

## **THE RELATIONSHIP BETWEEN EXTRINSIC MOTIVATION AND PHYSICAL ACTIVITY LEVEL AMONG STUDENTS**

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### **Abstract**

Nowadays, people have realized that physical activity plays a critical role in determining the health and wellness of an individual. This is proven by the extensive research on this area, which indicates that people have started to emphasize this matter. In addition, it is also well known that motivation is one of the main factors that determine whether people will participate in performing physical activity or not. Both extrinsic and intrinsic motivators play a major role in determining levels of physical activity. Therefore, this study is made to investigate the relationship between extrinsic motivation and physical activity level. The researcher randomly selected 195 students from SMK Alam Megah 2, Seksyen 28, Shah Alam, Selangor as respondents for this study. The method of this study includes a questionnaire adapted from International Physical Activity Questionnaire (IPAQ) and Exercise Motivation Inventory (EMI), which was edited to fulfil the requirements of this study. The results from this study show that there is a positive and significant relationship between extrinsic motivation and physical activity.

*Keywords:* Motives, physical activity (PA), students, health

### **Introduction**

Nowadays, there are lot of health issues that are continuously increasing and worsening each day. This is mainly because of unhealthy lifestyles. One of the ways to counter this is performing physical activity. According to the World Health Organization (WHO), physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure.

Physical activity is integral part of our life since it may help us to avoid illnesses. According to Kilpatrick, Hebert, and Batholomew (2005), evidence clearly shows that regular physical activity improves physiological and psychological health. Nonetheless,

encouraging people to become physically active is a big challenge. This is because people tend to play with their gadgets such as cell phones and video games rather than become involved in physical activity. This is essentially the 'couch potato' hypothesis, whereby time spent with television and video games is thought to be negatively related to time spent in more energy expending activities and positively related to time spent in sedentary activities (including media use itself) (Vandewater, Shim, and Caplovitz, 2004).

Across the world, people prefer to stick with their gadgets rather than breaking a sweat to perform some physical activity. Our ancestors had no gadgets; hence, all they did was work, which is included in physical activities. That is why we can see most of old people nowadays can still work and remain free from chronic illness or diseases. There are even some young adults that have worst illnesses than older people. Older people that previously lived without gadgets can even live to 100 years old and it is doubtful if our current generation can even live until 65 years old. That is evidence that physical activities are important.

Sports are a type of physical activity that can be applied in everyone's lives. There are many types of sports available. From light intensity until vigorous intensity. Another benefit of sports, other than to prevent illness, it is enjoyable and fun especially that involve team. This is because other than playing, they can socialize with other peoples and get to know one another. Hence, an approach need to be taken to encourage people to involve in physical activities. One of it is by motivation. Motivation is defined as the process that initiates, guides and maintains goal-oriented behaviors. That is what causes us to act. For example, if our motivation is to reduce thirst, our action will be getting a glass of water. There are two types of motivation: intrinsic and extrinsic. So, this study will emphasizes on the relation of motivation toward involvement in sports.

Physical activities are always associated with illnesses and diseases. This is as simple as more physical activity, less illnesses; or less physical activity, more illnesses. There are several illnesses commonly related to a lack of physical activity. Example of illnesses and diseases are obesity, cancer, and diabetes. Physically active children and adolescents have lower blood pressure levels, more favorable lipoprotein levels, higher bone density and decreased adiposity compared to their sedentary counterparts (Riner & Sellhorst, 2012). According to this statement, the exposure of people active in physical activity is less than that of people who perform little or no physical activities.

Physical activity provides numerous benefits for people who engage with it. It enables people to maintain their health, helps in reducing stress and encourages happy living. In addition, it gives benefits to everyone, whether children, adults or seniors. According to Elena, Georgeta, Cecilia, & Elena (2011), physical activities have important preventive and therapeutic effects including preserving mobility, reducing the risk of falls and fractures, improving muscle strength and enhancing aspects of mental well-being and quality of life. These are just some of the benefits offered by physical activities.

Since there are so many benefits to be gained by participating in physical activity, encouragement is needed so that more people engage with physical activity. One of the main mediums in encourage people to participate in physical activity is motivation.

