Effect of Physical Activity on Students Academic Achievements: Mediating Role of Hedonic and Eudaimonic Wellbeing

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Abstract: *As we know that all around the world education is considered a very important factor towards a successful life, similarly in Pakistan it is also given the same value. Although it does not go hand in hand with physical activity, both mental and physical health play an important role with each other. This thesis presents an introduction to physical activity and academic performance using hedonic and eudaimonic wellbeing as a mediating factor. A quantitative study was carried out with 300 students from different departments of Abdul Wali Khan University Mardan situated in the province of Khyber Pakhtunkhwa. Regression analysis was evaluated using the SPSS data analysis software. According to the results, physical activity played a positive effect to the academic concert of the students. It was therefore as evidenced by the findings that hedonic and eudaimonic happiness also facilitated the relationship between physical activity and academic performance. Finally, the hypothetical and everyday contribution of the learning towards the existing literature and rural development in particular is examined.*

Introduction

Numerous health advantages have been linked to regular physical activity. According to (Andersen, (2011)., these advantages are especially relevant during childhood and adolescence, when developing good behaviors is recommended to ward off illness. as diabetes, obesity, and high blood pressure (Leibinger, E.,. (2023) Furthermore, increasing moderate-to-intense physical exercise during childhood and adolescence improves mental and physical health, which increases the likelihood of improving academic achievement (Dermont, M. (2008). Thus, in an attempt to improve academic performance and health, numerous institutional initiatives centered on the promotion of physical exercise have been implemented in schools (Gall, S., Adams,. (2018)

Academic performance is the progression of moving closer to the objective of gaining knowledge, skills, and resources for education. Any measurable achievement in the fields of scholarship or focused study is recognized as education (APA Dictionary of Psychology, 2006). Scholarly Knowledge gained through an scholastic system, grades or performance on an educational accomplishment test, educational degrees and diplomas, and other items can all be considered components (Steinmayr, (2014). More specifically, the grade point average (GPA), is used by the

majority of Pakistani colleges to assess academic performance. It is the total of all the grades a student has taken over the course of their applicable degree.

Several studies have shown that academic success and physical activity are positively correlated. Frequent physical activity has been linked to enhanced cognitive performance, attention span, and memory retention—all of which are critical for to ensure performance and achievement in school (Hillman, (2008) Moreover, physical activity improves general mental health, lowers stress levels, and encourages better sleep patterns—all of which help students do better academically (Singh, N. (2012).

Numerous psychological outcomes that fall into three broad categories—self-perception, emotional functioning, and cognitive functioning—have been connected to the welfares of physical activity for mental health (Cloonan,. (2008). Nevertheless, not much study has looked at how Sport and physical activity have an impact on cognitive development, maybe because there are intricate relationships between motor coordination, cognitive function, physical fitness, and attentional operating during the developmental stage (eRigoli, . (2012.)

In its simply and clear manner the WHO defines mental health to the community in which they live as 'a state of well-being in which the individual realises his or her abilities, can easily handle such pressures of life, can work and bring out productivity and efficiency and be useful in society'. It is also important to note that when one is in this state of well-being they know they can cope with most of life's normal demands or work effectively and have a positive impact to society. According to the WHO, wellbeing is a multidisciplinary idea that combines objective and subjective components. It encompasses both the individual's life experience and life comparisons. It is both a cause of and a determinant of health, and vice versa. The idea of wellbeing and the quality of life in connection to health are not the same thing.

The term "hedonic wellbeing" describes the individualized feeling of happiness and pleasure. By producing endorphins, which are known to improve mood and lessen stress, physical activity has been demonstrated to boost hedonic wellbeing (Craft, L. L., & Perna, F. M. (2004). Pupils who participate in increased emotional wellbeing brought about by physical activity improve motivation, self-esteem, and general life satisfaction. By creating a favorable learning environment, these pleasant feelings can have a direct impact on academic success (Fredrickson, B. L. (2001)).

The consequences of physical inactivity, on the other hand, are equally well understood (US Department of Health and Human Services, 1996) yet various university pupils are sedentary. Research also shows that more than 50% student across 27 countries from Australia, China and the USA etc. do not take part in any form of physical activity (Irwin, 2004). This inactivity affects both physical health—contributing to risks like heart disease and lower life expectancy—and mental well-being. The transition from high school to university can further disrupt activity levels and introduce stressors, such as social isolation and lifestyle changes, which negatively impact well-being (Caspersen et al., 2000; Allgower et al., 2001).

