



SELF-EFFICACY, SELF-ESTEEM AND BODY IMAGE AS PSYCHOLOGICAL DETERMINANTS OF 15-YEAR-OLD ADOLESCENTS' PHYSICAL ACTIVITY LEVELS

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HANNA KOŁOŁO^{1*}, MONIKA GUSZKOWSKA¹, JOANNA MAZUR², ANNA DZIELSKA²

¹ Józef Piłsudski University of Physical Education, Warsaw, Poland

² The Institute of Mother and Child, Warsaw, Poland

ABSTRACT

Purpose. The aim of the study was to analyze which psychological factors can determine the physical activity levels of 15-year-old adolescents. The psychological factors examined were self-efficacy, physical self-esteem (body weight and body appearance) and body image. A multifactorial perspective based on a socioecological approach as well as Bandura's social learning theory was used to clarify the relationships between the determinants and physical activity levels. **Methods.** The study participants were 2277 15-year-old adolescents (1086 boys and 1191 girls). Selected questions and scales from HBSC's international standard questionnaire were used, including the Moderate to Vigorous Physical Activity index, the self perception of body weight and body appearance question, the General Self-Efficacy Scale and the Body Image Subscale. **Results.** It was found that over half of the Polish 15-year-old population featured an insufficient level of physical activity. Self-efficacy, body image and physical self-esteem of both body mass and body image were significant predictors of physical activity. The role of these predictors was found to be differentiated by gender. **Conclusions.** The physical activity levels of 15-year-old adolescents can be predicted by use of psychological variables.

Key words: physical activity, adolescence, self-efficacy, self-esteem, body image

Introduction

Data available on the physical activity levels (PAL) of youth is alarming. Although programs aimed at increasing children's and adolescents' physical activity levels have existed for quite some time, few have yielded satisfactory results. Only those programs that were particularly steadfast were able to document a positive effect on physical activity (especially during childhood and adolescence), health, fitness and the quality of life in later adulthood and old age. Some of the more common, and simpler, methods of influencing adolescents' physical activity levels were by investments in infrastructure: the modernization and construction of playgrounds, sports fields and other sports facilities as well as seeing that physical education classes' had a well-suited curriculum. However, recent scientific studies have found that these types of solutions produce limited results [1].

The aim of this study was to therefore seek and analyze criterion outside of environmental factors that could increase adolescent physical activity levels with lasting and positive effects. There exist a number of ways of differentiating the factors that could be classified as determinants of physical activity. This study focuses largely on those which are psychological in nature. Among the determinants of physical activity that fall within this category are those which hold a special sig-

nificance in Bandura's social learning theory [2], which provided the theoretical basis of this study.

To accomplish this, an approach deriving from both social learning and self-efficacy theory was used to accentuate the interaction of the numerous individual, environmental and behavioral factors that come into play. Such an approach would focus attention on, among others, the role of self-regulatory processes on a variety of behaviors, in this case physical activity, as one entity [2]. Emphasis on the importance of psychological factors such as self-efficacy and self-esteem can provide an alternative to those approaches in previous studies that focused solely on physical factors, as well as expose a gamut of previously unconsidered factors that can modify physical activity levels.

As was mentioned, one of the most important determinants of behavioral change is self-efficacy, where "self-efficacy is the optimistic belief of one's possibilities through actions that are in accordance with a chosen goal, regardless of the obstacles one faces in achieving this goal or the belief that one is able to perform actions that will create certain results. In addition, self-efficacy allows an individual to decide when to initiate action, decide how much effort should be exerted and if they will be able to continue in spite of additional obstacles and/or failures" [3, p. 66].

Self-efficacy affects how people feel and how they react. Individuals with low self-efficacy frequently have feelings of anxiety, helplessness, sadness and severe depression. High levels of self-efficacy allow for better decision-making, task implementation, information pro-

* Corresponding author.

cessing, goal formulation and, therefore, goal achievement. It also affects how much effort is put into countering the discrepancies between the results of our actions and our designated goals. It determines if people use their cognitive resources more efficiently by accurately assessing a given situation and examining for ways to effectively cope with the difficulties one meets when attempting to realize an aim. The source of such behavior in individuals convinced of their self-efficacy is holding a higher level of positive emotions and a lower level of negative emotions.

