentional, with the goal of enhancing or maintaining physical fitness [9]. Despite its recognized benefits, inactivity remains widespread. In 2022, 31.7% of adults worldwide did not meet the World Health Organization's recommendations of at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity activity per week, with higher inactivity among women (33.8%) than men (28.7%). Trends of increasing inactivity were most evident in high-income nations [10, 11]. Among adolescents, an estimated 80.3% fail to achieve the recommended 60 minutes of moderate-to-vigorous activity daily, with girls consistently reporting lower activity than boys [12, 13, 14]. This lack of physical activity contributes substantially to chronic diseases and premature mortality, accounting for 6–10% of the global burden [10, 15]. In the Philippines, the situation is even more concerning: only 7.7% of adolescents meet daily activity recommendations, one of the lowest prevalence rates globally [16, 17]. The 2022 Philippine Report Card on Physical Activity assigned the country an overall grade of "F," indicating that fewer than 20% of children and adolescents are sufficiently active, with equally poor results for active transportation and school-based activity. Filipino girls remain less active than boys, reflecting global gender disparities [16, 17].

Recent research highlights the important role that physical activity plays in shaping eating behavior regulation. Both objective and subjective indicators of activity are associated with healthier eating regulation through interconnected motivational, behavioral, and physiological pathways. Objective studies, such as those using accelerometers and structured interventions, show that higher levels of moderate-to-vigorous physical activity are linked with better control over binge and emotional eating, though outcomes vary depending on individual and intervention characteristics [18, 19]. Similarly, subjective reports of higher activity consistently align with greater self-determined motivation for both exercise and eating, which predicts healthier eating patterns less influenced by external or emotional pressures [20, 21, 22]. Mechanistically, physical activity fosters self-determined motivation that extends to eating behaviors, builds self-regulation skills that improve dietary control, and enhances appetite sensitivity, allowing energy intake to more closely match expenditure [20, 21, 22, 23, 24, 25].

Analysis of research findings has shown that physical activity and perceived physical fitness are closely related to eating behavior regulation through psychological and physiological mechanisms. Researchers emphasize that these interactions reflect the integration of self-regulation, motivation, and health-related behavior, which together determine overall well-being among young adults. However, the complexity of these relationships continues to pose challenges for understanding how lifestyle patterns and personal perceptions of fitness interact in specific sociocultural settings.

In addition, it should be noted that grounded in Self-Determination Theory (SDT), these behavioral connections can be understood through the lens of autonomous motivation and self-regulation. SDT posits that when individuals engage in physical activity for intrinsic reasons such as enjoyment, competence, or personal health, they are more likely to internalize healthy eating habits and maintain consistent dietary regulation. While SDT has been extensively applied in Western health behavior research [20, 21, 22, 23, 24, 25], its use in Southeast Asian contexts, particularly in the Philippines, remains limited [16, 17]. Most regional studies focus on academic motivation or examine SDT constructs in isolation, rather than integrating them into predictive models of everyday health behaviors [16, 17].

Accordingly, this study is anchored in Self-Determination Theory and proposes two hypotheses informed by prior evidence: (H1) higher levels of physical activity will significantly predict greater eating behavior regulation, and (H2) higher levels of perceived physical fitness will significantly predict greater eating behavior regulation. Together, these

hypotheses address the need for a theoretically grounded and culturally informed analysis of how physical and motivational factors interact to shape eating self-regulation among Filipino college students. The present study aimed to investigate the predictive influence of physical activity and perceived physical fitness on eating behavior regulation among Filipino collegiate young adults.

Materials and Methods

Participants

A total of 271 students (88 females and 183 males) were selected using a simple random sampling method from the population of officially enrolled students in the *Physical Activity Towards Health and Fitness 1* course at a state university in Region III, Philippines, during the first semester of the 2025–2026 academic year. Although the total number of enrolled students was not officially reported, class lists submitted by course instructors served as the sampling frame for random selection. A random number generator ensured that each student had an equal chance of being chosen. Eligibility criteria included official registration in the course and attendance at the main campus. Students with prior experience in varsity sports or formal athletic training were excluded to ensure comparable baseline fitness levels. Students from satellite campuses were also excluded for consistency in learning context.

Invitations to participate were distributed by class advisers through institutional email and class communication platforms. The survey was administered via a secure Google Form, and only students who completed the form and provided informed consent were included in the final sample. The final sample size of 271 exceeded the recommended minimum of 10 to 15 participants per predictor variable for multiple regression analyses, ensuring adequate statistical power and stable regression estimates.

This study was conducted in full compliance with institutional and national ethical research standards. Formal approval was obtained from the Research Management Office of the state university in Region III, Philippines. Data collection began only after coordination with the college's designated research coordinator to ensure procedural oversight. Prior to participation, students received clear, written information describing the study's purpose, procedures, confidentiality measures, and assurance of anonymity. Informed consent was obtained from all participants. Participants were also informed that study results would be available to them and to the university administration upon request, reinforcing transparency and academic integrity.

Research Design

A quantitative research design was employed using validated instruments to assess physical activity, perceived physical fitness, and eating self-regulation among Filipino college students. Predictive modeling techniques were used to examine how physical activity and fitness levels influence students' ability to regulate their eating behavior.

A post hoc power analysis was conducted using G*Power software for linear multiple regression (random model), testing the deviation of R^2 from zero. The analysis used a two-tailed test with an alpha level of .05, an assumed effect size of R^2 = .25, and 11 predictors. For the overall sample (N = 271), the achieved power (1 – β) was 0.9999997, confirming a very high probability of detecting true effects. The computed critical R^2 was 0.0798, with a lower critical R^2 of 0.0144.

Subgroup analyses were also performed by gender. For females (n = 88), achieved power was 0.9021, with critical R^2 = 0.2388 and lower critical R^2 = 0.0463, indicating sufficient power to detect large effects. For males (n = 183), achieved power was 0.9997, with critical R^2 = 0.1175 and lower critical R^2 = 0.0215. These results confirm excellent statistical power for both subgroups and support the reliability of gender-based comparisons. Figure 1 presents the G*Power analysis for the total, female, and male samples.

