

About Women Emerging from Patriarchy: Expectancies of Benefits and Engagement in Physical Education

Maryam Abdullah^{1*}, Maura Pilotti²

^{1,2} Department of Sciences & Human Studies, Prince Mohammad bin Fahd University (PMU); <https://orcid.org/0000-0002-1231-087X>; <https://orcid.org/0000-0001-7955-680X>

*Corresponding Author: mpilotti@pmu.edu.sa

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ABSTRACT

Insufficient physical activity is associated with poor physical and mental health. In this research area, Saudi Arabian female undergraduate students are an understudied population. While they are emerging from a strict patriarchal order, physical education is not only beneficial to their health but also a socio-cultural marker of their progress toward gender equity. Thus, the present study focused on how physical activity is viewed by first-year female students (n =290) enrolled in a physical education course. Through a survey methodology, the study gathered information about students' views of the impact of physical activity on cognition and affect (i.e., benefit expectancies). Then, it examined, through regression analyses, whether such views could predict students' course engagement as well as their physical activity levels. In this study, beliefs in the impact of physical activity on both cognition and affect were found to be linked to increased self-reported physical activity. Course engagement increased with students' beliefs in the impact of physical activity on cognition. Need for relatedness yielded null results in both analyses. Notwithstanding the expectation of benefits, most students did not report engaging in daily physical activity outside the physical education course. These findings suggest that the hectic academic lives of undergraduate students may obscure the impact of physical exercise on quotidian functioning. Targeted opportunities to be active both inside and outside university campuses may reverse current patterns and be beneficial to students' well-being.

Keywords: physical activity, physical education, self-determination, autonomy, benefit expectancies, survey, empirical study, Saudi Arabian students

INTRODUCTION

In a society that is emerging from a strict patriarchal order, such as Saudi Arabia, physical exercise for young women may mean much more than health and physical appearance. It reflects their progress toward gender equity rights, and within such rights, their sense of autonomy. Students' sense of autonomy embodies the belief that their actions can influence their functioning within and outside the classroom as well as the events that define their daily lives (Bandura, 2017). According to self-determination theory, autonomy is a fundamental human need that concerns a person's belief in being able to self-initiate and self-regulate one's own actions (Ryan & Deci, 2017). The sense of autonomy that emanates from performing an activity, such as physical exercise, is likely to be embodied in expectations regarding the benefits and costs of the activity. According to expectancy-value theory (Vroom, 1964), expectancy, which is the belief that an action is linked to a particular outcome, is defined by the estimated probability that the outcome will materialize (instrumentality) and by the valence of the outcome (i.e., benefit or cost value). Thus, it is reasonable to assume that although students' motivation to invest resources (i.e.,

time and effort) in an activity may be initially propelled by a need (e.g., autonomy; Ryan & Deci, 2017), it is ultimately shaped by expectations regarding potential outcomes (Petri & Govern, 2004).

In the classroom, students' investment of resources (i.e., time and effort) to optimize learning experiences and enhance learning outcomes is referred to as engagement. According to Fredricks et al. (2004, 2022), three dimensions define engagement: affective (e.g., positive emotional reactions, which may include enjoyment and a sense of belonging), cognitive (e.g., investment in learning activities along with an appreciation for challenges), and behavioral (e.g., compliance with attendance policies and degree of participation in class activities). The present study first surveys Saudi Arabian female undergraduate students' expected benefits of physical activity, which are reflected in their views of the impact of physical activity on cognition and emotive state. Within this understudied population, it then examines the extent to which expectancies of benefits (i.e., expectations of gains) predict their physical activity levels and their engagement in a physical education course.

The context that serves as the foreground for the study is idiosyncratic. Saudi Arabian undergraduate students tend to be, by and large, young and at the center of a top-down plan to restructure the country's economy into a sustainable engine (i.e., Vision 2030). The plan requires an educated workforce of both women and men who can contribute to the development of a knowledge and service economy away from reliance on fossil fuels. As a result, women have been recently granted legal rights equal to those of men (Al-Bakr et al., 2017), and young women of college age have swiftly been moved to the center of the envisioned economy. Legislative changes have yet to translate into the removal of barriers to female university students' physical activities (Aljehani et al., 2022). Barriers include the scarcity of adequate facilities, heavy academic workload, and residues of patriarchy that define cultural standards for gender roles (Aljehani et al., 2022). Resistance to change is the strongest with the latter. Indeed, top-down changes of cultural and societal norms mandated by legislative actions are meaningful only if they are adopted and internalized by the communities that define the social fabric of Saudi Arabia. Internalization of roles reflecting gender equity can take time (Aljehani et al., 2022) as it counteracts long-established, archaic normative beliefs about women and related social disapproval if even minor violations occur (Alharbi et al., 2023).