Self-efficacy is also one of the factors that influences an increase in the belief that one can manage to solve problems, increasing the inner-motivation needed towards formulating goals as well as increasing our initiative in taking action. Individuals with high self-efficacy augment the amount of effort they put in achieving an objective when obstacles are encountered or when they are unhappy with a certain outcome. Despite the negative emotions one feels when dealing with failure, such individuals mobilize and renew their efforts. In contrast, individuals with a low sense of self-efficacy who encounter obstacles or failures frequently become apathetic, depressed and abandon their goals. Self-efficacy may therefore have both a direct and indirect impact on making healthy behavioral choices, which includes physical activity.

Another factor that was pointed out in literature on adolescent physical activity levels was self-esteem. It is defined as the feeling individuals have of themselves, one that is encompassed by numerous psychological dimensions and influences the behavior of individuals [4]. Although self-esteem can be made up of these different individual dimensions (appearance, knowledge, intelligence, specific skills), not all are equally important for a given individual.

Self-esteem can be assessed intentionally, from information gathered on one's ability, such as by the implementation of a task at hand, or unintentionally, based on an evaluation (by assessing oneself or by being assessed by others) of the results of their own actions. Among the information derived from different sources about oneself, there is a number of interactions that make up global self-esteem; it is a collection of all the elements of self-esteem.

Another differentiating factor of physical activity is body image, usually understood as the internal representation of one's external appearance, i.e., the perception of one's body [5]. It is closely connected to the emotional sphere (thoughts and feelings), and in some cases it can have an impact on an individual's behavior. Depending whether an individual's body image is positive or negative, it can lead to either positive emotions or depressive bouts, or even behavioral disorders resulting from too many negative emotions.

One of the more modern definitions of body image define it as an image that we form in our own minds [6]. Body image is highly subjective, unstable and suscep-

tible to many environmental influences; it can change due to one's mood, the context of one's self-evaluation and by suggestions given from others. Body image is a systematic, cognitive, affective, conscious and at the same time unconscious image that a person has of his or her own body, an image that is cultivated during one's development and by social relationships. It is a sensual image of sizes and shapes that is accompanied by feelings of the whole or certain parts of the body [7].

Body image and self-esteem are mutually dependent on each other. The results from Harter's studies [8, 9] point to a strong correlation between self-esteem and body image. Body image is a key element of self-esteem, which makes it an important component of mental health throughout an entire lifetime.

This study aimed at determining the importance of self-efficacy, self-esteem and body image as differentiating factors of physical activity levels in a sample of 15-year-old adolescents, guided with the following research questions:

1. What is the relationship between the physical activity levels and 15-year-olds' sense of self-efficacy?
2. What is the relationship between 15-year-olds' physical activity levels and perceived body weight, body appearance and body image?
3. Do relationships between 15-year-olds' physical activity levels and mentioned psychological factors differ in terms of gender?

Material and methods

To analyze the set-out research questions, the study employed a diagnostic poll, and as a research technique, a questionnaire survey was used. The measurement tool used was the standard, international HSBC questionnaire (*Health Behavior in School-aged Children. A WHO Cross-national Collaborative Study*) from 2006, which analyze health behaviors of school-aged youth. The study was conducted at the Department of Child and Adolescent Health at the Institute of Mothers and Child under a research grant from the Ministry of Science and Higher Education (No. 2PO5D04330) *Protective factors against risk behaviors and their relationships on school-children's health in Poland and other countries*, led in 2006–2008 by Dr. Joanna Mazur, who is the Principal Investigator of the HSBC study in Poland.

Physical activity level was determined by using an MVPA indicator (*Moderate-to-Vigorous Physical Activity scale*) – classified as physical activity of moderate to intense levels (increased heart rate with, at times, shortness of breath) and best determines overall physical activity.

