JSSH Journal of Social Sciences and Humanities

Volume 5 | Issue 1 | Jan - Jun 2025
ISSN: 2984-9969
Website: https://csu.org.ph/jssh
Email: csujssh@gmail.com

Moderation Analysis of Gender Roles in the Relationship Between Autonomy Index and Physical Activity Among University Students

Sivan Pattaguan, Mikhail Callangan, Margaret Aia V. Castillo, Maria Gabriela C. Gabriel, Bryan M. Nozaleda

Cagayan State University – Carig Campus

Corresponding Author: Sivan Pattaguan ✉ iamsivanpattaguan@gmail.com

DOI: https://doi.org/10.5281/zenodo.17103969 Published: June 01, 2025

ABSTRACT

The primary aim of this quantitative study was to examine the relationship between students' motivation as measured by the Relative Autonomy Index and their physical activity levels, and to determine whether gender roles moderate this relationship. A sample of 987 undergraduate students at Cagayan State University-Carig Campus completed surveys on physical activity and motivation. Descriptive and inferential analyses were used to address seven research objectives. The results showed that overall physical activity levels were moderate, with male students being more active than female students. Urban-dwelling students were also slightly more active than those in rural areas. A higher autonomy index was positively correlated with higher physical activity levels, meaning students who were more intrinsically motivated engaged in more exercise. Most students (77.6%) reported being motivated by intrinsic factors, although male students were somewhat more influenced by external factors than females. Male students also reported a higher incidence of gender dysphoria and higher "androgyny" scores compared to females, though the majority of all students did not experience gender identity conflict. Importantly, sex was found to significantly moderate the motivation–activity relationship wherein the positive effect of intrinsic motivation on physical activity was much stronger for male students than for female students. Other profile variables (BMI, residence, college, and gender role orientation measures) did not significantly moderate this relationship. These findings suggest that gender plays a key role in university students' physical activity behavior and its motivational drivers. Interventions should therefore consider gender-specific strategies to leverage intrinsic motivation and support students in becoming more physically active.

Keywords: *Gender roles; Autonomy Index; Intrinsic motivation; Physical activity; University students; Moderation analysis*

INTRODUCTION

Physical inactivity among young people is a global public health concern, contributing to elevated risks of chronic diseases. Engaging in physical activity is influenced by a variety of factors, including personal goals, social support, environmental conditions, and physiological predispositions. According to Self-Determination Theory (Ryan & Deci, 2020), motivation for behavior can be categorized as intrinsic or extrinsic. Intrinsic motivation is associated with positive attitudes and sustained behavior, defined as the inner drive to attain personal goals (e.g. health or mastery). In contrast, extrinsic motivation is based on external reinforcement or obligations. Motivation plays a vital role in exercise participation, as it shapes individuals' attitudes toward physical activity and their likelihood of maintaining an active lifestyle.

Prior research indicates notable gender differences in physical activity motivation. Women often report being motivated by social factors and improving physical appearance, whereas men are more likely to seek competition and physical challenges (Wasserfurth et al., 2020). For example, women may exercise for stress relief or social bonding, while men more frequently cite competitive sports or goal achievements as motivators. Body image satisfaction also affects motivation differently. For instance, women's activity levels tend to be strongly influenced by body image concerns, whereas men more often pursue exercise for rewards or popularity (Dias et al., 2021; Pana o & Carraça, 2020). Moreover, environmental and societal influences – including gender norms and stereotypes – shape motivation and the types of activities individuals engage in. Traditional gender norms can channel men and women into different sports or exercise settings, which in turn impacts their overall activity levels (Van Uffelen et al., 2017). Access to a safe and supportive environment is particularly significant for promoting physical activity among women, as women may face more barriers or safety concerns in sports settings (Rasmussen et al., 2021). Physiological factors (e.g. strength, endurance) and social support further contribute to differences in exercise preferences between genders (Jimenez-Morcillo & Clemente-Sua rez, 2023).

Recognizing these disparities, educators and policymakers have emphasized developing gender sensitive physical activity programs and creating supportive environments that challenge traditional gender norms. By addressing the specific needs and preferences of both men and women, such initiatives aim to encourage equitable participation in exercise. In the Philippines, understanding students' motivation for exercise is crucial for designing effective interventions. Surveys suggest that the primary reasons Filipinos engage in exercise are internal motivations – managing weight, improving health, and enjoyment (Mungcal et al., 2021) – whereas competition and social recognition are less prioritized motives (Manasan et al., 2023). This implies that leveraging on intrinsic motivation may be key to increasing activity levels in this context.

The policy landscape in the Philippines provides a supportive backdrop for promoting youth physical activity. The 1987 Philippine Constitution emphasizes the importance of physical education and sports in developing self-discipline, teamwork, and excellence among the youth. It mandates educational institutions to collaborate with athletic and sports organizations to hold regular sports activities, which holds potential for promoting gender equality in sports participation. Additionally, Republic Act 5708 (Schools Physical Education and Sports Development Act of 1969) as cited by Sabado et al. (2025) integrates physical education and sports into school curricula, encouraging students to engage in physical activities from an early age. The Magna Carta of Women (Republic Act 9710) explicitly condemns discrimination against women – including in sports – and calls for equal opportunities for female athletes (Francisco, 2023). These policies aim to challenge historical restrictions that discouraged girls and women from pursuing sports, ensuring that female students have the same access to physical activity as males. Despite such

supportive frameworks, cultural stereotypes and practical barriers (e.g. fewer resources for women's sports) continue to influence participation rates.

While numerous studies have explored gender differences in physical activity and motivation, few have examined whether gender role orientations influence the relationship between motivation and exercise behavior. Gender role orientation refers to an individual's identification with traits or roles traditionally associated with masculinity or femininity, regardless of their biological sex. It is possible that one's gender role (e.g. being more masculine, feminine, or androgynous) could affect how motivation translates into action. For instance, a student with a more traditional masculine role might respond differently to competitive exercise motivation than a student with a more feminine or androgynous role. To address this gap, the present study investigates how gender roles moderate the relationship between students' autonomy in motivation and their level of physical activity. By examining the underlying reasons behind male and female students' participation in physical activities, this research seeks to clarify gender related differences and provide guidance for strategies that encourage equitable engagement in exercise. The results will be crucial for creating effective interventions in school settings – such as specialized fitness programs or motivational strategies – that can improve health and well-being outcomes for all genders.