Motivation is a reason or reasons for acting or behaving in a particular way. With respect to PA persistence, the quality of motivation to engage in PA seems to play a critical role, a role that can be best understood within an overarching theoretical framework, such as the Self-Determination Theory (SDT) (Seghers, Vissers, Rutten, Decroos & Boen, 2014). This statement shows that motivation plays a big role in encouraging people to participate in physical activity.

Motivation is the driving force that causes the flux from desire to will in life. People tend to do something if they have an exact reason. That is what we called motivation. For example, if one is thirsty, he or she will go have a drink so that he or she no longer thirsty. In this example, the motivation is to overcome thirst and the action is having a drink. According to Anselme (2009), incentive concepts suggest that motivation is a process which temporarily enhances sensitivity to specific stimuli and produces goal-directed behaviors. The statement state that motivation may drive us in performing specific behavior to achieve motives.

Basically, there are two common type of motivation: extrinsic motivation and intrinsic motivation. Intrinsic motivation is motivation that come within oneself. As cited by Gunnell, Crocker, Mack, Wilson & Zumbo (2013), intrinsic goal contents such as for health and personal growth are more likely to lead an individual to satisfied psychological needs. On the other hand, extrinsic motivation refers to execution of behavior to gain outcome and it comes from outside of the individual. Things that enhance extrinsic motivation includes fame, praises, grades and money. Extrinsic goal contents such as image and recognition are pursued for external contingencies such as self-worth, and are less likely to lead to psychological need fulfilment (Gunnell et al., 2013).

This study will focus on one of the type of motivation which is extrinsic motivation and it will be related with the physical activity level. As being mention previously, extrinsic motivation is motivation that comes from outside of the individual. For example, a person engages with workout because he or she want to be praised for their body shape. Another example is an athlete participating in sport competitions in order to gain fame and money. Hence, this study will further explore on the relationship of extrinsic motivation in respect of physical activity level.

## **Method**

The purpose of the paper is to look at the validity and reliability of the instrument that had been use in this study. Thus, pilot study needs to be performed to test the validity and the reliability of each instrument in this study. The pilot study was conducted using 30 respondents from students. The pilot study was performed to ensure the reliability of the questionnaire in terms of Cronbach's coefficient alpha and also the reliability of the previous researchers.

From the pilot study, the Cronbach's alpha value is .938. This value is higher than .7; thus, the questionnaire can be accepted to be use. The number of items taken from the Exercise Motivation Inventory (EMI-2) is 42 that are including about health, appearance, fitness,

challenge and social. Based on previous research by Piskozub (2013), in a previous study state the Cronbach alpha is .56 to .95.

For this research, the main tool that being used by the researchers in order to obtain information and data is the questionnaire. The sampled students were required to complete the questionnaire and answer the question honestly. The questionnaire have been used by previous researcher and being adapted from Exercise Motivation Inventory -2 (EMI2) by Markland (1999). The questionnaire emphasizes motivation. A questionnaire was also adapted from International Physical Activity Questionnaire (IPAQ; 2005). This questionnaire focuses on physical activity level.

The questionnaire was then edited by the researchers to be valid for the study. The questionnaire contains 3 parts. Part A focuses on demographic data of respondents. Part B focuses on extrinsic motivation. Part C focuses on physical activity level of the respondents. There are 7 questions in Part A, 41 questions in Part B, and 6 questions in Part C.

#### *Part A: Demographic Data*

Part A focuses on the demographic data of the respondents. There are seven questions in this part. The questions cover gender, race, religion, status, age, height and weight. All the data in this part will be in ordinal and nominal.

#### *Part B: Extrinsic Motivation*

Part B focuses on the extrinsic motivation of the respondent in participating in physical activities. The questions are classified into five components: appearance, social, health, challenge and reward.

The questions were designed with a Likert scale, ranging from very true, true, quite true, not true and not true at all. 1 is for not true at all, 2 is for not true, 3 for quite true, 4 for true and 5 is for very true.