The physical activity question was preceded by an introduction in order to help the adolescents understand the concept of physical activity, stating: “[it] is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, school activities, playing with friends, or walking to school. Some examples of physical activity are running,

brisk walking, biking, dancing, skating, soccer. When answering the questions, please think about how much time you spend each day on physical activity."

The survey's questions were aimed at calculating the physical activity level expressed in the number of days in the preceding week that an individual devoted to physical activity lasting at least 60 minutes. The questions were sourced from a screening test by Prochaska et al. [10], which was confirmed by the HSBC network in 2002 after a number of pilot and validations studies. The adolescents answered how many days they were active by use of a visual scale from 0 to 7. Due to the multidimensional analysis of this study, the *physical activity level* was then converted into a binary variable, where 0 meant a sufficient level of physical activity, and 1 as insufficient physical activity. Insufficient physical activity was determined as less than five days of physical activity, each lasting at least 60 minutes.

In order to assess the level of self-efficacy, Schwarzer's *General Self-Efficacy Scale* was used. It was translated by Juczyński [11] into Polish and had been previously used in studies on health behavior and its long-term effects, on the prevention of substance abuse and in diagnosing adaptability capabilities. The Scale's total score, based on distribution analysis, was divided into three categories: a low sense of self-efficacy (0–15 points), an average sense of self-efficacy (16–20 points) and high sense of self-efficacy (21–30 points). In later analysis, the psychometric properties of the scale were found to be reliable: Cronbach's alpha reliability coefficient was 0.850, while factor analysis found a common factor accounting for 44% of the scale's variability.

Self-esteem was defined by three dimensions: a self-assessment of one's weight, an assessment of appearance and an assessment of body image (the perception of one's own body). Questions were answered either with individual answers or by rating their feelings on a scale. A self-assessment of weight was analyzed with the question, "Do you think your body is...? :", with responses being either, "much too thin, a bit too thin, about the right size, a bit too fat, much too fat". A self-assessment of appearance was examined by asking, "Do you think you are...?", which could be answered with "good looking, quite good looking, about average, not very good looking, not at all good looking".

Body image was examined by the *Body Image Subscale*, which is one of many subscales that make up the *Body Investment Scale*, developed by Orbach and Mikułincer [12] to quantify one's experiences with their body. The *Body Image Subscale* (BIS) was adapted and based on available information, this part of the 2006 HSBC survey was the first time this measurement tool was used in Poland. The BIS scale is composed of six partial assessments, with a total score ranging from 0–24 points that is subdivided into three scoring categories (a low score of 0–14 points, indicating a negative perception

of the body, a score of 15–20 points indicating an average perception, and a score of 21–24 points indicating a positive image of the body). This scale also featured a high reliability of the studied psychometric properties, with Cronbach's alpha reliability coefficient at 0.853, and one factor accounting for 58% of total variance.

In total, the study examined 2287 female and male high schools attending their third year of high school. The students were randomly chosen from a list of schools from the Ministry of Education as well as a database of schools previously selected in a HSBC study conducted in 2002. The selection criterion was the grade. The number of students selected from each of Poland's region was proportional to its share in the total population as well as proportional in terms of the urbanization level of each region. Due to incomplete data from some of the tested adolescents, the final sample size on which analysis was conducted was $N = 2277$, made up of 1086 boys and 1191 girls. The minimum accepted significance level was $p = 0.05$.

Results

Insufficient physical activity was found in nearly 65% of the studied Polish 15-year-olds, with a significant higher number of girls than boys (Tab. 1).

In order to establish a relationship between physical activity and the selected psychological variables of self-efficacy and self-esteem of one's body weight, appearance and body image, logistic regression models were constructed for each of the variables, followed by a model including all of the collective psychological factors.

Both low and high levels of self-efficacy were found to be associated with the level of physical activity in adolescents. Those individuals who were less confident of their own effectiveness were more vulnerable of having a poor physical activity levels [OR = 1.42; CI(OR):1.06–1.89, OR – odds ratio, CI – confidence interval], while those more convinced of their effectiveness were significantly less likely of having a low physical activity level [OR = 0.46; CI(OR):0.48–0.85].

