

Motor Competence, Grit, and Physical Literacy as Determinants of Active Lifestyle Participation among University Students

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Abstract

This study examined motor competence, grit, and physical literacy as determinants of active lifestyle participation among university students. A quantitative cross-sectional correlational research design was employed to determine the relationships among the variables. The respondents consisted of 150 first-year undergraduate students from selected academic programs at Western Mindanao State University, chosen through stratified random sampling. Data were collected using a motor skill performance test battery to measure motor competence, the Short Grit Scale (Grit-S) to assess perseverance toward long-term goals, a physical literacy questionnaire, and the International Physical Activity Questionnaire–Short Form (IPAQ-SF) to determine active lifestyle participation. Descriptive statistics were used to determine the levels of the variables, while Pearson Product–Moment Correlation and multiple linear regression analyses were conducted to examine their relationships and predictive influence. The results revealed that students demonstrated moderate to high levels of motor competence, moderate levels of grit, and moderately high levels of physical literacy, while their participation in active lifestyle behaviors was classified as moderately active. The findings also showed significant positive relationships between motor competence and active lifestyle participation and between grit and active lifestyle participation. Furthermore, regression analysis indicated that motor competence, grit, and physical literacy significantly predict active lifestyle participation, with physical literacy emerging as the strongest predictor among the variables. These findings highlight the importance of promoting movement competence, perseverance, and physical literacy to encourage sustainable physical activity participation among university students.

Keywords: motor competence; grit; physical literacy; active lifestyle participation; university students

Introduction

Active lifestyle participation involves the regular practice of activities that improve and maintain a person's physical health and overall well-being. This is even more critical among university students who are in the adulthood stage for the first time. A more physically active student is likely to have more positive mental health and quality of life (Herbert, 2022). Several studies show university students are the least physically active among other students in the world. This is attributed to time constraints, access to exercise equipment, and even motivation (Silva et al., 2022). Almost 41.4% (more than a third) of university students across 23 countries are classified as physically inactive. This is the highest proportion of inactivity (Pengpid

et al, 2015). The declining level of physical activity among university students coupled with an alarming increase of sedentary behavior underlines the importance of more studies that can unlock the reasons for the phenomenon.

Multiple global studies have indicated concerns about the levels of participation in physical activity as well as the degree of sedentary behavior among university students. Inactivity is especially alarming among the students at a university in Brazil which is part of the study of Barbosa et al. (2024) as they are noted to have an average of over 7 hours of being sedentary. Research on university students in Germany revealed that there are substantial amounts of time spent sedentary and there is a significant perception of stress which speaks to a high degree of inactivity in university settings (Tan et al, 2020). A study in China described university students that participate in physical activity as having an alarming range of activity levels with many reporting low participation in physical activity of a moderate to vigorous level (Zhang et al, 2023). Inactivity is also noted among medical students in Latin America with female students and students in the early years of study being noted to have a greater degree of sedentary behavior (Herrerros-Irarrázabal et al, 2024). Concerns over physical activity and the sedentary lifestyle have been present in many studies that are conducted in different settings of higher education, and these studies have all indicated that there is a problem in this area among university students.

National studies also show concerns regarding the lifestyle and physical activity patterns of Filipino students. Low levels of engagement in lifestyle components such as exercise, and nutrition were found in the study by Dungog et al. (2021) concerning high school and college students in Luzon, Philippines. Likewise, Masagca (2025) analyzed physical activity levels and perceived physical fitness of Filipino collegiate young adults in a state university in Region III, Philippines and described self perceived physical competence and activity level disparities among university students. Monte (2025) investigated health-related behaviors of female freshman students at the University of the Philippines Los Baños and found a lack of consistency in health related behaviors such as meal patterns, hydration, and regular exercise. Studies have shown little improvement in exercise behaviors and sustained active lifestyle practices among Filipino students and this persists in the university setting.