#### *Part C: Physical Activity Level*

Part C focuses on the physical activity levels of the respondents. There are six questions in this part divided into three classes: vigorous, moderate and light physical activity level. The researchers have defined the level of respondents' physical activity calculated using the MET formula.

Formula to compute METS:

Walking MET-minutes/week at work = 3.3 x walking minutes x walking days at work

Moderate MET-minutes/week at work = 4.0 x moderate-intensity activity minutes x moderate-intensity days at work

$$\text{Vigorous MET-minutes/week at work} = 8.0 \times \text{vigorous-intensity activity minutes} \times \text{vigorous-intensity days at work}$$

$$\text{Total Work MET-minutes/week} = \text{Sum of walking + moderate + vigorous MET-minutes} / \text{week scores at work}$$

A normality test was conducted for all items in the questionnaire to determine whether the data gathered were normally distributed. This was to ensure an appropriate test to be conducted based on the data. The result of the normality test shows that the data are not normally distributed. Thus, type of test can be run to the data is descriptive statistic, Spearman correlation, Mann-Whitney U-Test, Kruskal-Wallis and MANOVA test.

## **Result and Discussion**

There are several items included in demographic data: gender, race, religion, status, age and BMI range.

**Table 1:** Demographic profile of students

Items		Frequency	Percent
Gender	Male	95	48.7
	Female	100	51.3
Race	Malay	167	85.6
	Chinese	15	7.7
	Indian	11	5.6
	Others	2	1.0
Religion	Islam	170	87.2
	Christian	10	5.1
	Others	15	7.7
Status	Single	195	100.0
Age	16	103	52.8
	17	92	47.2
BMI Range	underweight	47	24.1
	normal	108	55.4
	overweight	28	14.4
	obesity	12	6.2

**Table 2:** Analysis of extrinsic motivation level in physical activity/sport among school students

Components	Appearance	Challenge	Health	Reward	Social
Mean	3.9923	3.5654	4.0598	3.9955	3.6827
Std. Deviation	.77676	.78785	.68616	.74724	.74106
Minimum	1.25	1.00	1.67	1.00	1.50
Maximum	5.00	5.00	5.00	5.00	5.00

Results show the level of extrinsic motivation among school students in area of Shah Alam, Selangor. There are 41 items divided into 5 components, which are appearance, challenge, health, reward and social.

Based from the table, the health component shows the highest mean with 4.0598 and standard deviation of  $SD = 0.68616$ . The table also shows that the challenge component has the lowest mean with 3.5654 and standard deviation of  $SD = 0.78785$ . Overall, the data show that the level of extrinsic motivation in physical activity among school students in area of Shah Alam, Selangor is high.

**Table 3:** Analysis of physical activity level among school students?

Level of Physical Activity	Frequency	Percent
Vigorous	26	13.3
Moderate	61	31.3
Light	108	55.4
Total	195	100.0

Results shows the level of physical activity among the respondents. Based on the figure, it shows that majority of 108 respondents (55.4%) perform light physical activity level, followed by 61 respondents (31.3%) doing moderate-intensity physical activity and 26 respondents (13.3%) involves in a vigorous-intensity physical activity. The mean for the physical activity level is 2.4205 and the standard deviation is  $SD = 0.71623$ .

**Table 4:** The relationship between extrinsic motivation with physical activity level among school students

<b>Correlations</b>				
Spearman's rho	Total MET	Correlation Coefficient	1.000	Total Extrinsic2
		Sig. (2-tailed)	.	.236**
		N	195	195
	Totalextrinsic2	Correlation Coefficient	.236**	1.000
		Sig. (2-tailed)	.001	.
		N	195	195

\*. Correlation is significant at the 0.01 level (2-tailed).

The results show the relationship between extrinsic motivation and the physical activity level of the respondents. Extrinsic motivation, with a mean of 19.29 and standard deviation of  $SD = 2.93$ , is correlated with total physical activity levels, with a mean of 2743.84 and standard deviation of  $SD = 2476.1$ . The Spearman Correlation test shows there are positive and significant relationship between extrinsic motivation and physical activity level ( $r = 0.236$ ,  $sig = 0.001$ ).

