

# The effect of physical activity on positive body image in adolescent girls

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## Abstract

**Background.** Our study was purposed to trace the dynamics in the body image of adolescent girls engaged in sport fencing. Positive body image is considered to be essential for mental health in adolescence and adulthood.

**Objective.** Physical activity and sports may affect the body image. But participation in aesthetic sports (figure skating, gymnastics) leads to less positive body image among girls. However, little is known about the effect of non-aesthetic sports on the positive body image. Responses from our respondents indicate that non-aesthetic sports such as fencing may enlarge body acceptance, body functionality appraisal, and positive constitution appraisal. Also important, is that physical activity in fencing made body image more realistic.

**Design.** The study involved 83 adolescent girls aged 12-16 years. An experimental group included 38 adolescent girls who started fencing classes. The control group consisted of 45 girls of the same age who did not do sports or dance. Girls were examined on the day they begin their sports and 9 months after their start. We use “Measurements by M. Feldenkraiz” and the psychosemantic instrument “My body” by K. N. Belogai. Also, the interview gave us information about participants’ height, weight as well as attitudes towards their bodies, their lifestyles, and their body compliance with internal and external beauty standards.

**Results.** In the beginning, adolescent girls had mostly negative body images: they did not evaluate its functionality, activity, and did not accept their body. But Student’s t-test for the dependent samples showed that among girls who practiced fencing for nine months, body acceptance, appraisal of body functionality and activity increased significantly, and the gap between perceived body proportions and the real ones decreased. Initially, girls appraised their bodies and limbs as longer than they actually were.

**Conclusion.** Fencing classes for 9 months changed girls’ body image to more realistic and subjectively acceptable. The findings suggest that integration of physical activity of functional sports in everyday life or therapy might be one route to facilitate positive body image development. This may support wellbeing among adolescents.

**Keywords:** positive body image, mental health, attitudes, adolescent girls, sports.

## Introduction

In modern society unrealistic standards of beauty and attractiveness are common, and it leads to increasing cases of eating disorders, especially among teenager-girls and young women. Research shows that negative perceptions of one's body are associated with low self-esteem (O'Dea, 2012) and the decline in one's general

psychological well-being (Anderson-Fye, 2004; Meland et al., 2007, He, et al., 2020). Data collected around the world shows the same trend: an increasing number of children, adolescents, and young women with eating disorders, including anorexia nervosa (Amianto et al., 2016, Linardon, 2021, Ciwoniuk, Wayda-Zalewska & Kucharska, 2022). N. Ciwoniuk and colleagues

postulate that, in individual predisposing to developing anorexia nervosa the distorted body image becomes a key factor. And as long as anorexia nervosa has the highest mortality rate among all mental disorders (Ciwoniuk, Wayda-Zalewska & Kucharska, 2022) the issues of positive body image become the influent factor of mental health of the young people all over the world. For example, analyzing the prevalence of eating disorders in adolescence and youth in northwestern Iran, scientists compared current data and data from the 1990 survey and found that in 1990 only 0.25% of respondents were diagnosed with eating disorders of all types, while in 2015 their number was 24.2% (Rauof et al., 2015).

Girls traditionally experience more body stereotypes pressure, that is to say, suffer more from the evaluation of their body by others and even by themselves than boys and have more problems (Holmqvist, 2007, Tylka, & Wood-Barcalow, 2015 Jerónimo & Carraça, 2022). However, gender differences decrease in the group of adolescents with positive body image. Such teenagers are more focused not on the appearance of the body, but its functionality and more flexibly define a "beautiful" body. They are critical of the image of the ideal body displayed in the media and consider it "unrealistic".

In studies conducted in groups of people with a positive body image, such components of positive body image were found: body appreciation, positive rational acceptance, and broad conceptualization of beauty and so these parameters contribute to their mental health. To create a positive body image, a person needs to look at the body through the prism of its functionality, not its appearance and weight. The vast majority of people with a positive body image are physically active and report that this activity gives them pleasure. Increased physical activity has been shown to make the body image more positive (Burgess et al., 2006, Cox, et al., 2022). However, if the activity is aimed at weight loss, the results will be the opposite (Prichard & Tiggemann, 2008, Alleva, et al. 2022). A.P. de Bruin, R. Oudejans, F.Bakker and L.Woertman provided information that even high performance women athletes had negative body image. So, not

the physical activity itself makes body image more positive. Also the authors obtained that female athletes who had eating disorders had more negative body image than athletes without disordered eating (de Bruin et al., 2011). Thus, the physical activity- body image nexus is a complicated issue.