Among young people, an active lifestyle and engagement in physical activity is influenced by a range of factors. One key component that has gained recognition in research, is motor competence. Motor competence is seen as the ability to execute the skill-based movements like throwing, jumping, running, and kicking that are necessary to complete the tasks that different physical activities require (Stodden et al., 2009). It has been found that people with greater motor competence are more likely to participate in physical activities and are more likely to be physically fit, as opposed to those with lesser motor skills (Utesch et al., 2019). Further research shows that motor competence shapes how a person perceives their physical capabilities, which in turn impacts their confidence and willingness to take part in physical activities at different levels (De Meester et al., 2020). Longitudinal studies have found that motor competence is a great predictor of the likelihood of someone's participation in physical activity over time which indicates that people with higher level of motor functioning when compared to their peers are more likely to have active lifestyle orientated behaviours as they grow older (Huhtiniemi & Jaakkola, 2024). In addition, the model framework proposed by Stodden et al. shows how the interaction of motor competence, physical activity, fitness, and psychosocial variables create pathways for developing behaviours that promote health and

activity in the long run (Robinson et al., 2015). In summary, these studies reveal that for one to be able to participate in physical activity with regularity and maintain an active lifestyle, they need to possess a good level of motor competence.

Grit is a key psychological construct that plays a central role in an individual's propensity to undertake and maintain a health-promoting behavior, including the practice of regular exercise and the adoption of an active lifestyle. Grit has been defined as the ability to endure bothersome short-term failures in order to achieve success in the long-term, and, more specifically, to demonstrate passion to persist towards the eventual achievement of success (Duckworth et al., 2007). Regarding exercise, Martin and colleagues (2022) state that high levels of grit are a strong predictor to the completion of difficult physical activities as well as the duration of time that the person continues to partake in physical exercise and sport-related activities. Additionally, it has been shown that grit is a positive predictor to a person's ability to cope with a lack of motivation to exercise and perform the other health-related behaviors that are essential to gaining a healthier lifestyle, such as regular exercise participation (Toyama, 2024). Furthermore, Harris and Kessler (2019) state that grit is a positive predictor to exercise adherence and participation persistence in organized exercise programs and is an indicator to the degree the individual's mental toughness assist them in maintaining an active lifestyle. Grit also positively affects one's engagement in physical activities and leads to the attainment of a higher state of overall well-being, a positive mental state, and greater satisfaction with one's life (Bae et al., 2024). It can be concluded that high levels of grit are a predictor of encouraging and maintaining physical exercise as well as a primary indicator motivating a consistent, healthy, and physically active lifestyle.

The current research is guided by theories pertaining to the involvement in active lifestyles, taking into account the physical and psychological aspects of the matter. From a developmental angle, the perspective on motor competence posits that as individuals refine their movement skills, they are likely to experience an enhancement in their self-efficacy related to the use of their body, which in turn, is likely to increase their participation in the relevant activities, and embrace the sustained development of behaviors that support a long-term active lifestyle. Furthermore, psychological attributes such as grit, which refers to the ability to maintain focus and subsequently exercise that effort over extended periods toward the attainment of a definable objective, may play a role in one's ability to continue exercising, despite the challenges, or the competing demands of one's life. Those that possess a high degree of grit are even likely to maintain regular practice of exercising irrespective of the existence of academic activities that may necessitate the use of one's available time. Additionally, the components of physical literacy, which include the requisite motivation, confidence, and competence pertaining to movement and physical activities, may influence the degree to which an individual is inclined to engage in active behaviors. The integration of the aforementioned concepts may imply that the combination of psychological grit, movement confidence, and physical ability may play a role in active lifestyle involvement. Within this framework, this study aims to analyze motor competence, grit, and physical literacy, as key predictors of active living participation among university students.

Previous research analyzed the factors affecting the level of physical-related activities done by people, yet still plenty remain unexplored/older studies on the relation of motor competence to physical activities/fitness outcomes. Other studies grant/ regard grit, academically, psychologically, and in terms of

resilience. Few studies look at both physical and psychological factors, and how they help foster active lifestyle participation, while in this case, university students. Most existing studies have been conducted in Western or foreign contexts, while university settings in developing countries—particularly in the Philippines—remain relatively underexplored in research. Given the chronic issues of university students engaging in physical activities and both psychological and physical factors, studies on how these factors pan out in the university context are, hence, warranted. Thus, this research seeks to establish how motor competence and grit determine university student's active lifestyle participation, to what degree. This study attempts to answer the following research questions: (1) What is the level of motor competence, grit, and active lifestyle participation among university students? (2) Is there a significant relationship between motor competence and active lifestyle participation among university students? (3) Is there a significant relationship between grit and active lifestyle participation among university students? (4) To what extent do motor competence and grit predict active lifestyle participation among university students?

