

## Can Physical Activity Reduce Perceived Psychological Stress? A study among Sultan Qaboos University Students in Oman

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### ABSTRACT

This research aims at examining the relationship between physical activity and perceived psychological stress among Sultan Qaboos University students with some variables using specific questionnaires designed for the purpose of this study. The sample included 222 male and female students from different science and humanities colleges (2018-2019 summer academic enrollment). The findings showed that the majority of the students expressed a medium level of physical activity (48.9%) and moderate psychological stress (50%). Significant relationships between the physical activity, gender and college (scientific versus humanities) were found. However, gender and college did not significantly correlate with students' reported psychological stress. Significant relationship was found between physical activity and reported psychological stress among students with high level of physical activity as they were more likely to express low level of psychological stress. Findings also found that psychological pressure levels could be predicted by physical activity levels.

### Keywords

Physical activity, psychological stress, university students, gender, college

### Introduction

Regular physical exercise is a central part of many individuals' lives. Nonetheless, many people live under continuous pressures, making it quite challenging to identify an outlet to release stress and reduce anxiety. This is the case for university students who sometimes juggle through different academic and life stressors. University students are faced with several challenges and expectations that exacerbate the likelihood of psychological stress and burnout. Students coming to college will have to become more self-sufficient in a new environment that requires building new connections, new lifestyles, as well as building resilient personalities [14]. Unless students sustain or develop effective behaviors that contribute to well-being, they may become prone to psychological stress [9 & 24].

### Literature Review

#### Physical activity

Before going any further, it is important to define what we mean by physical activity within the

current study. "Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure. The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities" (p.126 ) [11]. This definition outlines that any daily activity can be a form of physical exercise, including but not limited to walking, jogging, running errands, or going to the gym.

Different research pointed that physical activity has positive impacts on people's lives. Paluska and Schwenk (2000) reviewed the literature on the use of physical activity in managing depression and anxiety among adults. They reported that regular exercise mitigated the symptoms of depression, anxiety, and panic attacks, although did not prevent their occurrence. Regular physical exercise is considered as the most important factor in maintaining good mental health, feeling more adjusted and dealing with many psychological

problems [11]. Physical activity also helps improve the quality of life in the society by reducing the level of psychological stress [1 & 31].

People who exercise regularly are more likely to feel happy and excited; especially if other people share this with them [31]. The feeling of temporary satisfaction and happiness was attributed to the release of happiness enzymes (i.e. dopamine) by the body after physical exercise [6]. Esch and Stefano (2010) explain that higher dopamine and oxytocin are naturally released after exercise, thus altering bodily physiology to the extent that "pleasure induction" is sought after by people who regularly exercise (p.19). Kilpatrick, Hebert, and Bartholomew (2005) also attributed participation in physical exercise to motivation. They found that engaging in sports activities were driven by excitement and interaction with others. On the contrary, Kilpatrick et al. found that non-sport related physical exercise was more related to body image and wanting to feel healthy. Thus, physical exercise may improve social connection with others as well as health promotion [8].

To study exercise related habits, Al-Kilani, Waly and Yousef (2012) surveyed 202 university students (101 male, 101 female) from Sultan Qaboos University from five colleges (Education, Engineering, Nursing, Agriculture, Medicine). They found that most students reported weekly exercise, and that male students spent more hours exercising as compared to females [3]. This was because they had more access to outdoor physical activities and fitness clubs [3].

In a study conducted to assess Sultan Qaboos University students' motives to exercise, Zayed and Frieze (2014) found that students exercised for several reasons, particularly as a way to reduce anxiety and stress, to stay fit, and to stay positive. Additionally, students engaged in physical activities for social interaction, body image, health and fitness, and competition. Male students were more active as compared to females [32]. Zayed and Frieze (2015) found that 20% of male students and 77% of females did not participate at any sport exercise activity [32]. On the contrary, 45% of male students exercised and participated in sports activities from 2 to 3 times a week, and 35% of the males and 2% of the females exercised on daily basis. Male students were more motivated to exercise than female as they thought exercise helped reduce their stress and made them feel more relaxed [32]. Thus, motivation to

participate in group sports activities is more likely to sustain non-sport related physical exercise [17].

