

THE ROLE OF SELF-EFFICACY IN PHYSICAL ACTIVITY IN STUDENTS: A LITERATURE REVIEW

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Abstract. *Physical activity among adults and adolescents do not meet the recommendations of WHO. Many studies focus on investigation of physical activity in students and the role of self-efficacy as important factor in predicting physical activity behaviour. Aim of the study was to determine the role of self-efficacy in physical activity in students. A literature review has been conducted to determine the self-efficacy measurements in physical activity studies and to determine factors related to self-efficacy and physical activity. Through search in the PubMed database 206 records were identified and 24 articles were included in further analysis. Thirteen studies used the General Self-Efficacy Scale [GSES] to measure self-efficacy level. Two studies considered The Exercise Self-Efficacy scale [ESES] focusing specifically on physical activity. Other studies considered different self-efficacy measurement tools including separate questions about physical activity self-efficacy as part of the questionnaire or survey used in the study. One study focused on emotional self-efficacy measures. Other factors investigated in relation to self-efficacy and physical activity were health beliefs, anxiety, depression, perceived stress, academic behaviour, academic procrastination, academic burnout, emotional intelligence, subjective well-being, Self-control, motivation and addiction, self-esteem, body image, sense of inferiority, and social support.*

Keywords: *measurement tools, physical activity, self-efficacy, students*

Introduction

Physical activity is important in preventing and maintaining health for all people of all ages. Physical activity plays an important role both in physical and mental health and wellbeing. However, data of World Health Organization [WHO] shows prevalence of insufficient physical activity among adult. One in four adults and four out of five adolescents do not reach the recommendations of daily physical activity. Women and girls are generally less active than men and boys. Older adults and people with disabilities are also less active and lose physical, mental and social health (WHO, 2021). At all times there have been may researchers focusing on physical activity studies, trying to determine the factors

influencing and predicting physical activity. Many studies have investigated the influential factors of the self-efficacy of physical activity.

The concept of self-efficacy was introduced by the psychologist Albert Bandura in the social cognitive theory (Bandura, 1997; 1989). Self-efficacy is defined as an individual's belief in their ability to cope with various life situations. A person with low self-efficacy tends to run away or give up when faced with difficulties. In contrast, a person with high self-efficacy will take specific actions to solve a problem when faced with difficulties (Luszczynska & Schwarser, 2005). Self-efficacy plays a central role in behavioral self-regulation because it influences the formation and strength of intentions and the persistence of action in the face of obstacles (Bandura, 1977; Bandura, 1986).

Self-efficacy is the most frequently identified psychosocial determinant of physical activity. Researches (Gong & Sheng, 2022; Hou, Li, Zheng, Qi & Zhou, 2022; Wang et al., 2022a; Xue-Liu & Mu, 2021) show that self-efficacy frequently influences or mediates physical activity behavior.

The current study aims to determine the role of self-efficacy in physical activity in students by literature review. Two research questions were considered:
What self-efficacy measurements are used in physical activity studies?
What other factors are related to self-efficacy and physical activities?

Methodology

A literature review has been conducted through the PubMed database following the PRISMA Group workflow (Figure 1).