Methods

Research Design

This research used a quantitatively driven cross-sectional correlational approach to understand the relationships between motor competence, grit, physical literacy, and involvement in active lifestyle participation of university students. Quantitative research is the collection of systematic and evaluative research of numerical data to identify the trends, relationships, and predictive correlations between definable and measurable variables (Creswell & Creswell, 2018). Quantitative research is premised upon the objective analysis of the variables using standardized tools, thereby ensuring accurate said analysis, and providing a seemingly definable relationship between the variables' constructs. The analysis of the focused relationship between definable variables of research and the university students' population affirmatively justifies the selection of the said approach to the study.

A correlational design was used to analyze if students' active participation in an active lifestyle is significantly related to motor competence, grit, and physical literacy. As defined in Fraenkel et al. (2019), correlational studies strive to understand the determination and direction of relationships between two or more variables while refraining from environmental manipulation or variable control. This form of design is best suited to researchers who wish to study relationships among various variables in real-life environments. In addition, with respect to the independent variables, a predictive analysis was performed to evaluate how active lifestyle participation is affected. As a result of the single measurement of each variable and the absence of experimentation, the results must be viewed as correlations (associative) instead of causal relationships.

Respondents and Sampling

The target population included first-year undergraduates from selected academic programs during the study period. Respondents were sampled from the following three academic programs: the Bachelor of Secondary Education from the College of Teacher Education, the Bachelor of Science in Mechanical Engineering from the College of Engineering, and the Bachelor of Science in Social Work from the College of Social Work and Community Development. The purpose of the selected academic programs was to ensure adequate cross-disciplinary representation and to assess possible differences in motor competence,

grit, physical literacy, and active lifestyle participation among university students from different disciplinary contexts.

The study implemented stratified random sampling. In stratified random sampling, the population is split into subgroups, and each subgroup is sampled to represent each distinct segment of the population (Creswell & Creswell, 2018). This technique works best to increase the representativeness of a sample when specific subdivisions of the population need to be representatively sampled in the final sample (Fraenkel et al., 2019). In this case, the strata were the three academic programs. 50 students were randomly selected from each academic program using the official enrollment lists as the sampling frame, so the total sample consisted of 150 respondents. This method improved the sample representation as well as the reduction in the chance of overrepresentation from one academic program.

We included participants in the study that (a) have current enrollment in the specified academic programs in the semester that the data was collected and (b) agreed to participate in the study voluntarily. Students that have medical and/or physical conditions that may significantly limit their participation in physical activities were excluded to enable consistency in the study.

Before conducting the study, we considered completing a power analysis using G*Power with an alpha level of .05 and statistical power of .80 to identify the number of participants that would be needed to achieve the intended statistical analysis. In this case, the final sample would be 150. In this case, the selected sample would be adequate to facilitate the descriptive, correlation, and regression analysis in the study and to ensure that the sample size was adequate to achieve the statistical analysis, we would have to identify the appropriate sample size.

Research Instrument

University students' motor competence, grit, physical literacy, and active lifestyle participation were measured using self-report questionnaires that had been validated.

A performance test battery of motor skills comprising of a standing long jump, a shuttle run, a ball throw, a ball catch, and a balance test, was used to assess motor competence. These tests measure the fundamental skills of locomotion, stability, and object control that physical education programs strive to promote. Each test was assigned a score based on the results, and the greater the score, the greater the motor competence.

Grit was evaluated using the Short Grit Scale (Grit-S), which was created by Duckworth and Quinn (2009). This tool contains eight items that cover the perseverance of effort and the persistence of interest toward long-term goals. Responses were rated on a 5-level Likert scale, with 'strongly disagree' and 'strongly agree' as the two extreme options. Previous research has shown the Grit-S to have adequately reliable internal consistency, with a Cronbach's alpha (α) ranging from .73 to .83.