### **Psychological stress**

Any new experience can be marked with an array of new learning experiences. College students go through a number of stressors such as academic, social, financial, and the like [8, 16, 18, & 22]. While it must be acknowledged that stress is a normal part of life, stress perception affects the way students experience college [18]. Before going any further, though, it is vital we define psychological stress. Psychological stress is defined as the external and internal factors that affect the individual and his emotions negatively. Folkman & Lazarus (1987) defined stress in terms of ineffective person-environment relationship. Folkman and Lazarus believed that our cognitive appraisals of stress and our emotional responses may form perceived stress. Psychological stress affects students negatively, particularly in terms of students' low self-esteem and poor academic performance [17].

The term stress might be inclusive of a number of life domains such as family, school, financial issues, and political related issues [27]. For university students, they juggle through different problems that lead to academic and non-academic stress. For instance, academic overloads, course difficulties, time management issues, workload every semester, exams difficulties, low motivation, fear of failure, and inadequate resources [5] are just examples of daily stressors. Additionally, family problems, financial problems, changing the environment, abuse, peer pressure, life changes and conflicts, are other sources of stress [24].

One issue related to psychological stress is prolonged stress that might lead to depression [8 & 20]. Bayram and Bilgel (2008) studied levels of depression and psychological stress among Turkish college students. They reported that levels of psychological stress were moderate among college students, with higher levels of stress among first and second-year students. They also found that female students suffered from higher levels of psychological stress. Southwick, Vythilingam and Charney (2005) offered an extensive review of factors that help in resilience against stress and depression. They concluded that decreased stress resilience was a major factor leading to depression and prolonged anxiety, which could be mitigated through "positive

emotions and optimism, humor, cognitive flexibility, . . . ., social support, role models, coping style, exercise, capacity to recover from negative events, and stress inoculation” (p.255).

In the context of college students, Sreeramareddy et al. (2007) reported that 20.9% of medical students in Nepal suffered from high levels of psychological stress. Researchers indicated that lack of facilities for entertainment and coping activities were factors leading to high levels of stress [27]. In a study of 232 of undergraduate university students from King Saud University in Saudi Arabia, Bataineh (2013) found that university students experienced a moderate level of stress. Results also indicated that there were no significant differences between stress and students’ different level of study and specialization. Baghurst and Kelley (2014) monitored stress among a sample of college students by monitoring cognitive-behavioral stress management, cardiovascular fitness, generalized physical activity. Burnout was one major issue college students suffered from and used a variety of strategies to mitigate its effects.

### **Physical activity and psychological pressure**

There is a plethora of research indicating the positive relation between physical activity and psychological well-being [12, 19]. Steven and Heidi (2004) studied vigorous physical activity and its relation was studied among a sample of Canadian college students. Steven and Heidi found that college students, in general, had decreased physical activity compared to high school. Students who remained physically active had lower levels of fatigue and psychological stress [6]. Baghurst and Kelley (2014) asserted that physical activity had long term positive effects on the overall psychological well-being of college students. Physical exercise was more positively related to psychological health among males, while females who had eating disorders did not indicate a clear relation between exercise and mental health [29]. In a randomized clinical trial, sedentary adults were enrolled in two groups (experimental and control) to monitor the impact of regular physical activity in overall wellness using an online personal activity monitor (Grube Solution™) [7]. Results indicated significant practical outcomes among the experimental group in reported overall wellness using the WEL measure [7].

Given that research on the relation between reported psychological stress and physical exercise behaviors is lacking among university students in Oman, this study aims to examine the relationship between these two variables. Addressing the relation between reported physical activity and perceived psychological stress levels might help decision makers in raising students’ awareness about physical activity and its importance. Thus, the current study aims to investigate the relationship between reported physical activity practices and perceived psychological stress among undergraduate students at Sultan Qaboos University. The current study had four main hypotheses. The first hypothesis was that university students report medium to high levels of physical exercise. The second hypothesis was that university students reported medium to high level of psychological stress. This study also hypothesized a significant negative relationship between reported psychological stress and physical activity scales. Finally, we hypothesized that psychological pressure levels could be predicted by physical activity levels using regression analysis.

## **Methods**

### **Sample**

Participants in this study were comprised of 222 undergraduate university students at Sultan Qaboos University and were enrolled during the summer semester of 2018. This sample consisted of 105 male and 116 female students aged between 19 and 25 years, with a mean age of 22 years old. The students came from scientific colleges (77) and humanities colleges (144).

Students were given an introduction about the two questionnaires and the purpose of collecting data. Those who agreed to participate were asked to sign a consent form and fill in the questionnaires which lasted between 15 and 20 minutes. Students and researchers had no direct relationship in that researchers did not teach participants. Participation in the study was completely voluntary, and no participant was forced to fill the survey questionnaires.