The demographic characteristics of the participants are summarized in Table 1. Female students were generally younger, shorter, and lighter than their male counterparts, while male students exhibited higher mean values for all anthropometric measures.

As shown in Table 1, male participants demonstrated higher values in height, weight, and BMI compared with female participants, whereas age differences were minimal. These patterns reflect typical sex-based anthropometric differences among college-aged populations.

Research Instrument

To examine the interplay between eating regulation, physical activity, and perceived fitness among Filipino collegiate young adults, a set of validated self-report instruments was employed. All research instruments were reviewed for cultural and linguistic appropriateness within the Filipino collegiate context. Since participants were university students with sufficient English proficiency, language barriers were not a concern. Minor wording adjustments were made where necessary to ensure clarity and contextual relevance.

The Self-Perception of Physical Fitness Scale was subjected to confirmatory factor analysis using responses from the Filipino collegiate sample to assess its structural validity. The results indicated that all factor loadings were statistically significant and met accepted standards for construct validity.

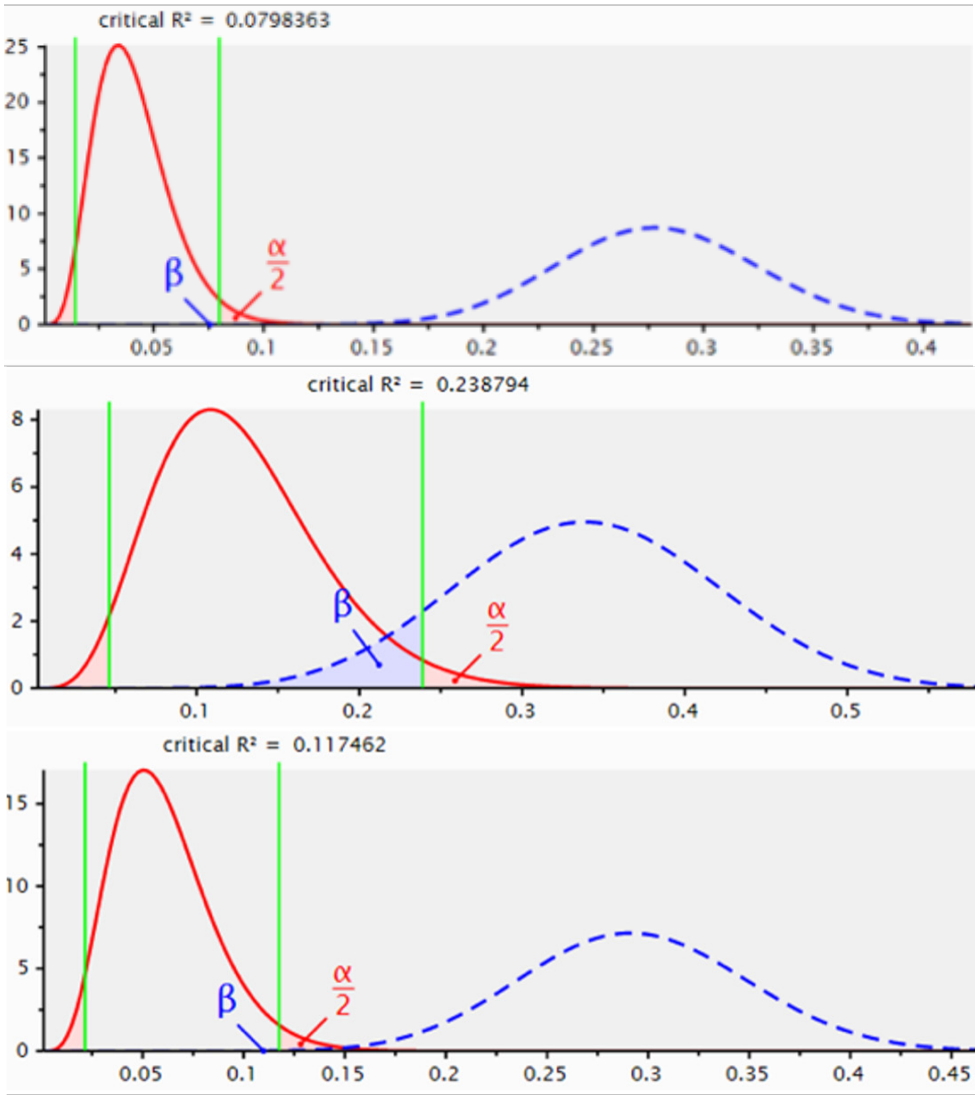

Figure 1. G*power analysis of all, female, and male respondents

Table 1. Demographic Characteristics of Participants by Sex

Variable	Female	Male	All
Age (years)	19.19 ± 2.32	18.98 ± 1.85	19.05 ± 2.01
Height (cm)	156.44 ± 5.35	168.93 ± 7.83	164.87 ± 9.21
Weight (kg)	52.05 ± 12.54	68.00 ± 20.84	62.82 ± 20.00
Body Mass Index (kg/m²)	21.24 ± 4.77	23.84 ± 7.31	23.00 ± 6.70

Furthermore, the instrument demonstrated acceptable to strong internal consistency across its subscales, confirming its reliability. These results support the appropriateness of the adapted scale for use in the Filipino context and enhance the methodological rigor of the present study.

To assess participants' ability to regulate their eating behaviors, the Self-Regulation of Eating Behaviour Questionnaire (SREBQ) was administered. The SREBQ is a concise, five-item self-report instrument designed to evaluate individuals' perceived capacity to manage their eating in accordance with personal dietary goals. Originally developed and validated among UK adults, the questionnaire has demonstrated solid psychometric properties, including acceptable internal consistency (Cronbach's α = 0.75) and good test–retest reliability (ICC = 0.77) [26]. Construct validity has been supported through moderate correlations with established measures of general self-control and dieting success, as well as significant associations with motivational, emotional, and automatic processes relevant to eating behavior. The SREBQ is intended for individuals who report active intentions to eat healthily or resist tempting foods, aligning well with the goal-oriented framework

of the present study involving Filipino university students.

