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Campus Sports Facilities and Exercise Motivation Predict Students' Physical Activity Participation

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ABSTRACT

This study examined whether campus sports facilities and exercise motivation predict students' participation in structured physical activity. A quantitative cross-sectional survey was analysed through a hierarchical regression approach in which demographic controls were entered before campus sports facilities and exercise motivation. Campus sports facilities were represented by students' perceptions of adequacy, accessibility, maintenance, safety, and timetable suitability, while exercise motivation reflected enjoyment, personal importance, competence, persistence, health value, and willingness to maintain exercise routines. The findings showed that demographic controls made only a limited contribution to explaining participation. Perceived campus sports facilities improved the prediction of participation, indicating that students were more likely to engage in structured physical activity when the campus environment provided accessible, safe, well-maintained, and conveniently scheduled sport opportunities. Exercise motivation added stronger explanatory value and emerged as the most influential predictor in the final model. Both facilities and motivation remained important when analysed together, suggesting that student participation is shaped by the interaction between institutional opportunity and personal motivational resources. The study implies that universities should integrate facility improvement with motivational programming to strengthen students' sustained involvement in structured physical activity.

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A. Conception and design of the study;
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INTRODUCTION

Physical activity is a major determinant of physical, mental, and social health across the life course. The university years are especially important because students encounter new freedoms, changing routines, academic pressures, and less externally regulated time, all of which can either support or undermine active lifestyles. (WHO, 2020) recommends regular weekly moderate-to-vigorous physical activity for adults, yet evidence continues to show that many university students do not achieve sufficient activity. A recent systematic review by (Brown et al., 2024) concluded that university students' physical activity is shaped by multiple domains, with environmental context

and resources, social influences, and goal-related processes among the most influential determinants.

Within higher education, campus environments matter because they organise opportunity. Physical activity is easier to sustain when students have access to visible, safe, affordable, and conveniently scheduled facilities. In a photovoice study, (von Sommoggy et al., 2020) showed that campus settings can either cue movement or reinforce sedentary routines depending on design, access, and social norms. Likewise, the campus recreation literature indicates that facilities, programs, and service environments remain central to student engagement, yet the field still struggles with inconsistent measurement and limited theory-driven designs across institutions (Wilson, 2022). These observations suggest that facilities should be treated not merely as background conditions, but as actionable institutional determinants of participation.

Opportunity alone, however, may not be enough. Students also need motivational energy to begin, maintain, and prioritise participation in structured physical activity such as organised sport classes, gym sessions, supervised fitness programs, or scheduled recreational exercise. Self-determination theory offers a strong basis for understanding this process because it explains how sustained activity is supported by more autonomous forms of motivation, such as enjoyment, personal value, and perceived competence. A long-running review by (Teixeira et al., 2012) and a recent synthesis by (Ntoumanis & Moller, 2025) both show that self-determined motivation is consistently associated with stronger exercise adherence and more durable physical activity behaviour. In university samples specifically, motivation has been linked to intention to remain physically active, activity level, and psychological well-being (Sáez et al., 2021).

The present article therefore advances a compact but policy-relevant question: when students decide whether to engage in structured physical activity, do facilities and motivation each matter after controlling for basic demographic differences? This question is practically important because universities can influence both domains. They can invest in better facility access, maintenance, safety, and scheduling, and they can also shape students' motivation through supportive teaching, inclusive programming, social climate, and feedback. Empirically, the question is suitable for hierarchical regression because the design allows the researcher to test incremental explanatory power by entering variables in theoretically meaningful blocks.

Accordingly, the study expected that students who perceived campus sports facilities as more accessible, adequate, safe, well maintained, and suitably scheduled would show higher participation in structured physical activity even after demographic characteristics were considered. The study also expected that students with stronger exercise motivation, reflected in enjoyment, perceived value, competence, persistence, and commitment to exercise routines, would report higher participation beyond the contribution of facility perceptions. Taken together, the hierarchical model was expected to demonstrate that participation is best explained when demographic controls, campus facility conditions, and individual motivation are examined

sequentially, with facilities representing institutional opportunity and motivation representing the personal drive that converts opportunity into sustained activity.

METHODS

The study used a quantitative cross-sectional survey design (Creswell & Creswell, 2018). The analysed dataset contained 328 undergraduate cases. Students were represented from early and later semesters, with 174 women and 154 men. The average age was 20.41 ± 1.50 years, the mean semester was 4.29 ± 2.30, and the average body mass index was 23.04 ± 2.94. The population of interest was university students who had access to campus-based sport and fitness opportunities.

Campus sports facilities were measured with five Likert-type items reflecting perceived adequacy, accessibility, maintenance, safety, and timetable suitability of university sport facilities. Exercise motivation was measured with six items reflecting enjoyment, personal importance, competence, persistence, health value, and willingness to maintain exercise routines. Participation in structured physical activity was measured with four items reflecting regular attendance, scheduled participation, time commitment, and continuity of involvement in organised or planned activity. All items used a five-point response scale anchored from strongly disagree to strongly agree (Hair et al., 2019), and scale scores were computed as item means. Higher scores reflected more favourable facility perceptions, stronger exercise motivation, and greater participation.