### **Instruments**

#### **Physical Activity Questionnaire**

Physical activity is measured using a specific questionnaire which was developed for the purpose of this study. It consisted of 15 items. A five-point Likert scale was used to measure the

students' response ranging from 5 (always) to 0 (never). The overall reliability score of the scale was Cronbach's  $\alpha = .740$ . A faculty in physical education was consulted to rate the relevance of the items to student reported physical activity behaviors. Demographic variables were included at the beginning of the scale to identify any variability resulting from gender, college, year of study, and region. These independent variables were computed to investigate any differences within the sample attributed to demographic variables.

### Psychological Stress Questionnaire

This present study applied the quantitative approach using two surveys to collect data about the topic. To measure level of psychological stress, a specific survey was developed based on existing literature and previously developed measures that were used to assess stress. It comprised of 25 items that measured the academic, social, psychological, and financial aspects relevant to students' psychological stress. The aspects within the scale included university environment (students' activities, services), student-student relationships, classes and campus facilities, student-family relationship, student-friends relationship, students' health and mental health. The mental health variable focused on students' reported emotions, behaviors, thoughts experienced during their studies at the university. In addition, financial aspects were investigated, such as life expenses, stationary, and off campus internet fees. A five-point Likert scale was used to measure the students' response ranging from 5 (always) to 0 (never). The reliability of the questionnaire was assessed using Cronbach's Alpha, which was obtained from the sample data for the psychological stress and its three dimensions. The overall reliability of the questionnaire was  $\alpha = .650$ .

### Data Analysis

Data from the surveys was analyzed using the Statistical Package of Social Sciences (SPSS) software. Two statistical procedures were used for the data analysis: descriptive and inferential. The current study examined the relationship between physical activity and psychological stress among university student sample considering some variables.

### Results

To assess the level of physical activity among the university sample, we relied on the median as a criterion as follows. Those who scored  $< 3.4000$  are considered to have a high level of physical activity,  $2.7333 > 3.400$  is considered as medium level of physical activity and  $> 2.7333$  as a low level of physical activity. The findings showed that about half (48.9%) of the university students reported a medium level of physical activity ( $M=3.01$ ,  $SD=0.19$ ), and about 27.1 % of the study sample had a high level of physical activity ( $M= 0.36$ ,  $SD=0.27$ ), and 24% of them had a low level of physical activity ( $M=2.49$ ,  $SD=0.19$ ). This is a positive indication that the students were moderately aware of the importance of physical activity in their lives. This is also because the university provides the students with all the needed resources and facilities to exercise through deanship of students' affairs which always provides different exercises activities and completions for all the university students on and off campus. This will impact positively on their quality of their lives and academic studies as physical activity has shown to have good impacts on people's physical and psychological health [2].

An independent Sample t-test was conducted to examine differences in gender and college of the university students in their level of physical activity. Gender was found to be a significant factor that affects the level of physical activity. Data revealed that there were significant differences between male and females' students in level of physical activity. Male students ( $M=3.64$ ,  $SD=0.22$ ) had a high level of physical activity (32.4%) as compared to females ( $M=3.75$ ,  $SD=0.31$ ) (22.4%). This could be interpreted as a cultural factor as male students can exercise anytime and anywhere, as they have more access to outdoor physical activities and exercises than females [2]. This finding is consistent with the results of other studies [3] in which gender was a significant factor in affecting the level of physical activity as male students had a higher level compared to females.

Similarly, findings also showed that students at Scientific colleges (29.9%,  $M=3.72$ ,  $SD=0.72$ ) were higher than those from humanities colleges (25.7%,  $M=3.67$ ,  $SD=0.23$ ) in levels of physical

activity. This could be interpreted as the nature of study in scientific colleges is more pressured than those in humanities colleges as it included more labs and practical works. This makes them in a need to relax and externalize the pressure by engaging in physical activity. As such, it is not surprising that their level of physical activity is high [2]. However, direct relation between college and level of exercise is still unclear in this study. It may be that more participants from scientific colleges could be needed to yield more accurate results.

Data also showed that about two-thirds of students (65%) reported that they used to exercise between 1 and 5 times a week, 17.6% of them used to exercise between 6 and 10 times a week and 11.3% reported that they did not exercise at all. This finding is good in a way that showed that more than half of the sample used to exercise. This may also indicate that more programs are needed to raise the students' awareness towards the exercise.