### Conclusion and Suggestion

This study was conducted to determine the relationship between extrinsic motivation and physical activity level among school students in the area of Shah Alam, Selangor. Based on the study, there is a positive and significant relationship between extrinsic motivation and physical activity level among school students in the area of Shah Alam, Selangor. This

study also proves that most of the respondents agree that extrinsic motivation plays a role in determining physical activity level.

This study also show that all the respondents perform physical activity even though most of them perform only light-intensity physical activity. Regardless, it shows that the students understand the importance of physical activity in their lives. The range of physical activity perform by the students are light-intensity to vigorous-intensity physical activity. This show that the students are active and might slowly become more active through time.

This study also helped various stakeholders such as school administrators, teachers, parents and students to determine their own physical activity levels and how to increase the level based on extrinsic motivation. It might help them to determine which component would be best to encourage them to become more active, either health, appearance, challenge, social or reward component.

#### *Level of extrinsic motivation in sport/physical activity*

The results show that a majority of the students agree that extrinsic motivation plays an important part in sport or physical activity. It has been shown most of the respondents agree with the involvement of the five components of extrinsic motivation in physical activity, which includes health, appearance, social, reward and challenge. The figure shows that the health component has the highest mean of 4.05 with standard deviation of  $SD = 0.78$ . However, all other 4 components also show high means, which indicates the positive involvement of extrinsic motivation in physical activities

#### *Level of physical activity*

Physical activity is important to help people avoid illness and maintain good health. Physical activity has many health benefits, including reduced risk of cardiovascular disease, ischemic stroke, non-insulin dependent (type 2) diabetes, colon cancers, osteoporosis, depression and fall-related injuries (Kahn et al., 2002).

Based on the analyzed data, a majority of the students perform light-intensity physical activity, followed by moderate-intensity physical activity and finally vigorous-intensity physical activity. In chapter 4, in figure 4.4.2, the result from the study show that 108 respondents (55.4%) perform light-intensity physical activity which is majority of the respondents. However, this is still a positive indicator, since it shows that no respondents avoided physical activities altogether.

#### *Relationship between extrinsic motivation and physical activity level*

This is the main objective of this study. There has been little research on relationship between extrinsic motivation and physical activity level, since most researchers prefer to study the relationship between intrinsic motivation and physical activity level instead. Hence, this study has been conducted to determine the relationship between extrinsic motivation and physical activity level. Based on the data analysis, there is a positive and significant relationship between extrinsic motivation and physical activity level. The

results show that ( $r = 0.236$ ,  $\text{sig} = 0.001$ ). Hence, it proves that the five components of extrinsic motivation, which are appearance, health, challenge, reward and social, do contribute to enhancing levels of physical activity. Motivation is an important variable to consider in the physical education (PE) context, as adaptive types of motivation have been associated with intentions to exercise (Lonsdale, Sabiston, Taylor & Ntoumanis, 2011). This shows that people with motivation tend to perform physical activity.

## References

- Abbott, B. D., & Barber, B. L. (2010). Differences in functional and aesthetic body image between sedentary girls and girls involved in sports and physical activity: Does sport type make a difference? *Psychology of Sport and Exercise, 333-342*.
- Anselme, P. (2009). The uncertainty processing theory of motivation. *Behavioural Brain Research, 291-310*.
- Ayub, N. (2010). Effect of intrinsic and extrinsic motivation on academic performance. *Pakistan business review, 8, 363-372*.
- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, S. J.,...Leon, A. S. (2000). Compendium Of Physical Activities: An Update Of Activity Codes And Met Intensities. *Medicine & Science In Sports & Exercise*.
- Brener, N. D., Eaton, D. K., Kann, L. K., McManus, T. S., Lee, S. M., Scanlon, K. S.,...O'Toole, T. P. (2013). Behaviors related to physical activity and nutrition among U.S. high school students. 539-546.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise and physical fitness: definitions and distinctions for health-related research.
- Catherine, L., Granger, B., Christine, F., McDonald, B. C., Irving, L., Clark, L. A.,...Denehy, L. (2013). Low physical activity levels and functional decline in individuals with lung cancer. 292-299.
- Caviness, C. M., Bird, J. L., Anderson, B. J., Abrantes, A. M., & Stein, M. D. (2013). Minimum recommended physical activity, and perceived barriers and benefits of exercise in methadone maintained persons. *Journal of Substance Abuse Treatment, 457-462*.
- Caviness, C. M., Bird, J. L., Anderson, B. J., Abrantes, A. M., & Stein, M.D. (2012). Minimum recommended physical activity, and perceived barriers and benefits of exercise in methadone maintained persons. *Journal of Substance Abuse Treatment, 457-462*.