Encouraging teenagers to engage in physical activity contributes to the formation of a positive body image, but such activities should give positive emotions. For example, students may be allowed to try out different types of activities. And it is especially important to encourage girls to exercise. There is a special term - "corseting" - restriction of physical activity of women due to the use of sexual clothing that affects the ability to move, as well as restriction of activity due to the idea that beautiful women should not sweat (Sim, & Peterson, 2021). At the same time, a study of a large group of 13-18-year-olds in Australia (1002 people) found that girls who played sports were more likely to view the body through the lens of functionality and had more positive body image (Abbott & Barber, 2011).

A meta-analysis conducted by H. A. Hausenblas and E. A. Fallon in 2006 showed that according to most authors, increased physical activity contributes to the formation of a positive body image. They analyzed 121 published and unpublished studies and concluded that the trainee had a more positive body image than the non-trainee and participants had a significant improvement in body image indicators after the exercise intervention (Hausenblas & Fallon, 2006).

That is to say, there are some gaps in past research of body image and body image formation in the line of the formation of perceived body image especially in adolescent girls. And the most interest is attached to the possible positive impact of physical activity: the trajectory, the speed, and the vector of possible changes of perceived body image.

So, the purpose of our study was to trace the dynamics in the perceived body image including body acceptance, body functionality appraisal, compliance with internal and external standards, positive/negative constitution appraisal, and real

and perceived body parameters of adolescent girls engaged in fencing for nine months..

In this regard, we postulate the research questions:

1. How do body proportions and perceived body proportions differ in adolescent girls?
2. Are there any differences in body image and body acceptance in girls experiencing sport activity and girls not doing any sports or dance?
3. How do changes in adolescent girls' physical activity affect their body image?

## Methods

### *Participants*

Our study was designed as a mixed method and was held in 2020-2021 in Russia in Kemerovo region. 83 girls were involved in our study. The average age of girls was 14.7 years old. They were divided into two groups: experimental and control. An experimental group included 38 adolescent girls aged 12-16 years who started fencing classes in the creative association "School of Historical Martial Arts" in Kemerovo (Russia). Before the beginning of classes, they had had no experience of sports activities. While training these girls took sports classes twice a week. They answered the number of measures on the day they began their sports and then after 9 months from their start. The control group consisted of 45 girls of the same age who did not do sports or dance. The Control group was asked to answer the measures two times at the same period as an experimental group. All the participants were living in Russia. 100% were from urban families from the city of Kemerovo. All the respondents were recruited and compensated through the local Research community.

### *Procedure*

A 20-minute, face-to-face, interview with girls was conducted between January 2020 and April 2021. All the participants attended with written informed consent form and permission from parents of participants under 14 years old.

## *Measures*

*Weight and Height* were assessed by measuring height and weight in metric measures. and through the interview in which, girls were asked to give verbal information about height, weight as well as to indicate their attitudes towards their bodies (including the desire to change something in the body) and their lifestyles (diets or other options of restrictive eating behaviour, sports or dancing and prior sport participation).

*BMI* was defined using a formula a person's weight in kilograms divided by the square of the person's height in meters (kg/m<sup>2</sup>). The groups of "normal", the "lower" and "higher" groups BMI were divided using the recommendation of the World health organization (WHO, 2006).

*Compliance with internal and external standards* was obtained by our asking girls to evaluate the percentage of their body's compliance with their internal beauty standards and compliance with external (social, media) beauty standards using a scale from 0 to 100 percent.