Gender-specific models found that those with high self-efficacy were found to have less risk in featuring insufficient physical activity in both males [OR = 0.62; CI(OR):0.47–0.80] and females [OR = 0.46; CI(OR):0.48–0.85].

Table 1. Relationship of the level of physical activity and gender (% of 15-year-old adolescents)

Gender	Physical activity level *	
	sufficient	insufficient
Boys	45.4	54.6
Girls	26.6	73.4
Total	35.6	64.4

* $\chi^2 = 87.411$; $df = 1$; $p = 0.0000$

Similarly, gender was found to weaken the predictive abilities of low self-efficacy, which in this model was found to be insignificant and therefore points to the dominant role of gender. The relationships and the way the risks of low physical activity can be predicted for the rest of the parameters were found to be the same as in the individual models – the male gender and a high value of self-efficacy reduced the risk of having poor physical activity: [OR = 0.44; CI(OR):0.37–0.53] and [OR = 0.62; CI(OR):0.52–0.76]), respectively.

Those adolescents who evaluated themselves as *too fat* were found to be at risk of having insufficient physical activity [OR = 1.71; CI(OR):1.39–1.25]. In the gender-specific models, analysis found that the relationship remained unchanged, i.e., the belief in being *too fat* increased the risk of having insufficient physical activity [OR = 1.93; CI(OR):1.27–2.71]. However, the model for the girls shows a significant relationship between the personal conviction of being *too thin* and insufficient physical activity, and therefore increases the risks one faces [OR = 1.59; CI(OR):1.04–2.42].

After switching to the gender-variable model, the goodness of fit was found to significantly worsen and be at the limit of admissibility (Naglekerk's $R^2 = 0.57$). Therefore, in this model both gender (the male gender reduces the risk of insufficient physical activity) and the conviction of being *too fat* are the most important, at [OR = 0.47; CI(OR):0.39–0.56] and [OR = 1.36; CI(OR):1.09–1.68], respectively.

A negative perception of one's appearance (*not very good looking*) reduces the likelihood of having insufficient physical activity in 15-year-old boys and girls [OR = 0.65; CI(OR):0.46–0.91]. Analysis independent of both sexes was found to have similar results: a negative self-assessment of appearance has a slightly stronger predictive value in the group of girls [OR = 0.61; CI(OR):0.40–0.94] than in boys [OR = 0.52; CI(OR):0.28–0.94].

When analyzing the model that incorporates gender as a variable, it was found that gender was independently connected to insufficient physical activity, where the male gender significantly reduces this risk of this occurring [OR = 0.41; IC(OR):0.34–0.50]. In addition, a negative perception of appearance significantly reduces the risk of having insufficient physical activity [OR = 0.58; CI(OR):0.41–0.82].

A negative self-assessment of body image was found to be associated with an increased risk of insufficient physical activity [OR = 1.29; CI(OR):1.02–1.63], while a positive evaluation of the body reduced the risk of having insufficient physical activity [OR = 0.64; CI(OR):0.52–0.79].

In analyzing the data in terms of gender, it can be stated that in the group of boys a negative self-assessment increased the risk of having insufficient physical activity [OR = 1.90; CI(OR):1.24–2.91], while a positive assessment had a protective effect by reducing the risk of having insufficient physical activity [OR = 0.74; CI(OR):0.57–0.97]. For the group of girls, the only pre-

dictor of being at risk of insufficient physical activity was a positive self-assessment of one's body, which was found to correlate with a reduction in risk [OR = 0.65; CI(OR):0.46–0.91].

A gender-variable model found that the male gender and a positive self-assessment of body image reduced the risk of showing insufficient physical activity at [OR = 0.46; CI(OR):0.38–0.56] and [OR = 0.69; CI(OR):0.56–0.86], respectively.