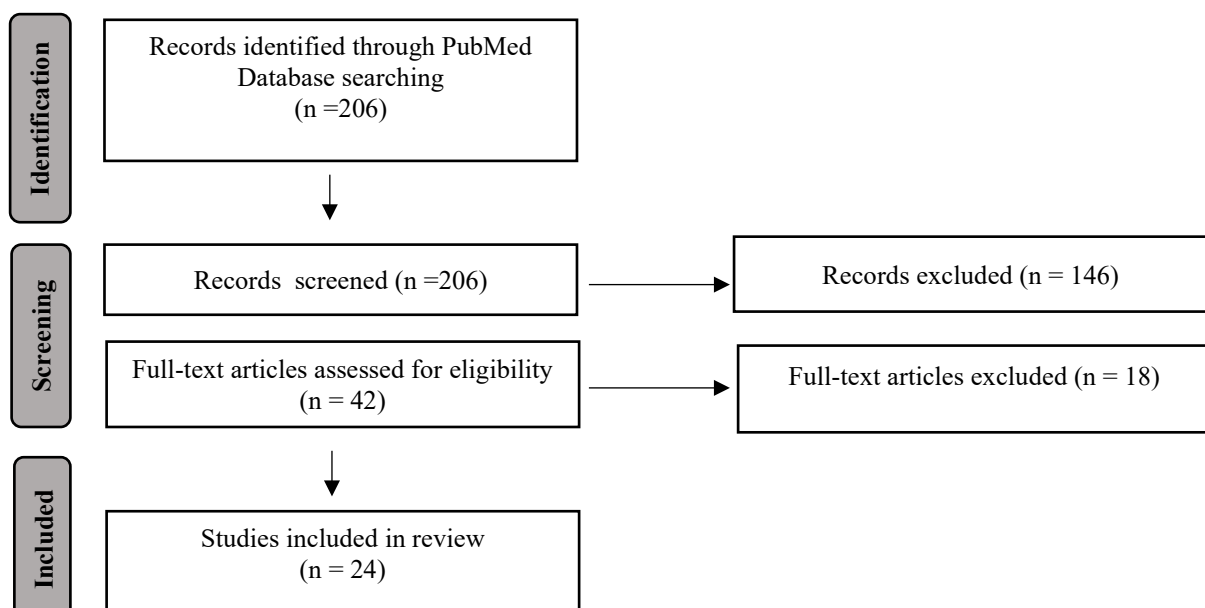


Figure 1 Preferred Reported Items for Systematic Reviews and Meta-analyses (PRISMA) chart summarizing the identification of the studies and selection process

The following key words were considered: self-efficacy, physical activity, students. To be included in the review process studies should consider: measurements of self-efficacy and physical activity; respondents of the study should be students; studies should be fully written in English; studies should be published in last 5 years. Review articles and Meta-Analysis meeting the above inclusion criteria were also considered. Studies that met any of following criteria were excluded from the study: focus only on self-efficacy or only on physical activity measurements; respondents were not students of college or university.

Research results

Through search in the PubMed database 206 records were identified. Records were analyzed by the author and in the first stage 146 records were excluded because the inclusion criteria were not met. In the next step 42 full-text articles were assessed for the eligibility by in depth analysis of the goal and method description of the article. At first 29 articles were included in the further analysis but in process 5 were excluded as the self-efficacy or physical activity measures were conducted indirectly. There were 24 research articles included in the literature review that considered the main inclusion criteria. Most articles were published in 2022, in total 16 articles; in 2021 two articles; in 2020 three articles; in 2019 two articles; in 2018 one article were published. All studies conducted the measurement of physical activity (incl. physical exercise, exercise health beliefs, physical exercise intentions, exercise behavior, use of physical activity apps, sports habits) and self-efficacy, and participants were students of college or university. Other factors that have been investigated in studies are health beliefs, anxiety, depression, perceived stress, academic behavior, academic procrastination, academic burnout, emotional intelligence, subjective well-being, self-control, motivation and addiction, self-esteem, body image, sense of inferiority, social support (Table 1).

24 analyzed studies considered different measurement tools for self-efficacy and physical activity (Table 2). Thirteen studies (Chen, Liu, Mou, Zhao, & Guo, 2022; Ding, Jiang, Li, & Wen, 2020; Du & Zhang, 2022; Ouyang et al., 2020; Han et al., 2022; Li, Hu, & Ren, 2022; Liu, 2022; Li, Liu, Yu, Zhang, & He, 2022; Wang, Li, Zhang, & Luo, 2022; Wang et al., 2020; Song, Ren et al., 2021; Yu, Yang, Tian, Austin, & Tao, 2022; Zhang, Hasibagen, & Zhang, 2022) used the General Self-Efficacy Scale [GSES] to measure the students' self-efficacy level. German version was developed by Jerusalem and Schwarzer (Schwarzer & Jerusalem, 1995). The scale was created to assess a general sense of perceived self-efficacy with the aim in mind to predict coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events.

