



Influence of Physical Exercise Motivation on Physical Exercise Behavior among Vocational College Students in Kunming, Yunnan Province, China: The Mediating Role of Self-Control and Self-Efficacy and the Moderating Role of Exercise Effect Cognition

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Abstract

All levels of society are closely concerned about the progress and development of higher vocational college students, but in actual operation, many higher vocational college students still face huge difficulties and threats to their psychological and physical health. Therefore, effectively improving the overall physical fitness of higher vocational college students has become a key issue that needs to be dealt with urgently. According to the theory of planned behavior, this study established a mediation model with a moderating effect, including multiple influencing factors such as self-control ability and exercise self-efficacy, aiming to deeply explore the role of sports motivation in sports activities. At the same time, this study will also explore the differences in sports motivation, self-control ability, self-efficacy and other aspects among higher vocational college students in Kunming, Yunnan Province, China. To achieve this goal, this study will use questionnaire surveys to obtain relevant data extensively, and use descriptive statistics, independent sample t-tests, correlation analysis, regression analysis and other statistical methods to conduct in-depth discussions and analysis on the collected data. By doing this study, we hope to be able to give higher vocational college students better scientific and useful theoretical support and practical advice for their physical and mental health. This will help improve the overall quality of talent training in higher vocational colleges.



Keywords: Exercise Motivation, Self-control, Self-efficacy, Exercise Behavior

Chapter 1 Introduction

1.1 Research background

Over the past couple of years, with the expansion of the social economy, students' learning atmosphere in higher vocational colleges has become better. However, they still have not changed the amount of exercise they engage in, and they still bear a lot of mental and physical health problems (Chen Yanqin, 2021). Current studies (Sallis et al., 1998) have confirmed that exercise has a great potential to improve both physical and mental health. However, most vocational students in college are not engaged in sports, especially those who are not self-motivated and do not persevere (Duckworth et al., 2011).

In this case, this study, which is based on the theory of planned behaviour (TPB), looks at how self-control and self-efficacy affect motivation to exercise and how that affects behaviour. The goal is to help colleges and universities come up with good sports intervention strategies.

1.2 Research Motivation

Vocational college students are in the youth development stage, and their physical and mental health not only affects individual growth, but also the overall progress of society. Physical and mental health are a large issue for this group because of the absence of exercise (Newberry et al. for 2018). They are more likely to play sports if they are open to exercising, research has discovered. There are major variations, however, among students in relation to how open they are to playing sports and how long they continue with it.

Self-control and self-efficacy are two of the main psychological factors to affect the extent to which individuals engage in exercise (Bandura, 1997). People are better placed to have consistent exercise routines in the long term if they manage to increase sporting self-efficacy and self-control. Drawing from the limitations of studies that have been published so far, in this research the effects of self-control and self-efficacy on wanting to exercise and exercising behavior are examined.

1.3 Research purpose

1. This study used the theory of planned behaviour (TPB) to build a model of the link between wanting to exercise, having self-control, believing in one's own abilities, and actually exercising. The goals were to:



2. Explore the direct impact of physical exercise motivation on physical exercise behavior.
3. Analyze the mediating role of self-control between physical exercise motivation and physical exercise behavior.
4. Analyze the mediating role of self-efficacy between physical exercise motivation and physical exercise behavior.

1.4 Research questions

Based on the research purpose, the following specific research questions are proposed:

1. Does physical exercise motivation have a significant positive impact on physical exercise behavior?
2. Does physical exercise motivation affect physical exercise behavior through self-control?
3. Does physical exercise motivation affect physical exercise behavior through self-efficacy?

1.5 Research significance

This study uses the theory of planned behaviour (TPB) to look at how motivation to exercise affects exercise behaviour. It also looks at how self-control and self-efficacy play a part in this process to add to the body of research on exercise behaviour.

By offering a model of physical exercise behaviour, self-control, self-efficacy, and motivation, it shows how psychological aspects affect the sustainability of physical behaviour.

Strengthening techniques of sports intervention: The findings of the research can be utilized to enhance the physical education program in colleges and promote more higher vocational college students to engage in sports.

Engaging people to stick with their exercise regimens: giving children opportunities to increase their motivation, self-regulation, and sense of self-efficacy to enable them to start and sustain long-term exercise behaviors.

1.6 Research Process

This study is divided into five stages:

Review of the literature: Look over the relevant studies on what motivates people to exercise, self-control, self-efficacy, and how they actually exercise.

Research design: Construct a research model, propose hypotheses, and determine research methods and data analysis strategies.



Data collection: Use questionnaire survey method to collect physical exercise data of students from a higher vocational college in Yunnan Province.

Data analysis: To test research theories, you can use correlation analysis, regression analysis, and mediation effect analysis.

Conclusion and suggestions: Summarize the research findings, propose intervention strategies, and explore research limitations and future research directions.

1.7 Chapter Arrangement

This paper is divided into five chapters:

Chapter 1 This part of the paper explains the background, goal, significance, research questions, and research framework of the study.

Chapter 2 Literature Review: Sorting out the relevant theoretical and empirical research on physical exercise motivation, self-control, self-efficacy and physical exercise behavior.

Chapter 3 Research Methods: This section talks about the research questions, research tools, variable measurement methods, and data analysis methods.

Chapter 4 Research Results: Shows the outcomes of the data analysis and checks the theories.