The validated physical literacy questionnaire that assesses an individual's motivation, confidence, and competence in physical activity participation was used to assess participants. Previous research has shown physical literacy instruments to have adequate reliability, with a Cronbach's alpha (α) typically ranging from .80 to .89.

To determine how active the participants are, the IPAQ-SF by Craig et al. (2003) is used. This tool asks about the frequency of walking, moderate and vigorous physical activities engagement in the last week.

Based on the answers, a physical activity participation level is given. IPAQ-SF has shown decent reliability and validity with different groups/ populations with consistent reliability of about Cronbach's $\alpha \approx .76-.88$.

Statistical Analysis

In this study, we used both types of statistics, descriptive and inferential, for analysis. For summary statistics, we describe the demographic characteristics of the respondents, and the levels of motor competence, grit, physical literacy, and participation in an active lifestyle. We used frequency counts, percentages, means, and standard deviation. These summary statistics describe the general distribution and central tendency of the data.

For the study variables, the Pearson Product-Moment Correlation Coefficient was used to assess the strength and direction of the relationships between the variables: motor competence, grit, physical literacy, and participation in an active lifestyle. Furthermore, multiple linear regression analysis was employed to assess the impact of motor competence, grit, and physical literacy on active lifestyle participation among university students. These types of analytic techniques were used because this study did not only want to determine relationships among the study variables, but also to examine the extent to which they predict the dependent variable. All the statistical tests were performed using a statistical package, and we set the level of significance at $p < .05$.

Ethical Considerations

This study was conducted in accordance with established ethical standards for research involving human participants. Data collection began only after receiving approval from the institutional research ethics committee. Participants were informed about the purpose of the study, the procedures involved, and their rights as research participants. Informed consent was obtained from all respondents before their participation in the study.

Participation in the study was entirely voluntary, and respondents were informed that they could withdraw from the study at any time without any penalty or negative consequences. To ensure confidentiality and anonymity, participants' identities were not recorded in the dataset, and all responses were treated with strict confidentiality. The collected data were stored securely and were accessible only to the researcher for academic and research purposes. These measures were implemented to ensure the protection of participants' rights, privacy, and well-being throughout the conduct of the study.

Results

Level of Motor Competence, Grit, Physical Literacy, and Active Lifestyle Participation

Table 1 presents the descriptive statistics for motor competence, grit, physical literacy, and active lifestyle participation among the respondents. Mean scores and standard deviations were computed to determine the overall level of each variable among the university students.

Table 1

Levels of Motor Competence, Grit, Physical Literacy, and Active Lifestyle Participation of the Respondents

Variables	Mean	SD	Interpretation
Motor Competence	73.84	9.72	Moderate to High

Grit	3.48	0.54	Moderate
Physical Literacy	3.71	0.58	Moderately High
Active Lifestyle Participation	2346.52	1028.63	Moderately Active

The results show that the respondents generally demonstrated moderate to high levels of motor competence, indicating that most students possess adequate fundamental movement skills. The respondents also exhibited moderate levels of grit, suggesting a reasonable degree of perseverance and commitment toward long-term goals. In terms of physical literacy, the respondents displayed moderately high levels, reflecting positive motivation, confidence, and competence toward engaging in physical activity. Meanwhile, the level of active lifestyle participation was classified as moderately active, indicating that the respondents participate in physical activities at a moderate level.

Relationship Between Motor Competence and Active Lifestyle Participation

Table 2 presents the results of the Pearson Product–Moment Correlation analysis examining the relationship between motor competence and active lifestyle participation among the respondents.

Table 2

Relationship Between Motor Competence and Active Lifestyle Participation

Variables	r-value	p-value	Interpretation
Motor Competence and Active Lifestyle Participation	.46	.001	Significant Moderate Positive Relationship

The results revealed a significant moderate positive relationship between motor competence and active lifestyle participation ($r = .46, p = .001$). This finding indicates that students with higher levels of motor competence tend to engage more frequently in physical activities and are more likely to maintain an active lifestyle.

Relationship Between Grit and Active Lifestyle Participation

Table 3 presents the results of the Pearson correlation analysis examining the relationship between grit and active lifestyle participation among university students.