As for psychological pressure, we relied on the normal distribution of the sample as criteria because the psychological pressure is one of the psychological factors that is usually normally distributed among people. So, we will rely on the following score ( $M=3.129$ ),  $SD (\pm 0.473)$  as criteria for classifying the groups. Those who scored above ( $M=3.129$ ) + ( $SD = 0.473$ ) were considered to have a high level of psychological pressure. Those who scored less than ( $M=3.129$ ) - ( $SD = 0.473$ ) were considered to have a low level of psychological pressure; and those who scored between ( $M=3.129$ )  $\pm$  ( $SD = 0.473$ ) were considered to have a medium level of psychological pressure.

In the current study, (50%) of university students showed a medium level of psychological pressure ( $M=3.14$ ,  $SD=0.260$ ). This is a good indication that many students can manage with their studies' pressure and time. This is also because having a medium level of pressure helps increase the motivation for studying. The result of this study is similar to previous studies [5, 8, & 20] who

found that level of psychological pressure among university students was moderate, despite the notion that the young are generally active.

In terms of gender differences, no significant differences found between male and female in their psychological pressure and those who come from STEM and humanities. This could be explained by the fact that students may perceive study related pressures in the context of their studies, regardless of their field of study. This result is similar to a previous that reported mixed findings [24]. Many science majors reported higher levels of psychological stress, just like some humanities majors such as music and spiritual/ religious studies majors.

Two-Way Analysis of Variance was conducted among the variables (gender, college, region, and physical activity) and psychological pressure. There were no significant differences found between all the variables and the interaction, except between psychological pressure and physical activity (see Table 1). Results showed that there was a significant effect of physical activity on psychological pressure at the  $p < .5$  level for [ $F = 4.45$ ,  $p = .013$ ]. Post hoc comparisons using Lsd test were used to compare between means of physical groups and pressure (low = 3.31, medium = 3.12, high = 3.06). [see Table 2 & 3].

Findings showed that those who scored a high level of physical activity had a low reported level of psychological pressure. This is an indication that those students were aware about the importance of the physical activity as a positive tool for coping with stress and increasing emotional stability. Physical activity also helps students manage their times which positively impacts their studies [23]. Regular physical exercise could also help students stay away from other unhealthy behaviors like smoking, staying up late, and negative friendships through engagement in healthier lifestyles.

**Table 1.** Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Gender	.021	1	.021	.092	.762	
College_1	.197	1	.197	.871	.352	.0634
Region_1	1.093	4	.273	1.209	.309	
Phys group	2.012	2	1.006	4.453	.013	
Gender * College1	.001	1	.001	.003	.957	-.2064*
Gender * Region1	.311	4	.078	.344	.848	
Gender*Phys group	.875	2	.438	1.937	.147	
College1 * Region1	.364	4	.091	.403	.807	.2697*
College1*Phys group	.037	2	.018	.081	.922	
Region1*Phys group	1.387	8	.173	.768	.632	.2064*
Error	36.368	161	.226			

**Table 2.** Tests of Between-pressure and physical activity

Phys_group	Mean	Std. Error
1.00	3.062 <sup>a</sup>	.083
2.00	3.118 <sup>a</sup>	.054
3.00	3.310 <sup>a</sup>	.077

**Table 3.** Tests of Between-pressure and physical activity

(I) Phys_group	(J) Phys_group	Mean Difference (I-J)	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1.00	2.00	-.0634	.0812	-.2238	.0971

**Table 4.** Correlation coefficients for physical exercise and psychological pressure

Coefficients		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	2.356	.199		11.818
	Total_Phys_Act	.252	.064	.257	3.927

**Conclusions**

This study examined the relation between reported physical activity and perceived psychological stress among university students. The current

To find out whether perceived psychological pressure could be predicated by reported physical exercise, we used simple linear regression. The

95% confidence interval for psychological pressure (Mean= 3.1299, SD=0.47368) and Total Phys Act (Mean= 3.0757, SD=0.48309) is [2.89066, 3.56934]. The correlation coefficient ( $r^2 = 0.066$ ,  $B = 0.252$ ,  $t = 3.927$ ,  $p = .000$ ) shows a significant correlation between reported physical exercise and psychological pressure. Results also

show that physical exercise explained 6% of the total variance in levels of psychological pressure ( $F = 15.425$ ,  $p = .000$ ). The prediction formula is as follows  $\hat{y} = 2.356 + \text{physical exercise score} \times .252$ .