Table 1 Main characteristics of the 24 articles reviewed (created by the authors)

Author, year	Sample size N, gender, age (Mean, SD)	Factors measured
Chen, K., Liu, F., Mou, L., Zhao, P., & Guo, L. (2022)	1,270 (Male = 476, Female = 794)	Physical exercise, academic burnout, self-efficacy, resilience
Du, Z., & Zhang, X. (2022)	855 (Male = 497, Female = 358), Age (M = 19.84, SD = 2.48)	Self-efficacy, self-control, physical activity, internet addiction
Gong, L., & Sheng, J. (2022)	313 (Male = 138, Female = 175); Age 19.5 ± 1.5	Exercise health beliefs, self-efficacy
Han, S. S., Li, B., Wang, G. X., Ke, Y. Z., Meng, S. Q., Li, Y. X., Cui, Z. L., & Tong, W. X. (2022).	1,923 (Male = 951, Female = 972)	Physical fitness, exercise behavior, and self-efficacy
Hou, B., Li, L., Zheng, L., Qi, Y., & Zhou, S. (2022)	218 (Male = 64, Female = 154); Age 19.53 ± 1.01	The physical exercise intention, coping planning, action planning, and self-efficacy
Lawrence, M. R., Wan, H.I., Liu, W., McDonough, D.J., Mishra, S., & Gao, Z. (2022)	60 (Male = 30, Female = 30); Age 23.6 ± 4.1	Anthropometric Measures, Situational Interest, Self-Efficacy, Equilibrium Chang
Lee, D., & Young, S. (2018)	164 (Male = 91, Female = 73); Mean age = 21.68	Social support, self-efficacy, and behavioral change in physical activity
Lee, K., Bae, H., & Jang, S. (2022)	175 (Male = 175); Age 21.37 ± 0.87	Effects of short-term exercise, positive psychological capital sub-factors (self-efficacy, optimism, and hope)
Li, C., Hu, Y., & Ren, K. (2022)	564 (Male = 251, Female = 313); Age (M = 19.44, SD = 0.87)	Physical activity, self-control, self-efficacy, and academic procrastination
Li, X., Liu, M., Yu, H., Zhang, Z., & He, Z. (2022)	552 (Male = 201, Female = 351); Age (Mean = 20.12, SD = 1.58)	Self-efficacy, personality, academic performance
Lin, B., Teo, E. W., & Yan, T. (2022)	1787 (Male = 628, Female = 1159); Age (Mean = 18.85, SD = 0.93)	Motives, self-efficacy, smartphone addiction, physical activities
Liu, C. (2022).	110 (Male = 62, Female = 48)	Self-esteem, self-efficacy, sports activities, sense of inferiority
Ouyang, Y., Wang, K., Zhang, T., Peng, L., Song, G., & Luo, J. (2020)	887 (Male = 472, Female = 415); Age 20.91 ± 1.39	Self-efficacy, self-esteem, body image, physical activity
Parsons, J. L., MacDonald, L., Cayer, M., Hoepfner, M., Titterton, A., Willsie, J., & Webber, S. C. (2019).	24 (Male = 2, Female = 22); Age 23	Physical activity, knowledge, outcome expectations, and self-efficacy
Ren, K., Liu, X., Feng, Y., Li, C., Sun, D., & Qiu, K. (2021)	687 (Male = 350, Female = 337); Age (M = 19.59, SD = 0.89)	Academic procrastination, physical activity, self-efficacy
Song, X., Ding, N., Jiang, N., Li, H., & Wen, D. (2020).	686 (Male = 276, Female = 410); Age 20.27 ± 0.73	Out-of-class activities, self-efficacy, perceived stress
Tang, S., Chen, H., Wang, L., Lu, T., & Yan, J. (2022)	479 (Male = 293, Female = 186); Age (M = 19.94, SD = 1.25)	Physical activity, anxiety, depression, emotion regulation, self-efficacy