The "freshman 15," a common weight gain in first-year students, highlights the decline in physical activity during this period. With 30-40% of students experiencing psychological distress, promoting both physical action and mental health becomes essential (Adlaf et al., 2001). Encouraging exercise at this developmental stage may build long-term healthy habits (Leslie et al., 2001). Research further shows that physical activity correlates with academic success, though the amount or frequency of exercise does not directly affect GPAs (Chomitz et al., 2009).

Well-being is defined through **hedonia** (pleasure and happiness) and **eudaimonia** (personal growth and fulfilment). Both forms influence motivations for physical activity differently, with eudaimonic pursuits often prioritizing growth over immediate pleasure (Huta & Ryan, 2010). These dimensions interact and impact well-being, as engaging in meaningful activities (eudaimonia) may sometimes reduce short-term happiness (hedonia) but enhance personal development and fulfilment (Fredrickson, 2004).

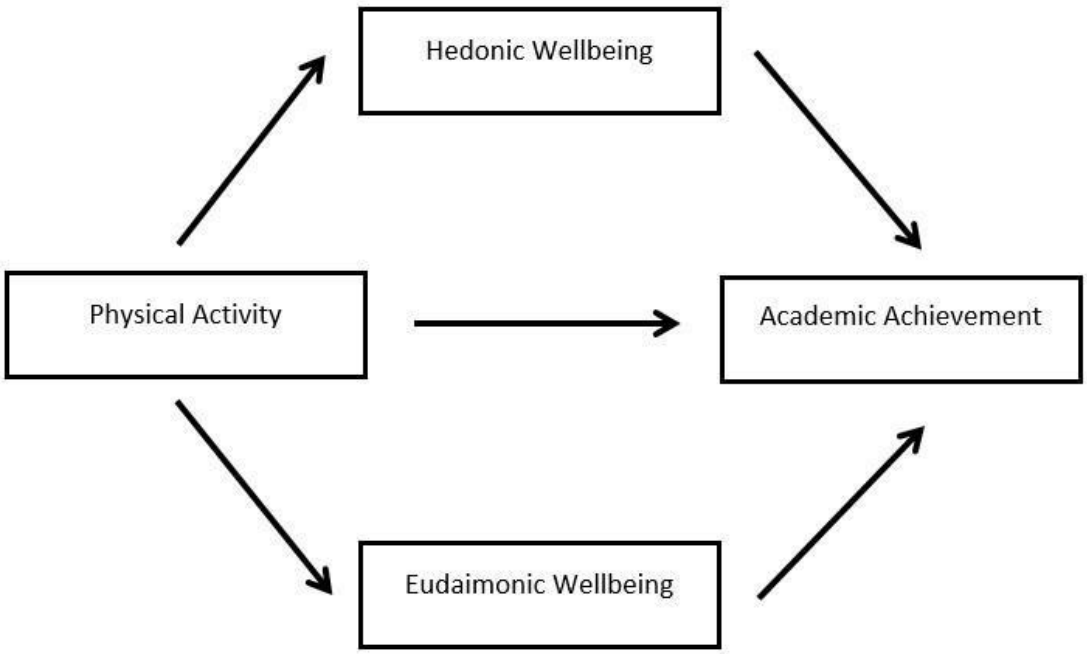
Hypothesis

H1: "Physical activity is positively associated with academic performance"

H2: "Physical activity is positively associated with student hedonic wellbeing".

H3: "Physical activity is positively associated with student eudaimonic wellbeing".
H4: "Hedonic wellbeing is positively associated with student academic performance".
H5: "Eudaimonic wellbeing is positively associated with student academic performance".
H6: "Hedonic wellbeing positively mediates the relationship between physical activity and academic performance".

Theoretical Framework



Methodology

The present research used a quantitative method in the investigation of the research questions concerning physical activity, academic performance, and wellbeing. Quantitative data were obtained by employing a convenient sampling technique by selecting three hundred students from Abdul Wali Khan University, Mardan, KPK, Pakistan. Participants were given a consent form to complete before they could fill the questionnaires.

Measurement Tools

1. **International Fitness Scale (IFIS)**:
   Developed by Ortego et al. (2011), this **5-point Likert scale** assesses physical fitness through five items, with questions such as "Your general physical fitness is..." and "Your muscular strength is...".
2. **Academic Performance Scale**:
   Adapted from McGregory (2015), this **5-point Likert scale** evaluates academic performance across eight items. Examples include, "I pay attention during discussions" and "I want to get good grades in every subject".
3. **Personally Expressive Activities Questionnaire (PEAQ)**:
   Developed by Waterman (1998), this scale measures both **hedonic and eudaimonic well-being**. It includes six items each for eudaimonia (e.g., "This activity gives me my greatest feeling of being alive") and hedonia (e.g., "I feel more intensely involved in this activity").