*Body Acceptance, Body Functionality Appraisal, Activity Level, and Positive Constitution Appraisal* were assessed by using psychosemantic instrument "My body" by K. N. Belogai (Belogi & Morozova, 2018) which is an instrument constructed using 7 points Likert scale (from "strongly disagree" to "strongly agree") to appraise the degree of acceptance of the body (body acceptance) and to indicate the appraisal of its activity (activity level) and its functionality (body functionality) as well as the degree of positive or negative constitution appraisal (positive constitution appraisal).

We also used the "Measurements by M. Feldenkraiz" (Solov'eva, 2017) to compare girls' real and perceived body parameters. Girls were asked to appraise their body sizes (26 parameters including head, arms, legs), which described perceived body parameters. Then they found out their real body parameters. The comparison of these two variants of parameters made it possible to calculate the percentage of misconception for each of the parameters, as well as to build a picture of the body at a scale of 10:1 which makes this misconception visual (see figures 1 and 3).

### Statistical analyses

Statistical analyses included calculation of the descriptive statistics, F-Test for Equality of Two Variances, the Kolmogorov Smirnov test and the Student's t-test for the independent and dependent samples. At first, we compared the level characteristics of our sample with statistical norms. Through this, we concluded that our sample did not have any specific features in comparison with the other children of the same age. Therefore, we can conduct further analysis of the results obtained from this sample of children.

Then we compared experimental group with the control group before experimental group had begun there exercises and 9 months later.

The F-Test for Equality of Two Variances at a significance level equal to 0.01 showed that the variances between groups differed slightly. Also, all parameters were checked by the Kolmogorov Smirnov test and were obtained to be of the normal distribution law. We used the Student's t-test for the independent samples to find any differences between groups of participants.

### Results

The descriptive statistics of the body image of all adolescent girls are presented in table 1.

Table 1.

*Parameters of body image of adolescent girls (N=83)*

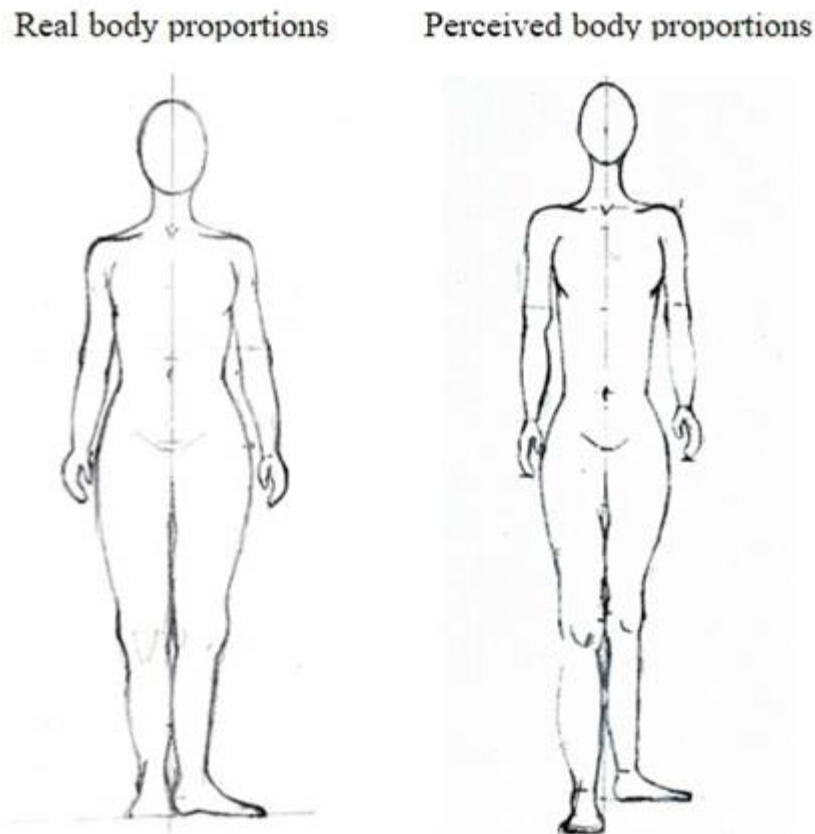
Parameters	M	Minimum	Maximum	SD
<b>Weight</b>	53.98	33.00	78.00	9.83
<b>Height</b>	160.56	140.00	175.00	7.23
<b>BMI</b>	20.55	14.66	34.08	4.16
<b>Compliance with external standards</b>	65.92	.10	99.00	15.77
<b>Compliance with internal standards</b>	68.01	15.00	100.00	16.58
<b>Body Acceptance</b>	5.21	-13.00	20.00	7.38
<b>Body Functionality Appraisal</b>	5.92	1.00	12.00	2.72
<b>Activity Level</b>	3.52	-8.00	9.00	3.72
<b>Positive Constitution Appraisal</b>	3.6	-4.00	11.00	3.53

All the girls had the normal body mass index, 5% of girls had a little lower index, 6% – a little higher than average BMI.