Educational and professional success rests not only on physical health but also on mental health (e.g., emotional regulation in the face of challenges and obstacles). Physical activity is critical to both (Mahindru et al., 2023). According to self-determination theory (Ryan & Deci, 2017), an activity, such as physical exercise, is intrinsically motivated when the activity is seen as bringing pleasure and satisfaction. Autonomy (i.e., one's sense of being able to initiate and control behavior and its outcomes), competence, and relatedness (i.e., one's desire to connect with others, including respect and value) are key components of one's intrinsic motivation. An autonomy orientation chiefly defines students' intrinsic motivation to participate in physical activities and sustain involvement over time. It tends to reflect an internal locus of causality, according to which one's actions are not only valued but also responsible for desired outcomes. It follows that the extent to which female students perceive a causal link between physical activities and cognitive and affective benefits may be critical to decisions about the physical activity levels they can achieve and maintain while pursuing an academic degree. Not surprisingly, evidence exists, mostly in populations of the Global North, that autonomy motives are linked to positive expectations regarding physical activity and can predict it (Teixeira et al., 2012; Wilson et al., 2004).

Guidelines recommending that young people accumulate at least 60 minutes of moderate-to-vigorous physical activity each day are sporadically followed. Saudi Arabia conforms to worldwide trends. In recent years, the country has experienced an unprecedented economic expansion, which has impacted many aspects of people's lives (Al-Hazzaa, 2018). Lifestyle changes, including sedentary occupations, and eating and sleeping habits, have contributed to fostering inactivity among Saudi Arabian citizens (Al-Hazzaa, 2018). Overall, Saudi Arabian women are reported to be less active than Saudi Arabian men (Al-Zalabani et al., 2015). Most Saudi Arabian children, teenagers, and adults are not physically active enough to fulfill moderate-to-vigorous physical activity standards (Al-Zalabani et al., 2015). Minimal physical activity, obesity, and Body Mass Index (BMI) increases among Saudi Arabian youth have become national health issues (Althumiri et al., 2021). Yet, little research has been conducted in Saudi Arabia on the association between physical activity and sedentary behavior (Al Saif & Alsenany, 2015). In 2002, the Ministry of Education issued guidelines for a physical activity curriculum devoted to primary and secondary education (grades 1-12). The Ministry of Education has also sponsored initiatives to encourage recreational team sports among school-age children. At the tertiary level, the picture is less clear. Starting in 2018, a few Saudi universities have begun to offer diplomas or bachelor's programs for physical education teachers (Albujulaya et al., 2023). The initiatives mentioned above for school-age children have been expanded to include college and university students. Physical education courses embedded in general education curricula are still a novelty, though (Albujulaya et al., 2023). Not much progress has been achieved (Alahmadi et al., 2024; Almutairi et al., 2018; Bajuaifer & Alrashdi, 2025). For instance, Almutairi et al. (2018) reported widespread unhealthy lifestyles, including questionable eating habits and low levels of physical activity among undergraduate students.

Individual differences in students' understanding of the potential cognitive and affective benefits of physical activity are likely to correspond to different levels of engagement in formal instruction. A physical education course

serving the general education curriculum usually overviews human anatomy, physiology, and mental health. It includes practical applications targeting physical skill development and maintenance, along with the removal of bad habits. Thus, at the very minimum, it can be viewed as a weekly reminder of the benefits of physical exercise. Of course, in a student-centered pedagogy, students become the beneficiaries of instruction that targets autonomy, a key component of internal motivation. In this pedagogy, the instructor's positive feedback is intended to foster students' appreciation for their competence and expectancies of benefits arising from their actions. Furthermore, a sense of relatedness is likely to be nurtured by the presence of classmates with whom the student can identify as well as by the instructor's promotion of teamwork. Feeling connected with others and being included in activities and groups represent another component of students' intrinsic motivation to participate in sports and sustain involvement over time (Jösaar & Hein, 2011).

In Saudi Arabia, individualistic considerations puncture a traditionally collectivist culture (Jiang et al., 2018; Pilotti et al., 2021). Individualism, as a cultural orientation, emphasizes autonomy, self-reliance, self-realization, uniqueness, social differentiation, and competition, while communal interests are viewed as secondary. Collectivism, as a cultural orientation, emphasizes group identities, interests, and goals, and thus reinforces the relatedness between the self and others. It follows that a physical education course taught in a student-centered pedagogy can be assumed to provide a nurturing context for our participants' intrinsic motivation to pursue physical activities in two distinct ways. By fostering autonomy, it draws on students' individualistic orientation, whereas by fostering a sense of relatedness, it brings into play their collectivistic orientation. According to self-determination theory (Deci & Ryan, 2000) and its offspring, basic needs theory, autonomy and relatedness needs are fundamental to well-being. The need for autonomy is satisfied by experiences that involve choice and a sense of control over the initiation and execution of actions consistent with one's values. The need for relatedness is satisfied by experiences that lead one to feel securely connected to and understood by others. In physical education, relatedness can be expressed as a preference for team sports (Ferraz et al., 2021; Reinboth & Duda, 2006; Rodríguez-Bravo et al., 2020), as such sports entail activities in group settings where individuals share responsibilities (Nia & Besharat, 2010). Expectancies of benefits from the execution of particular actions, such as those involved in a variety of physical exercises, are an essential aspect of the drive that underlies such actions (Studer & Knecht, 2016).