This means that physical activity can be a coping approach that could be used for stress reduction. Thus, understanding habits around physical activity will help predict levels of psychological pressure among college students.

sample of university students reported a medium level of physical activity and psychological stress. Gender and college were significant factors that affected students' physical activity whereas these

two factors did not influence students' reported levels of psychological stress. Negative significant relationship was found between physical activity and psychological stress.

Findings from this study are in line with the literature on the relation between physical activity and mental wellbeing [28]. Teychenne and colleagues reported a number of guidelines for physical activity and mental health such as dose, type, life domain, psychosocial and contextual factors, as well as sedentary behavior, all of which all vital to consider achieving a healthier lifestyle. Students who reportedly exercised more than their peers also reported lower perceived stress, which is in line with previous studies [12]. In fact, exercise is well-known to be one intervention in reduction of stress and stress management due to the physiological impacts exercise leaves in the body [13]. The BERN stress management intervention (Behavior, Exercise, Relaxation, Nutrition) is one effective intervention that results in decreased stress and increased sense of satisfaction [12 & 13], which is similar to the reported feelings of some participants in the current study. It seems as though that male participants used vigorous exercise (i.e. soccer, basketball, jogging, etc.) as a stress management technique more than female participants. On the other hand, females indicated less physical activity, possibly not considering walking as a form of stress reduction exercise.

As for discrepancies in physical exercise related to gender, gender and college were significant factors that affected students' physical activity whereas these two factors did not influence students' reported psychological stress. Thome and Espelage (2004) reported that males generally exercise to feel good about themselves. However, females exercise for many reasons, including feeling well and reducing weight, which also may have negative impacts on their exercise related feelings [29]. Culturally, it is more normal to see males exercise outdoors in Oman, or the middle east in general. However, females may have more restrictions in relation to exercise in that females are more likely to exercise indoors or would only walk outdoors if they ever wanted to exercise. Our results could have been affected by cultural

norms, thus, more males reporting to be exercising than females [32].

As per pervious research, perceived psychological pressure can be predicted by reported regular exercise behaviors. Our findings support previous literature [10 & 22] in that individuals' perceived stress level could be predicted through habits around regular physical exercise. Physical exercise habits are among the most predictive variables of the wellbeing of college students due to their physiological and psychological benefits [19]. Despite minor demographic differences among the sample in terms of gender, college, and region from which students come, we found that students who reported higher physical exercise also reported lower levels of perceived stress. Mental health professionals, academic advisors, and university administrators can have a better understanding of the types of behaviors that can help students succeed at college [21 & 23]. Physical exercise could be promoted as one primary stress reduction approach by facilitating the environment that encourages exercise, such as gyms, well-equipped sports complexes, on-campus gardens, and year-round extra-curricular sports activities for both genders.

### Limitations and Future Studies

Preventive programs are needed to make the students aware of the impact of psychological stress on their academic studies and psychological health. Specifically, it is significant to provide female students with the needed sport services to encourage them to exercise. Despite the existence of a female sports complex, it seems as though the facilities are not adequate compared to the number of female students. Due to cultural barriers, female students prefer exercising in closed areas. In addition, the climate in Oman is mostly hot and dry, necessitating the need for more indoor sports facilities that allow for vigorous physical activity in the right environment [10]. Moreover, those students who have stress are encouraged to seek counseling help from the student counseling center. Exercise may be one effective way to ameliorate effects of stress but seeking professional help may also be a viable option. More research studies are needed to examine other factors that might affect students' physical activity

and psychological stress such as quality of social relationships and time of the year data is collected.

Limitations to this study are that the generalizability of the data to other university students may be limited as the questionnaires only covered a small number of university students. Since the data was collected during the academic summer semester, this might reflect only their perception during that time of the year as during summer course load is higher, and students take two or three courses in a two-month period. In addition, the excess heat during summer months may discourage students from engaging in regular exercise, especially with lack of air-conditioned gyms that could take enough students at a time. As such, this might not reflect their actual psychological stress; they might have it during the normal study. It is also important to keep in mind that students' report of physical exercise does not necessarily reflect their actual behaviors. This makes it more complex to draw findings only on participants self-reports without monitoring their