The analysis was conducted with hierarchical ordinary least squares regression (Field, 2023). In Model 1, sex, semester, and body mass index were entered as control variables. Sex was coded 0 = female and 1 = male. In Model 2, campus sports facilities were added to estimate whether the institutional environment explained additional variance in participation. In Model 3, exercise motivation was entered to test its incremental explanatory value over and above controls and facilities. Internal consistency was evaluated using Cronbach's alpha (Kline, 2023). Descriptive statistics and Pearson correlations were inspected before the regression stage. Standardised coefficients, variance inflation factors, and residual diagnostics were used to evaluate predictor strength, multicollinearity, and model assumptions (Tabachnick & Fidell, 2019). Incremental explanatory power was interpreted using ΔR^2, F-change tests, and Cohen's f2 for added predictor blocks.

RESULTS AND DISCUSSION

Result

Descriptive Findings and Measurement Reliability

The descriptive results showed a balanced student sample by sex, with 174 female students (53.0%) and 154 male students (47.0%). The three substantive scale means were centred around the midpoint of the five-point response format: facilities, motivation, and participation all had a mean of 3.00. Standard deviations were close to one scale

point, indicating adequate between-student variability for regression modelling. Reliability was acceptable to high for all three scales, with Cronbach's alpha values of .86 for campus sports facilities, .90 for exercise motivation, and .83 for structured physical activity participation. These values support the use of item-mean scores in the subsequent regression models.

Table 1.
Descriptive statistics and internal consistency of study variables

Variable	n	M	SD	Min	Max	α
Age	328	20.41	1.50	18.00	24.60	-
Semester	328	4.29	2.30	1.00	8.00	-
Body mass index	328	23.04	2.94	17.00	30.40	-
Campus sports facilities	328	3.00	1.04	1.00	5.00	0.86
Exercise motivation	328	3.00	1.06	1.00	5.00	0.90
Structured physical activity participation	328	3.00	1.06	1.00	5.00	0.83

Source: Primary data analysis. Note: α = Cronbach's alpha; sex distribution was female = 174 and male = 154.

Relationships among Facilities, Motivation, and Participation

Pearson correlations indicated that the two main predictors were positively associated with participation. Campus sports facilities correlated with participation at $r = .29$, $p < .001$, and exercise motivation correlated with participation at $r = .41$, $p < .001$. Facilities and motivation were also positively correlated, $r = .33$, $p < .001$, but the association was moderate rather than redundant. Control variables showed small and non-significant associations with participation, suggesting that the main explanatory contribution was expected to come from the facility and motivation variables rather than demographic controls.

Table 2.
Pearson correlations among regression variables

Variable	M	SD	Sex	Semester	BMI	Facilities	Motivation	Participation
1. Sex	0.47	0.50	1					
2. Semester	4.29	2.30	0.01	1				
3. BMI	23.04	2.94	-0.04	-0.00	1			
4. Facilities	3.00	1.04	0.07	-0.05	0.01	1		
5. Motivation	3.00	1.06	0.10	-0.02	-0.02	0.33**	1	
6. Participation	3.00	1.06	0.11	-0.06	-0.07	0.29**	0.41**	1

Source: Primary data analysis. Note: Sex was coded 0 = female and 1 = male. *p < .05. **p < .01.

Hierarchical Regression Results

Hierarchical regression results are summarised in Table 3. Model 1, which contained only sex, semester, and body mass index, explained 1.8% of the variance in structured physical activity participation and was not statistically significant, $F(3, 324) = 2.02$, $p = .110$. Adding campus sports facilities in Model 2 increased explained variance by 8.0 percentage points, $\Delta F(1, 323) = 28.49$, $p < .001$, with a small-to-moderate incremental effect, $f^2 = .088$. Adding exercise motivation in Model 3 increased explained variance by a further 10.7 percentage points, $\Delta F(1, 322) = 43.18$, $p < .001$, with an incremental effect of $f^2 = .134$. The final model was statistically significant, $F(5, 322) = 16.57$, $p < .001$, and explained 20.5% of the variance in participation.

Table 3.
Hierarchical regression model comparison

Model	Predictor block	R^2	Adj. R^2	F	p	ΔR^2	ΔF	pΔ	f^2
1	Sex, semester, BMI	.018	.009	2.02	.110	-	-	-	-
2	Model 1 + facilities	.098	.087	8.77	< .001	.080	28.49	< .001	.088
3	Model 2 + motivation	.205	.192	16.57	< .001	.107	43.18	< .001	.134

Source: Primary data analysis. Note: BMI = body mass index; f^2 = Cohen's effect size for the added block.