But all the adolescent girls were not satisfied with their bodies, they did not appreciate their functional capabilities and activity, and their constitution did not satisfy them.

Compliance with external standards is 65.92 % for both groups and compliance with internal

standards is a little higher 68.01 %. Only 3% of girls indicated less than 15%, and these girls have higher BMI.



*Figure 1.* Real and perceived body proportions among adolescent girls not doing (before starting) sports (N=83)

According to the interview data, 87% of the girls would like to make changes to their bodies. 36% of the girls would like to have a thinner waist, thinner belly, 24% of the girls would like to change the lower part of the body (to lose weight in the hips, to reduce the buttocks, to have longer legs, etc.), 12% of the girls are dissatisfied with the size of their breasts and 7% of the girls expressed a desire to change something in their face, 8% would like to change "everything" in their body. And 6% of girls noted that they regularly resort to strict diets, high physical activity to correct weight.

Using the parameters of the perceived and real body according to the "Measurements by M. Feldenkraiz" by I. A. Solovieva, misconception

in the perceived body proportions were calculated as differences between perceived body proportions and the real sizes for the 25 body parameters.

The perception of the body in adolescent girls is distorted in such a way that the body and limbs are perceived as longer, and the body as narrower. Images of the girls' real and perceived bodies were pictured at a scale of 1:10 and are graphically performed at the figure 1. So, we see that body proportions and perceived body proportions differ in adolescent girls.

Then we tried to find out how changes in adolescent girls' physical activity will affect their body image. We compared girls who started

fencing classes (experimental group) with girls of the same age who did not do sports or dance.

Comparison of parameters in the experimental and control groups using Student's t-test for the independent samples showed that there were no

significant differences between the groups at the beginning.

9 months later we conducted a second study in both groups which indicated some differences in body acceptance in these two groups (Table 2).

Table 2.

*Parameters of body image of adolescent girls in two groups after 9 months*

<b>Parameters</b>	<b>M for experimental group (N=38)</b>	<b>M for control group (N=45)</b>	<b>p</b>
Compliance with external standards	69.24	67.43	.15
Compliance with internal standards	78.85	71.65	.00
<b>Body Acceptance*</b>	7.04	5.82	.00
<b>Body Functionality Appraisal*</b>	6.8	5.2	.00
<b>Positive Constitution Appraisal*</b>	3.90	3.16	.08
<b>Activity Level*</b>	5.01	4.23	.02

So, we have obtained that there are differences in body image parameters such as body acceptance, constitution appraisal and body functionality appraisal in girls experiencing sport activity (in in non-aesthetic sports) and girls not doing any sports or dance.

It was also important for us to obtain changes in the perceived body image after starting sports. We have found that after 9-month lessons, misconception in many parameters of body

image among the girls practicing sports significantly reduced. For instance, for the length of the body corpus and limbs became more realistic. Misconception of the length of the neck, arms, waist, and pelvis became comparable with results reported in other studies (Solov'eva, 2017). Thus, the changes in adolescent girls' physical activity made their perceived body image become much closer to the realistic one. The results of the 9 months training are graphically performed at the figure 2.