Data Analysis

The data were evaluated using **SPSS version 26.0. Regression analysis** and other statistical techniques were applied to assess the relationships between physical activity, academic performance, and well-being. These methods helped identify how fitness and mental well-being impact students' academic outcomes.

Results

This study involved 300 students of which 74% were male and 26% were female. The demographic variables are as follows; their distributions are described in full in Table 1. Following the demographic information, the findings of the first hypothesis that postulates that physical activities are positively correlated with study achievements will be expounded. The subsequent discussion will thus concentrate on the findings obtained from the second and the third hypothesis which postulated that physical activity has a direct positive correlation with student hedonic and eudaimonic wellbeing. Last, the results of the main objective: H6 – Hedonic wellbeing as a mediator of the relationship between physical activity and students' academic performance or/and H7 – Eudaimonic wellbeing as a mediator of the relationship between physical activity and students' academic performance. In a research study, the analysis of results shall be done according to APA 7th edition.

Of all the respondents 74% were male and 26% were female. The majority of the students went to college 82% were in the age of the 18-22, 16% were in the age group of 23-27, and only 2% were in the age group of 28 years and above. Among these research participants 11 % are married and 89% are unmarried persons. Since this study comprises both main and garden campuses of Abdul Wali Khan University Mardan, there were several departments and multiple programs, but mainly we focused on the Health and Physical Education department (HPE). There were 97 percent bachelors students, 2 percent Masters and M.Phil students and 1 percent Ph.D.

Table 1

Demographic details of the students

Demographic Information	Frequency	Percentage
Gender		
Male	222	74%
Female	78	26%
Age		
18 - 22	247	82%
23-27	48	16%
28& above	5	2%
Marital Status		
Married	32	11%
Unmarried	268	89%
Study Program BS	292	97%
MS/Mphil	5	2%
PhD	3	1%
Total	300	100%

Table 2 presents a simple profile of the study sample through mean, standard deviation and relationship of variables that would be used at the basic level with the aim of establishing the correlation of the variables with one another.

Table 2

Variables	Mean	SD	1	2	3	4
Physical Activity	3.89	.985	1			
Academic performance	3.8358	.73254	.485**	1		

Eudaimonic wellbeing	4.0539	.74633	.488**	.689**	
Hedonic wellbeing	3.8472	.80417	.436**	.642**	.573**

Note: N=300 **p<0.001

In table 3 shows that physical activity has a positive influence on the academic performance (B =.485***, p*** <.0001) this supported hypothesis 1. Hypothesis 2 stated that physical activity, will have positive relationship with hedonic wellbeing. Therefore, based on hypothesis 2 the findings (B =.436***, p*** <.0001) were in agreement with the findings. The below table also supported positive relationship of physical activity and eudaimonic wellbeing (B=.488***, P*** < .0001) supporting H1.

Table 3

Regression analysis

Variable		HED	EUD	AP
Constant				
Gender		.103	.059	.106
Age		.018	.012	.005
PA		.436***	.488***	.485***
HED				.642***
EUD				.689***
R2	.191	.238		.235
Δ*R2*	.188	.236		.233
F		70.130	93.311	91.794

Note: N=300 *p<0.05, **P <0.001 ***p<0.0001,

The intermediating hypothesis analysis was performed by Hayes SPSS process program version 26. To test the mediating roles of hedonic and eudaimonic wellbeing, the Hayes process Model 4 was applied based on the Hayes process templates. The following tables also act as evidence for the confirmation of hypothesis as highlighted below s.

Table 4

Mediation Analysis of Eudaimonic Well-being between Physical Activity and Academic Performance

Testing Paths	Unstandardized coefficient				Bootstrapping	
	Coefficient	Std error	T	Sig	LLCI	ULCI
IV→M (a)	.370	.038	9.660	.0001	.295	.446
M→DV (b)	.582	.046	12.657	.0001	.492	.673
IV→M→DV(c') .146		.035	4.175	.0001	.077	.214
IV→DV (c)	.361	.038	9.581	.0001	.287	.435
Indirect effects	.215	.033			.155	.285

Note: IV (Physical Activity), MV (Eudaimonic well-being), DV (academic performance)

This table presents the results of the studied mediation analysis for which eudaimonic well-being was considered as the mediator variable (MV) between the independent variable (IV) – physical activity and the dependent variable (DV) – academic performance. The findings suggest that physical activity bears a strong relationship with eudaimonic well-being (r =.370, p <.0001), and eudaimonic well-being bears a strong relationship to the grades (r =.582, p <.0001). Also, the direct

association between physical activity and academic performance (c) is significant, c = .361, t < .0001, highlighting the partial mediating role of eudaimonic well-being because the indirect effect is .215.