## References

- [1] Abdul Haleem, A. (2005). Relationship between psychological stress and some motivation and emotional aspects among boxers in North Asaeed. *Asuit Journal for Science and Art of Physical Activity*, 20(2), 1-35.
- [2] Abosree, O., Ibrahim, M., & Al Nabhani, Z. (2014). Interests of Sultan Qaboos University Students: "A Comparative Study Based on Gender and Specialty Area". *Journal of Arts and Social Sciences*, 2 (5), 83-103.
- [3] Al-Kilani, H., Waly, M., & Yousef, R. (2012). Trends of obesity and overweight among college students in Oman: A cross sectional study. *SQU Medical Journal*, 12(1). 69-76.
- [4] Al-Oun, I., S., Al-Zuboun, M, Al-Qadi, H, M. (2016). The role of directed physical activity at the reduction of psychological stress among high elementary students in northern Badia. *Dirasat, Educational Sciences*, (43)1. 329-340.
- [5] Bataineh, M., Z. (2013). Academic stress among undergraduate students: The case of educational faculty at King Saud University.

stress levels in a controlled physical exercise program. Reading the results of the current study must be done in caution if seeking generalizability to other contexts than the context of this study.

## Ethical Compliance

**Funding:** No funding was received for conducting this study.

**Compliance with Ethical Standards:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Conflicts of Interest:** The authors declare that they have no conflict of interest.

**Informed Consent (when applicable):** Informed consent was obtained from all individual adult participants included in the study.

*International Interdisciplinary Journal of Education*, 2(1). 82-88.

- [6] Baghurst, T., & Kelley, B. C. (2014). An Examination of Stress in College Students Over the Course of a Semester. *Health Promotion Practice*, 15(3), 438-447. <https://doi.org/10.1177/1524839913510316>

- [7] Barwais, F. A., Cuddihy, T. F., & Tomson, L. M. (2013). Physical activity, sedentary behavior and total wellness changes among sedentary adults: A 4-week randomized controlled trial. *Health and Quality of Life Outcomes*, 11(1), 1-8. <https://doi.org/10.1186/1477-7525-11-183>

- [8] Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, 43(8), 667-672. <https://doi.org/10.1007/s00127-008-0345-x>

- [9] Beauchemin, J., Gibbs, T., & Granello, P. (2018). Wellness Promotion Courses in University Settings: A Review of the Outcome Research. *Building Healthy Academic Communities Journal*, 2(1), 36. <https://doi.org/10.18061/bhac.v2i1.6344>



- [10] Bray, S. R., & Born, H. A. (2004). Transition to University and Vigorous Physical Activity: Implications for Health and Psychological Well-Being. *Journal of American College Health*, 52(4), 181–188. <https://doi.org/10.3200/JACH.52.4.181-188>
- [11] Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research. *Public Health Reports*, 100(2), 126–131. <https://doi.org/10.1093/nq/s9-IX.228.365-f>
- [12] Edwards, S. (2006). Physical exercise and psychological well-being. *South African Journal of Psychology*, 36(2), 357–373. <https://doi.org/10.1177/008124630603600209>
- [13] Esch, T., & Stefano, G. B. (2010). The neurobiology of stress management. *Neuroendocrinology Letters*, 31(1), 19–39.
- [14] Folkman, S., & Lazarus, R. S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, 1(March), 141–169. Retrieved from <http://0-web.ebscohost.com.sally.sandiego.edu/ehost/pdfviewer/pdfviewer?vid=2&sid=535f9a36-1166-41c8-9fdd-d89e6fa96249%40sessionmgr198&hid=110>
- [15] Friedline, T., Rauscher, E., West, S., Phipps, B., Kardash, N., Chang, K., & Ecker-Lyster, M. (2017). “They will go like I did”: How parents think about college for their young children in the context of rising costs. *Children and Youth Services Review*, 81(June), 340–349. <https://doi.org/10.1016/j.childyouth.2017.08.027>
- [16] Hinkelman, J. M. L., & Luzzo, D. A. (2007). Mental health and career development of college students. *Journal of Counseling and Development*, 85(2), 143–147. <https://doi.org/10.1002/j.1556-6678.2007.tb00456.x>
- [17] Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students’ motivation for physical activity: Differentiating men’s and women’s motives for sport participation and exercise. *Journal of American College Health*, 54(2), 87–94. <https://doi.org/10.3200/JACH.54.2.87-94>
- [18] Misra, R., & McKean, M. (2000). College students’ academic stress and its relation to their anxiety, time management, and leisure satisfaction. *American Journal of Health Studies*, 16(1), 41. Retrieved from <http://search.proquest.com/docview/210480531?pq-origsite=gscholar>
- [19] Molina-García, J., Castillo, I., & Queralt, A. (2011). Leisure-time physical activity and psychological well-being in university students. *Psychological Reports*, 109(2), 453–460. <https://doi.org/10.2466/06.10.13.PR0.109.5.453-460>
- [20] O’Connor, D. B., Cobb, J., & O’Connor, R. C. (2003). Religiosity, stress and psychological distress: No evidence for an association among undergraduate students. *Personality and Individual Differences*, 34(2), 211–217. [https://doi.org/10.1016/S0191-8869\(02\)00035-1](https://doi.org/10.1016/S0191-8869(02)00035-1)
- [21] Paluska, S. A., & Schwenk, T. L. (2000). Physical Activity and Mental Health: current concepts. *Sports Med*, 29(3), 167–180. [https://doi.org/0112-1642/00/0003-0167/\\$20.00/0](https://doi.org/0112-1642/00/0003-0167/$20.00/0)
- [22] Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students: A Third Decade of Research*, pp. 534–545. <https://doi.org/10.2307/1982025>
- [23] Plotnikoff, R. C., Costigan, S. A., Williams, R. L., Hutchesson, M. J., Kennedy, S. G., Robards, S. L., Germov, J. (2015). Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 1–10. <https://doi.org/10.1186/s12966-015-0203-7>
- [24] Robinson, N., Andrews, S., & Yoder, B. E. (2016). Student Lifestyle Choices and Perceptions of Stress Based on Majors. *Kinesiology and Allied Health Senior Research Projects*, 5(Fall), 1–20.
- [25] Sidman, C. L., D’Abundo, M. L., & Hritz, N.