Based on the logistic regression analysis performed on all of the separately analyzed psychological factors, a 95% confidence interval was calculated for the odds ratios (OR) and plotted in Figure 1. Individual analysis found that the strongest buffers against featuring insufficient physical activity were having a high level of self-efficacy, followed by positive body image and a negative self-assessment of appearance. The most dominating factor against individuals featuring insufficient physical activity was the belief in being *too fat*. The strongest determinants of featuring low levels of physical activity in youth is low self-efficacy and negative body image (Fig. 1).

The next step consisted of building a logistic regression model that incorporated all of the analyzed psychological factors. Figure 2 shows the odds ratio (OR)

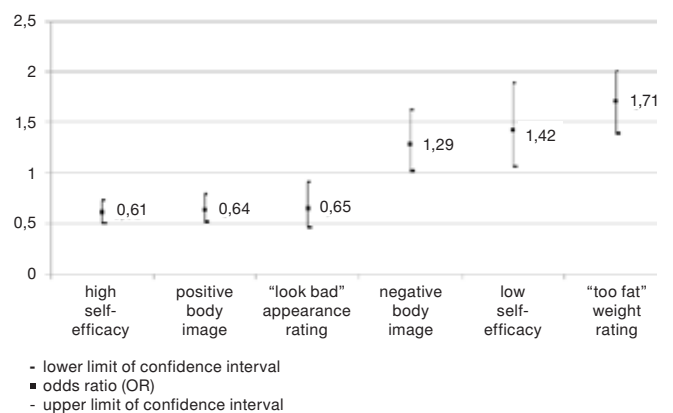


Figure 1. Risk of 15-year-olds having insufficient physical activity based on individual psychological factors

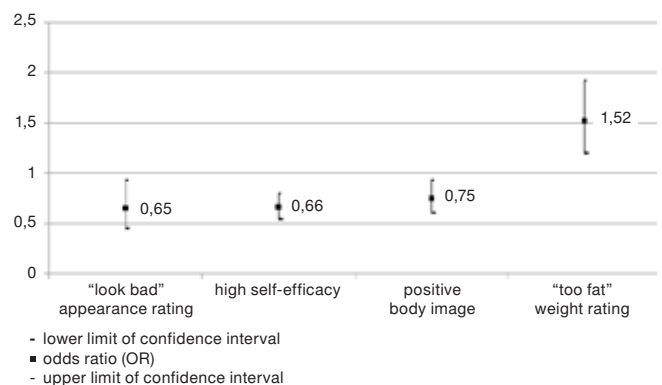


Figure 2. Risk of 15-year-olds having insufficient physical activity based on all of the psychological factors acting simultaneously

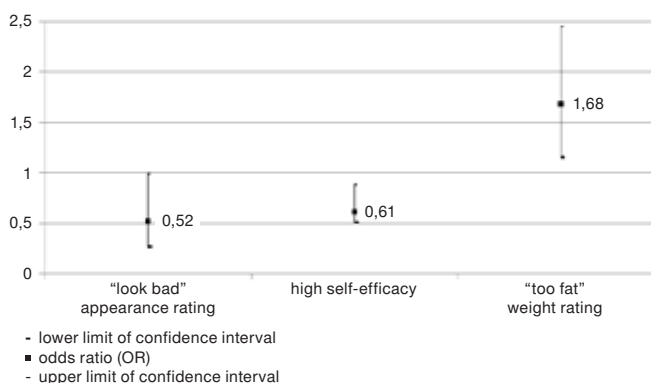


Figure 3. Risk of 15-year-old boys having insufficient physical activity based on all of the psychological factors acting simultaneously

and confidence intervals (CI) of all the psychological factors acting simultaneously.

As a result, four factors independently determining the level of physical activity were found. The strongest variable that works against having insufficient physical activity was a negative self-assessment of appearance, followed by a high belief of one's self-efficacy and positive body image. The strongest determinant of being a risk of having insufficient physical activity was the belief in being *too fat* (Fig. 2).

Since there existed a strong independent relationship between physical activity and gender, which was found to distort the other variables' relationships, the final model for analysis did not include gender as a variable. Instead, two separate models were created for the analyzed boys and girls (Fig. 3 and 4).