- Chien-Yu Pan , Chia-Liang Tsai , Chia-Hua Chu , Kai-Wen Hsieh. (2011). Physical activity and self-determined motivation of adolescents with and without autism spectrum disorders in inclusive physical education. *Research in Autism Spectrum Disorders*, 733-741.
- Demirci, N., Osman, A., & Özmen, A. (2012). The Influence of Physical Activity Level on the Children's Learning Ability of Disabled Children Having Difficulties in Learning. 1572-1578.
- Elena, S., Georgeta, N., Cecilia, G., & Elena, L. (2011). The attitude of the elderly persons towards health related physical activities. 1913-1919.
- Giel, K. E., Kullmann, S., Preißl, H., Bischoff, S. C., Thiel, A., Schmidt, U., Zipfel, S. & Teufel, M. (2013). Understanding the reward system functioning in anorexia nervosa: Crucial role of physical activity. *Biological psychology* 94, no. 3 (2013), 575-581.
- Hinkley, T., Teychenne, M., Downing, K. L., Ball, K., Salmon, J., & Hesketh, K. D. (2014). Early childhood physical activity, sedentary behaviors and psychosocial well-being: A systematic review. *Preventive Medicine*, 182-192.
- Hohepa, M., Schofield, G., & Kolt, G. S. (2006). Physical activity: what do high school students think?. *Journal of Adolescent Health*, 39(3), 328-336.
- Hohepa, M., Scragg, R., Schofield, G., Kolt, G. S., & Schaaf, D. (2009). Self-reported physical activity levels during a segmented school day in a large multiethnic sample of high school students. 284-292.
- Jacka, F. N., Pasco, J. A., Williams, L. J., Leslie, E. R., Dodda, S., Nicholson, G. C.,...Berk, M. (2010). Lower levels of physical activity in childhood associated with adult depression. 222-226.
- Jongeneel-Grimen, B. A. N., MariëlDroomers, A., vanOers, H. A. M., Stronks, K., Kunst, A. E. (2013). The relationship between physical activity and the living environment: A multi-level analyses focusing on changes over time in environmental factors. *Health & Place*, 149-160.
- Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E.,...Corso, P. (2002). The Effectiveness of Interventions to Increase Physical Activity.
- Kilpatrick, M., Hebert, E., & Batholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sports participation and exercise. 54(2).
- Lemos, M. S., & Veríssimo, L. (2014). The relationships between intrinsic motivation, extrinsic motivation, and achievement, along elementary school. 930-938.