Another way to conceptualize autonomy and relatedness is through the lens of sociocultural theory. According to it (Glăveanu, 2021; Vygotsky, 1978), knowledge is socially constructed, thereby shaping an individual's cognition, including the processes responsible for one's sense of autonomy and relatedness. Learners come to know and understand how to exist in the world through interactions with members of their communities (e.g., parents, siblings, instructors, and peers) and the environment in which they operate. In sociocultural theory, mediation is a dialectic relationship between people (conceptualized as volitional agents) and the society and culture they inhabit. Thus, female students' beliefs in the impact of physical activity on cognition and affect (reflecting benefit expectancies stemming from their newfound sense of autonomy), as well as their sense of relatedness, may be the outcomes of 'mediation'. At present, in the Saudi Arabian society, collectivism and individualism are intertwined. Within the individualistic framework, both autonomy and relatedness can be viewed as aspects of one's distinctiveness from others (e.g., "I kind of stand out among my many friends because of my independence"). Within the collectivistic framework, autonomy and relatedness may be conceptualized as aspects of one's commonalities with others (e.g., "As many of my friends, I am independent but also feel that I can learn from them and they can learn from me"). In the Saudi Arabian society, others may denote a multitude of intertwined communities, such as immediate and extended families, tribes, and the Ummah. Yet, individualistic and collectivistic conceptualizations are not to be viewed as mutually exclusive opposites but rather as coexisting entities in the minds of individuals who are facing a sociocultural restructuring of their quotidian existence driven by top-down forces (Jiang et al., 2018; Pilotti et al., 2021). Although theoretical frameworks, such as sociocultural theory and self-determination theory, may account for autonomy and relatedness needs differently, they both underscore their relevance. Thus, in the present study, the following hypotheses are tested via a survey of female undergraduate students who are enrolled in a course taught through a student-centered pedagogy:

- H1 A student's sense of autonomy, if it expresses benefit expectancies (as represented by viewing physical activity as capable of impacting cognition and affective state), will be positively linked to course engagement (including affective, cognitive, and behavioral dimensions).
- H2 A student's sense of autonomy, if it expresses benefit expectancies (as represented by viewing physical activity as capable of impacting cognition and affective state), will predict the student's self-reported physical activity.
- H3 If a student's need for relatedness (as represented by her preferences for team-related physical activities) is included in decision-making processes regarding physical activity, it will predict both course engagement (including affective, cognitive, and behavioral dimensions) and the student's self-reported physical activity.

The results of the present study will indicate the extent to which a physical education course taught through a student-centered pedagogy provides a nurturing context for the intrinsic motivation in physical activities exhibited by young women emerging from patriarchy. As such, the study adds to a modest body of knowledge concerning the role of physical education in universities of the Arabian Gulf peninsula.

Figure 1 offers a schematic representation of H1-H3, which are tested through the data collection method and data analyses described in the section below. Testing relies on the assumption that expectations of benefits arising from the satisfaction of autonomy and relatedness needs are the precondition for the impact of these needs on students' physical activity and course engagement.

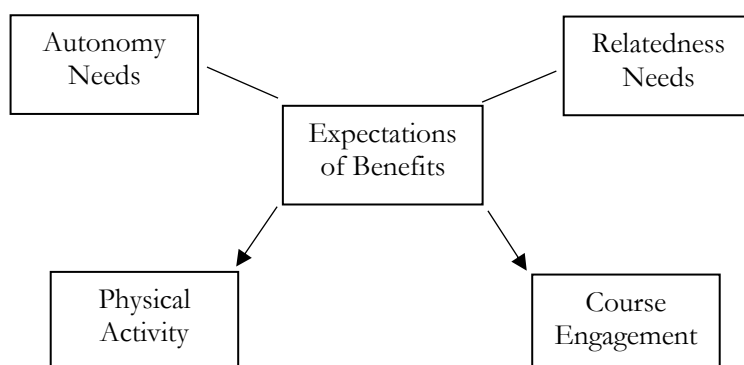


Figure 1. A Schematic Representation of H1-H3

METHOD

Participants

The population frame in this research consisted of female undergraduate students of Saudi Arabian nationality who were enrolled in a physical education course at an English-medium university in the Eastern Region of Saudi Arabia. At the selected university, physical education is taught through two parallel 1-credit courses: Active Living Lifestyle (PHED 1111) and Healthy Behaviors and Management (PHED 1112). These courses are part of the general education curriculum. They focus on practical strategies and exercises for developing and maintaining a healthy lifestyle (PHED 1111) and discarding unhealthy ones (PHED 1112). Each course' performance relies on physical activities, as well as written reports and exams assessing students' knowledge of physical and psychological health and its applications. Courses are taught through a student-centered pedagogy in which positive feedback is intended to foster competence and autonomy, whereas team activities are intended to promote relatedness. The courses have been developed and approved by the Texas International Education Consortium (TIEC).