Physical activity was measured using the International Physical Activity Questionnaire (IPAQ), a globally standardized instrument for assessing self-reported physical activity levels across various life domains, including occupational tasks, transportation, household chores, and leisure-time activities. The IPAQ has demonstrated high test–retest reliability (r = 0.66–0.88) and moderate criterion validity (r = 0.30–0.50) when compared with accelerometer-based assessments [27, 28, 29]. Its construct validity is supported by its consistent ability to distinguish between low, moderate, and high activity levels across culturally diverse samples [30]. In this study, participants' IPAQ responses were converted into Metabolic Equivalent of Task (MET) scores to quantify and compare activity intensities.

To evaluate students' perceived physical fitness, the study employed the Self-Perception of Physical Fitness Scale, which has been validated for use among adolescents aged 11 to 18.9 years [31]. The scale measures self-perception across four key dimensions of physical fitness: morphological fitness (e.g., body composition), muscular strength, motor fitness (e.g., coordination), and cardiovascular endurance. Responses are rated on a 3-point Likert scale ranging from 1 (Strongly Disagree) to 3 (Strongly Agree), with higher scores indicating more favorable self-assessments. Given its established reliability and validity, the scale was adapted in this study to capture the subjective fitness experiences of collegiate young adults in the Filipino context.

The confirmatory factor analysis (CFA) of the Self-Perception of Physical Fitness Scale (SPPFS) retained all items, as no factor loadings fell below the 0.50 threshold. Standardized estimates ranged from 0.530 to 0.809, reflecting moderate to strong relationships across domains: morphology (0.717–0.731), muscle strength (0.637–0.766), motor dimension (0.530–0.800), and cardiovascular (0.688–0.809). All factor loadings were statistically significant ($p < .001$), confirming their contribution to the construct. Model fit indices were $\chi^2(113) = 470$, $p < .001$; CFI = 0.854; TLI = 0.824; SRMR = 0.0668; and RMSEA = 0.108 (90% CI [0.098, 0.118]), with AIC = 6788 and BIC = 6993 [32]. These values indicate an acceptable, though not optimal, fit with some evidence of model misfit.

Reliability analysis yielded Cronbach's alpha coefficients of 0.768 (morphology), 0.843 (muscle strength), 0.848 (motor dimension), and 0.809 (cardiovascular), demonstrating acceptable to strong internal consistency across domains [33]. Overall, the SPPFS exhibited a supported factor structure and reliable subscales, making it a suitable instrument for assessing self-perceived physical fitness, although model fit indices suggest room for improvement.

Data Gathering

Data collection was conducted online via Google Forms following ethical approval. The questionnaire link was distributed only to randomly selected participants from the list of officially enrolled students in the designated course at a state university in Region III, Philippines. Course instructors shared the link through students' verified institutional email addresses and class communication platforms, ensuring that only eligible, randomly chosen students received access.

Data collection was carried out over a two-week period during the middle of the first semester of the 2025–2026 academic year. Participants were instructed to complete the survey independently using either a mobile phone or a personal computer, typically in a home, dormitory, or other private setting. The estimated completion time for the entire questionnaire was 10 to 15 minutes. Before accessing the main sections, each participant was presented with a digital informed consent form describing the study's purpose, voluntary nature, confidentiality, and the right to withdraw. Only participants who selected "Yes" to the consent question were granted access to the full instrument.

The Google Form was configured to accept only one response per institutional email address to prevent duplicate submissions. Timestamps were automatically recorded to monitor submission timing and identify unusually fast completions, which were reviewed for quality and consistency. All sections of the survey, including demographics, perceived physical fitness, physical activity, and eating regulation, were designated as required fields to minimize missing data. Participants were instructed to complete the form in a single sitting to maintain response integrity.

The questionnaire followed a fixed item order that matched the validated sequence of each scale: demographics first, followed by self-perceived fitness, then physical activity, and finally eating behavior regulation. This structure ensured logical flow and reduced participant fatigue. Internal consistency reliability was evaluated after data collection using Cronbach's alpha, and confirmatory factor analysis (CFA) was performed for the Self-Perception of Physical Fitness Scale. Only responses containing complete demographic data and valid entries for age, height, and weight were included in the final analysis. Each submission was automatically logged with a submission date to verify that it fell within the approved data collection period.

Data Analysis

To examine the predictive influence of physical activity and subjective physical fitness on eating self-regulation, multiple linear regression analysis was employed. This approach enabled the evaluation of how these independent variables jointly contributed

to the variance in eating behavior regulation (EBR) among Filipino college students. Prior to analysis, data cleaning procedures were conducted using IBM SPSS Statistics version 30. All survey responses were reviewed for completeness, and entries with missing data in any required section (demographics, fitness, physical activity, or EBR) were excluded. Responses containing biologically implausible values (e.g., extreme height or weight values) were flagged and cross-checked, although no outliers met exclusion thresholds based on standardized z-scores.

Inclusion and exclusion criteria were strictly enforced during cleaning: only responses from the 271 pre-selected, officially enrolled students were retained, and those who self-reported prior formal athletic training were excluded from the final analysis set. Each entry was verified for internal consistency and checked for duplication based on email, timestamp, and demographic data.

Statistical Analysis

The analysis was conducted using IBM SPSS Statistics version 30 to ensure a systematic and reliable assessment of the hypothesized relationships. Prior to interpretation, the key assumptions of multiple regression were evaluated, including normality of residuals, linearity, homoscedasticity, independence of residuals, and absence of multicollinearity. Diagnostic plots (P–P plots, histograms, and residual scatterplots) were examined for each model, and Durbin–Watson statistics were calculated to assess autocorrelation.