Objectives of the Study

Building on the background and the theoretical framework, this study generally aimed to explore how motivation relates to physical activity in university students and how gender factors come into play. The specific objectives were as follows: (1) Describe the demographic profile of the respondents in terms of (a) sex, (b) Body Mass Index (BMI) category, (c) home residence (rural vs. urban), and (d) college affiliation. (2) Determine the level of physical activity participation of the respondents. (3) Assess the perceived gender role characteristics of respondents, including measures of gender identity (presence of gender dysphoria) and gender role orientation (androgyny level). (4) Measure the relative autonomy in motivation for physical activity of the respondents. (5) Analyze whether the profile variables significantly predict the physical activity level of respondents. (6) Examine the relationship between the autonomy index and the level of physical activity of respondents. (7) Determine whether gender role characteristics significantly moderate the relationship between autonomy index and physical activity levels.

MATERIALS AND METHODS

Research Design

This research employed a correlational research design to examine the relationships between motivation, gender variables, and physical activity. The study is non-experimental and cross-sectional, focusing on measuring existing characteristics and behaviors of students and analyzing the statistical associations among them. We specifically tested for a moderation effect, wherein the relationship between two variables (motivation and physical activity) may change depending on a third variable (gender role factors such as sex). This design allowed us to determine whether there is a direct effect of motivation on activity levels and whether this effect is different for different groups. All data were collected through structured self-report surveys at a single point in time and then analyzed with both descriptive statistics and inferential tests to address the research questions.

Participants and Setting

The study was conducted at Cagayan State University–Carig Campus, Tuguegarao City, Philippines. Using random sampling, we invited undergraduate students from all colleges on campus to participate. The initial target sample size was determined via a power analysis using G*Power software (Chaokromthong & Sintao, 2021). Given a two-tailed test for correlation with a medium effect size ($r \approx 0.20$), $\alpha = 0.05$, and power 0.80, the minimum required sample was estimated to be 314

students. The final sample comprised N = 987 students, providing robust statistical power for detecting even small effects. The participants ranged from first year to fourth year college students across various academic programs. Key demographic characteristics are shown in Table 1.

The sample was almost evenly split by sex, with 50.5% male (n = 498) and 49.5% female (n = 489) students. Secondly, using self-reported height and weight, 58.8% of respondents fell in the normal BMI category. About 34.1% were categorized as overweight, 5.9% as obese, and only 1.2% were underweight. This indicates the majority had a BMI in the healthy range, with a substantial minority being above the normal range. Meanwhile, a majority of the students (71.0%) reported living in urban areas, while 29.0% came from rural areas. This urban-majority skew reflects the university's location in a city and suggests many students have access to urban facilities. Lastly, students from all eight colleges of the university participated. The largest group came from the College of Human Kinetics (CHK) (42.5%), likely due to their strong interest in sports and physical education. The next largest were from the College of Engineering and Architecture (21.0%) and the College of Public Administration (10.3%). This diverse representation ensures that findings are not limited to physical education majors but extend across different academic disciplines.

Table 1. Distribution of Respondents by Sex, BMI Category, College, and Residence.

Variable	Category	Count	Percent
Sex	Female	489	49.5 %
	Male	498	50.5 %
BMI	Normal	580	58.8 %
	Underweight	12	1.2 %
	Overweight	337	34.1 %
	Obese	58	5.9 %
College	CHK	419	42.5 %
	COEA	207	21.0 %
	CHASS	80	8.1 %
	CPAD	101	10.3 %
	CNSM	20	2.0 %
	CICS	54	5.5 %
	CVM	30	3.0 %
	CIT	52	5.3 %
	COM	22	2.2 %
Residence	Rural	286	29.0 %
	Urban	701	71.0 %

Research Instruments

Data were collected using a questionnaire packet that combined several standardized instruments. The measures and their psychometric properties are described below:

The study assessed motivation for physical activity using the Revised Motivation for Physical Activity Measure (Pelletier et al., 2013). This instrument evaluates different types of motivation (external regulation, introjected regulation, identified regulation, and intrinsic motivation) with 13 items rated on a 7-point Likert scale (1 = "not true at all" to 7 = "very true"). From these responses, a Relative Autonomy Index is calculated by weighting and summing the subscale scores, yielding a single continuous score for each participant. Positive RAI scores indicate that the individual's motivation is primarily intrinsic (self-determined), whereas negative scores indicate more extrinsic motivation. Previous studies have demonstrated high internal consistency for this scale; for example, Uimonen et al. (2021) reported Cronbach's α coefficients of 0.82 for external regulation, 0.75 for introjected regulation, 0.72 for identified regulation, and 0.84 for intrinsic motivation. In a Filipino sample, Ngo et al. (2022) found an overall $\alpha \approx 0.84$ for the RM-4FM, indicating good reliability.

On the other hand, physical activity was measured using the International Physical Activity Questionnaire (IPAQ) – specifically the short form suitable for young adults (Maddison). The IPAQ gathers the frequency and duration of physical activities across different intensities (walking, moderate, vigorous) in the past week. From these responses, we computed total weekly MET-minutes (Metabolic Equivalent minutes) for each participant. Following standard IPAQ scoring protocols, we then classified each participant's activity level as Low, Moderate, or High. For example, "High" activity corresponds to ≥1500 MET-min/week of vigorous activity or ≥3000 MET-min/week of total activity, while "Moderate" includes those who meet some moderate/vigorous activity criteria, and "Low" indicates insufficient activity. In prior research, the IPAQ (short form) showed acceptable internal consistency (α ~0.70)

and test-retest reliability. Our study used the IPAQ primarily to categorize activity level and to provide a continuous outcome (MET minutes) for regression analysis. Reliability in this sample was not explicitly computed (since it's an index based on various activities), but extensive validation studies support IPAQ's use for ranking individuals by activity level.

Meanwhile, to assess aspects of gender identity, we included the Gender Identity/Gender Dysphoria Questionnaire for Adolescents and Adults (GIDYQ) (Meyer-Bahlburg, 2019). This 27-item instrument asks about feelings of discomfort or confusion regarding one's biological sex, using a 5-point scale (1 = Always, 5 = Never). Lower scores on relevant items indicate more gender dysphoria (e.g. often feeling "different" from one's assigned sex). The GIDYQ-AA has demonstrated excellent reliability in past studies (Cronbach's $\alpha \approx 0.89$–0.97 in different samples). In our sample, we used this measure to classify whether a respondent experiences notable gender incongruence ("With Gender Dysphoria") or not ("Without Gender Dysphoria"), for use in moderation analysis.