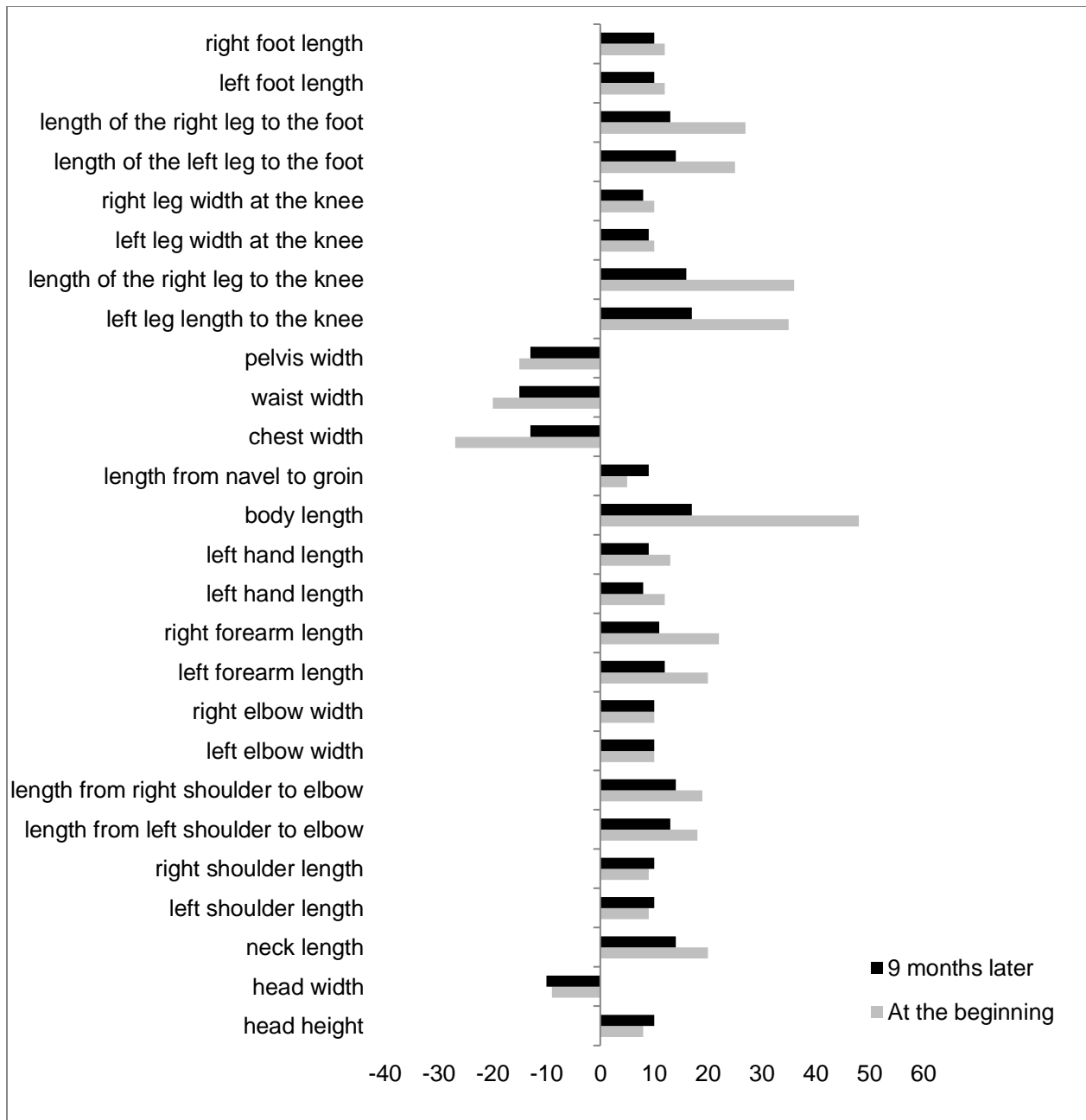
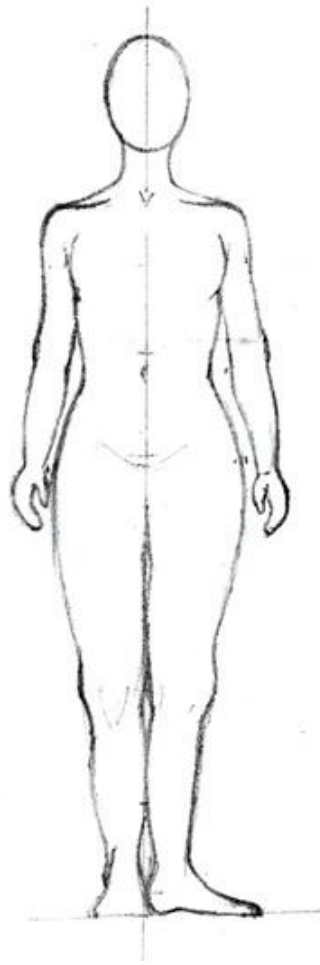


Figure 2. Body image misconception obtained by the Feldenkrais Method in the experimental group at the beginning and after 9 months of sports training (N=38)

This can be seen in figure 3.