Results indicated that the assumptions of normality and linearity were generally met across models, though minor concerns were noted regarding heteroscedasticity and residual independence, particularly in male subgroups. Additionally, one subjective fitness variable (MUSC) was excluded from certain models due to severe multic

Results

As shown in Table 2, male students reported higher self-perceived physical fitness scores than female students across nearly all domains. Significant sex differences were observed in muscle strength, motor ability, cardiovascular endurance, and total self-perceived fitness, while no significant difference was found for morphology. These findings indicate that male students tend to evaluate their overall physical competence more positively, particularly in performance-related aspects, whereas morphological self-perception appears relatively comparable between sexes.

As indicated in Table 2, significant gender-related differences are most evident in the strength, motor, and cardiovascular domains, suggesting that male students perceive themselves as fitter in dynamic and endurance-related aspects, while females show more moderate evaluations of their abilities.

As shown in Table 3, male students reported slightly higher mean values than female students across nearly all physical activity indicators, including total days of activity, total activity minutes, and MET values for vigorous, moderate, and total activity. However, none of these differences reached

Table 2. Self-Perceived Physical Fitness by Sex

Variable	Female	Male	All	t-value	p-value	d
MORPH	2.19 ± 0.47	2.30 ± 0.48	2.26 ± 0.48	1.70	0.091	-0.219
MUSC	2.03 ± 0.50	2.35 ± 0.45	2.25 ± 0.49	5.03	< .001	-0.677
MOT	2.09 ± 0.47	2.36 ± 0.44	2.27 ± 0.47	4.43	< .001	-0.588
CARDIO	2.11 ± 0.49	2.40 ± 0.47	2.30 ± 0.50	4.57	< .001	-0.602
TSPF	2.11 ± 0.41	2.35 ± 0.40	2.27 ± 0.42	4.63	< .001	-0.603

Note. MORPH = Morphology; MUSC = Muscle Strength; MOT = Motor; CARDIO = Cardiovascular; TSPF = Total Self-Perceived Fitness.

Table 3. Physical Activity Levels by Sex

Variable	Female	Male	All	t	p	d
DAYS_ACT	5.48 ± 2.25	5.90 ± 1.92	5.76 ± 2.04	1.52	0.13	0.21
ACT_MIN	338.18 ± 180.50	384.92 ± 174.64	369.74 ± 177.92	2.01	0.05	0.26
ACT_MIN2	321.41 ± 196.29	350.01 ± 202.52	340.72 ± 200.96	1.11	0.27	0.14
VIG_MET	2577.95 ± 2543.63	3169.51 ± 2694.18	2977.42 ± 2660.69	1.75	0.08	0.22
MOD_MET	1235.99 ± 1210.07	1512.83 ± 1331.87	1422.93 ± 1300.06	1.70	0.09	0.21
WALK_MET	1587.20 ± 1179.23	1642.33 ± 1239.52	1624.43 ± 1220.54	0.35	0.73	0.05
TOT_MET	5353.52 ± 4375.45	6256.16 ± 4732.57	5963.06 ± 4638.93	1.54	0.13	0.20

Note. DAYS_ACT = Total Days of Activity; ACT_MIN = Total Activity (min/wk); ACT_MIN2 = Total Activity (min/wk^2); VIG_MET = Vigorous MET; MOD_MET = Moderate MET; WALK_MET = Walk MET; TOT_MET = Total MET.

statistical significance at the conventional alpha level ($p > .05$).

As indicated in Table 3, male participants consistently reported higher activity levels than females, though the differences were small in magnitude. The small to moderate effect sizes suggest a possible trend toward higher engagement in vigorous and total physical activity among male students, but without statistical confirmation.

As shown in Figure 2, eating behavior regulation (EBR) scores were highly similar between female and male participants. Female students reported a mean score of 3.04 ± 0.51, and male students reported a mean of 3.06 ± 0.58. An independent samples t-test indicated no statistically significant difference between the groups ($t = 0.30$, $p = .77$, $d = 0.04$), suggesting comparable levels of eating behavior regulation across sexes.

As illustrated in Figure 3, diagnostic plots were used to assess the assumptions of multiple linear regression for all respondents and by gender, predicting Eating Behavior Regulation (EBR) from six physical activity indicators: total days of activity (DAYS_ACT), total activity minutes per week (ACT_MIN), squared activity minutes per week (ACT_MIN2), vigorous MET-minutes per week (VIG_MET), moderate MET-minutes per week (MOD_MET), and walking MET-minutes per week (WALK_MET). These predictors were entered simultaneously using the enter method, which allows the evaluation of unique contributions of each variable while controlling for all others.

The assumptions of multiple regression were consistently examined across all subgroups. Normal P–P plots and histograms confirmed that residuals were approximately normally distributed. Scatterplots of standardized residuals versus predicted values indicated linear relationships with no major funneling patterns, supporting the assumption of homoscedasticity. Minor vertical banding and clustering were more noticeable among male participants but remained within acceptable limits for behavioral data. Durbin–Watson statistics were 0.910 (all), 1.311 (females), and 0.716 (males), suggesting mild positive autocorrelation and potential concerns with residual independence. However, these values did not reach levels considered severely problematic and were evaluated alongside theoretical justification for the model.

As shown in Table 4, multiple linear regression analyses were performed to determine whether physical activity variables predicted Eating Behavior Regulation (EBR) across the full sample ($N = 271$) and within female ($n = 88$) and male ($n = 183$) subgroups.

For the full sample, the regression model was statistically significant, indicating that physical activity indicators collectively explained a modest proportion of variance in EBR. Specifically, a higher number of active days was associated with better eating behavior regulation, while total activity time and its squared term showed inverse relationships, suggesting that excessive or prolonged activity may not linearly enhance self-regulation.

Among female participants, the regression model was not statistically significant, and none of the predictors reached conventional significance levels. Although a slight positive trend was observed for squared activity minutes, the association was weak and did not meet the threshold for statistical reliability.