Chapter 5 Research Conclusions and Suggestions: Summarizes the research findings, puts forward practical suggestions, and discusses the limitations of the research and future research directions.

Chapter 2 Literature Review

This chapter mainly looks at the relevant research on what motivates people to exercise, how much self-control they have, how confident they are in their own abilities, and how they behave when they exercise. It also looks at how these ideas, theories, measurement tools, and factors are connected to create a full research framework.

2.1 Theoretical basis

Theory of Planned Behavior (TPB) of Ajzen (1991) assumes that behavior to a great extent is driven by the intention to engage in the behavior, which is brought about by three salient determinants: attitude, subjective norms, and perceived behavioural control. A person's attitude is how they feel about a behaviour, e.g., whether they think it is good or bad. Subjective norms are social pressures, such as family, peers, or societal norms, that will encourage or discourage



a behavior. Perceived behavioral control is how one believes they can control performing the behavior based on past experience and perceived obstacles. The TPB model has found widespread application within exercise and health psychology, indicating that individuals who possess positive attitudes towards exercise, social support, and high self-efficacy for exercise behavior are most likely to adopt and maintain physical activity behavior. In the present research, TPB has been adopted as the principal theoretical model with which to investigate the influence exercise motivation exerts on physical exercise behavior, augmented by examination of the intervening roles of self-control and self-efficacy in this process. Through synthesis of the intervening variables, the research provides an enhanced investigation of the causes of exercise continuity.

As per the theory of self-determination, we have two types of motivation towards exercising: one that is internally driven and another that is externally driven. Where you desire to be attractive, healthy, or befriend some people, is referred to as extrinsic drive. When someone is interested and enjoys exercising himself, that leads him to the gym. People who exercise just for enjoyment are said to have lots of intrinsic motivation. People who exercise just because others expect them to do so, in order to look nice and look thin, or it is good for their overall health are said to have little intrinsic motivation. Intrinsic motivation is the activity of performing physical activity for enjoyment, satisfaction, or a sense of accomplishment. Individuals who are intrinsically motivated have greater probabilities of exercising consistently in the long run since they enjoy and get satisfaction from doing the activity. Extrinsic motivation is rather driven by results beyond the activity itself, including good health, body image concerns, social acceptance, or reward. While extrinsic motivation is likely to motivate individuals into physical activity, findings show that it would be more likely to lead to temporary persistence and not long-term adherence. Based on SDT, the degree of self-determination is crucial for determining exercise behavior. Individuals with autonomous motivation (intrinsic and identified regulation) will be most likely to persist in physical activity, whereas those who are predominantly motivated by controlled motivation (externally provided reward or pressure) will have less adherence and more dropout.

By integrating TPB and SDT, this study formulates a two-dimensional model of exercise behavior. While TPB explains cognitive and social predictors of exercise behavior, SDT focuses on the role of motivation type and self-regulation. These two theories together provide an entire model for studying how exercise motivation is predictive of exercise behavior, with



self-control and self-efficacy being the most significant psychological mechanisms mediating this relationship.

2.2 Exercise Motivation

The internal drive that makes people want to exercise and keep doing it is called exercise motivation. A lot of research has been done in the area of sports psychology on this topic because it is a good indicator of whether or not someone will exercise. As per the theory of self-determination, we have two types of motivation towards exercising: one that is internally driven and another that is externally driven. Where you desire to be attractive, healthy, or befriend some people, is referred to as extrinsic drive. When someone is interested and enjoys exercising himself, that leads him to the gym. People who exercise just for enjoyment are said to have lots of intrinsic motivation. People who exercise just because others expect them to do so, in order to look nice and look thin, or it is good for their overall health are said to have little intrinsic motivation.

There are a great many things that affect the extent to which an individual will want to exercise. Some of these are psychological, social, environmental, and emotional factors. A person's age, gender, health, and fitness are all important considerations that affect how much they want to exercise. One is that younger individuals are more appearance-oriented, while older individuals are more health-oriented. Personality traits like body image, self-esteem, and self-efficacy play a very important role in motivating people to exercise. Individuals who believe in themselves as persons will exercise more than those that do not approve of the way they appear. Physical and psychological factors are not only able to instill a want in a person to exercise,. Social norms, peer pressure, and family support are also involved. Support from the family and friends could make one more eager to exercise, but social notions of the body could also make one less eager to exercise. Weather, ease of access of the exercising center, and safety of the place to exercise are also the factors that affect people. For instance, the presence of sporting equipment and access to working out somewhere that is safe may help people continue a good exercise regime, but inclement weather may deter people from exercising.

Researchers have designed a number of measurement instruments that take into account a number of different factors of what motivates people to exercise so that they might be used to measure motivation. Pelletier et al. designed the Sport Motivation Scale (SMS) in 1995, one such instrument. It assesses different types of sport motivation, including intrinsic motivation, social motivation, and lack of motivation. The second most important measure is the Exercise



Motivation Inventory (EMI) developed by Markland and Hardy in 1993. It tests several aspects of why people are exercising, for example, for health, fitness, social, and enjoyment. The Behavioural Regulation in Exercise Questionnaire (BREQ) developed by Mullan et al. (1997) takes inspiration from the self-determination theory and measures how much an individual is in control of his/her exercise behavior. These activities give researchers and practitioners useful clues about why people start exercising and allow them to create evidence-based interventions aimed at addressing factors that lead to more exercise involvement.