Lastly, we measured gender-role orientation using the Bem Sex-Role Inventory (BSRI) (Berrocal et al., 2022). The BSRI is a classic 60-item inventory with traits classified as masculine, feminine, or neutral; respondents rate how well each trait describes them on a 1–7 scale. Instead of a binary outcome, the BSRI provides continuous masculinity and femininity scores. We computed an androgyny index or classification: respondents who score high on both masculinity and femininity scales are labeled "androgynous," those high in one and low in the other are traditionally "masculine" or "feminine," and those low on both are "undifferentiated." For simplicity, we binned BSRI results into four categories: Very High Androgyny, High Androgyny, Moderate Androgyny, and Normal (low) androgyny, based on standardized scoring procedures. High androgyny implies a strong mix of masculine and feminine traits, whereas "normal" (low) androgyny implies the person leans toward a single gender-typed profile. The BSRI is well-established in which (Bem, 1977) reported coefficient α of ~0.86 for the Masculinity scale and 0.82 for the Femininity scale, and later studies (Bell, 2022) found $\alpha \approx 0.95$ and 0.92, respectively, indicating high internal consistency.

Each of these instruments was administered in English, which is the medium of instruction at the university. Prior to data collection, we conducted a pilot test with 30 students to ensure clarity of the questions and approximate the time needed. The survey packet also included items on demographic information (sex, age, year level, college, residence, height, weight).

Data Gathering Procedure

Before proceeding with the study, we obtained ethical clearance and permission from the Office of the Campus Executive Officer. The survey was administered online wherein informed consent was obtained from all participants prior to the formal survey. Participants were debriefed with a short summary of the study's purpose and provided contact information for the researchers in case they had questions or wanted to know the results. Furthermore, participation was voluntary, and respondents could decline or withdraw at any time. The researchers coordinated with faculty members to distribute and collect the survey packets during a convenient period. Students completed the questionnaires in approximately 15–20 minutes.

To maintain confidentiality and data privacy throughout the process, the questionnaires were anonymous, and all completed online forms were kept securely. After collection, responses were entered into a password-protected electronic database. Only the research team had access to the raw data.

Analysis of the Data/ Statistical treatment

Data were analyzed using Jamovi (Version 2.3.28) and SPSS software. Firstly, we computed frequencies and

percentages for categorical variables (sex, BMI categories, residence, etc.), and means and standard deviations for continuous variables (e.g. MET-minutes, RAI scores). This provided an overview of the sample profile and distributions of key measures. Although not the primary focus, we examined differences in activity levels and motivation by sex, using independent samples t-tests or chi-square tests as appropriate, to confirm known gender differences as a preliminary step.

For inferential analysis addressing Objectives 5–7, we used the Pearson product-moment correlation coefficient to assess the bivariate relationship between the autonomy index (RAI) and physical activity level. This tested whether higher autonomous motivation is associated with higher physical activity. We also examined correlations among other key continuous variables (e.g. RAI with age, etc.) and Spearman correlations for ordinal categories as needed.

To investigate which factors, predict physical activity level, we conducted a multiple regression with MET-minutes per week as the outcome. Predictor variables entered into the model included sex (coded 0 = female, 1 = male), BMI category (dummy coded with "Normal" as reference, and dummy variables for Underweight, Overweight, Obese), residence (0 = rural, 1 = urban), and other relevant profiles. We also included the RAI as a predictor in this model to see its effect while controlling for demographics. This analysis allowed us to estimate the unique contribution of each factor. Regression coefficients (B) with t tests and p-values were used to determine significance, with $\alpha = 0.05$ as the threshold. Before interpreting results, we checked assumptions of linear regression (normality of residuals, homoscedasticity, multicollinearity) and found no severe violations.

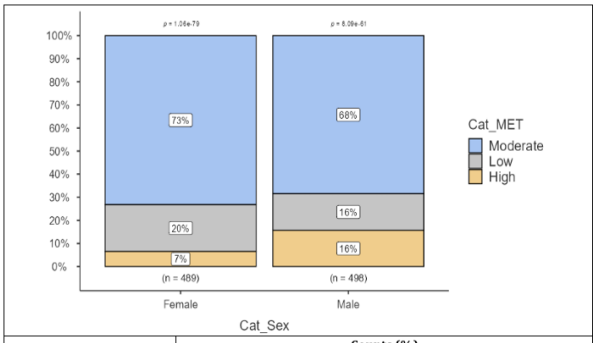
To directly address Objective 7, we tested moderation effects using hierarchical regression and interaction terms. For each potential moderator (sex, BMI, residence, college, gender dysphoria, and androgyny), we added an interaction term to the regression model: (Autonomy Index) × (Moderator). For example, to test if sex moderates the motivation–activity relationship, we included the interaction RAI × Sex in the model. All continuous variables were mean centered before creating interaction terms to ease interpretation. A significant interaction term ($p < 0.05$) would indicate a moderation effect. We ran separate models for each moderator variable to see which ones significantly interacted with RAI. Additionally, we conducted simple slope analyses for significant moderators. Figures were generated to visualize the interactions.

RESULTS AND DISCUSSION

Physical Activity Levels

Overall, the student population demonstrated moderate physical activity levels. Figure 1 shows the distribution of physical activity categories (low, moderate, high) by gender. About 70.8% of all respondents were classified as engaging in a moderate level of exercise, whereas 18.0% were in the low activity category and only 11.1% achieved high activity levels. This indicates that while most students are not completely sedentary, relatively few reach the highest activity benchmarks. Notably, male students were more likely to be in the "High" activity group than female students (approximately 7.9% of the total sample were high-active males, compared to 3.2% high-active females). Conversely, females comprised a slightly larger share of the low-activity group, about 10% of total, versus 8% low-active males. These patterns suggest that male students tended to be more active overall, especially at vigorous intensity levels, whereas female students more often had moderate or low activity. This gender gap in activity levels is consistent with prior studies. For instance, McCarthy & Warne (2022) found that among Irish university populations, women accumulated significantly fewer minutes of vigorous activity than men. Similarly, an international study reported that 65% of male college students were consistently active versus only 45% of female students, aligning closely with our observed proportions. The predominance of moderate-level activity in both groups

echoes findings by Kljajevic et al. (2021) that moderate activity is the most common intensity among university students globally.