Table 5:

Mediation Analysis of Hedonic Well-being between Physical Activity and Academic Performance

Testing Paths	Unstandardized coefficient				Bootstrapping	
	Coefficient	Std error	T	Sig	LLCI	ULCI
IV→M (a)	.356	.043	8.374	.0001	.273	.440
M→DV (b)	.484	.043	11.261	.0001	.400	.569
IV→M→DV(c')	.188	.035	5.365	.0001	.119	.258
IV→DV (c)	.361	.038	9.581	.0001	.287	.435
Indirect effects	.173	.031			.119	.240

Note: IV (Physical Activity), MV (Hedonic well-being), DV (academic performance)

This table gives the results of the mediation test for hedonic well-being (MV) as the mediator variable on the relationship between physical activity (IV) and academic performance (DV). The findings affirm that physical activity has a robust and positive correlation to hedonic well-being with a standardized coefficient of.356 (t = 8.326, p <.0001), while hedonic well-being also emerged as a strong predictor of academic achievement since with a standardized coefficient of.484, (t = 10.164, p <0.0001). Physical activity is still a positive predictor of academic achievement once again in the direct model (c = .361, p < .0001) and the total indirect effect of hedonic well-being-mediated effect comes up to .173 showing partial mediation.

Discussion

The primary concern of this research study was therefore to examine the relationship between physical activity, academic achievement, hedonic and eudaimonic well-being among University students of Abdul Wali Khan University Mardan. A few previous studies investigated these variables in this particular perspective and, therefore, the present research is meaningful. In particular, the authors sought to answer the following questions: does hedonic and eudaimonic wellbeing moderate the relation between physical activity and academic performance, and does physical activity contribute to students hedonic and eudaimonic wellbeing? A number of researches have provided significant evidence that physical activity enhances performance in school. Singh et al. in their findings in 2012 showed that students who practice physical activity are likely to have better body and brain functions hence improve their performance. Another literature review by Fedewa and Ahn (2011) therefore proposed that physical activity would increase the academic performance of students based on improved thinking, focus and behaviour in class. Furthermore, Sallis et al (1999) observed that active students perform better in term of test scores and pay more attention than the sedentary students. It correlates with what you have found out, that it is as fact that increased physical activity is linked to improved academic achievement.

Our second and third hypothesis provided the evidence that physical activity plays an important role in hedonic and eudaimonic wellbeing. These regression statistics of the physical activity on hedonic an eudaimonic wellbeing revealed that B value shows a positive correlation between physical activity and hedonic wellbeing B = .436*** (Table 3) and eudaimonic wellbeing B = .488*** (Table 3). The reviewed literature shows positive relationship between physical activity and hedonic well-being, which involves pleasure and happiness. Reed and Buck in their survey that revealed, commitment to moderate regular exercise can enhance mood, reduce feelings of anxiety and depression specifically leading to hedonic well-being. In the same way, Biddle and Mutrie's research (2007) shows that increased physical activity leads to the secretion of endorphins which has an impact on enhancing mood and happiness – something that also you noted as compatibility between physical activity and hedonic well-being.

Kanning and Schlicht (2010) also established that people, who exercise, are happier in their daily lives for what, in Goldman and Kerem's (2004) terms; promote the hedonic aspect of well-being.

Hypothesized pathways include physical activity enhancing eudaimonic well-being, character-ized by personal growth, purpose and meaning in life. According to Ryan and Deci (2001), physical activity is reflective of characteristics of autonomously proudly self-organizing, increases competence, being related and need satisfaction that are most important for eudaimonic well-being. It backs up your conclusion they have made on the fact that physical activity enhances eudaimonic wellbeing because it enhances purpose and accomplishment feeling.

Furthermore, Heinonen et al (2015) discovered that PA, leads to higher levels of eudaimonic well-being as exercise promotes the formation of life objectives, growth of self, and choice. And this study fits into your hypothesis that physical activity increases the two types of well-being, hedonic, and eudaimonic.

Conclusion

The aim of the current research study was therefore to take physical activity and investigate the moderating effect of hedonic and eudaimonic wellbeing on the performance of students. Moreover, the study aimed at evaluating the impacts of exercises on academic achievement and hedonic and eudaimonic utility. The study findings suggested that the students who engaged in physical activity turned out to be benefited and got better performance in the examination, and physical activity was positively significant with hedonic and eudaimonic wellbeing. Furthermore, the finding pointed to a positive correlation between hedonic as well as eudaimonic wellbeing and academic performance and that hedonic as well as eudaimonic wellbeing mediates the relationship existing between physical activity and academic performance.

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