In contrast, the model for male participants demonstrated a moderate effect, showing that the

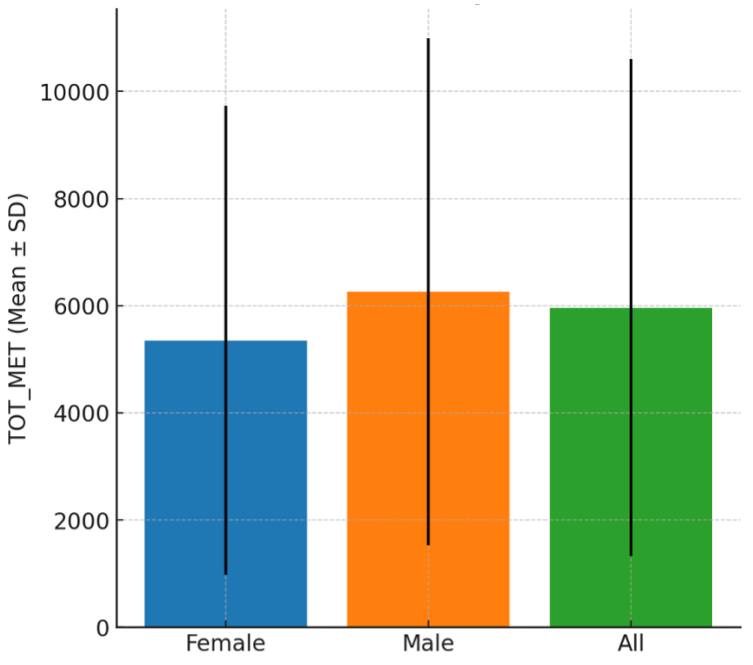

Figure 2. Eating Behavior Regulation by Sex

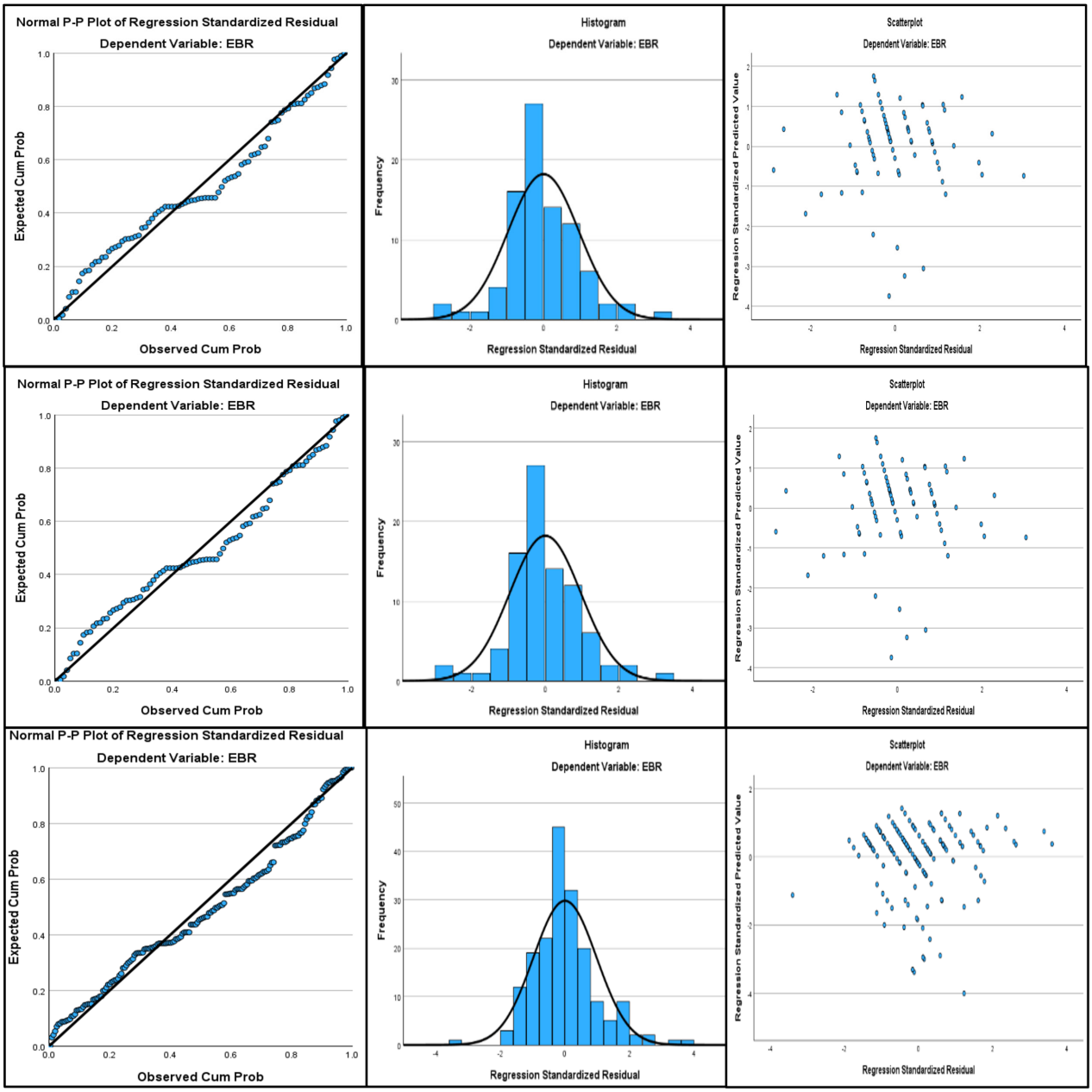

Figure 3. Regression Diagnostics for EBR Prediction Based on Physical Fitness by Sex Group

Note. The diagnostic plots are organized by subgroup, with the top row representing all respondents, the middle row representing female respondents, and the bottom row representing male respondents. Each row includes three plots: the normal P–P plot (left), the histogram of standardized residuals (center), and the scatterplot of standardized residuals versus predicted values (right), allowing visual comparison of assumptions across subgroups.

number of active days significantly predicted higher EBR scores. Other physical activity indicators did not contribute meaningfully to the prediction of EBR in males.