Convenience sampling led to 290 participants (age range: 18-15): 49% enrolled in STEM programs (engineering, computer science, and architecture), and 51% in non-STEM programs (law, business, and interior design). By and large, they were freshmen experiencing their first year of university-level instruction. According to institutional records, they were from a middle-class background and had completed a physical education course in high school. The sampling of freshmen was based on earlier research describing the first year of university studies as demanding considerable lifestyle adjustments (e.g., time management, workload, and others' changed expectations; Pilotti et al., 2024), thereby taxing students' resources and requiring considerable emotional regulation (Brooker et al., 2017; Costabile et al., 2013). As such, it was thought that the freshman year would make students' sense of autonomy (i.e., self-perception of control over their actions; Rutenberg et al., 2022) in university settings, particularly relevant to their psychological and physical wellbeing (Mahindru et al., 2022). The participation rate was 86%. The sample size was deemed adequate based on the estimated female student population enrolled in physical education during one semester (Krejcie & Morgan, 1970).

Materials and Procedure

After having offered their informed consent, participants completed two online questionnaires in class. Questionnaires were administered at the midpoint of an academic semester. It was thought that at this time, students had enough exposure to the course materials and activities to have developed a stable and informed opinion of the course. However, they would not be overburdened by end-of-the-semester hectic academic demands to discount the offer to participate. The timing of questionnaire administration was selected based on the outcome of pilot work conducted during the prior semester. In it, 15 students who were not included in the present study were asked to fill out the questionnaires after the midterm and during the last two weeks of the semester.

Ten students yielded a test-retest reliability of 98%. Five students did not participate at the end of the semester due to their demanding exam preparation schedule.

Students completed a questionnaire gathering factual and attitudinal information. It was divided into three main sections. Section A gathered demographic information (e.g., age, nationality, major, and class standing). Section B collected students' estimated frequency of weekly physical activity (1 question) and type of physical activity pursued (1 question). Section C asked for students' subjective views of the potential impact of physical activity on cognition (4 questions assessing participants' self-reported ability to concentrate, remember, solve problems, and have mental clarity following physical activity) and affect (4 questions assessing participants' self-reported ability to regulate mood, and likelihood of experiencing stress, wellbeing, and negative feelings). Section C questions, which were author-developed, were intended to measure benefit expectancies. For instance, "Does engaging in physical activity reduce your feelings of stress?" inquired about participants' emotive state, whereas "Do you notice an improvement in your ability to stay focused on tasks after engaging in physical activity?" was a question relating to participants' cognitive state. Cronbach's alpha was 0.74 for the questions of Section C involving cognition and 0.71 for the questions of Section C involving affect.

Students typed their responses to demographic questions into comment boxes. The types of physical activity could be selected from a menu (including aerobic, strengthening, flexibility, and balance exercises) as well as entered in a comment box. Other responses were to be reported on a 5-point Likert scale from 'never' (0) to 'always' (4). For question 1 (i.e., estimated frequency of weekly physical activity), 'daily' was used as a substitute for 'always'. Thus, the scale ranged from 'never' to 'daily' (0-3).

Questions about the cognitive and affective impact of physical exercise were developed from answers to two open-ended questions collected during pilot work. In such work, 15 students who had yet to take either physical education course were asked to indicate whether they experienced changes following physical exercise. If so, they were encouraged to report the nature of the changes.

Students also completed a questionnaire about their cognitive, affective, and behavioral engagement concerning the physical education course in which they were enrolled. It contained 36 of the items developed by Al-Obaydi et al. (2023), organized into three sections: 12 cognitive engagement items (Cronbach's alpha = 0.77), 12 affective engagement items (Cronbach's alpha = 0.80), and 12 behavioral engagement items (Cronbach's alpha = 0.77). To ensure that students' responses referred to physical education, students had to report the name of the course in which they were enrolled before reading any of the items. Furthermore, each item was introduced by the statement "when I am in class". Each section contained 3 items that required reverse scoring to minimize social desirability biases. For instance, items reflecting affective engagement could be positively worded, such as "When I am in class, I like what I am learning", or negatively, such as "When I am in class, I find what I am learning wearing". Similarly, behavioral engagement items could be worded positively, such as "When I am in class, I participate by asking questions or making comments", or negatively, such as "When I am in class, I use my phone to check or send personal text messages". Cognitive engagement items could also be worded positively, such as "When I am in class, I try to put ideas into my own words", or negatively, such as "When I am in class, I do not mentally arrange information in my own words". Participants were asked to provide their answers on a 5-point Likert scale from 'strongly disagree' (0) to 'strongly agree' (4) with 2 as the neutral point.