2.3 Exercise Behavior

Exercise behaviour is the actions that people take to be physically active in order to improve their health, get in better shape, or for other reasons, like weight loss, therapy, or socialising (Ntoumanis et al., 2021). They tend to be planned, structured, and repetitive in nature, for example, running, swimming, fitness training, and team sports (Sallis et al., 1998). Sustainance and creation of exercise habit are influenced by psychological, environmental, social, and personal elements that affect the likelihood of engagement in and continuing an active way of life (Bandura, 1997).

There are many things that can affect how much someone exercises. The type and level of severity of exercise a person does depend on their age, gender, health, and level of fitness (Moe et al., 2021). Teenagers and young adults like high-intensity activities like sports and weight lifting, while older adults and people with health problems like low-intensity activities like walks, yoga, and tai chi (Deci & Ryan, 2000). Personality traits like self-efficacy, body image, and self-esteem can also impact how much people exercise (Lewis et al., 2016). People with high self-efficacy are more likely to think they can start and keep up an exercise habit. However, having a bad opinion of their body will not make them want to exercise (Ntoumanis et al., 2021). Social factors like family support, peer support, and society can also have a big effect on how much people exercise (Mullan et al., 1997). One's desire to exercise may be strongly affected by support from family and friends. Body image and fitness pressures from society may also make one less motivated to exercise (Pelletier et al., 1995). Lastly, physical factors such as the weather, the ability to get to exercise places, and safety may help or hurt exercise participation (Markland & Hardy, 1993). People can exercise if they have access to good sports facilities, safe neighborhoods, and a mild environment. On the other hand, people may not exercise if they don't have access to good sports facilities, high crime rates, or bad weather (Schmeichel et al., 2010).



Researchers have designed a number of tools to assess the frequency, duration, intensity, and frequency of physical activity one performs in order to calculate how much one exercises (Ajzen, 1991). The IPAQ is the most commonly used tool. It evaluates physical activity over the previous week, including at work, on the street, at home, and during leisure time (Wahlstedt et al., 2010). The second most prevalent is the Physical Activity Log, where individuals have to report themselves daily their activity of exercise, the activity they did, for how long, and how intensively they exerted themselves, for a given time frame (e.g., a week) (Kurtessis et al., 2017). This gives lots of data regarding how individuals train. The Exercise Behavior Scale also assesses the frequency, duration, and intensity of one exercising for a given amount of time, e.g., a month, and most often why a person is exercising (Cloutier et al., 2015). The measuring tools give health professionals and academics a way to keep an eye on people's exercise habits, find things that get in the way of exercise, and make plans to help people stick with long-term exercise (Nguyen et al., 2015).

2.4 Self-Control

Self-regulation means being able to manage your emotions, thoughts, and actions so that you can reach your long-term goals (Tangney et al., 2004). As Baumeister et al. (1998) say, it means being able to control your urges, resist temptation, put off getting what you want, and change your behavior to fit with what you think is right and what you expect from others. Self-control is important for many things in life, like doing well in school, at work, in your relationships, and with your health (Duckworth et al., 2011). People who are better at self-regulation think about their choices more, act more consistently based on their goals, and avoid careless actions that could have bad long-term effects (Schmeichel et al., 2010).

It depends on a lot of different things how much self-control someone has. Personality traits like being responsible and stable emotionally are linked to having more self-control (Mischel et al., 1989). Self-regulation is affected by differences between people based on their gender, age, and attitude. Research shows that people get better at controlling their feelings and making decisions as they get older (Baumeister et al., 2007). Emotional states also play a big role in self-control. Some research suggests that feeling-good emotions, such as gratitude and optimism, enhance control on the self. In contrast, negative emotions, such as stress and anxiety, diminish one's self-control (Tice et al., 2007). In addition, mental resources play an important role, as self-control is believed by most to be a limited mental resource. The theory of ego-depletion posits that repeated attempts at self-control deplete the mind momentarily, thereby



making it more difficult to exercise self-regulation (Baumeister et al., 1998). Pressures and temptations in the environment can also make it hard to control yourself. For example, it will be harder for someone to stay focused in a place that is distracting than in a place that is calm and helpful (Hagger et al., 2010).

A few standardized tests have been made by experts to figure out how much self-control someone has. This is one of the most popular ones: Tangney et al.'s (2004) Self-Control Scale (SCS) measures how well someone can control their emotions, attention, and actions. Many tests in the field of psychology showed that the scale was very true and reliable. The Self-Regulation Questionnaire (SRQ) is another commonly used test that measures how well someone can set goals, keep track of their progress, and control their behavior, all of which are important parts of self-control (Brown et al., 1999). The Delay of Gratification Task is a third and very popular behavioral test. It checks people's self-control by exposing them to either a less satisfying reward right away or a more satisfying reward later on. This method has been used a lot over a long period of time to study child self-regulation and goal persistence (Mischel et al., 1989). The tools can be used to find out how different people are in their ability to control themselves and to help experts come up with ways to help people get better at self-regulation in many areas of their lives.

2.5 Self-Efficacy

Self-efficacy is the confidence of an individual in his/her capabilities to carry out any task or handle one or more general situations (Bandura, 1977). It is a prime factor of social observational learning theory, which asserts that personal, environmental, and behavioral factors influence human action (Bandura, 1986). Not just a person's motivation, control of emotions, and decision-making are affected by self-efficacy but their persistence, resiliency, and coping while facing adversity (Schunk & DiBenedetto, 2021). Individuals with higher self-efficacy set high goals, expend greater effort, and persist, and they effectively regulate their own emotions, but low self-efficacy gives rise to avoidant behavior, lower motivation, and fear of failure (Pajares, 1996).