As shown in Figure 4, diagnostic plots illustrate the regression models predicting Eating Behavior Regulation (EBR) from physical fitness test outcomes (PFTO): morphological fitness (MORPH), muscular fitness (MUSC), motor fitness (MOT), cardiorespiratory fitness (CARDIO), and total score of physical fitness (TSPF). These predictors were entered using the enter method to maintain consistency in model-building strategy.

Similar to the physical activity models, the normal P–P plots and histograms showed that residuals were approximately normally distributed, while scatterplots indicated linear relationships and homoscedasticity. Slight vertical clustering appeared in the male subgroup, suggesting minor heteroscedasticity. Durbin–Watson values ranged from 0.402 to 1.102, which is below the ideal range of 1.5 to 2.5, indicating mild positive autocorrelation.

Table 4. Multiple Linear Regression Predicting Eating Behavior Regulation (EBR) from Physical Activity Indicators by Sex

Hypothesis	Predictor Variable	Stand. Coefficient (β)	Adjusted R^2	F	t	p	Decision
	ALL						
H1	DAYS_ACT→EBR	.209	.167	10.010	2.650	.009	ACCEPTED
	ACT_MIN→EBR	-.579			-5.183	<.001	ACCEPTED
	ACT_MIN2→EBR	-.684			-5.273	<.001	ACCEPTED
	VIG_MET→EBR	-.178			-1.659	.098	REJECTED
	MOD_MET→EBR	.037			.351	.725	REJECTED
	WALK_MET→EBR	.075			.995	.320	REJECTED
	FEMALE						
H1	DAYS_ACT→EBR	.097	-.009	.866	.592	.555	REJECTED
	ACT_MIN→EBR	-.401			-1.258	.212	REJECTED
	ACT_MIN2→EBR	.567			1.671	.099	REJECTED
	VIG_MET→EBR	.042			.175	.862	REJECTED
	MOD_MET→EBR	-.224			-.975	.332	REJECTED
	WALK_MET→EBR	.050			.337	.737	REJECTED
	MALE						
H1	DAYS_ACT→EBR	0.270	.231	8.793	3.006	.003	ACCEPTED
	ACT_MIN→EBR	-.490			-1.396	.165	REJECTED
	ACT_MIN2→EBR	.572			1.352	.178	REJECTED
	VIG_MET→EBR	-1.034			-.360	.719	REJECTED
	MOD_MET→EBR	-.286			-.201	.841	REJECTED
	WALK_MET→EBR	-.264			-.200	.842	REJECTED

Note: DAYS_ACT = Total Days of Activity; ACT_MIN = Total Activity (minutes per week); ACT_MIN2 = Total Activity (minutes per week, squared); VIG_MET = Vigorous MET-minutes per week; MOD_MET = Moderate MET-minutes per week; WALK_MET = Walk MET-minutes per week; EBR = Eating Behavior Regulation.

Importantly, the MUSC variable was excluded from all models due to multicollinearity, with variance inflation factor (VIF) values exceeding 10 and tolerance values near zero, violating acceptable thresholds. This exclusion ensured the integrity of the regression estimates and allowed for clearer interpretation of the remaining predictors.

As presented in Table 5, multiple linear regression analyses were conducted to determine whether physical fitness test outcomes (PFTO) predicted Eating Behavior Regulation (EBR) across the full sample and within sex-based subgroups.

For the full sample, the model was not statistically significant, indicating that self-perceived physical fitness indicators collectively explained little variance in EBR. None of the predictors, morphological, motor, cardiovascular, or total physical fitness, showed significant effects, while the muscular fitness variable was excluded from the analysis due to multicollinearity.

Among female participants, the regression model was also non-significant, and no PFTO dimensions were associated with EBR, suggesting that subjective physical fitness was not a meaningful predictor in this subgroup.

For male participants, however, the model showed a small but statistically significant effect. Morphological fitness emerged as a significant negative predictor, indicating that lower morphological fitness scores were associated with better eating behavior regulation. Motor fitness approached significance, while the total physical fitness score demonstrated a modest yet statistically significant relationship with EBR. Cardiovascular fitness remained non-significant.

Discussion

The present study aimed to examine the predictive influence of physical activity and perceived physical fitness on eating behavior regulation (EBR) among Filipino collegiate young adults. The findings revealed that physical activity variables accounted for a modest but statistically significant proportion of the variance in EBR, particularly among male participants, where the number of active days emerged as a positive predictor. In contrast, perceived physical fitness indicators demonstrated