Before administration, the face validity and content validity of the measurement instruments were estimated (Allen et al., 2023; Nevo, 1985). The content validity of the engagement questionnaire and that of the sections of the factual and attitudinal questionnaire were assessed independently by two local behavioral scientists. For instance, after being provided with a definition of affective, cognitive, and behavioral engagement in academic activities, raters estimated the degree to which individual statements would capture the construct of course engagement (affectively, cognitively, and behaviorally). They rated each statement on a 5-point Likert scale, including 'poor', 'fair', 'good', 'very good', and 'excellent', as capturing the construct of engagement in either of its three facets. The statements of the factual and attitudinal questionnaire were rated on the same scale based on the constructs that they were intended to measure. The statements included in the engagement questionnaire and in the sections of the factual and attitudinal questionnaire were those rated as 'good' or above by both raters. Questionnaires were also assessed for face validity (Allen et al., 2023; Nevo, 1985). The assessment involved 25 students from the same subject pool who did not later participate in the current study. Each rater was given the engagement questionnaire and the sections of the factual and attitudinal questionnaire, along with the corresponding definition of the constructs they were intended to measure. Then, raters were asked to evaluate independently the degree to which each statement measured the intended construct. Their ratings were expressed on a 5-point Likert scale, including 'extremely suitable', 'very suitable', 'adequate', 'inadequate', and 'irrelevant and thus unsuitable'. All statements of the engagement questionnaire and each of the sections of the factual and attitudinal questionnaire were judged by students as either 'extremely suitable' or 'very suitable'.

The numerical values of all the Likert scales were only used for statistical purposes and were not visible to the students. For all questionnaires, students were instructed to carefully read questions as well as all choices available

before producing a response. Administration was monitored by independent proctors. Written informed consent was obtained from all participants. After the data from the two questionnaires were connected, any identifying information was deleted, and codes were assigned to each participant. Data collection instruments and methodology were approved by the XXXXXX University (Approval XXXXXX). Approval was based on the ethical standards of the Office for Human Research Protections of the US Department of Health and Human Services. The risks to participants were deemed not to exceed those encountered in everyday life and to be offset by the benefits offered by the opportunity to self-reflect on personal choices and behaviors.

RESULTS AND DISCUSSION

The responses to the items of the engagement questionnaire, as well as the responses involving students' subjective views of the potential impact of physical activity on cognition and affect (section C of the factual and attitudinal questionnaire), were grouped by content. The mean (*M*) and the standard deviation (*SD*) of each dimension and type of impact were then computed. Table 1 reports descriptive statistics, including the range of values for each variable. For the variable frequency of physical exercise outside the classroom, the following were the percentages of students who reported not exercising at all (1%), or exercising rarely (19%), sometimes (56%), and daily (24%). Debriefings illustrated that the choice 'sometimes' was used to specifically refer to physical activities performed once or twice a month, whereas 'rarely' was used for activities performed once or twice every six months. For both choices, students mentioned that physical activity was not a major component of their lives.

Table 1. Descriptive Statistics (Mean, *M*, Standard Deviation, *SD*, and Range)

<i>Variables</i>	<i>M</i>	<i>SD</i>
Impact on cognition (0 – 4)	1.91	0.90
• Ability to concentrate	2.32	1.04
• Ability to remember	1.90	1.17
• Ability to solve problems	0.85	1.54
• Experience mental clarity	2.55	1.00
Impact on affect (0 – 4)	1.92	0.64
• Ability to regulate mood	1.48	1.07
• Experience of less stress	2.61	0.98
• Experience of well-being	1.46	1.15
• Reduction of negative feelings	2.54	1.20
Preference for team physical activity (frequency of choice: 0 – 7)	1.21	1.37
Engagement (0 – 4)	2.86	0.40