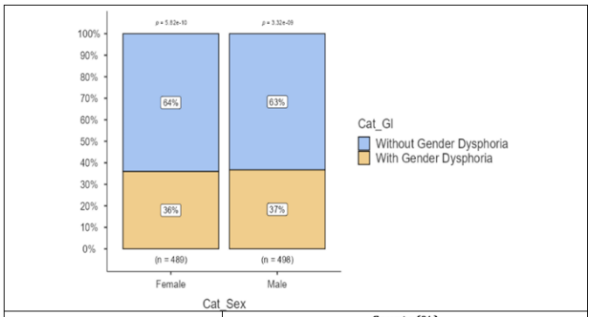
Physical Activity Level	Counts (%)		
	Male	Female	Total
High	78 (7.9%)	32 (3.2%)	110 (11.1%)
Moderate	341 (34.5%)	358 (36.3%)	699 (70.8%)
Low	99 (10.0%)	79 (8.0%)	178 (18.0%)

Figure 1. Proportional Distribution of Physical Activity Levels Across Female and Male Participants

Several factors could contribute to males' higher vigorous activity engagement. Culturally, sports and vigorous exercises are often encouraged for men, while women may face more social or institutional barriers to high-intensity exercise (Vasudevan & Ford, 2022). Structural support and funding for female sports have historically been lower, both globally and in the Philippines (Guinto et al., 2021), which may limit opportunities for women to engage in high-level training. As a result, female students may gravitate towards moderate activities like brisk walking, dance fitness, or casual sports, rather than competitive sports leagues that demand vigorous exertion. Addressing these disparities requires universities to proactively support women's access to diverse physical activities. On a positive note, for both moderate and low activity categories, the differences between genders in our sample were not very large – indicating that at lighter intensities, female participation is nearly on par with male participation. This suggests that if appropriate programs are in place (e.g. group exercise classes, non-competitive recreational activities), women will participate almost as much as men.

Gender Dysphoria

A notable minority of students reported experiencing some degree of gender incongruence. In our sample, 36.4% of respondents answered the GIDYQ-AA in a manner indicating they "have or have had" feelings of gender dysphoria (Figure 2). This percentage is higher than what is typically observed in general adult populations. Cooper et al. (2020) found the prevalence of clinically significant gender dysphoria to be around 3–5% in community samples. Among those in our study, male students were slightly more likely to report gender identity conflict than female students. About 18.5% of the total sample were dysphoric males and 17.8% were dysphoric females. In other words, roughly 37% of males and 36% of females in this sample indicated some confusion or distress about their gender identity. Meanwhile, about 63.6% of all respondents did not report any notable gender dysphoria, with almost equal proportions of males (31.9%) and females (31.7%) in this non-dysphoric majority.



Autonomy Index	Counts (%)		
	Male	Female	Total
With Gender Dysphoria	183 (18.5%)	176 (17.8%)	359 (36.4%)
Without Gender Dysphoria	315 (31.9%)	313 (31.7%)	628 (63.6%)

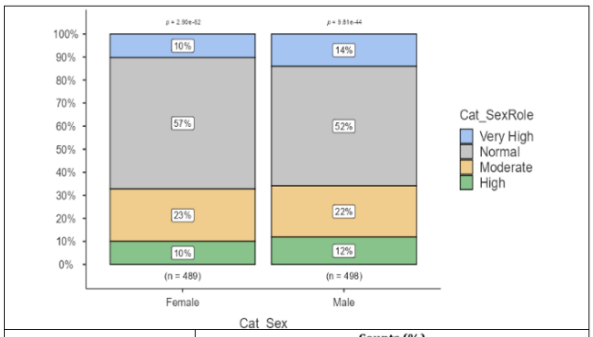
Figure 2. Proportional Distribution of Gender Dysphoria Across Female and Male Participants

These results imply that the majority of students are comfortable with their gender identity, but a substantial subset – over one-third – experience some degree of conflict or nonconformity. The slightly higher rate in males could be influenced by social factors. In some cultures, gender-nonconforming males, such as effeminate men or those questioning their male identity, might actually feel more societal pressure or become more visible, whereas gender-nonconforming females might face slightly less scrutiny (Jones, 2023). It's also possible that male respondents were more forthcoming in the

questionnaire about such feelings, or that the measure captured transient developmental feelings. Regardless, this finding highlights the importance of supportive environments. Students grappling with gender identity issues might feel alienated in traditional gender-segregated sports or facilities; thus, universities should ensure inclusivity so that these students are not deterred from being active.

Androgyny (Masculinity–Femininity Balance)

Figure 3 shows the distribution of the androgyny level of the students. Just over half of the respondents (~54.4%) fell into the "normal" androgyny level, meaning they predominantly identified with traits of one gender, either strongly masculine or strongly feminine, but not high in both. The rest had elevated androgyny. About 22.5% were Moderately androgynous, 10.9% High, and 12.2% Very High androgyny. These levels reflect how many students see themselves as blending masculine and feminine characteristics. We found that male students were more represented in the high and very high androgyny categories compared to female students. Specifically, among those with "Very High" androgyny, 7.1% of the total sample were male vs. 5.1% female; for "High" androgyny, 6.0% total were male vs. 5.0% female. In contrast, females slightly outnumbered males in the "Normal" category (females comprised ~28.3% of total vs 26.1% males), meaning more women in our sample were strongly gender-typed as feminine without many masculine traits, whereas a few more men had a mixture of traits. This complements the gender dysphoria finding where male students not only reported more identity conflict on average, but also a tendency to endorse both masculine and feminine traits, which could indicate a more fluid gender expression. From a discussion standpoint, higher androgyny in males might reflect changing norms where young men feel more open to embracing traditionally "feminine" traits (empathy, emotional expressiveness, etc.) alongside masculine ones. It could also be related to the presence of some gay or bisexual men in the sample who historically score higher on androgyny measures.