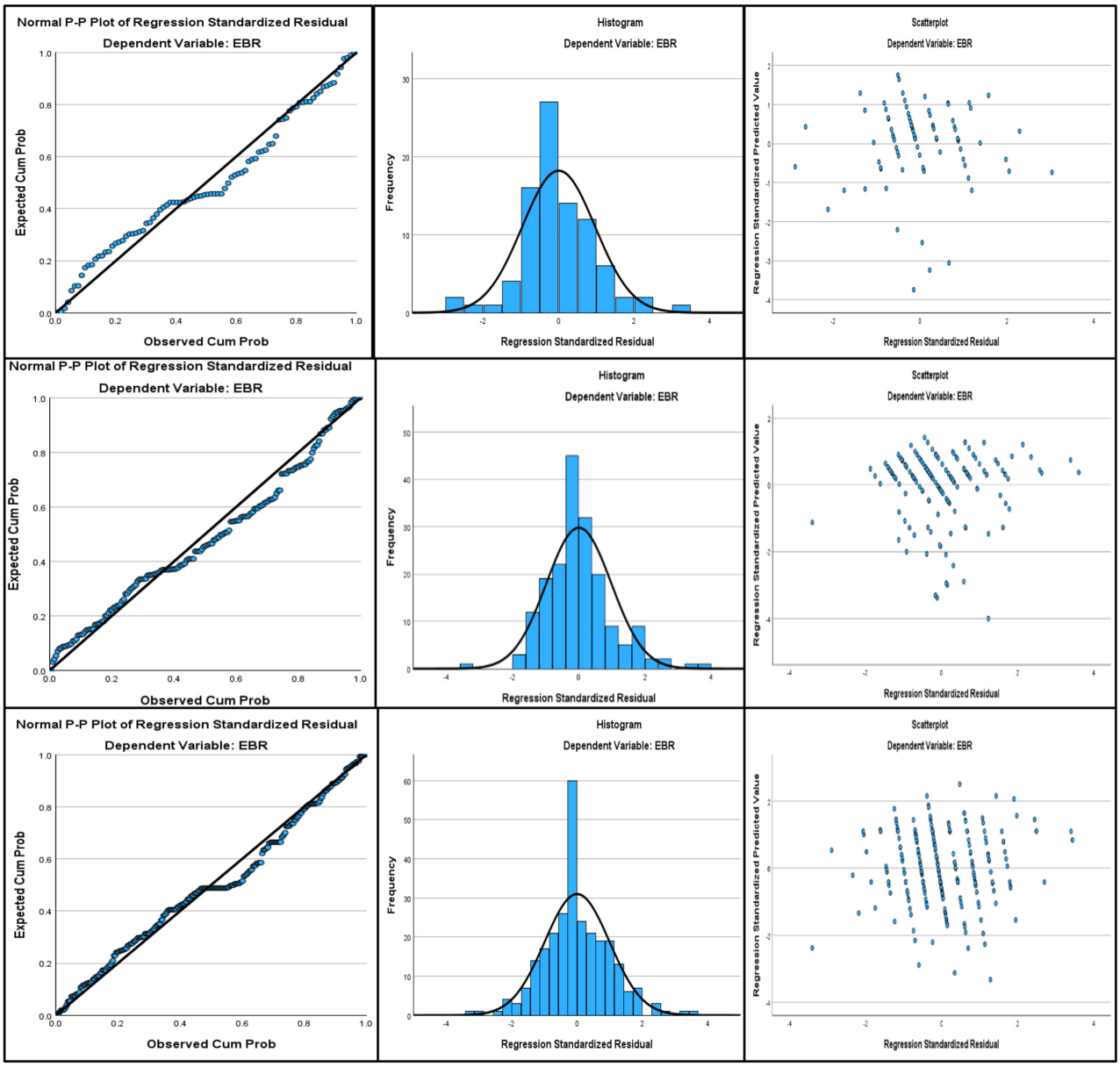

Figure 4. Regression Diagnostics for EBR Prediction Based on Physical Fitness Test Outcomes by Sex Group

Note. The top row represents all respondents, the middle row represents female respondents, and the bottom row represents male respondents. Each row includes normal P–P plots, histograms, and residual scatterplots to assess key assumptions.

weaker associations, with most fitness domains failing to significantly predict EBR across the total sample. Only morphological fitness showed a small but significant negative relationship with EBR in males, suggesting that students with lower self-perceived body composition tended to report higher eating regulation. Overall, the results highlight that physical activity, more than perceived fitness, may play a central role in promoting self-regulated eating behaviors, though these relationships appear to differ by sex and by the specific dimensions of physical activity examined.

This study applies a Self-Determination Theory (SDT) framework to examine the combined effects of physical activity and perceived physical fitness on eating behavior regulation among Filipino collegiate students. The integration of these constructs allows for a more comprehensive understanding of how motivational and behavioral factors jointly contribute to eating self-regulation within this population [20, 21, 22, 23, 24, 25].

While earlier studies have examined physical activity or physical fitness separately in relation to eating behaviors [18, 19, 31, 32, 33], limited attention has been given to their combined influence, particularly in Southeast Asian settings. Cultural factors such as communal eating, shared food practices, and social perceptions of body image may shape how Filipino students manage their eating behavior [7, 8, 17]. In addition, academic

Table 5. Influence of Subjective Physical Fitness on Eating Behavior Regulation

Hypothesis	Predictor Variable	Stand. Coefficient (β)	Adjusted R2	F	t	p	Decision
	ALL						
	MORPH→EBR	-.188	.007	1.470	-1.270	.205	REJECTED
	MUSC→EBR				-.791		
H2	MOT→EBR	-.152			-.250	.429	REJECTED
	CARDIO→EBR	-.041			.803	.803	REJECTED
	TSPF→EBR	.438			.249	.249	REJECTED
	FEMALE						
	MORPH→EBR	.211	.047	1..23	.891	.376	REJECTED
	MUSC→EBR						
H2	MOT→EBR	.469			1.322	.190	REJECTED
	CARDIO→EBR	.251			.815	.417	REJECTED
	TSPF→EBR	-.621			-.932	.354	REJECTED
	MALE						
	MORPH→EBR	-.449	.020	1.913	-2.225	.027	ACCEPTED
	MUSC→EBR						
H2	MOT→EBR	-.400			-1.839	.068	REJECTED
	CARDIO→EBR	-.163			-.871	.385	REJECTED
	TSPF→EBR	.975			2.135	.034	ACCEPTED

MORPH = Morphological Fitness; MUSC = Muscular Fitness; MOT = Motor Fitness; CARDIO = Cardiorespiratory Fitness; TSPF = Total Score of Physical Fitness; EBR = Eating Behavior Regulation.

routines that often involve prolonged sitting and irregular schedules could further affect both activity levels and self-regulatory capacities. Examining these factors within a motivational framework grounded in SDT provides a basis for understanding how lifestyle patterns interact with health-related behaviors in this context.