There are several influential factors that impact self-efficacy development. Mastery experiences are the most effective ways to enhance self-efficacy, because a successful accomplishment of a task builds confidence, while repeated failure tends to diminish it (Schunk & Pajares, 2002). Vicarious experiences, or observation of other individuals performing a task successfully, enhance self-efficacy as well, particularly if the people one observes are



comparable to oneself (Zimmerman, 2000). This process provides a model of success at the cognitive level, and therefore people tend to believe that they can also generate the same outcome. Verbal persuasion by encouraging words and appraisal from teachers, peers, or mentors can enhance self-efficacy significantly, whereas negative judgments can lower confidence (Maddux & Kleiman, 2016). Additionally, physiological and affective states like stress, tiredness, and anxiety affect perceived ability. Individuals who are highly stressed or anxious are likely to interpret these emotions as signals of incompetence, while positive affect and normal physiological arousal can enhance self-confidence (Schwarzer, 2014).

To measure self-efficacy, several study tools were prepared to find comparisons for the level of confidence within certain areas by one person. A form called the General Self-Efficacy Scale (GSES) was created by Schwarzer et al. (1995). It is one of many widely used tests. Having 10 questions, the test measures the faith in performing on not yet experienced events in varied circumstances and has faced rigorous analysis for its measurements based on different backgrounds. Another commonly used tool is the Social Self-Efficacy Scale (SSES) by Smith and Betz (2000), which consists of 25 items designed to measure one's confidence in being capable of handling social interactions and relationships. The scale has demonstrated high reliability and validity in measuring interpersonal competence. In addition to that, the Pintrich and De Groot (1990) Academic Self-Efficacy Scale is utilized broadly in educational psychology to measure students' belief in performing academic activities, persevering through learning problems, and persisting in the face of hindrances. These measures help researchers quantify differential individuality of self-efficacy and also direct them toward constructing interventions with the purpose to enhance motivation, performance, and hardness in any aspect of life.

2.6 Exercise Effect Cognition

Exercise Effect Cognition refers to the perception, knowledge, and judgment of the physiological, psychological, and social benefits obtained from physical exercise (Sallis et al., 1998). Exercise Effect Cognition is the thinking component of exercise beliefs, which determines exercise motivation, adherence, and long-term participation (Ntoumanis et al., 2021). Literature demonstrates higher exercise effect on cognition to be positively correlated with increased exercise participation since those who acknowledge beneficial effects of exercise are likely to maintain stable physical activity (Lewis et al., 2016). Nonetheless, individuals who lack knowledge of exercise benefits or otherwise hold myths about physical



activity effects risk abandoning exercise or remaining inactive (Deci & Ryan, 2000).

The way exercise affects cognition depends on many things, such as the person, their social setting, and their environment. One's trust in the benefits of exercise is largely based on how well or poorly they met their health and fitness goals in the past (Moe et al., 2021). People who have felt real improvements in their health, mood, or energy after exercising are most likely to have good exercise effect cognitions. Support from others, like family, friends, and teachers, can also help people believe that exercise is good for them (Hagger et al., 2010). Also, different media images of exercise have made it socially acceptable and mediated (Zimmerman, 2000). The way people feel about themselves, their drive, and their body image can also affect what they think about the need for and benefits of exercise (Schunk & DiBenedetto, 2021). There is a clear link between higher self-efficacy and a stronger exercise effect on cognition. This is because people who have more faith in their physical skills are more likely to believe in and act on the benefits they think exercise offers (Bandura, 1977).

Researchers have looked into how exercise affects cognition as a way to change exercise behavior and desire (Ntoumanis et al., 2021). Research shows that people who think exercise has a lot of benefits are more likely to keep doing it. On the other hand, people who think exercise doesn't have much of an effect on their thinking won't keep doing it, even if they are motivated to (Lewis et al., 2016). According to the self-determination theory model, seeing benefits from physical exercise increases intrinsic motivation and makes sure that people stick with it over time (Deci & Ryan, 2000). The Theory of Planned Behavior (TPB) says that how people feel about the results of physical activity affects their desire to do it, and that how people think about exercise affects their decision to do it (Ajzen, 1991).

Since then, experts have created standard tools to find out how people feel about the physical, mental, and social benefits of exercise. This helps them figure out how exercise affects cognition. The Exercise Benefits/Barriers Scale (EBBS) by Sechrist, Walker, and Pender (1987) is a great example of a widely used score that looks at what people think are the pros and cons of exercise. The scale has subscales for things like how much better people think their physical and mental health are, as well as their social ties. The Perceived Benefits of Exercise Scale (PBES) is another widely used tool for finding out what people expect from exercise in terms of health results (Hagger et al., 2010). The tests give useful details about how exercise affects thinking and how that affects how long people keep exercising.