On average, a participant reported on 1.81 types of activities, such as cardiovascular exercises (81%), strength exercises (33%), and flexibility exercises (37%). Within types, they reported a variety of particular recreational team-based sports that integrate different types of exercises (24%). Concerning the frequency of physical exercise, only 24% reported exercising daily during the current academic week. In the course of debriefing sessions, students were asked to qualify their choices when they fell short of a daily routine. Thematic analysis was used to classify anonymized students' answers (coding reliability approach; Braun & Clarke, 2021). Two independent raters with expertise in mental health science research categorized students' remarks. Their inter-rater agreement was 98%. Most students indicated that exercise was limited to the physical education course in which they were enrolled (56%). Others mentioned that they also occasionally exercised during the weekend if time permitted (24%). Further probing indicated that the weekend was often used to catch up on sleep and that physical activity was rarely pursued, thereby realistically equating themselves to the group for whom exercising was restricted to the physical education course. A chi-square goodness-of-fit test [$\chi^2(1) = 102.01, p < 0.001$] supported the conclusion that the pursuit of physical activity was, for most students, not subject-initiated. Because of this qualitative information, the ratings of frequency (0-3) were transformed into a binary variable, with 76% of the students reporting no or very little physical exercise outside the classroom (coded as 1) and 24% reporting notable physical exercise outside the classroom (coded as 2).

Table 2a displays a binary logistic regression analysis, and Table 2b a linear regression analysis used to test H1, H2, and H3. H1 predicted that a student's benefit expectancies (as represented by viewing physical activity as

capable of impacting cognition and affective state) would increase with course engagement (including affective, cognitive, and behavioral dimensions). H2 forecast that a student's benefit expectancies would be linked to increased reports of physical activity. H3 predicted that if a student's need for relatedness (as represented by her preferences for team-related endeavors) was included in decision-making processes regarding physical activity, the higher the preference for team-related physical activity. Consequently, greater would be both the student's course engagement and her self-reported physical activity.

In the tables, beliefs in the impact on cognition or affect (indexing benefit expectancies) and preference for team physical activity (indexing relatedness) served as predictors, and frequency of physical activity (Table 2a) and engagement (Table 2b) operated as the outcome variable. Regression analyses assessed the degree to which each predictor contributed to an outcome variable when all other predictors were held constant. Preference for team physical activity, an index of the need for relatedness, was operationalized as the frequency with which students reported an endeavor that involved people exercising together towards a common goal.

The sample size was deemed adequate for testing individual predictors (104 + number of predictors; Field, 2024). Assumptions for the multiple linear regression analysis of Table 2b, including homoscedasticity (i.e., no clear pattern in residuals), linearity, and normality of residuals, were satisfied through visual scanning of plots. The values of tolerance and Durbin-Watson tests are at the bottom of Table 2b. The binary logistic regression, displayed in Table 2a, correctly classified 79.1% of cases. Assumptions, including linearity (through Box-Tidwell transformation) and multicollinearity (tolerance statistic), and independence of error, were met (Field, 2024). All results were deemed significant if $p < 0.05$. In the tables below, both the operationalized components of students' benefit expectancies contributed to self-reported physical activity, supporting H1. However, only beliefs in the impact of physical activity on cognition contributed to engagement, thereby partially supporting H2. No support for H3 was recorded for either physical activity or engagement as the outcome variables. Additional evidence for the latter finding is that team-based activities were not selected more often than individual exercises [$\chi^2(1) \leq 3.23$, n], suggesting that relatedness was not a key component of students' motivation to be active physically.

Table 2a: Binary Logistic Regression Analysis with Frequency of Physical Activity as the Outcome Variable.

Predictors	<i>B</i>	<i>SE b</i>	<i>Exp(B)</i>	<i>Wald</i>	<i>p</i>	95% <i>CI</i>
Constant	-1.025	0.466	0.359			
Beliefs in the impact on cognition (0 – 4) *	0.898	0.219	2.456	16.842	< 0.001	1.599 – 3.771
Beliefs in the impact on affect (0 – 4) *	0.541	0.246	1.718	4.828	= 0.028	1.060 – 2.784
Need for relatedness	-0.075	0.116	0.928	0.412	= 0.521	0.739 – 1.165

Note: $R^2_L = 0.86$; Cox & Snell: $R^2 = 0.128$; Nagelkerke: $R^2 = 0.201$; Model: $\chi^2(3) = 39.655$, $p < .001$.
 .201]; tolerance ≥ 0.79 ; the asterisk signifies a significant contribution to the outcome variable.

Table 2b. Linear Regression Analysis with Course Engagement as the Outcome Variable.

Predictors	<i>B</i>	<i>SE b</i>	<i>Beta</i>	<i>t</i>	<i>p</i>	95% <i>CI</i>
Constant	0.496	0.076				
Beliefs in the impact on cognition (0 – 4) *	0.105	0.028	0.233	3.70	< 0.001	0.049 – 0.160
Beliefs in the impact on affect (0 – 4)	0.077	0.040	0.121	1.92	= 0.056	-0.002 – 0.157
Need for relatedness	0.022	0.017	0.073	1.30	= 0.196	-0.011 – 0.055

Note: $R^2 = 0.10$; tolerance ≥ 0.79 ; Durbin-Watson = 1.88; $f^2 = 0.11$; the asterisk signifies a significant contribution to the outcome variable.