(2009). Exercise Self-Efficacy and Wellness among College Students in a Basic Course Exercise Self-Efficacy and Perceived Wellness among College Students in a Basic Studies Course Exercise Self-Efficacy and Wellness among College Students in a Basic Course. *International Electronic Journal of Health Education*, 12, 162–174. Retrieved from <https://files.eric.ed.gov/fulltext/EJ868237.pdf>

[26] Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The Psychobiology of Depression and Resilience to Stress: Implications for Prevention and Treatment. *Annual Review of Clinical Psychology*, 1(1), 255–291. <https://doi.org/10.1146/annurev.clinpsy.1.102803.143948>

[27] Sreeramareddy, C. T., Shankar, P. R., Binu, V. S., Mukhopadhyay, C., Ray, B., & Menezes, R. G. (2007). Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. *BMC Medical Education*, 7, 1–8. <https://doi.org/10.1186/1472-6920-7-26>

[28] Teychenne, M., White, R. L., Richards, J., Schuch, F. B., Rosenbaum, S., & Bennie, J. A. (2020). Do we need physical activity guidelines for mental health: What does the evidence tell us? *Mental Health and Physical Activity*, 18(November 2019), 100315. <https://doi.org/10.1016/j.mhpa.2019.100315>

[29] Thome, J., & Espelage, D. L. (2004). Relations among exercise, coping, disordered eating, and psychological health among college students. *Eating Behaviors*, 5(4), 337–351. <https://doi.org/10.1016/j.eatbeh.2004.04.002>

[30] Tolentino, L. R., Garcia, P. R. J. M., Lu, V. N., Restubog, S. L. D., Bordia, P., & Plewa, C. (2014). Career adaptation: The relation of adaptability to goal orientation, proactive personality, and career optimism. *Journal of Vocational Behavior*, 84(1), 39–48. <https://doi.org/10.1016/j.jvb.2013.11.004>

[31] Van der Waerden, J. E. B., Hoefnagels, C., Hosman, C. M. H., Souren, P. M., & Jansen, M. W. J. (2013). A randomized controlled trial of

combined exercise and psychoeducation for low-SES women: Short- and long-term outcomes in the reduction of stress and depressive symptoms. *Social Science and Medicine*, 91, 84–93. <https://doi.org/10.1016/j.socscimed.2013.05.015>

[32] Zayed, K., & Frieze, I. (2014). University Students' Motives to Exercise According to the Self-Determination Theory. *Journal of Educational and Psychological Studies [JEPS]*, 9(2), 340. <https://doi.org/10.24200/jeps.vol9iss2pp340-350>