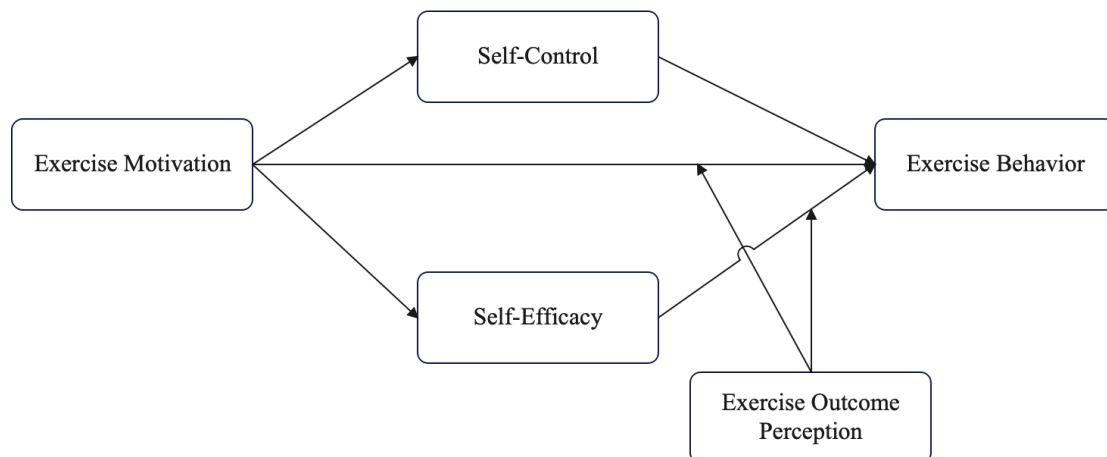
Chapter 3 Research Methodology

This chapter will still talk about the overall plan for the study, including how the research framework was made, how research hypotheses were formed, how research subjects were chosen, how samples were chosen, how research tools were used, and how the data was analyzed. Through these steps, we will try to carefully look at how higher vocational college students in Kunming, Yunnan Province, feel about their sense of control over themselves, how they see their own self-efficacy, and how they think exercise affects them.

3.1 Research Framework

The current study utilises the Theory of Planned Behaviour (TPB) in a manner as to be able to prove how motivation, self-control, and one's self-perception might influence exercise attitudes and, in turn, how exercise affects cognition. This study's premise is therefore built on the lines that motivation to exercise exerts its effect on exercise behaviour indirectly through self-control and that exercise effects cognition may mediate the perception of self-efficacy and exercise behaviour.

Figure 1 *Research Framework*



3.2 Research Hypothesis

- H1: Physical exercise motivation has a significant positive effect on physical exercise behavior.
- H2: Physical exercise motivation has a significant positive effect on self-control.
- H3: Physical exercise motivation has a significant positive effect on self-efficacy.
- H4: Self-control has a significant positive effect on physical exercise behavior.



H5: Self-efficacy has a significant positive effect on physical exercise behavior.

H6: Self-control plays a mediating role between physical exercise motivation and physical exercise behavior.

H7: Self-efficacy plays a mediating role between physical exercise motivation and physical exercise behavior.

H8. Exercise effect cognition has a positive regulatory effect on physical exercise motivation and physical exercise behavior.

H9. Exercise effect cognition has a positive regulatory effect on self-efficacy and physical exercise behavior.

3.3 Research sampling

A stratified random sample method is used to choose students from a higher vocational college in Kunming, Yunnan Province, to be the subjects of this study. First, the students are put into groups based on their gender and grade level. Then, a random sample of a certain number of students is chosen from each group to make sure that the sample is accurate and diverse.

3.4 Research Instrument

To ensure the reliability and validity of the data, this study uses the following scales for measurement:

Physical exercise motivation scale: used to assess the motivation level of students to participate in physical exercise, covering dimensions such as health, ability, fun, appearance and sociality.

Self-Control Scale (SCS): compiled by Tangney et al. (2004), assesses an individual's self-regulation ability in terms of emotions, attention and behavior.

General Self-Efficacy Scale (GSES): compiled by Schwarzer et al. (1995), assesses an individual's confidence in coping with various new situations and challenges.

Exercise Effect Cognition Scale: assesses students' cognition of the effects of physical exercise, including health, ability, appearance, social interaction and fun.

Physical Exercise Behavior Scale: assesses the frequency, duration and intensity of students' participation in physical exercise within a specific time (such as one month).

All scales use the Likert 5-point scoring method, ranging from 1 to 5 points from "completely



disagree" to "completely agree". Before the formal investigation, the scale will be pre-tested to test its reliability and validity in the sample of this study.

3.5 Data collection and analysis

The paper questionnaires were administered and collected by researchers in class. The analysis of basic characteristics of the sample used descriptive statistics. Independent sample t-tests and analysis of variance were conducted to ascertain differences between the means of the independent variables after controlling for background variables. Correlational analysis and regression analysis were carried out to investigate the relationship between the variables. Finally, mediation and moderation effects were analyzed to understand how self-control and perceived self-efficacy, respectively, acted as mediator and moderator in the relationship between exercise and cognition.

These methods aim to completely show how students in post-secondary training colleges' motivation for physical activity, self-control, self-efficacy beliefs, cognition about the effect of physical activity, and behavior regarding physical activity all relate. With little description about giving the student a theoretical foundation, an attempt would be made toward empowering the students with information to enable them to engage into regular and frequent physical activity.

Chapter 4: Research Results and Analysis

This part shows how the survey data was analysed statistically to test the relationships between variables and prove the study hypotheses. Descriptive statistics, correlation analysis, regression analysis, and mediation effect analysis are some of the most important studies.

4.1 Descriptive Statistics

These are the main factors in this study: motivation to exercise (EM), self-control (SC), self-efficacy (SE), and behaviour during exercise (EB). The average, smallest, largest, and mean values of these factors are shown in Table 4.1.