Analysis performed on the model for the boys pointed to the existence of three determinants of physical activity: a self-assessment of one's appearance, weight, and self-efficacy. A negative assessment of appearance and a high sense of self-efficacy were found to reduce the risk of insufficient physical activity while the belief in being *too fat* increased the risk of insufficient physical activity (Fig. 3).

In the model tailored just for girls, there were only two factors that influenced physical activity: self-efficacy and a self-assessment of body weight, where a high opinion of self-efficacy reduced the risk of insufficient physical activity while the belief in being *too thin* increased it (Fig. 4).

Discussion

Based on the logistic regression models, the first research question on the relationship between physical activity and 15-year-olds' sense of self-efficacy was answered by finding that self-efficacy can predict physical activity when considering an entire adolescent population as well as when taking into account only a respondent's gender. At the same time, the protective role

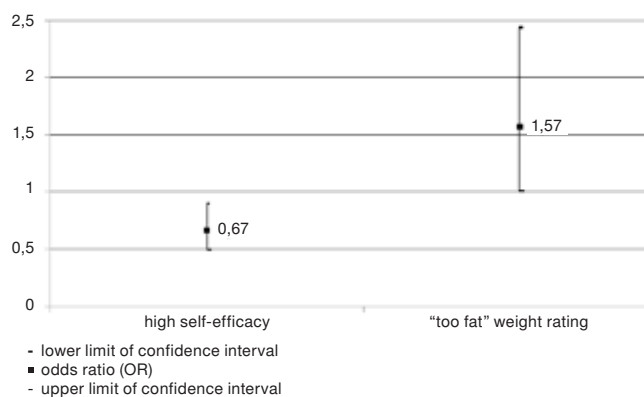


Figure 4. Risk of 15-year-old girls having insufficient physical activity based on all of the psychological factors acting simultaneously

of having a high sense of self-efficacy against insufficient physical activity levels was found in the general population of 15-year-olds as well as in the group of 15-year-old girls. In the case of boys, self-efficacy is an independent predictor of physical activity levels.

A positive relationship between self-efficacy and physical activity was also confirmed by other authors [13–15]. Detailed studies conducted by Rodgers et al. [16, 17] have indicated a relationship between self-efficacy and physical activity. Chase [18] and George [19] compared adolescents with a better sense of self-efficacy to those with a weaker belief in their self-efficacy in terms of motor skills and found that those with a higher sense of self-efficacy showed higher physical activity levels, engaged in physical activity with more determination, were able to better cope in the face of setbacks and achieve overall better results.

Based on the concepts of Bandura, the main source of self-efficacy comes from successful experience in adopting and maintaining physical activity. Therefore, it can be said that the key to combating insufficient levels of exercise in youth is by encouraging adolescents to not only engage in physical activity but to sustain their active involvement in exercise until their self-efficacy rises to a level that can ensure it being ingrained as a long-term behavior. Another effective method of forming self-efficacy is through behavior modeling, or in other words, the acquisition of behaviors by observation.

One of the factors that can increase the chances of successful modeling is by there being similarities to the observer in terms of gender, age, physical fitness and body weight. A potentially successful program would need to therefore start by showing less active adolescents, those who are initially reluctant to exercise, not necessarily physically fit or featuring poor body build and show the process of how they begin to exercise every day, where they are able to choose the physical activity that best suits them and successfully continue exercising, all the while showing the benefits both in terms of physical health and mental health.

In response to the second and third research questions that consider the relationships between 15-year-olds' physical activity levels and a variety of psychological factors (a self-assessment of body weight, appearance and body image) and the crucial role of gender, it is clear that the results of this study reveal the existence of a curvilinear relationship between adolescent physical activity levels and self-esteem, in terms of appearance and body image. In regards to self-esteem connected with appearance, it was found that "average" body appearance was a determining factor of insufficient physical activity. In the case of body weight, it was found that body weight judged *about the right size* determined a proper level of physical activity. Positive body image was found to determine sufficient physical activity levels in 15-year-old boys and girls.