General Discussion

The hectic lives of undergraduate students, especially during their first year, require emotional regulation to satisfy the cognitive demands of university curricula. Physical activities can be helpful (Mahindru et al., 2022), but their utility rests on students' appreciation of the link between cognitive and affective functioning and physical activity. Thus, the results of the present study were interpreted through the lens of self-determination theory (Ryan & Deci, 2017; Lynott, 2023; Vasconcellos et al., 2020) and expectancy-value theory (Vroom, 1964). Specifically, we examined two key components of students' intrinsic motivation to participate in physical activity and sustain involvement over time: benefit expectancies related to autonomy (i.e., one's sense of being able to initiate and control behavior leading to positive outcomes) as well as relatedness (i.e., one's desire to connect with others, including respect and value). Benefit expectancies related to autonomy, which defined students' intrinsic motivation to participate in physical activities and sustain involvement over time, were related to self-reported

frequency of physical exercise and, in part, to engagement in a physical education course. Although students appreciated the link between cognitive and affective functioning and physical activity, such an appreciation translated into daily physical activity in only 24% of the students. For the rest, exercising was limited to the course in which they were enrolled. Barriers, such as heavy academic workload and residues of gender roles from the past patriarchal order (Aljehani et al., 2022), might be responsible for this less-than-desirable physical commitment. Similar findings have been reported by Golkowska (2017) for women in Qatar, another country of the Gulf Cooperation Council. Notwithstanding investments in sport and recreational facilities, women's engagement in the Gulf region has been found to fall short of expectations.

Interestingly, relatedness was not linked to either outcome variable when its contribution was measured in relative terms through regression analyses. Both self-determination theory (Deci & Ryan, 2000) and sociocultural theory (Glăveanu, 2021; Vygotsky, 1978) underscored the relevance of relatedness. However, women emerging from a patriarchal system, such as the sample of participants in our research, prioritized benefit expectancies linked to their sense of autonomy. This null finding might be attributed to the rising individualism in Saudi Arabia, which is changing its fabric of assorted and overlapping social networks (De Jong & Moaddel, 2013; Jiang et al., 2018). It might also be attributed to the mental association made by our participants between patriarchy and the networks of male-only relationships that had sustained it (Al Chami & Youssef, 2025). Indeed, in pilot work and debriefings, this association was spontaneously often made by students.

Overall, our findings are consistent with those of other studies that show governmental policies promoting physical activity are a work in progress, notwithstanding their being recognized for yielding economic, health, and social benefits (e.g., Albululaya et al., 2023; Al-Hazzaa & AlMarzooqi, 2018). The most likely culprits for the slow progress in policy implementation are fragmentation, duplication, lack of coordination, and short-term focus. For instance, policies promoting women's sports in the national Quality of Life Program are yet to show substantial results, notwithstanding their being a key part of the Saudi government's Vision 2030 (Albululaya et al., 2023; Al-Hazzaa & AlMarzooqi, 2018).

Implications For Practice, Education, and Research: The Context and Actionable Recommendations

Saudi Arabia is in the process of restructuring its economic and social fabric. Rapid and broad-spectrum urbanization, although beneficial to moving the country into a sustainable future, has had its drawbacks. Street configurations are often engineered to discourage walking, and public transportation systems are in their infancy. With a few exceptions, a hot and arid climate is often a year-round occurrence. Due to this combination of circumstances, inhabitants tend to rely heavily on automobiles, even for short distances. The commonplace of satellite TV and telecommunication technology has further contributed to sedentary lifestyles. The hot and dusty physical environment has not helped, as it discourages outdoor physical activity. In this context, Saudi Arabian female students, who have only recently been granted agency, emerge as an unknown but knowable constituency, requiring targeted research endeavors.

The overall low self-reported physical activity, mostly limited to the physical education course in which students were enrolled, suggests that work needs to be done to counteract the circumstances that devalue physical activity in female students. Interventions that operate on the links between indices of intrinsic motivation and self-reported physical activity may be key. Students, who are the direct beneficiaries of physical education, may profit from a multi-level approach according to which instructors, events, and environmental structures contribute in concert to students' physical activities. Policies regarding physical education may promote gender equity, but for change to be palpable, it needs to come from people who see physical activity as capable of satisfying not only their needs for autonomy, relatedness, and competence, but also as capable of bringing notable benefits to their current lives. A course in physical education may be fertile soil. In it, causal links involving benefit expectancies can be strengthened by enhancing class activities that explicitly foster female students' self-efficacy (i.e., confidence in their capabilities; Bandura, 2017; Raven & Pels, 2021). Actionable recommendations entail training that targets the likely sources of self-efficacy in physical activities, such as mastery experience, self-persuasion, and positive affective states (Warner et al., 2014). Specific interventions involving well-defined instructions, action planning, and reinforcement of effort can enhance self-efficacy and result in higher physical activity engagement (Williams & French, 2011). Programs that promote awareness of recommended physical activity guidelines, such as the '150 Minutes Program' (Alshehri, 2024), may also be effective in changing attitudes and behaviors.