Author, year	Sample size N, gender, age (Mean, SD)	Factors measured
Wang, F., Gao, S., Chen, B., Liu, C., Wu, Z., Zhou, Y., & Sun, Y. (2022)	1,300 (Male = 620; Female = 680)	Exercise Self-Efficacy, Exercise Motivation, and Exercise Behaviour
Wang, K., Li, Y., Zhang, T., & Luo, J. (2022)	826 (Male = 381, Female = 445); Age 20.13 ± 1.05	Physical exercise, self-efficacy, emotional intelligence, and subjective well-being
Wang, K., Yang, Y., Zhang, T., Ouyang, Y., Liu, B., & Luo, J. (2020)	835 (Male = 374, Female = 461); Age 20.13 ± 1.06	Physical activity, self-efficacy, and emotional intelligence
Wang, T., Ren, M., Shen, Y., Zhu, X., Zhang, X., Gao, M., Chen, X., Zhao, A., Shi, Y., Chai, W., Liu, X., & Sun, X. (2019)	1245 (Male = 466, Female = 779); Age 20.5 ± 2.6	Use of physical activity apps, sports habits, social support, self-efficacy
Xue-Liu, L., & Mu, X. (2021)	801 (Male = 242 boys, Female = 559); Age 20	Physical evaluation self-efficacy, perceived exercise benefit and perceived severity of disease and weakness
Yu, H., Yang, L., Tian, J., Austin, L., Tao, Y. (2022)	1627 (Male = 968, Female = 659), Age (M = 19.41, SD = 0.66)	Self-efficacy, self-control, physical activity
Zhang, Y., Hasibagen, & Zhang, C. (2022)	1,440 (Male = 662, Female = 778)	Social support, self-efficacy, physical exercise behavior

The scale is designed for the general adult population, including adolescents. The GSES consist of 10 items and measured in 4-point Likert scale. The total score ranges between 10 and 40, with a higher score indicating more self-efficacy. Two studies (Lin, Teo, & Yan, 2022; Wang et al., 2022a) considered The Exercise Self-Efficacy scale [ESES] focusing specifically on physical activity. However, the ESES used in the studies, differed in items or measurement scale. Also other studies (Gong & Sheng, 2022; Hou, Li, Zheng, Qi, & Zhou, 2022; Lawrence et al., 2022; Lee, Bae, & Jang, 2022; Lee & Young, 2018; Marcus & Forsyth, 2018; Parsons, et al., 2019; Wang et al., 2019; Xue-Liu & Mu, 2021) considered self-efficacy measurement tools with items of questions about physical activity specifically (n = 6), including separate questions about physical activity self-efficacy as part of the questionnaire or survey used in the study (n = 4). One study (Tang, Chen, Wang, Lu, & Yan, 2022) focused on emotional self-efficacy measures.

For physical activity measures there were used internationally recognized scales. Eight studies (Chen, Liu, Mou, Zhao, & Guo, 2022; Han et al., 2022; Li, Hu, & Ren, 2022; Ren et al., 2021; Tang, Chen, Wang, Lu, & Yan, 2022; Wang, Li, Zhang, & Luo, 2022; Wang et al., 2020; Zhang, Hasibagen, & Zhang, 2022) used Physical activity rating scale [PARS-3] (Liang, 1994). The scale has three items that measure exercise intensity, exercise frequency, and single exercise time

measured in 5-point Likert scale. Four studies used International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003). IPAQ is mainly used to evaluate physical activity level against the recommended level. It can also be used to evaluate the results of a physical activity intervention. Seven studies used different tools to measure physical activity and 5 studies conducted experimental methods implementing physical activity routines.

Table 2 Self-efficacy and physical activity measurement tools (created by the authors)

Self-efficacy	N	Physical activity	N
The General Self-Efficacy Scale (GSES)	13	Physical activity rating scale (PARS-3)	8
The Exercise Self-Efficacy Scale (ESES)	2	International Physical Activity Questionnaire (IPAQ)	4
A six-item physical activity self-efficacy scale	1	Physical Activity Level Scale,	1
Physical Fitness Evaluation Self-Efficacy subscale	1	The degree of sports participation scale	1
Physical activity self-efficacy subscale	1	Perceived Benefits of Exercise subscale	1
The emotion regulation self-efficacy scale (RES)	1	Physical exercise behavior scale	1
		Physical activity measurements scale	1
		Exercise Health Belief Survey	1
		National Survey of Student Engagement	1
Other: Self-efficacy scale (3items) questions regarding self-regulatory self-efficacy; self-efficacy survey (5 items); Self-efficacy subscale	6	Other: exercise action (single item); Situational interest survey after 20-min exercise session; Exercise routine (experiment); twelve-week experiment; exercise two or more times a week for 30–60 min	5