## Real body proportions



## Perceived body proportions

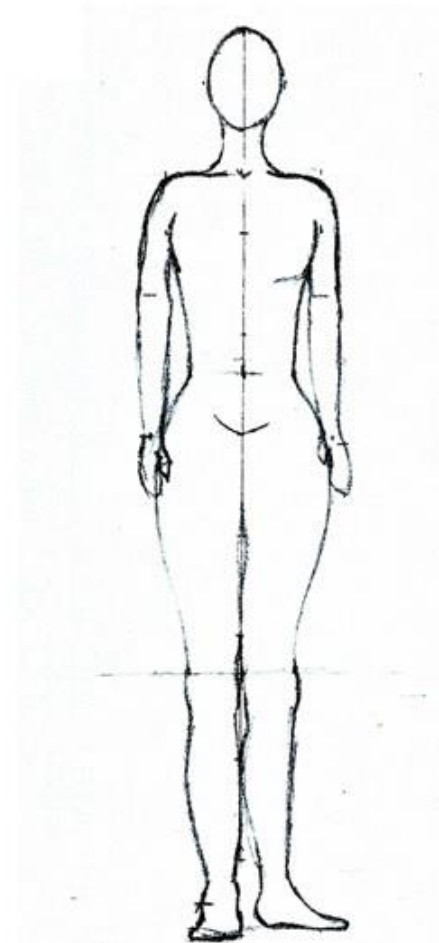


Figure 3. Real and perceived body proportions among adolescent girls in experimental group after starting sports (N=38)

However, there were no significant changes in the body parameters in the control group ( $p \leq 0.01$ ).

### Discussion

We studied the characteristics of body image in adolescent girls who started fencing and dynamics of body image after 9 months of classes. We found that the strongest body misconceptions in adolescent girls are present in the perception of the length of the body (48%). In addition, girls have smaller misconceptions of the perception of chest width, waist width, and

length. The neck also is perceived by the girls as longer than the real one (20%). The limbs, both arms, and legs, also are perceived longer. Comparing all the parameters, we can note that most of the misconceptions are related to the length of the body and limbs. The width of the chest and waist and pelvis are perceived as narrower compared to the real ones.

The perceived body image of girls resembles the image influenced by the fashion industry, which includes a long neck, narrow waist, hips, disproportionately long limbs. There are many examples of this type of figure: the figures of modern top models, and the figures of many



dolls, including the Barbie doll with its disproportionately elongated body.

Analysis of our results showed that after 9 months of fencing lessons, the body image became more positive: body acceptance and body functionality ( $P \leq 0.01$ ) significantly increased.

The resulting perceived body image became closer to the real one. The strong misconceptions of the upper body and limbs that were observed initially disappeared.

Thus, changes in the physical activity of adolescent girls, in particular fencing classes, have led to a change in girls' perceptions of their bodies. The body representations have become more positive, realistic, and consistent.

A minority of people have a positive body image in modern society has, the vast majority is characterized by normative dissatisfaction with appearance (Anderson-Fye, 2004, Nikolaev, 2022). At the same time, research on positive body image and its components has been started in the last 15 years. And to answer the question of how to prevent negative body image formation and how to carry out corrective and developmental work in this direction is still quite difficult (Smolak & Cash, 2011). For instance, T. Tylka writes that usual psychological techniques may lead to the absence of psychopathology, but do not enhance the experience of joy in life and do not form psychological well-being (Marta-Simões, Tylka, & Ferreira, 2021). K. Holmqvist Gattario postulates that to prevent misconceptions of body image it is important to understand the specifics of a positive body image. And she has found that teenagers with a positive body image emphasize functional characteristics, rather than appearance. (Holmqvist Gattario, 2013).