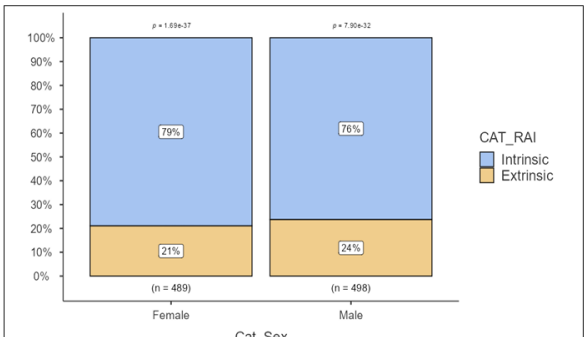


Androgyny Level*	Counts (%)		
	Male	Female	Total
Normal	258 (26.1%)	279 (28.3%)	537 (54.4%)
Moderate	111 (11.2%)	111 (11.2%)	222 (22.5%)
High	59 (6.0%)	49 (5.0%)	108 (10.9%)
Very High	70 (7.1%)	50 (5.1%)	120 (12.2%)

Figure 3. Proportional Distribution of Androgyny Levels Across Female and Male Participants

Relative Autonomy Index

Moving on, we measured each student's motivation for physical activity using the Relative Autonomy Index (RAI). The RAI scores in our sample ranged from negative (external motivation-dominant) to positive (intrinsic motivation-dominant). We categorized students broadly into "primarily intrinsically motivated" vs. "primarily extrinsically motivated" based on their RAI. The majority – 77.6% – of respondents had positive RAI scores, indicating they were motivated mainly by intrinsic factors rather than external pressures. Only about 22.4% had negative RAI, reflecting a tilt towards extrinsic motivation. This is an encouraging finding, as intrinsic motivation is known to be associated with more persistent and self-regulated exercise behavior. It appears that many students engage in physical activity because they find it enjoyable or personally important.



Autonomy Index	Counts (%)		
	Male	Female	Total
Intrinsic Motivation	380 (38.5%)	386 (39.1%)	766 (77.6%)
Extrinsic Motivation	118 (12.0%)	103 (10.4%)	221 (22.4%)

Figure 4. Proportional Distribution of Autonomy Index Across Female and Male Participants

In a similar vein, there were small but noteworthy gender differences in motivation orientation. Female students were slightly more inclined toward intrinsic motivation compared to male students, while males showed a somewhat higher tendency toward extrinsic motivation. Specifically, female respondents accounted for 39.1% of the total sample as intrinsically motivated, whereas males accounted for 38.5% intrinsically motivated (roughly 93% of males). On the extrinsic side, 12.0% of the total sample were extrinsically motivated males and 10.4% were extrinsically motivated females. In other words, among those few students who are mostly exercising due to external reasons, males slightly outnumber females. This aligns with qualitative observations that many male students cited things like competitive drive, desire for recognition, or pressure to maintain a certain physique as motivators, more so than female students did. This pattern is consistent with previous research. Sas-Nowosielski & Szopa-Wis nios (2024) found that male physical education students in Eastern Europe were more likely than females to cite external incentives as reasons for sport involvement. Similarly, Ugau et al. (2024) noted that males often have higher "competition" motive scores, whereas females score higher on appearance/fitness motives that are arguably more intrinsic tied to self-improvement. Zervou et al. (2017) also reported that women's top reasons to exercise included improving attractiveness and reducing stress, which relate to personal satisfaction, while men ranked competitive challenge and gaining popularity higher.

Predictors of Physical Activity

This study also examined which factors significantly influence students' physical activity levels as measured in weekly MET-minutes. The regression model included sex, BMI categories, residence, college, and autonomy index as predictors. Key results are summarized in Table 2 (Model Coefficients).

Table 2. Model Coefficients

Predictor	Estimate	SE	t	p
Intercept[a]	1431.26	167.80	8.53	**<.001**
Sex				
Male – Female	390.79	70.80	5.52	**<.001**
BMI				
Underweight – Normal	-1550.54	322.00	-4.82	**<.001**
Overweight – Normal	-726.06	80.70	-9.00	**<.001**
Obese – Normal	-1238.14	166.60	-7.43	**<.001**
College				
COEA – CHK	1.81	95.00	0.02	0.99
CHASS – CHK	3.49	135.40	0.03	0.98
CPAD – CHK	108.56	123.00	0.88	0.38
CNSM – CHK	-319.30	252.30	-1.27	0.21
CICS – CHK	24.00	161.20	0.15	0.88
CVM – CHK	-7.09	207.70	-0.03	0.97
CIT – CHK	-182.29	163.00	-1.12	0.26
COM – CHK	341.53	240.80	1.42	0.16
Residence				
Urban – Rural	164.88	77.80	2.12	**0.03**
Autonomy Index				
Intrinsic – Extrinsic	581.93	97.10	5.99	**<.001**
Gender Dysphoria				
Without Gender Dysphoria – With Gender Dysphoria	56.94	74.30	0.77	0.44
Androgyny Level				
Moderate – High	-269.70	129.40	-2.08	**0.04**
Normal – High	-191.88	116.90	-1.64	0.10
Very High – High	-187.02	146.00	-1.28	0.20

From the table, biological sex emerged as a significant predictor of activity level ($p = 0.001$). Controlling for other factors, male students on average engaged in about 390.8 more MET-minutes of activity per week than female students. This translates to roughly an additional 1.5 hours of moderate exercise per week. The positive regression coefficient ($B = +390.79$) for the Male–Female contrast indicates higher activity for males. From a practical perspective, this suggests female students may need additional encouragement or tailored programs to boost their activity levels to close this gap. University administrators might, for example, design campaigns to engage more female students in regular exercise.

Secondly, BMI showed significant associations with physical activity. Using "Normal BMI" as the reference group in the regression, we found that students who were Underweight, Overweight, or Obese had significantly lower activity levels than those with normal weight. Specifically, an underweight student logged on average ~1550 fewer MET-minutes per week compared to a student of normal weight ($B = 1550.54$, $p < 0.001$). Overweight students had about 726 fewer MET-minutes than normals ($B = –726.06$, $p < 0.001$), and obese students about 1238 fewer MET-minutes ($B = –1238.14$, $p < 0.001$). All these differences were statistically significant. In practical terms, an overweight student might be doing roughly 30% less activity than a similar normal-BMI peer, and an obese student ~50% less. This result is not surprising as higher body weight can be both a cause and a consequence of low physical activity.

Overweight/obese students might find exercise more physically taxing or uncomfortable, face self-consciousness in exercise settings, or have health issues that limit mobility.

Our finding mirrors those of Ding & Jiang (2020) who observed poorer fitness and activity among higher-BMI college students. It also fits with general evidence that BMI is inversely related to activity levels in youth (Guo et al., 2024). Interestingly, underweight students were the most inactive of all – though our underweight group was very small (1.2% of sample), this could reflect that underweight status might be due to illness or other factors that also reduce energy for exercise.

Furthermore, in the regression, living in an urban area was a modest but significant positive predictor of activity ($B = +164.88$, $p = 0.03$). As mentioned earlier, urban students tended to be more active than rural students. Although the effect size is small, it corroborates findings from other contexts that urbanicity can influence lifestyle – sometimes urban residents have more sedentary jobs but more exercise facilities, whereas rural residents might have active chores but fewer organized exercise options. Our finding aligns with reports by Regis et al. (2016) where urban adolescents had slightly higher activity levels, likely due to better access to sports infrastructure. An interesting contrast is that global data often show rural populations having more occupational or lifestyle physical activity (like farming work) but possibly less leisure-time exercise (Regis et al., 2016). In our young adult student sample, the difference might come from the fact that rural students have to commute or have less free time for gym sports, whereas urban students can jog in parks or join fitness classes.