Exercise behavior, exercise intention, motivation, situational interest

In the study (Hou et.al., 2022) the aim was to identify whether self-efficacy can serve as a moderator to facilitate the transition from intention to planning, as well as from planning to action in physical activities. The self-efficacy moderated the relationship between physical exercise intention and coping planning, but not between physical exercise intention and action planning. For students with high self-efficacy, both coping planning and action planning served as mediators in the relationship between exercise intention and exercise action. Results point to a

moderated mediation effect of self-efficacy on the transition from intention to action in the context of physical exercise. Findings suggest that the epidemic situation of COVID-19 affects students' participation in physical activities. There is a positive correlation between exercise motivation, exercise self-efficacy, and exercise behaviour (Wang et al., 2022a). Exercise behaviour (intensity, length, frequency) is an important mediator in the relationship between physical fitness and self-efficacy. Physical fitness (body shape, cardiorespiratory endurance, flexibility, and power) can improve self-efficacy (Han et al., 2022).

Type and environment of physical activity has an impact on exercise behaviour. Use of exergame instead of traditional treadmill exercise shows statistically significantly higher situational interest scores. However, there are no differences in self-efficacy scores (Lawrence et al., 2022). The scores of self-efficacy, optimism and hope were higher for the groups in the natural environment and visual stimulation exercise conditions than those in the indoor exercise group (Lee, Bae, & Jang, 2022).

Exercise and health beliefs

Recent studies have evaluated the role of exercise self-efficacy, health beliefs (Gong & Sheng, 2022) and perceived exercise benefit and perceived severity of disease and weakness (Xue-Liu & Mu, 2021) as well as knowledge of core stabilization and body mechanics principle and outcome expectations related to engaging in core stabilization/functional fitness exercises (Parsons et al., 2019).

Self-efficacy and perceived barriers (such as inconvenience for the participation of exercise or lack of time and companionship) are important factors of exercise belief that impact exercise behaviour. However, there was no significant association among exercise self-efficacy and perceived benefits, perceived objective barriers, perceived severity, or cues to action. This study revealed a significant negative correlation between perceived subjective barriers and exercise self-efficacy (Gong & Sheng, 2022).

The study (Xue-Liu & Mu, 2021) concluded that perceived exercise benefit and exercise self-efficacy (as positive motivational factors) have a positive correlation with amount of exercise. Therefore, confirming that self-efficacy is an important positive motivational factor. Physical evaluation self-efficacy mediated the positive effect of perceived exercise benefits on the amount of exercise and inhibited the negative effects of perceived severity of disease and weakness on the amount of exercise.

In a quasi-experimental study (Parsons et al., 2019) it was found that weekly participation in mandatory functional fitness classes led to some improvements in physical competence, but no changes in knowledge, outcome expectations or self-efficacy to engage in exercise.

Anxiety, depression, perceived stress

Investigating relationship between physical activity and negative emotions, it was concluded that the physical activity participation was positively related to emotion regulation self-efficacy, and indirectly negatively related to anxiety and depression (Tang et al., 2022). The results of the study (Song et al., 2020) demonstrated that with higher perceived stress, less time was devoted to physical exercise among students with a lower level of self-efficacy.

Academic performance, academic procrastination, academic burnout

Studies shows that self-efficacy can predict academic behaviour in students. The aim of the study (Li et al., 2022b) was to explore the mediating effect of self-efficacy on the relationship between the proactive personality and academic performance of college students. The level of self-efficacy of those students who participated in exercise two or more times a week for 30-60 min each time was significantly higher than that of the non-sports group. Self-efficacy plays a fully mediating role between proactive personality and academic performance. Proactive personality is a stable individual variable that improves performance by actively manipulating the environment in which it is placed. Individuals with high levels of proactive personality have positive attitudes and behaviours toward environmental adaptation and are able to adopt a proactive approach to cope with stress and frustration, thus enhancing self-efficacy in work and study.

Self-efficacy plays a mediating role between physical activity and academic procrastination. Individuals who actively participate in physical activity are more likely to have a higher level of self-efficacy which lead to a lower level of academic procrastination (Ren et al., 2021). Higher self-efficacy was associated with more time spent preparing for class and studying, thereby promoting students' academic performance (Song et al., 2020). Physical activity significantly predicted higher levels of self-control and self-efficacy, as well as lower levels of academic procrastination. Self-control and self-efficacy were significant moderators between physical activity and academic procrastination (Li et al., 2022a).