Table 3

Relationship Between Grit and Active Lifestyle Participation

Variables	r-value	p-value	Interpretation
Grit and Active Lifestyle Participation	.39	.008	Significant Moderate Positive Relationship

The results show a significant moderate positive relationship between grit and active lifestyle participation ($r = .39, p = .008$). This suggests that students who demonstrate higher levels of perseverance and commitment toward long-term goals are more likely to engage consistently in physical activities.

Predictive Influence of Motor Competence, Grit, and Physical Literacy on Active Lifestyle Participation

Table 4 presents the results of the multiple linear regression analysis conducted to determine whether motor competence, grit, and physical literacy significantly predict active lifestyle participation among the respondents.

Table 4
Regression Analysis Predicting Active Lifestyle Participation

Predictor Variables	B	SE B	Beta	t	p
Motor Competence	14.27	4.02	.29	3.55	.001
Grit	211.43	78.11	.21	2.71	.008
Physical Literacy	398.92	65.47	.43	6.09	.000

The regression model was found to be statistically significant ($F = 33.59, p < .001$). The results indicate that motor competence, grit, and physical literacy collectively explained 41% of the variance in active lifestyle participation among the respondents. Among the predictor variables, physical literacy emerged as the strongest predictor, followed by motor competence and grit. This suggests that students who demonstrate higher levels of movement competence, perseverance, and physical literacy are more likely to actively participate in physical activities.

Discussion

Level of Motor Competence, Grit, Physical Literacy, and Active Lifestyle Participation

The levels of these variables may be indicative of the campus lifestyle typical of university students. In the process of transitioning into higher education, students face new challenges such as increased workload, tighter schedules, and new lifestyle changes, all of which can impact their engagement in physical activities. Students may be physically literate and possess the necessary motor skills, but the limited time they can dedicate due to their schoolwork and other responsibilities may impact their ability to stay physically active. Similar to the aforementioned, the presence of grit means that students are likely to channel their efforts towards long-term academic goals and neglect other physically active pursuits, which may offer some explanation to the subdued levels of active lifestyle engagement reported in this study.

Motors skills, grit, and physical literacy have shown to positively affect physical activity behavior in children and adolescents. Participating in physical activity and health-related fitness outcomes are positively correlated with motor competence. Individuals with higher levels of proficiency movement are more likely to participate in physical activity (Huhtiniemi & Jaakkola, 2024).

Motor competence, perceived physical competence, and health-related fitness play a pivotal role in explaining the variances in MPA (Moderate Physical Activity) and VPA (Vigorous Physical Activity) in youths (Jaakkola et al. 2019). Barnett et al. (2024) further reinforced that a specific level of motor competence may influence the continuity of participation in physical activity, positively. Besides physical skills, psychological traits, such as grit, have also shown to have a positive influence on university students. Higher grit levels are correlated with enhanced psychological well-being and resilience of students (Musumari et al., 2018). Students with a higher level of grit tend to have a higher self-perceived wellbeing (Wills et al., 2023). The role of physical literacy as a promoter of motivation, confidence, and competence to engage in physical activity among university students is well documented in studies (Luo et al., 2022).

Overall, the current study findings, in conjunction with previous studies, indicate that motor competence, grit, and physical literacy are key characteristics that facilitate students' adoption of active lifestyle behaviors. Although study participants displayed sufficient levels of these attributes, their physical activity engagement was still moderate. This highlights the necessity of the further development of active lifestyle habit programs in the university setting. Competence in movement, psychological grit, and physical literacy, along with university-sponsored educational and recreational programs, may encourage participants' physical activity levels and promote positive health outcomes for university students.

Motor Competence and Active Lifestyle Participation

The current study found a significant, moderate, positive correlation between motor competence and active lifestyle involvement in university students. This means that students with a higher level of motor competence are more likely to perform physical activities, and subsequently more likely to have an active lifestyle. This result implies that the ability to perform a variety of movement skills positively impacts students' levels of participation in different physical activities. Students with higher levels of motor competence probably have more opportunities and confidence to take part in sports, exercise, and leisure activities.

The relationship found in this study can be understood through the role that motor competence plays in facilitating an individual's confidence and ability to participate in physical activity. If students have stronger motor skills, they are likely to find physical activities easier and more fun, and this can lead them to be more active in other lifestyle activities. On the other hand, students with less motor skills are likely to experience more difficulty in physical tasks, and this can lessen their desire to be active. Therefore, motor

competence can be the basis of students' active participation in physical activities during their university education.