It turns out that increasing physical activity and sports can really make the body image positive. However, the question remains: can we say that any sport contributes to the formation of a positive body image? Apparently not. Previous research has shown that adolescent girls who are professionally engaged in figure skating have a negative body image (Morozova et al., 2018).

Currently, researchers are increasingly considering aesthetic and functional (non-aesthetic) sports separately. They show that the body image of people involved in different sports can differ significantly. We also believe that a significant role belongs to how professionally a person practices sports, since the pressure on professional athletes is traditionally much higher than for amateurs (Reel et al., 2013).

L. Smolak, S. K. Murnen, and A. E. Ruble draw conclusions that body dissatisfaction was lower in female athletes. But athletes who engage in sports that emphasize thinness, were at risk of eating problems. Also, athletes in high school had a lower risk of eating problems compared to professional athletes (Smolak et al., 2000).

Previous research has found that aesthetic sports are associated with increased attention to the appearance of the body and less attention to its functionality (Vandenbosch, Fardouly, Tiggemann, 2021). However, more recent studies have found different results. For instance, B. Abbott and B. Barber have found no significant differences in functional values between only aesthetic and only non-aesthetic sports participants. And according to them, different sports were also not significantly associated with differences in girls' appearance satisfaction (Abbott & Barber, 2011).

In the Polish study, which involved 242 professional athletes engaged in aesthetic and non-aesthetic sports, the results are different. Athletes representing aesthetic sports showed a more positive body image than those representing non-aesthetic sports. So, the type of sport, age, BMI, and level of competition were all significant for body image formation. (Kantanista et al., 2018).

Similar results were obtained in another study in which elite gymnasts dieted more often than control gymnasts, although they were not more negative about their bodies (de Bruin et al., 2007). At the same time, changing the body image to the negative can motivate people to increase physical activity (Brudzynski & Ebben, 2010). Thus, we can assume that doing sports can positively change the body image, but the

question of whether every sport changes the body image into positive remains open.

## **Conclusion**

The results of the study showed that adolescent girls have mostly negative body images: they do not evaluate its functionality, activity, and do not accept their body.

Also, we may conclude that to form a positive body image it is necessary to look at the body through the prism of its functionality but not its appearance. The increase in physical activity of adolescents, aimed specifically at developing functional characteristics, rather than changing weight, contributed to the formation of a more positive and realistic body image. The girls' acceptance of the body increased, their appraisal of its functionality and activity also significantly increased, and the gap between perceived and real proportions decreased. Initially, adolescent girls appraised their bodies and limbs much longer than they actually were. It seemed to them that the proportions of their bodies were similar to those of a famous doll. Fencing classes for 9 months changed their body image to more realistic one at least in a short term.

## **Limitations**

Some limitations of the current study should be mentioned. First, most measures for this study relied on girls self-reports. In further studies, some parameters could be evaluated using reports by external observers, such as the parents.

Second, our sample was represented only by girls. In our further study, we plan to indicate gender differences if any. Third, this study's use of a convenience sample limits the generalizability of the results.

Despite these limitations, the current study furthers our understanding of the body image formation. The findings suggest that integration of physical activity of functional sports in everyday life or therapy might be one route to facilitate positive body image development. This may support wellbeing among adolescents. We

need further study to answer some questions raised in our current study. Some of them are how physical activity of functional sports effects boys' body image and what educational means and ways of psychological help could be useful in work with children' body image.

## ***Ethics Statement***

The study was approved by the Methodical Committee of the Institute of Education (Kemerovo State University). The study conforms to the recognized standards of the Declaration of Helsinki.

## ***Informed Consent from the Participants' Legal Guardians***

Informed consent was obtained from all individual participants (or parents of participants under 14 years old) included in the study.

***Consent to publish statement.*** All individual participants (or parents of participants under 14 years old) provided written informed consent for the publication of any associated data and accompanying images.

## ***Data availability statement***

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

## ***Conflict of Interest***

The authors declare that they have no conflicts of interest.

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