It should be noted that Mulvihill et al.'s qualitative study [22] proved that body mass index (BMI) is a less important determinant of physical activity than the perception (self-assessment) of body weight, body appearance and body image. In addition, it was also shown that adolescents frequently assess their own body weight incorrectly when compared to their actual weight. Teenage girls had a higher tendency to overstate their weight than boys. Adolescent youth attach great importance to physical appearance and weight, and as was found, the perception (self-assessment) of one's body was the second, after negative emotions and depression, strongest factor that influences mental health, both in feeling satisfaction and quality of life.

According to the results, adolescents with negative body image and a negative self-assessment of body weight (*I am too fat*) are characterized by insufficient physical activity. This relationship may stem from a reluctance to participate in recreational activities and sports due to a lack of self-acceptance and therefore create a vicious circle. On the one hand, the components of self-esteem (a negative perception of body weight and body image) are factors that prevent an adolescent from taking up physical activity. On the other hand, the most optimal way to control and maintain body weight is through physical activity combined with a proper diet. Adolescents who perform less physical activity while featuring excess body weight have a reduced chance at controlling their weight or bringing it to an acceptable level and may even lead to a continual increase in body weight, which in turn causes an further increased risk of featuring insufficient physical activity.

Such a mechanism may be interrupted if an adolescent begins to exercise and remains physically active thanks to a positive feedback mechanism. Only systematically implemented exercise can help reduce weight and increase self-esteem of one's physical capabilities. Experiencing success through exercise can lead to increased self-efficacy and therefore increase the willingness to participate in more physical activity, thereby increasing the likelihood of further weight reduction and an increase of both self-esteem and self-efficacy.

Furthermore, the level of physical activity was found to be dependent on one's assessment of their appearance. The largest amount of insufficient physical activity was found in adolescent's who were satisfied with their appearance, where almost three-quarters of the females in this study that were satisfied with their appearance featured insufficient physical activity. This relationship may stem from a lack of incentive mechanisms to take part in physical activity, where only those adolescent girls who were dissatisfied with their appearance would have the desire to improve their physical looks.

Despite the fact that the main motivating factor for girls to participate in physical activity appears to stem from a dissatisfaction with their appearance, this variable should not be too strongly emphasized when trying to increase this group's physical activity level. Being dissatisfied with one's appearance can be a symptom of a more serious disorder that can cause a reduction in overall self-esteem, and can lead to alienation, depression, risky behavior and eating disorders. Instead, in this group, it would be better to activate and strengthen health-related and hedonistic themes, with emphasis on the pleasure of performing various kinds of exercise. This requires an adaptation of adolescent physical activities to meet individual needs, preferences and expectations.

The results of this study indicate that adolescent physical activity is related to a number of psychological factors. However, in order to more accurately specify the nature of these relationships, additional studies should be conducted on the effectiveness of different types of intervention strategies aimed at increasing the physical activity level of adolescents. A theoretical basis for future studies should be developed on the basis of modern health psychology and behavioral change theory, especially in the form of hybrid models [23], which can take into account the various psychological factors that condition physical activity [1].

Conclusion

A number of psychological factors were found to be important determinates of adolescents' physical activity levels, however, one especially important criterion was gender – girls are more likely than boys to feature insufficient physical activity. In addition, gender was found to differentiate the importance of some of the studied psychological factors. A high level of self-efficacy was found to reduce the risk of featuring insufficient physical activity in both boys and girls. Insufficient physical activity was also found among those adolescents with negative body image or a negative perception of their body weight. Adolescents' physical activity levels were found to also depend on the perception of one's appearance, those who were satisfied with their appearance were more often characterized by insufficient physical activity.

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Correspondence address

Hanna Kołolo
 Wydział Wychowania Fizycznego
 Akademia Wychowania Fizycznego
 Józefa Piłsudskiego
 ul. Marymoncka 34
 00-968 Warszawa, Poland
 e-mail: hanna.kololo@gmail.com