In the study (Chen et al., 2022) was explored the relationship between physical exercise and academic burnout, with a focus on the serial mediating roles of self-efficacy and resilience. Physical exercise was significantly and negatively associated with academic burnout. Self-efficacy mediated the relationship between physical exercise and academic burnout. It was suggested that college students can enhance self-efficacy via physical exercise, which then promotes resilience and ultimately ease their academic burnout.

Emotional intelligence and subjective well-being

There is significant correlation among physical activity amount, self-efficacy, and emotional intelligence (Wang et al., 2020). Students who regularly participate in physical exercises often have a higher sense of self-efficacy, could be more determined of being able to complete a certain behaviour and achieve expected goals, were more able to perceive and evaluate the emotions of others in specific situations, could also be correctly applying and managing emotional intelligence, and could better obtain subjective well-being experiences such as positive emotions and life satisfaction. Physical exercise can positively and directly affect the subjective well-being and indirectly affect subjective well-being through the chain mediating effect of self-efficacy and emotional intelligence (Wang et al., 2022).

Self-control, motivation and addiction

Nowadays when Internet and smart phone use plays a major role in peoples' daily life, the focus on physical activity levels must be considered. Smartphone addiction negatively predicts intrinsic motivation to engage in physical activity and positively predicts extrinsic motivation. Smartphone addiction can predict lower level of intrinsic motivation and self-efficacy and this leads to decrease in physical activity level (Lin et al., 2022). Self-control has a mediation role between self-efficacy and physical activity (Yu et al., 2022). Analysing differences between physical activity levels on self-efficacy, self-control and Internet addiction, the results showed that physical activity was more likely to reduce symptoms of Internet addiction. Self-efficacy and self-control as important psychological factors, played a mediation role in the effect of physical activity and Internet addiction. Self-efficacy was significantly positively correlated with physical activity, and significantly negatively correlated with Internet addiction (Du & Zhang, 2022).

Self-esteem, body image and sense of inferiority

The study (Ouyang et al., 2020) found that body image and self-efficacy had a significant positive influence on sports participation and that higher the body image scores, the higher degree of sports participation. The results showed that college students can directly influence their sports participation by promoting a correct and positive body image and indirectly affect their sports participation behavior by improving self-efficacy. This study found that the body image of college students had an impact on the degree of sports participation by self-efficacy, and self-efficacy affected the sports participation by partial mediation of self-esteem. Students with higher body image can promote self-efficacy, therefore

enhancing their sense of self-esteem and self-affirmation and promoting sports participation.

In the experimental study (Liu, 2022) during 12-weeks two groups performed competitive scenarios and recreational sport scenarios. Both had positive effect on student's inferiority feeling. Throughout the experiment, the scores of sense of inferiority decreased and scores of self-esteem and general self-efficacy increased with the increase of experiment time.

Social support

Social support has impact on physical activity and self-efficacy. There is relationship between social support (family support, school support, peer support), self-efficacy, and physical exercise behaviour. The influence of family support on physical exercise behaviour is only achieved through the intermediary role of self-efficacy. The impact of school support on physical exercise behaviour has direct influence and is achieved through the intermediary effect of self-efficacy. Peer support has a direct impact on physical exercise behaviour (Zhang, Hasibagen & Zhang, 2022). Use of physical activity apps is associated with higher physical activity levels. This effect was mainly through the mediation effect of social support and self-efficacy, rather than the direct effect on physical activity apps. Higher social support level and high self-efficacy score are associated with higher physical activity levels (Wang et al., 2019).

In contrary, one study (Lee & Young, 2018) focusing on the measurements of social support, self-efficacy, and behavioral change in physical activity concluded that social support for physical activity did not have effect on physical activity. Physical activity stages of change are significant predictors of physical activity behavior and the path of physical activity self-efficacy to physical activity was indirect.

Conclusions

Self-efficacy is proved to be most frequently identified factor determining physical activity. By improving students' general self-efficacy, it could be an effective measure to foster participation in physical activities, which would then enhance both physical and mental wellbeing. Self-efficacy plays an important mediating role between physical activity and other factors such as health beliefs, anxiety, depression, perceived stress, academic behavior, academic procrastination, academic burnout, emotional intelligence, subjective well-being, self-control, motivation and addiction, self-esteem, body image, sense of inferiority, social support. The obtained research results are the basis for further

research, which allows to increase the perception of the importance of self-efficacy in the context of physical activities and health behavior.

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