As expected, autonomous motivation was a significant positive predictor of physical activity level. In the regression, a higher RAI score correlated with higher MET-minutes ($p < 0.001$). To illustrate, our model coefficient indicated that shifting from primarily extrinsic to primarily intrinsic motivation (approximately a one-unit increase in RAI on its standardized scale) was associated with an increase of about +582 MET-minutes per week ($B = +581.93$, $p < 0.001$). This is a substantial effect, underscoring that motivation is a key driver. This further means that students who internalize reasons for exercise like enjoyment and personal goals tend to spend significantly more time being active than those who feel pressured or unmotivated. It mirrors numerous studies in the literature. For example, Brown & Lent (2019) found that intrinsically motivated individuals had higher daily activity and even less sedentary time. Jimenez-Morcillo & Clemente-Sua rez (2023) also noted significant correlations between motivation levels and vigorous exercise involvement.

Ultimately, gender role orientation by itself did not strongly predict activity level. The regression found no significant differences in MET-minutes for androgynous vs. non-androgynous individuals when controlling for other factors and as noted, no interaction effect of androgyny on the motivation-activity relationship was found ($p = 0.644$). This suggests that simply having a mix of masculine/feminine traits doesn't directly influence how much exercise one gets, after accounting for sex. However, high androgyny in males coincided with more reported gender confusion, as we saw comparing Figures 2 and 3, which could hint at certain male students potentially feeling less comfortable in conventional sports settings which are often quite gendered and may reward hyper-masculinity. Universities might consider this when designing programs making sure that there are co-ed or noncompetitive physical activity options where rigid gender norms are less pronounced which may help highly androgynous or gender-nonconforming students engage more.

Relationship Between Motivation and Physical Activity

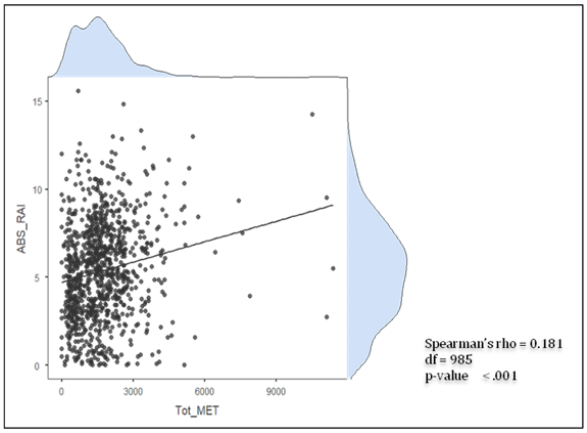
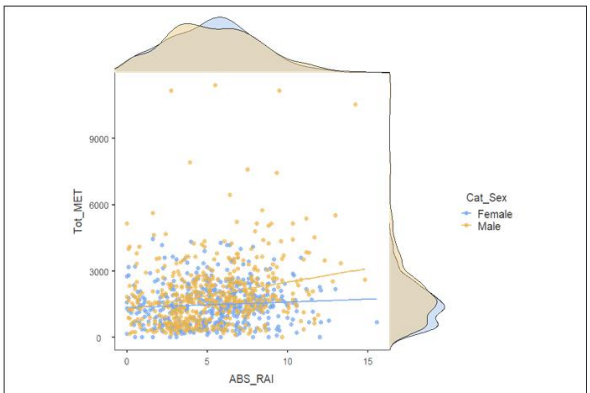


Figure 5. Relationship of autonomy index of respondents to levels of physical activity

To further illustrate the relationship between motivation and physical activity, we plotted the data and observed a clear positive trend. Figure 5 shows that students with higher RAI scores generally accumulated more MET-minutes. Specifically, the figure showed an upward slope, and the correlation was statistically significant (Spearman's rho ≈ 0.181, $p < 0.001$). Put simply, those who exercise because they want to often do exercise more. This finding is a cornerstone of applying Self-Determination Theory to physical activity which means that autonomy and internal motivation are critical for sustaining an active lifestyle.

Moderation Analysis of Motivation–Activity Relationship

Firstly, the moderation analysis revealed a significant interaction between sex and autonomy index (RAI) in predicting physical activity ($p < 0.001$ for the RAI × Sex term). This means the strength of the motivation–activity relationship differed for male and female students. Figure 6 illustrates this interaction. For male students (blue line), there was a steep positive slope which suggests that as their motivation became more intrinsic, their physical activity (MET-min/week) increased sharply. Highly intrinsically motivated males had the highest activity levels of anyone in the sample. In contrast, for female students (green line in Figure 6), the slope was much flatter – indicating that changes in motivation were associated with only small changes in activity. In fact, for females the relationship was almost negligible; an extrinsically motivated female and an intrinsically motivated female did not differ greatly in weekly exercise volume, on average.

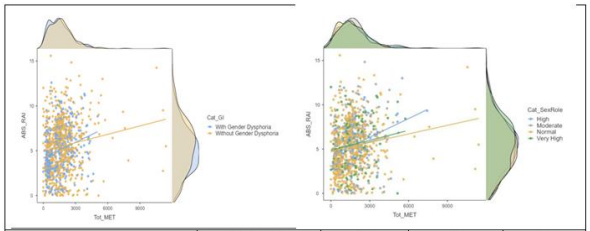


	Estimate	SE	Z	p
ABS_RAI	75.1	13.8	5.43	<.001
Sex	-454.6	77.1	-5.90	<.001
ABS_RAI ✻ Sex	**-98.0**	**27.7**	**-3.54**	**<.001**

Figure 6. Moderation Statistics between Sex and the Relationship of Autonomy Index and Physical activity

This result in figure 6 is quite insightful. It suggests that there are additional barriers or dynamics limiting female students from converting motivation into actual exercise behavior. One interpretation is that even motivated women might face obstacles – for example, lack of time due to familial duties, safety concerns when exercising (especially outdoors or at night), fewer female-oriented sports programs, or social discouragement (the lingering stereotype that strenuous exercise "is not feminine," etc.). Males, on the other hand, perhaps have more social support or cultural permission to be active when they want to. Another perspective is that the types of motivation measured by the RAI might manifest differently by gender. A high RAI score for a male often comes with competitive or vigorous outlets, which rack up METs. A high RAI for a female might involve more moderate forms, like doing yoga or brisk walking, which, while healthy, accumulate fewer MET-minutes. Our finding resonates with Chastin et al. (2014) who noted that even when women are motivated to be active, they often remain more sedentary than men. Similarly, a recent multi-country study by Vasudevan & Ford (2022) found that girls were more sedentary than boys even under conditions that encourage physical activity.