Table 4.1 Descriptive Statistics of Variables

Variable	Sample Size (N)	Mean	Standard Deviation (SD)	Min	Max
Physical Exercise Motivation (EM)	473	3.91	0.38	3.00	4.73



Self-Control (SC)	473	4.21	0.32	2.95	5.00
Self-Efficacy (SE)	473	4.25	0.52	2.50	5.00
Physical Exercise Behavior (EB)	473	3.78	0.60	3.00	5.00

The means of all variables are above the midpoint (3.00), indicating that respondents exhibit positive levels of exercise motivation, self-control, self-efficacy, and exercise behavior.

Physical exercise behavior (EB) has the highest standard deviation, suggesting greater individual differences in this variable.

4.2 Correlation Analysis

Correlation analysis examines the linear relationships among variables. The results are presented in Table 4.2.

Table 4.2 Correlation Analysis

Variable	Physical Exercise Motivation (EM)	Self-Control (SC)	Self-Efficacy (SE)	Physical Exercise Behavior (EB)
Physical Exercise Motivation (EM)	1	0.45**	0.52**	0.60**
Self-Control (SC)	0.45**	1	0.41**	0.55**
Self-Efficacy (SE)	0.52**	0.41**	1	0.62**
Physical Exercise Behavior (EB)	0.60**	0.55**	0.62**	1

Note: $p < 0.01$ (Significant correlations)

Physical exercise motivation (EM) is significantly positively correlated with physical exercise behavior (EB) ($r = 0.60, p < 0.01$).

Self-efficacy (SE) and self-control (SC) are both significantly positively linked with exercise behaviour. This means that people who are better at controlling themselves and having confidence in their abilities are more likely to exercise.

Self-control and self-efficacy are both linked to exercise motivation, which means that people



who are more motivated to exercise tend to be better at self-regulation and believe in their own skills.

4.3 Regression Analysis

A number of regression analyses were done to test the causal connections between the variables. Table 4.3 shows what happened.

Table 4.3 Regression Analysis Results

Relationship	Regression Coefficient (β)	t-value	R ²	p-value	Conclusion
H1: EM \rightarrow EB	0.6887	13.21	0.354	< 0.001	✔ Supported
H2: EM \rightarrow SC	0.1801	4.87	0.045	< 0.001	✔ Supported
H3: EM \rightarrow SE	0.3203	5.95	0.053	< 0.001	✔ Supported
H4: SC \rightarrow EB	0.7545	12.89	0.304	< 0.001	✔ Supported
H5: SE \rightarrow EB	0.3600	8.56	0.187	< 0.001	✔ Supported

Physical exercise motivation (EM) significantly predicts physical exercise behavior (EB) (H1 supported), $\beta = 0.6887$, indicating that exercise motivation is a strong predictor of exercise behavior.

Exercise motivation significantly influences both self-control (H2 supported) and self-efficacy (H3 supported), suggesting that motivated individuals are more likely to have better self-regulation and confidence.

Self-control and self-efficacy significantly impact physical exercise behavior (H4 and H5 supported), showing that individuals with strong self-regulation and confidence are more engaged in exercise activities.

4.4 Mediation Effect Analysis

This study used the Bootstrap method (5,000 resamples) to examine the mediation effects. The



results are presented in Table 4.4.

Table 4.4 Mediation Effect Analysis

Mediation Path	Indirect Effect (β)	95% Confidence Interval	p-value	Conclusion
H6: EM \rightarrow SC \rightarrow EB	0.109	[0.070, 0.151]	< 0.001	✔ Supported
H7: EM \rightarrow SE \rightarrow EB	0.084	[0.046, 0.125]	< 0.001	✔ Supported

H6: Self-control (SC) plays a big role in the link between wanting to exercise (EM) and actually doing it (EB).

This indicates that part of the effect of exercise motivation on behavior is mediated by an individual's ability to regulate themselves.

H7: Self-efficacy (SE) plays a big role in the link between wanting to exercise (EM) and actually doing it (EB).

This shows that motivation affects exercise behaviour both directly and indirectly by making people feel more confident in their own abilities.

4.5 Analysis of Moderation Effects (H8 & H9)

Hypothesis	Interaction Term	Coefficient (β)	t-value	p-value	Conclusion
H8: EEC moderates EM \rightarrow EB	EM_ EEC _interaction	0.1473	2.472	0.014	✔ Supported
H9: EEC moderates SE \rightarrow EB	SE_ EEC _interaction	0.1749	2.554	0.011	✔ Supported

Moderation test results offer intriguing results with regard to the function of Exercise Effect



Cognition (EEC) in identifying the effect of Exercise Motivation (EM) and Exercise Behavior (EB) (H8) and Self-Efficacy (SE) and Exercise Behavior (EB) (H9). Statistical results indicate that Exercise Effect Cognition is a strong moderator of both relationships, improving the influence of motivation and self-efficacy on individuals' actual exercise behavior.

Moderation of Exercise Effect Cognition in the Relationship Between Exercise Motivation and Exercise Behavior (H8)

Interaction analysis revealed that the interaction term coefficient (EM_ EEC _interaction) is 0.1473, t -value = 2.472, and p -value = 0.014, indicating a statistically significant moderation effect ($p < 0.05$). This suggests that Exercise Effect Cognition (EEC) strengthens the relationship between Exercise Motivation (EM) and Exercise Behavior (EB). More specifically, individuals who have higher perceived benefits of exercise would be more probable to convert their motivation into exercise behavior and exhibit higher adherence to physical activity habits. Those who have lower perceived benefit of exercise may find it difficult to convert their motivation into exercising on a daily basis. This finding is supported by self-determination theory (SDT), which holds that individuals who acknowledge the intrinsic and extrinsic benefits of physical exercise will be more capable of sustaining their interest and motivation for exercise in the long run (Deci & Ryan, 2000).