The link between motor competence and physical activity participation has been an area of research and interest for other scholars as well. Examples of such research include Schmutz et al. (2020), who have suggested that the association between motor competence and physical activity rapidly strengthens as people grow older and acquire more experiences. Research conducted by Kaioglou et al. (2022) also showed that the combination of motor competence and cardiorespiratory fitness is one of the key explanations for young people's engagement for moderate-to-vigorous physical activity. Regarding the relation of perceived motor competence to physical activity participation, Feitoza et al. (2022) showed that people who see themselves as proficient in some movement skills tend to participate more in physical activities. Though, Burton et al. (2023) showed that the association between motor competence and participation in physical activities, in the period of adolescence, is positive, the relationship remains stronger for some psychosocial factors. Another study by Barnett et al. (2024) introduces the notion of a "proficiency barrier," which theorizes that people may only engage in more advanced forms of physical activity if they possess a foundational motor skill competence. Finally, research conducted by Uil et al. (2022) concludes that both real and perceived motor competence are important in promoting participation in physical activity.

The current study alongside the existing body of literature underscores the significance of motor competence as a critical factor in determining the likelihood of engaging in an active lifestyle. Motor competence not only facilitates the enhancement of an individual's physical capabilities but also fosters a sense of self-assurance and an increased impetus to partake in fitness-related endeavors. Students who exhibit an advancement in their movement proficiency are likely to show an increased propensity to participate in sustained periods of exercise, as well as in recreation. Consequently, the enhancement of motor competence because of well-organized physical education, skill-oriented coaching, and the creation of a robust infrastructure for physical engagement is likely to result in higher levels of active lifestyle engagement among university students.

Grit and Active Lifestyle Participation

In this study, we observed a significant, moderate, positive correlation between grit and participation in active lifestyle behavior among university students. This finding indicates that students who have more resolve, particularly in the pursuit of goals that take more time and effort, are also more active and behaviorally consistent at exercising. This finding suggests that psychological attributes, particularly grit, may enable students to be more active despite competing challenges and responsibilities.

The positive correlation found in this study may be attributed to the impact grit has on integrating attainable health goals and behavioral adjustments by advocates for an active lifestyle. Such students are more likely to achieve set goals of maintaining an active lifestyle, even in the presence of competing academic and behavioral goals that may contradict exercise motivation. Thus, grit is an integral psychological attribute that enables students to sustain active lifestyle behaviors.

The existing literature validates the positive association between grit and the level of participation and adherence to physical activity and exercise. Grit has been associated with positive patterns of exercise behavior and a decrease in sedentary behavior across multiple groups of people. (Martin et al. 2022). Grit has been seen to strengthen the relationship between physical activity and self-efficacy. Grit and self-

efficacy were seen to have a positive relationship in college students, suggesting that college students who have high levels of grit are likely to maintain exercise routines. Additionally, among athletes, grit has been associated with elevated levels of mental health and a decrease in burnout which has shown the ability of grit to maintain an individual's long-term involvement in physical activity (Gray et al., 2023). Bae et al (2024) showed that among adolescents' grit has shown to strengthen life satisfaction, therefore indicating that grit has the ability to strengthen the positive effect physical activity has on life satisfaction. Grit has been shown to strengthen the relationship between physical activity and life satisfaction, therefore suggesting that people who persevere are likely to have greater levels of life satisfaction. Some research has shown that the positive influence of grit is subjective to the individual and the surrounding context. Self-control and mental toughness are also psychological facets that can influence exercise behavior (Cormier et al, 2023). Grit is the ability to maintain self-motivation and self-valuable, which promotes the adherence to exercise behavior (Huberty et al., 2008).

Overall, the results obtained in the current study, along with earlier work, indicate that there is an important relationship between grit and participating in an active lifestyle. Grit is a psychological trait that involves continuous and sustained engagement and can help individuals navigate an active lifestyle when they encounter obstacles and competing demands. Strengthening a student's grit will positively impact their ability to engage in and maintain a healthy lifestyle. Programs that enhance and focus on the development of students' abilities to set goals, be persistent, and stay committed to physical activities can be of significance to the improvement of students' engagement in an active lifestyle.