From a practical standpoint, this moderation effect means interventions might need to be gender tailored. For male students, simply fostering high motivation could be sufficient to ensure they stay active. For female students, we may need to go a step further, even if motivation is present, we should simultaneously work on reducing external barriers and providing opportunities that align with their needs like women-only workout sessions for those who feel uncomfortable in co-ed gyms, self-defense classes to build confidence, flexible scheduling around family commitments among others. The goal is that a motivated female student gets the same chance to be active as a motivated male student.



	Estimate	SE	Z	p
ABS_RAI ✻ Gender Dysphoria	-30.8	53.9	-0.571	0.568
ABS_RAI ✻ Androgyny Level	5.89	12.7	0.463	0.644

Figure 7. Moderation Statistics between Androgyny and the Relationship of Autonomy Index and Physical Activity

Finally, we examined the potential moderation by gender role variables - presence of gender dysphoria and level of androgyny. The results showed that neither gender dysphoria nor androgyny significantly moderated the motivation–physical activity relationship (interaction p = 0.568 and 0.644, respectively). Figure 7 conceptually indicated that the trend of motivation predicting more activity held true for those with and without gender dysphoria, and for those with high vs. low androgyny, without a statistically reliable difference in slope. In other words, a student struggling with gender identity issues derives just as much benefit from intrinsic motivation (in terms of being active) as a student who is comfortable in their gender. Similarly, whether a student is traditionally gender-typed or more androgynous doesn't change how motivation drives their activity level.

This is an important and somewhat optimistic finding because it implies that internal motivation is a universally positive driver. Even for groups that might face unique social challenges like gender-diverse students, if they are intrinsically motivated, they will likely find ways to be active. We did observe that male gender-dysphoric and highly androgynous students tended to have lower absolute activity, but once we account for those factors, motivation works the same. Prior literature on transgender or gender-diverse individuals often focuses on barriers such as discrimination or lack of safe spaces (Velasco et al., 2022), which certainly need addressing. Our data suggest that when those individuals are internally driven, they can overcome some barriers – but we must ensure supportive environments (e.g. inclusive gym policies, anti-harassment measures) so that their motivation is not stifled by external negativity.

CONCLUSIONS

This study demonstrated that university students at Cagayan State University-Carig Campus have generally moderate levels of physical activity, with notable gender differences—males being significantly more active than females. Intrinsic motivation strongly predicted higher physical activity levels, emphasizing the importance of advancing enjoyment, personal health goals, and internal satisfaction among students. Notably, sex significantly moderated this relationship where male students converted intrinsic motivation into higher levels of activity more effectively than females, who may encounter additional social or practical barriers. Other factors such as BMI, residence, college affiliation, gender dysphoria, and androgyny did not significantly alter the motivation–activity link. These findings emphasize the necessity for gender-sensitive interventions to support female students specifically, alongside initiatives to sustain intrinsic motivation and provide inclusive opportunities for physical activity to enhance overall student health and well-being.

RECOMMENDATIONS

Based on the study findings, the following are the recommendations for practice and further research. Overall, these recommendations are working toward a more active and healthy student community. The evidence suggests that "one size fits all" approaches are less effective; instead, strategies should consider gender and individual motivational differences. (1) University sports directors and wellness programs should design activities that enhance intrinsic enjoyment. For instance, offer a variety of fun, non-competitive physical activity classes (dance, yoga, martial arts, outdoor adventure clubs) so that students can find something they truly enjoy. By tapping into what students internally value, their overall activity levels are likely to increase and sustain. (2) Given the lower activity levels and the weaker translation of motivation to behavior among female students, administrators should create interventions to engage women in physical activity. This could include women-only fitness sessions, mentorship programs pairing novice female exercisers with active female role models, or forming interest-based groups like a walking club, Zumba class, or women's intramural sports league in a supportive environment. (3) While our data showed gender-diverse (e.g. androgynous or gender dysphoric) students can be just as active when motivated, it's important to ensure they feel safe and included. Universities should uphold nondiscrimination policies in sports facilities and possibly provide private changing areas or gender-neutral locker rooms. (4) The strong negative link between BMI and activity suggests that overweight and obese students may need specialized support to engage in physical activity. We recommend programs such as beginner-friendly fitness workshops, "exercise is medicine" counseling sessions, or supervised group workouts that cater to different body sizes and fitness levels. These can help build confidence and competence in students who may be self-conscious or physically challenged by standard exercise routines. (5) To build on this study, future research can explore the qualitative aspects of why female students' motivation doesn't translate to action as strongly. Interviews or focus groups could uncover specific barriers or social pressures at play.

REFERENCES

Bell, S. A. (2022). Changing perceptions of masculinity and femininity in America?: revisiting the Bem Sex-Role Inventory. Bem, S. L. (1977).

Bem sex-role inventory (BSRI). The 1977 Annual Handbook for Group Facilitators, 83–85.

Berrocal, C. G., Cervilla, O., A lvarez-Muelas, A., & Sierra, J. C. (2022). The Bem sex-role inventory: proposal of a short version in Spanish. Anales de Psicología/Annals of Psychology, 38(3), 530–537.

Brown, S. D., & Lent, R. W. (2019). Social cognitive career theory at 25: Progress in studying the domain satisfaction and career self-management models. Journal of Career Assessment, 27(4), 563–578. https://doi.org/http://dx.doi.org/10.1177/1069072719852736

Chaokromthong, K., & Sintao, N. (2021). Sample size estimation using Yamane and Cochran and Krejcie and Morgan and green formulas and Cohen statistical power analysis by G* Power and comparisions. APHEIT International Journal of Interdisciplinary Social Sciences and Technology, 10(2), 76–86.

Chastin, S. F. M., Fitzpatrick, N., Andrews, M., & DiCroce, N. (2014). Determinants of sedentary behavior, motivation, barriers and strategies to reduce sitting time in older women: a qualitative investigation. International Journal of Environmental Research and Public Health, 11(1), 773–791.