On the surface, our results appear not to support the relevance of participatory approaches in which students develop meaningful goals for themselves, assess and seek resources to achieve such goals, and can even co-design physical education activities with instructors serving as facilitators (Beni et al., 2017; Walseth et al., 2018). Yet, a sense of relatedness, which includes emotional connections and a strong sense of belonging, is increasingly acknowledged as a pivotal factor in learning outcomes (Ganotice et al., 2024; Goodenow, 1993). The null finding of relatedness in our study may be attributed to the rising individualism in Saudi Arabia (De Jong & Moaddel, 2013; Jiang et al., 2018), which encourages competition among peers. The need to be the best by striving to

outperform others may stem from a shift in education policy towards neoliberalism, which conceptualizes learners as individuals who operate in a globally competitive environment (Elyas & Picard, 2013). As noted earlier, it may also be traced to the association made in students' minds between the past patriarchal system and the networks of relationships that sustained it. Counteracting this mental association, thereby highlighting students' sense of relatedness, can be realized through a mastery climate. Such a climate defines success as skills and knowledge development. It contrasts with a performance climate, which defines success as outperforming others (Heuzé et al., 2006). Mastery climate is known to foster proactive actions that enable students to effectively address difficulties and challenges (Van Puyenbroeck et al., 2018). By doing so, it may reduce the desire to compete among female undergraduate students, which seems to be a response to the novelty of the professional opportunities that have suddenly become available to them and to the neoliberal framework in which such opportunities are framed.

LIMITATIONS

The research was conducted on a convenience sample at an English-medium university located in the Eastern Province of Saudi Arabia, one of the most populous and industrialized regions of the country. Evidence exists that Saudi Arabian youth from rural areas devoted to farming tend to be more physically active than those from either urban or desert environments (Al-Nuaim & Safi, 2022). Thus, the beliefs about the impact of physical exercise that the participants of our study expressed may be less intense than those of students from farming areas. It is also important to mention that our findings are restricted to what the respondents know, believe, have experienced, and are willing to report. The assurance of confidentiality does not rule out the influence of social desirability concerns on students' answers. Individualism may be on the rise among Saudi Arabian youth, but collectivistic norms have not evaporated (De Jong & Moaddel, 2013; Jiang et al., 2018), especially among the extended family networks that still define the power structure of the country (Najm, 2015). The tendency to respond in socially desirable manners to personally relevant items has been noted in members of societies with family collectivism and uncertainty avoidance, such as Saudi Arabia (Mahmood et al., 2015). However, it has been argued that social desirability is not to be viewed as a methodological artifact, but rather as bringing to the forefront cultural meaning (Smith, 2004).

Another limitation entails convenience sampling. Our study relied on a convenience sample of first-year students at a single higher education institution. This choice may limit the generalizability of its findings to students more advanced in their educational pursuits and from institutions in rural areas of the Arabic Gulf peninsula. Yet, an examination of the demographic characteristics of student populations from urban areas included in earlier studies does not suggest that our sample had notable distinctive characteristics regarding physical activity (e.g., Aljehani et al., 2022; Samara et al., 2015).

Notwithstanding generalizability issues, students' views about their motivation for physical activity are to be further explored with in-depth interviews to better understand what are the sources and features of their internal and external drives. Lastly, it is important to note that group data can provide an informative picture of the overall views of the recipients of physical education (i.e., students). Yet, they obscure individual differences, which exist in all domains of instruction and are related to performance. The recognition of such differences can help tailor physical education programs, courses, and extracurricular activities to particular audiences, thereby broadening their impact. Of course, reliance on self-reports brings about concerns about the influence of social desirability, which can be mitigated, but not entirely ruled out, by the assurance of anonymity offered to respondents and reversed-scored items.

The limitations of the present study are opportunities for further research into this underrepresented population of women, whose success is also the success of the envisioned economic engine of their country. Indeed, the plan to upgrade the Saudi Arabian economy (i.e., Vision 2030) cannot be realized without the contribution of the individuals who are now pursuing their education at the university level. Their mental and physical health is an unavoidable ingredient of their current and future success (Izutsu et al., 2015). Another unavoidable ingredient is the set of beliefs about physical activities held by such individuals, who are the pillars of the Vision 2030. Advocacy or social change campaigns can attempt to tackle such beliefs, but they remain a work in progress without fine-grained training on the ground. The reason bypasses gender. As Festinger et al. (2013) warned, "[a] man with a conviction is a hard man to change. Tell him you disagree, and he runs away. Show him facts and figures, and he questions your sources."

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