In the present study, female participants generally reported lower self-perceived physical fitness across all domains compared to male participants. While perceptions of morphology did not differ significantly, males demonstrated higher self-perceived fitness in muscle strength, motor ability, cardiovascular endurance, and overall fitness. These findings align with existing literature indicating that females tend to perceive themselves as less physically fit, particularly in domains such as muscular strength, cardiovascular endurance, and motor ability, while perceptions of flexibility or morphology are often comparable or slightly more favorable for females [34, 35, 36]. This trend is similarly observed among university students, where males report higher self-perceived fitness, largely due to greater levels of physical activity and physical condition [37, 38, 39]. Psychological variables such as self-confidence, body image, and specific subdomains of physical self-perception have been shown to mediate these differences, with females typically exhibiting lower self-confidence and greater insecurity about their physical capabilities [40, 41, 42]. However, when physical activity levels are similar between males and females, such as in athletic populations, sex-based differences in self-perception tend to diminish [43, 44]. These findings expand existing research by confirming sex differences in physical self-perception among Filipino college students, adding to the regional literature on health disparities and providing empirical grounding for gender-sensitive approaches.

In this study, physical activity levels were assessed through subjective indicators. Both male and female participants reported generally similar engagement, although males showed slightly higher levels of total, moderate, and vigorous activity. These differences were small but consistent with earlier studies indicating that men usually report greater intensity and duration of physical activity, while overall participation rates are comparable between sexes [45, 46, 47, 48, 49].

Comparable trends have been documented in adult and clinical populations, where men more often engage in structured or outdoor exercise, and women tend to participate in household or indoor physical tasks. These results suggest the value of encouraging more diverse and vigorous forms of activity among female students within Filipino collegiate settings. Physical education curricula

should also address gender-related factors that influence women's engagement in physical activity. Continued research among Filipino university populations is warranted to better understand how social and cultural conditions shape these behavioral patterns.

The findings showed that eating behavior regulation was comparable between male and female participants, with almost identical mean scores. No significant sex differences were found, indicating that self-reported eating behavior regulation was not associated with sex in this sample. Previous studies using the Regulation of Eating Behavior Scale (REBS) also reported no significant differences in external regulation, although women scored slightly higher in autonomous regulation, and the factor structure was consistent across sexes [50]. Comparable patterns have been described in studies of children, where parent-reported appetitive traits did not differ by sex [51]. However, other research has identified domain-specific differences: females often report greater emotional and restrained eating, particularly under stress or in clinical settings [52, 53, 54]. Moreover, disordered eating behaviors and food addiction are more frequently reported among females in both college and clinical populations [53, 54].

In the overall sample, no significant associations were found between subjective physical fitness components, self-rated fitness, perceived strength, and body satisfaction, and Eating Behavior Regulation (EBR). This finding is consistent with previous research showing that these perceptual variables, although psychologically relevant, are weak predictors of dietary self-regulation [55, 56, 57]. Earlier longitudinal and cross-sectional studies have indicated that subjective fitness often reflects self-concept and emotional attitudes shaped by social and cultural expectations rather than behavioral control [58, 59].

Among female participants, the lack of associations across all fitness indicators followed the same general pattern. Women's eating regulation may be more closely related to emotional state, internalized body ideals, and appearance-related concerns than to their perception of physical abilities or fitness level [55, 56, 57]. Studies also report that low perceived fitness in women is often linked to maladaptive eating behaviors, such as emotional or compensatory eating, rather than deliberate dietary regulation [60].

Among male participants, a significant negative association was found between morphological fitness, specifically self-perceived body shape or muscularity, and Eating Behavior Regulation (EBR). This relationship indicates that greater attention to body appearance, particularly muscularity or leanness, can interfere with consistent eating self-regulation [55, 56]. Similar findings have been reported in studies on male body image, where internalized ideals of muscularity were associated with anxiety, excessive dietary control, and restrictive or compensatory eating behaviors [57, 61]. These results suggest that perceived fitness and body satisfaction may not uniformly promote healthy behaviors and that motivational patterns can differ by sex. In men, appearance-related goals may contribute to dysregulated eating through pressure to meet social standards of strength and control [62].

From an educational and health promotion perspective, these findings indicate the importance of developing sex-specific approaches within university wellness programs and physical education curricula. For female students, interventions should emphasize emotional balance, coping with appearance-related stress, and motivation based on health and well-being rather than external evaluation [63]. For male students, educational strategies should address unrealistic body ideals and encourage a balanced perception of fitness that prioritizes function and health. In the Filipino setting, where appearance and social expectations may strongly influence behavior, intervention programs would benefit from incorporating cultural sensitivity and peer-based education that promotes realistic and health-oriented body standards.

Overall, the study clarifies the interplay between physical activity, perceived fitness, and eating behavior regulation among Filipino collegiate students. The results indicate that behavioral engagement, rather than subjective perception of fitness, plays a more consistent role in supporting self-regulated eating. These findings extend current understanding of motivation-based health behaviors within the framework of Self-Determination Theory and provide an empirical foundation for culturally contextualized health promotion in young adult populations.

This study has several limitations. Both physical activity and physical fitness were measured through self-report instruments, which may have introduced response bias. The unidimensional scale for eating behavior regulation did not capture the full complexity of this construct. The sample, drawn from a single state university in Region 3 of the Philippines, limits the generalizability of results, and the cross-sectional design prevents causal inference. Moreover, the study did not examine potential mediators such as motivation or self-efficacy that could clarify the observed relationships.

Future research should incorporate objective measures of activity and fitness, such as accelerometers, pedometers, and standardized field tests for strength, endurance, and motor skills. Broader sampling across different Philippine regions is needed to account for cultural and contextual diversity. Longitudinal and intervention-based

designs would allow stronger causal conclusions and evaluation of targeted, gender-sensitive health programs.

Conclusions

This study confirmed that female Filipino college students reported lower self-perceived physical fitness than their male counterparts across most domains, except morphology, where no significant difference was found. Both sexes demonstrated similar levels of physical activity and eating behavior regulation, with no meaningful differences in overall self-regulated eating. Among males, a negative association between morphological fitness and eating regulation suggests body image–related influences on dietary control.

Overall, the findings contribute to understanding the interaction between physical fitness perception and eating behavior regulation in Filipino collegiate students, emphasizing the role of gender-related psychological and perceptual factors in health-related behaviors.

Conflict of interests

The author declare that there is no conflict of interests.

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