Dias, S. S., Lages, M., Frontini, R., Luí s, L., Dixe, M. dos A., & Sousa, P. (2021). Association between food choices motivators and physical activity in body image (dis) satisfaction in Portuguese adolescents. Frontiers in Public Health, 9, 651228.

Ding, C., & Jiang, Y. (2020). The relationship between body mass index and physical fitness among Chinese university students: results of a longitudinal study. Healthcare, 8(4), 570.

Francisco, G. M. M. (2023). The Magna Carta of Women as the Philippine translation of the CEDAW: a feminist critical discourse analysis. In The Law and Critical Discourse Studies (pp. 52–63). Routledge.

Guinto, M. L. M., Lasat-Uy, G., & Cantancio, M. F. (2021). Women in Philippine sport and physical education: Bridging the gender divide. In Women and Sport in Asia (pp. 157–167). Routledge.

Guo, T., Shen, S., Yang, S., & Yang, F. (2024). The relationship between BMI and physical fitness among 7451 college freshmen: a cross-sectional study in Beijing, China. Frontiers in Physiology, 15, 1435157.

Jimenez-Morcillo, J., & Clemente-Sua rez, V. J. (2023). Gender differences in body satisfaction perception: the role of nutritional habits, psychological traits, and physical activity in a strength-training population. Nutrients, 16(1), 104.

Jones, C. (2023). An Inaugural, Qualitative Examination of the Relationships Between People With Gender Nonconforming Expression and Social Anxiety.

Kljajevic , V., Stankovic , M., Đorđevic , D., Trkulja-Petkovic , D., Jovanovic , R., Plazibat, K., Ors olic , M., C uric , M., & Sporis , G. (2021). Physical activity and physical fitness among university students—A systematic review. International Journal of Environmental Research and Public Health, 19(1), 158.

Manasan, P. L., Quitor, C. G., Ronquillo, V. P., Dabu, D. C., Cruz, J. T. Dela, Sode, M. A. V, & Cruz, S. J. L. (2023). Motives and Barriers to Exercise among Underweight Filipino College Students. International Journal of Multidisciplinary: Applied Business and Education Research, 4(9), 3244–3263.

McCarthy, C., & Warne, J. P. (2022). Gender differences in physical activity status and knowledge of Irish University staff and students. Sport Sciences for Health, 18(4), 1283–1291.

MEYER-BAHLBURG, H. F. L. (2019). Gender Identity/Gender Dysphoria Questionnaire. Handbook of Sexuality-Related Measures, 343.

Mungcal, K. S., Serrano, J. M. M., & Tolentino, J. C. G. (2021). Exploring motives and barriers to exercise among 'at-risk and obese'Filipino college students. 2021APCORE, 97.

Ngo, J. K., Kurata, Y. B., Sicat, Z. M. V, Bunas, D. I. G., Gutierrez, J. D., Pangilinan, P. R. D., & Pascual, P. A. M. J. (2022). Lifestyle-related Factors Affecting Physical Inactivity Issues among Filipino Aging Population during the COVID-19 Pandemic: A Multiple Regression Approach. Global Issues: Disease Control and Pandemic Prevention, 24, 37.

Panão, I., & Carraça, E. V. (2020). Effects of exercise motivations on body image and eating habits/behaviours: A systematic review. Nutrition & Dietetics, 77(1), 41–59.

Pelletier, L. G., Rocchi, M. A., Vallerand, R. J., Deci, E. L., & Ryan, R. M. (2013). Validation of the revised sport motivation scale (SMS-II). Psychology of Sport and Exercise, 14(3), 329–341.

Rasmussen, K., Dufur, M. J., Cope, M. R., & Pierce, H. (2021). Gender marginalization in sports participation through advertising: The case of Nike. International Journal of Environmental Research and Public Health, 18(15), 7759.

Regis, M. F., Oliveira, L. M. F. T. de, Santos, A. R. M. dos, Leonidio, A. da C. R., Diniz, P. R. B., & Freitas, C. M. S. M. de. (2016). Urban versus rural lifestyle in

adolescents: associations between environment, physical activity levels and sedentary behavior. Einstein (Sao Paulo), 14, 461–467.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary Educational Psychology, 61, 101860.

Sabado, M. L. C., Brebante, Z. R. T., Ulanday, M. E. D., Daut, H. C., Gallardo, M. A., Gallardo, A. M. S. A., Layao, M., & Lucman, A. T. (2025). Quality Physical Education in the Philippines: Challenges and Opportunities. Quality Physical Education, 175–186.

Sas-Nowosielski, K., & Szopa-Wis nios, S. (2024). COMPARISON OF PERCEPTIONS OF THE VALUE OF SPORTS AMONG PHYSICAL EDUCATION STUDENTS IN POLAND AND CHINA. Folia Turistica, 63.

Starr, C. R., & Zurbriggen, E. L. (2017). Sandra Bem's gender schema theory after 34 years: A review of its reach and impact. Sex Roles, 76, 566–578.

Ugau, V. A., Kram, S., Sanif, S. N. A. M., James, A., Shafie, A. C. A., & Catarinella, P. (2024). Unveiling Motivational Differences: Gender Influences on Physical Activity Engagement at UiTM Sarawak. International Journal of Research and Innovation in Social Science, 8(9), 1886 1894.

Uimonen, M., Repo, J. P., Gro nroos, K., Ha kkinen, A., & Walker, S. (2021). Validity and reliability of the motivation for physical activity (RM4-FM) questionnaire. Journal of Exercise Rehabilitation, 17(2), 103.

Van Uffelen, J. G. Z., Khan, A., & Burton, N. W. (2017). Gender differences in physical activity motivators and context preferences: a population-based study in people in their sixties. BMC Public Health, 17, 1–11.

Vasudevan, A., & Ford, E. (2022). Motivational factors and barriers towards initiating and maintaining strength training in women: a systematic review and meta-synthesis. Prevention Science, 23(4), 674–695.

Velasco, R. A. F., Slusser, K., & Coats, H. (2022). Stigma and healthcare access among transgender and gender-diverse people: A qualitative meta-synthesis. Journal of Advanced Nursing, 78(10), 3083–3100.

Wasserfurth, P., Palmowski, J., Hahn, A., & Kru ger, K. (2020). Reasons for and consequences of low energy availability in female and male athletes: social environment, adaptations, and prevention. Sports Medicine-Open, 6(1), 44.

Zervou, F., Stavrou, N. A. M., Koehn, S., Zounhia, K., & Psychountaki, M. (2017). Motives for exercise participation: The role of individual and psychological characteristics. Cogent Psychology, 4(1), 1345141.