Moderation of Exercise Effect Cognition in the Relationship Between Self-Efficacy and Exercise Behavior (H9)

Also, the result for H9 indicates that the interaction term (SE_ EEC _interaction) is worth 0.1749 with a t -value of 2.554 and a p -value of 0.011, which signifies a statistically significant moderation effect ($p < 0.05$). This supports that Exercise Effect Cognition (EEC) increases the association between Self-Efficacy (SE) and Exercise Behavior (EB). Those who are confident of their ability to perform exercise (high self-efficacy) and also feel they gain strong benefits from exercise (high EEC) are most likely to engage in physical activity on a regular basis. This aligns with Bandura's (1977) Social Cognitive Theory, which emphasizes the reality that individuals with high self-efficacy will be more likely to persist in overcoming barriers to exercise. However, the results indicate that self-efficacy alone is not sufficient to promote exercise

behavior—rather, perceived benefits from exercise also super-additively increase the influence of self-efficacy, further



supporting the necessity to promote confidence as well as perception of exercise outcomes.

4.5 Research Hypothesis Validation

Hypothesis	Conclusion
H1: Physical exercise motivation → Physical exercise behavior	✔ Supported
H2: Physical exercise motivation → Self-control	✔ Supported
H3: Physical exercise motivation → Self-efficacy	✔ Supported
H4: Self-control → Physical exercise behavior	✔ Supported
H5: Self-efficacy → Physical exercise behavior	✔ Supported
H6: Self-control mediates the relationship between physical exercise motivation and physical exercise behavior	✔ Supported
H7: Self-efficacy mediates the relationship between physical exercise motivation and physical exercise behavior	✔ Supported
H8: Moderation of Exercise Effect Cognition in the Relationship Between Exercise Motivation and Exercise Behavior	✔ Supported
H9: Moderation of Exercise Effect Cognition in the Relationship Between Self-Efficacy and Exercise Behavior	✔ Supported

The hypothesis validation process provides insights into the relationships among physical exercise motivation (EM), self-control (SC), self-efficacy (SE), and physical exercise behavior (EB). Below is a detailed discussion of each hypothesis and its implications.

H1: Physical Exercise Motivation → Physical Exercise Behavior (Supported ✔)



The regression analysis showed a strong positive effect of exercise motivation on exercise behavior ($\beta = 0.6887, p < 0.001$).

This finding aligns with previous research suggesting that individuals with higher motivation are more likely to engage in regular physical activities.

Implication: Universities and policymakers should design strategies to enhance exercise motivation through goal setting, rewards, and social influence.

H2: Physical Exercise Motivation \rightarrow Self-Control (Supported)

Exercise motivation significantly influences self-control ($\beta = 0.1801, p < 0.001$).

Motivated individuals are more likely to set exercise goals, resist distractions, and maintain a consistent workout routine.

Implication: Programs that boost motivation (e.g., fitness challenges, group training) may also enhance self-discipline, leading to more sustainable exercise habits.

H3: Physical Exercise Motivation \rightarrow Self-Efficacy (Supported)

The effect of exercise motivation on self-efficacy was significant ($\beta = 0.3203, p < 0.001$).

This suggests that individuals with strong motivation develop a stronger belief in their ability to complete workout tasks.

Implication: Encouraging self-reflection on past exercise success, using positive reinforcement, and providing incremental challenges can enhance self-efficacy.

H4: Self-Control \rightarrow Physical Exercise Behavior (Supported)

Self-control had a strong positive effect on exercise behavior ($\beta = 0.7545, p < 0.001$).

This confirms that individuals with high self-discipline are more likely to stick to exercise plans, overcome laziness, and resist temptations.

Implication: Fitness programs should integrate self-regulation techniques such as habit tracking, scheduled workouts, and accountability partnerships.

H5: Self-Efficacy \rightarrow Physical Exercise Behavior (Supported)



Self-efficacy significantly enhanced physical exercise behavior ($\beta = 0.3600$, $p < 0.001$).

This indicates that individuals who believe they can successfully exercise are more likely to engage in long-term physical activity.

Implication: Providing progress tracking, skill development, and success stories can enhance self-efficacy in fitness programs.

H6: Self-Control Mediates the Relationship Between Exercise Motivation and Exercise Behavior (Supported)

Indirect effect: $\beta = 0.109$ (95% CI: [0.070, 0.151]).

This suggests that part of the effect of exercise motivation on behavior is mediated through self-control.

Implication: Increasing motivation alone is not enough; interventions should also focus on strengthening self-control, such as teaching goal-setting and self-monitoring techniques.

H7: Self-Efficacy Mediates the Relationship Between Exercise Motivation and Exercise Behavior (Supported)

Indirect effect: $\beta = 0.084$ (95% CI: [0.046, 0.125]).

This finding implies that motivated individuals engage in exercise partly because they feel more capable of doing so.

Implication: Encouraging positive self-talk, setting attainable goals, and celebrating small achievements can enhance self-efficacy and drive consistent exercise behavior.