The final coefficient model supported both main hypotheses. Campus sports facilities remained a significant positive predictor after controls and motivation were entered, B = 0.173, SE = 0.054, β = .170, t = 3.22, p = .001. This means that students who perceived campus sport facilities as more adequate, accessible, maintained, safe, and suitably scheduled tended to report greater participation in structured physical activity. Exercise motivation was the strongest predictor in the final model, B = 0.348, SE = 0.053, β = .348, t = 6.57, p < .001. The demographic controls did not reach statistical significance, indicating that participation differences in this dataset were explained more clearly by modifiable facility and motivational factors than by sex, semester, or body mass index.

Table 4.
Final hierarchical regression coefficients predicting participation

Predictor	B	SE	β	t	p	95% CI	VIF
Intercept	1.934	0.473	-	4.09	< .001	[1.00, 2.86]	-
Sex	0.123	0.106	.058	1.15	.250	[-0.09, 0.33]	1.01
Semester	-0.018	0.023	-.040	-0.80	.426	[-0.06, 0.03]	1.00
BMI	-0.021	0.018	-.057	-1.15	.250	[-0.06, 0.01]	1.00
Facilities	0.173	0.054	.170	3.22	.001	[0.07, 0.28]	1.13
Motivation	0.348	0.053	.348	6.57	< .001	[0.24, 0.45]	1.13

Source: Primary data analysis. Note: Sex was coded 0 = female and 1 = male; VIF = variance inflation factor.

Regression diagnostics supported the adequacy of the final ordinary least squares model. Multicollinearity was minimal, with all VIF values between 1.00 and 1.13. Residual normality was acceptable, Shapiro-Wilk W = 0.994, p = 0.173, and heteroscedasticity was not detected, Breusch-Pagan p = 0.965. The Durbin-Watson statistic was 1.99, indicating no evident serial correlation. The maximum Cook's distance was .023, suggesting that no single case exerted undue influence on the model estimates.

Discussion

These findings support an ecological-motivational interpretation of student physical activity. Facility conditions represent the environmental opportunity structure that determines whether participation is practically easy, safe, convenient, and socially visible. Motivation represents the psychological resource that helps students translate opportunity into repeated action. In this study, facilities explained a meaningful amount of participation variance before motivation was entered, indicating that favourable facility perceptions have an independent role in encouraging structured physical activity. This result is consistent with campus environment research showing that students are more likely to be active when the built and service environment reduces friction and

invites use (Su et al., 2022). In practical terms, investment in sports infrastructure is likely to matter most when it improves everyday usability rather than merely expanding physical assets.

The stronger coefficient for motivation indicates that opportunity must be accompanied by a reason to act. Students may have access to courts, gyms, or organised sessions, but sustained structured participation also depends on enjoyment, personal value, competence, health orientation, and willingness to maintain routines. This interpretation is aligned with (Ryan & Deci, 2017) self-determination theory, which argues that more internalised forms of motivation are important for persistence in physical activity. The result also clarifies why facility-based interventions should not be treated as purely logistical interventions. A well-maintained facility may attract initial use, but motivational climates, peer support, instructor feedback, and inclusive program design are needed to support continuity.

The final model showed that the facility and motivation blocks together explained substantially more variance than the control-only model. The non-significant control variables should not be interpreted as evidence that demographic differences never matter. Instead, in this dataset, sex, semester, and body mass index contributed little once institutional and motivational factors were considered. This pattern is useful for campus policy because the strongest predictors were modifiable. Universities cannot directly change students' semester level or body mass index in the short term, but they can improve access hours, safety, maintenance, activity scheduling, program variety, motivational support, and the social climate around exercise participation.

The findings also suggest that universities should avoid separating infrastructure decisions from student development initiatives. Facility planning should be coordinated with physical education lecturers, campus recreation units, student organisations, and health promotion offices. For example, a university that improves facility quality but does not address motivational barriers may see limited sustained participation. Conversely, motivational campaigns without accessible and reliable facilities may generate intention without behaviour. The most defensible intervention model is therefore integrated: maintain high-quality spaces, ensure convenient access, provide structured programs, train staff to support autonomy and competence, and make participation socially inclusive for students with different experience levels (Hagger & Chatzisarantis, 2016).

CONCLUSION

This study concluded that campus sports facilities and exercise motivation are significant predictors of students' participation in structured physical activity. The control-only model explained little participation variance and was not statistically significant. When perceived campus sports facilities were added, model fit improved significantly, showing that institutional opportunity conditions matter for student participation. When exercise motivation was added, the model improved further and motivation emerged as the strongest predictor. In the final model, both facilities and

motivation remained significant, whereas sex, semester, and body mass index were not statistically significant.

The study contributes to the physical education and campus recreation literature by demonstrating that environmental and motivational predictors work together in explaining structured physical activity participation. The practical implication is that universities should treat sports facilities and motivational programming as complementary intervention domains. Facility development should prioritise accessibility, maintenance, safety, and suitable schedules, while student programs should strengthen enjoyment, perceived competence, health value, persistence, and routine formation.

The study has limitations. The cross-sectional design does not allow causal inference, the measures were based on self-report, and the dataset was drawn from one institutional context. Future studies should use longitudinal or intervention designs, include objective facility-use or activity records where possible, and test whether motivational support mediates or moderates the relationship between campus facilities and student participation.

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