Predictors of Active Lifestyle Participation

The present study establishes that motor competence, grit, and physical literacy predict active lifestyle participation among university students. The regression analysis model accounts for a considerable amount of variance in students' engagement in physical activities. Given the predictors, the highest contributor was physical literacy, then followed by motor competence and grit. This implies that psychological grit and physical capabilities are influential in influencing students' participation in active lifestyle behaviors. This reveals that students with increased movement competence, motivation, and perseverance are likely to participate in physical activities with high frequency.

One potential explanation for the predictive influence shown in this study may relate to the integrated role of the physical, psychological, and behavioral components in the participation of physical activity. Motor competence is the set of basic movement skills required for the successful execution of several physical activities, whereas physical literacy is the combination of the confidence, knowledge, and motivation of a person to engage in activities related to movement. At the same time, grit may help students hold physical activity practices, even when it is at the expense of schoolwork, due to limited time, or due to the loss of motivation. When all these elements are present, students may have the potential to adopt active lifestyle behaviors, as they have the psychological discipline and the behavioral components to engage in physical activity on a regular basis.

Prior research shows an array of predictors of the numerous predictors of the physical activity engagement of university students. Research utilizing the Multi-Process Action Control framework demonstrates that students' participating in moderate-to-vigorous physical activity can be explained by psychological and behavioral factors (Porter et al., 2024). In the same way, self-efficacy, social support,

and behavioral accessibility in the environment are predictors of reasons for engaging in physical activity (Zhang et al., 2022). Moreover, university students have been shown to increase their level of physical activity due to institutional policies that include physical activity as a prerequisite (Bailey et al., 2022). Furthermore, the Theory of Planned Behavior has been shown to increase physical activity intentions and behaviors by controlling the level of attitude and perceived behavior (Lemoyne et al., 2016). It has also been shown that individuals possess high confidence, competence and motivation towards movement to be more physically active. This is referred to as physical literacy (Britton et al., 2023). In addition, physical literacy is a predictor of active behavior, with a moderate level of activity (Yu et al., 2025).

The findings from this research, along with previous studies, show that university students' active lifestyle participation is positively correlated with their perceived physical ability, psychological confidence and motivation. Since motor competence, grit, and physical literacy are strong predictors of engagement in physical activity, fostering these attributes is likely to increase university students' participation in physical activity. Therefore, universities are encouraged to initiate movement skill development, psychological grit, and physical literacy educational programs, along with active supportive settings. These efforts are likely to facilitate students' engagement in and maintenance of healthy lifestyle habits that positively affect their well-being.

Conclusions

The findings of the present study revealed that motor competence, grit, and physical literacy are important determinants of active lifestyle participation among university students. The respondents demonstrated moderate to high levels of motor competence, moderate levels of grit, and moderately high levels of physical literacy, while their level of active lifestyle participation was classified as moderately active. The results further indicated significant positive relationships between motor competence and active lifestyle participation, as well as between grit and active lifestyle participation. These findings suggest that both physical capability and psychological perseverance contribute to students' engagement in physical activities.

Furthermore, the regression analysis showed that motor competence, grit, and physical literacy significantly predict active lifestyle participation, with physical literacy emerging as the strongest predictor among the variables. This indicates that students who possess greater confidence, motivation, and competence related to physical activity are more likely to engage in active lifestyle behaviors. Overall, the findings emphasize the importance of promoting movement competence, psychological resilience, and physical literacy in university settings to support the development of sustainable physical activity habits among students.

Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. The research relied partly on self-reported measures, particularly in assessing grit, physical literacy, and active lifestyle participation, which may be subject to response bias or social desirability effects. In addition, the cross-sectional correlational design limits the ability to establish causal relationships among the variables, as the findings only indicate associations rather than cause-and-effect relationships. The respondents were also limited to first-year students from selected academic programs in a single public university, which may

restrict the generalizability of the results to other university populations or contexts. Furthermore, other potential factors influencing active lifestyle participation, such as environmental conditions, academic workload, and access to physical activity facilities, were not examined in this study.

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