- Lonsdale, C., Rosenkranz, R. R., Peralta, L. R., Bennie, A., Fahey, P., & Luban, D. R. (2013). A systematic review and meta-analysis of interventions designed to increase moderate-to-vigorous physical activity in school physical education lessons. *Preventive Medicine*, 152-161.
- Lonsdale, C., Sabiston, C. M., Taylor, I. M., & Ntoumanis, N. (2011). Measuring student motivation for physical education: Examining the psychometric properties of the Perceived Locus of Causality Questionnaire and the Situational Motivation Scale. *Psychology of Sport and Exercise*, 284-292.
- Markland, D. (1999). Self-determination moderates the effects of perceived competence on intrinsic motivation in an exercise setting. *Journal of Sport and Exercise Psychology*, 21(4), 351-361.
- Mesa, J. A., Suárez, M. F., Arbeláez, A., Mosquera, M., Pradilla, A., Aguilar de Plata, A. C., & Ramírez-Vélez, R. (2011). Lack of relationship of physical activity level with cardiovascular risk factors and metabolic syndrome in apparently healthy men. *Endocrinología y Nutrición*, 68-74.
- Mudrák, J., Slepíčka, P., & Slepíčková, I. (2014). Perceived health and motivation to physical activity in seniors. e44-e50.
- Moreno, J. A., González-Cutre, D., Sicilia, A., & Spray, C. M. (2010). Motivation in the exercise setting: Integrating constructs from the approach avoidance achievement goal framework and self-determination theory. *Psychology of Sport and Exercise*, 542-550.
- Norton, K., Norton, L., & Sadgrove, D. (2010). Position statement on physical activity and exercise intensity terminology. 496-502.
- Ojanen, T., Sijtsema, J. J., Hawley, P. H., & Little, T. D. (2010). Intrinsic and extrinsic motivation in early adolescents' friendship development: Friendship selection, influence, and prospective friendship quality. *Journal of Adolescence*, 837-851.
- Owen, K. B., Astell-Burt, T., & Lonsdale, C. (2013). The relationship between self-determined motivation and physical activity in adolescent boys. *Adolescent Health Brief*, 420-422.
- Pirrie, A. M., & Lodewyk K. R. (2012). Investigating links between moderate-to-vigorous physical activity and cognitive performance in elementary school students. *Mental Health and Physical Activity*, 93-98.
- Piskozub, A. T. (2013). *Exercise Motivators and Exercise Causality Among Andrews University Students: a Correlational Study*. Andrews University. Retrieved from <https://digitalcommons.andrews.edu/theses/21/>
- Ploeg, K. A. V., Maximova, K., McGavock, J., & Davis, W. (2014). Do school-based physical activity interventions increase or reduce. *Social Science & Medicine*, 80-87.

- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions. 54-67.
- Riner, W. F., & Sellhorst, S. H. (2012). Physical ctivity and exercise in children with chronic health conditions.
- Sängera, J., & Wascher, E. (2011). The influence of extrinsic motivation on competition-based selection. *Behavioural Brain Research*, 58-64.
- Seghers, J., Vissers, N., Rutten, C., Decroos, S., & Boen, F. (2014). Intrinsic goals for leisure-time physical activity predict children's daily step counts through autonomous motivation. *Psychology of Sport and Exercise*, 247-254.
- Siu-Lung Kong, J., Chi-Wai Kwok, R., & Fang, Y. (2011). The effects of peer intrinsic and extrinsic motivation on MMOG game-based collaborative learning. *Information & Management*, 1-9.
- Slater, A., & Tiggemann, M. (2011). Gender differences in adolescent sport participation, teasing, self-objectification and body image concerns. *Journal of Adolescence*, 455-463.
- Slater, A., & Tiggemann, M. (2010). "Uncool to do sport": A focus group study of adolescent girls' reasons for withdrawing from physical activity. *Psychology of Sport and Exercise*, 619-626.
- Strobl, R., Müller, M., Thorand, B., Linkohr, B., Autenrieth, C. S., Peters, A., Grill, E. (2014). Men benefit more from midlife leisure-time physical activity than women regarding the development of late-life disability — Results of the KORA-Age study. *Preventive Medicine*, 8-13.
- Tatar, Y. (2010). Body image and its relationship with exercise and sports in Turkish lower-limb amputees who use prosthesis. 312-317.
- Vandewater, E. A., Mi-suk Shim, Caplovitz, A. G. (2004). Linking obesity and activity level with children's television and video game use. *Journal of Adolescence*, 71-85.
- Vallerand, Robert. (2004). Intrinsic and Extrinsic Motivation in Sport. *Encyclopedia of Applied Psychology*. 2. 427-435. 10.1016/B0-12-657410-3/00835-7.
- Yoo, S. J., Han, S., & Huang, W. (2012). The roles of intrinsic motivators and extrinsic motivators in promoting e-learning in the workplace: A case from South Korea. *Computers in Human Behavior*, 942-950.
- Zook, K. R., Saksvig, B. I., Wu, T. T., & Young, D. R. (2014). Physical activity trajectories and multilevel factors among adolescent girls. 74-80.