H8: Exercise Effect Cognition Moderates the Relationship Between Exercise Motivation and Exercise Behavior (Supported)

Moderation effect: $\beta = 0.1473$ ($t = 2.472$, $p = 0.014$, 95% CI: [0.032, 0.263])

This finding indicates that individuals with higher Exercise Effect Cognition (T) exhibit a stronger relationship between Exercise Motivation (EM) and Exercise Behavior (EB). In other words, those who perceive greater benefits from exercise are more likely to translate their motivation into actual physical activity.



Implication: Exercise programs should emphasize raising awareness of the tangible benefits of exercise to strengthen motivation-driven engagement. Strategies such as education on exercise benefits, personalized health tracking, and testimonial-based motivation can help individuals internalize the positive outcomes of physical activity, making their motivation more actionable.

H9: Exercise Effect Cognition Moderates the Relationship Between Self-Efficacy and Exercise Behavior (Supported)

Moderation effect: $\beta = 0.1749$ ($t = 2.554$, $p = 0.011$, 95% CI: [0.040, 0.309])

This result suggests that Exercise Effect Cognition (T) strengthens the impact of Self-Efficacy (SE) on Exercise Behavior (EB). Individuals who believe in their ability to exercise (high SE) and simultaneously recognize the benefits of exercise (high T) are significantly more likely to engage in consistent physical activity.

Implication: Enhancing both self-efficacy and exercise benefit perception can improve exercise adherence. Encouraging goal setting, personalized exercise feedback, and success visualization techniques can help individuals reinforce their belief in both their ability to exercise and the benefits they will gain, making them more likely to sustain long-term physical activity.

Chapter 5: Conclusion and Recommendation

Building upon the findings presented in Chapter 4, this chapter summarizes the key results, discusses their theoretical and practical implications, acknowledges study limitations, and proposes future research directions. The primary objective is to synthesize insights from the relationship between physical exercise motivation (EM), self-control (SC), self-efficacy (SE), and physical exercise behavior (EB), offering guidance for individuals, fitness professionals, educational institutions, and policymakers.

5.1 Summary of Key Findings

The statistical analyses conducted in Chapter 4 confirmed all seven research hypotheses, revealing that:

Physical exercise motivation (EM) significantly influences physical exercise behavior (EB) (H1 supported).

Individuals with higher motivation are more likely to engage in regular exercise.



Physical exercise motivation positively affects self-control (H2 supported) and self-efficacy (H3 supported).

This suggests that motivated individuals tend to demonstrate greater self-regulation and confidence in their ability to exercise.

Self-control (SC) and self-efficacy (SE) have significant positive effects on physical exercise behavior (H4 and H5 supported).

Individuals with strong self-discipline and confidence engage in exercise more frequently.

Self-control mediates the relationship between exercise motivation and exercise behavior (H6 supported).

Motivation fosters behavior partially by enhancing self-control, allowing individuals to overcome distractions and maintain consistency.

Self-efficacy mediates the relationship between exercise motivation and exercise behavior (H7 supported).

Exercise Effect Cognition Moderates the Relationship Between Exercise Motivation and Exercise Behavior (H8 Supported)

Exercise Effect Cognition Moderates the Relationship Between Self-Efficacy and Exercise Behavior (H9 Supported)

Motivation also enhances exercise behavior by improving individuals' belief in their ability to succeed.

These findings highlight the importance of not only motivation but also psychological self-regulation factors in shaping physical exercise behavior. While motivation serves as a catalyst, self-control and self-efficacy act as bridges that help individuals translate motivation into sustained exercise habits.

5.2 Theoretical Contributions

This study contributes to existing literature by extending theoretical frameworks in the domain of exercise psychology and behavioral science:

Enhancing the Theory of Planned Behavior (TPB):

While TPB posits that attitudes, subjective norms, and perceived behavioral control influence



behavior, this study shows that self-control and self-efficacy act as key mediators, reinforcing that motivational and self-regulatory factors are interdependent.

Bridging Self-Determination Theory (SDT) and Social Cognitive Theory (SCT):

SDT highlights intrinsic and extrinsic motivation, while SCT emphasizes self-efficacy and observational learning.

This study integrates both perspectives, demonstrating that higher motivation enhances self-efficacy and self-control, which in turn facilitate behavior adoption.

Empirical Evidence for Behavioral Change Strategies:

Findings suggest that developing self-regulation skills and reinforcing self-efficacy are effective psychological interventions, aligning with behavioral change models used in health psychology and fitness training programs.

5.3 Conclusion

This study confirms that physical exercise motivation significantly impacts exercise behavior, both directly and indirectly through self-control and self-efficacy. The findings underscore the importance of integrating motivational enhancement strategies with self-regulation training to sustain long-term physical activity.

For individuals, goal setting, habit formation, and confidence-building techniques can enhance exercise adherence. For fitness professionals and educators, structured behavioral interventions targeting both motivation and self-regulation can yield sustainable improvements. Policymakers should focus on creating supportive environments and incentive-based programs to foster physical activity at the community level.

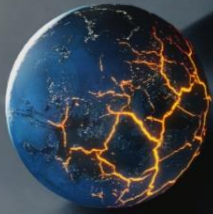
By recognizing the dual role of motivation and psychological self-regulation factors, this study offers a comprehensive understanding of how individuals develop and sustain long-term exercise habits, ultimately contributing to improved physical and mental well-being.

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