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RESEARCH

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# Factors associated with body size perception among adolescent goal-oriented sports participants and non-participants: a cross-sectional Finnish study

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## Abstract

**Background:** Regardless of competitive athletes' body image pressures, only few studies have focused on adolescent sport participants' body image and the findings are inconclusive. Furthermore, the role of competitive goals in sports on adolescents' body size perception has not been studied. We examined the factors associated with adolescents' competitive goals in sports and body size perception, and the associations between adolescents' competitive goals in sports and body size perception.

**Methods:** The cross-sectional study consisted of 475 goal-oriented sports club participants and 936 reference youths (aged 14–16 years). The study questionnaire included multiple choice items on health behaviours, motives to exercise, competitive goals in sports and body size perception. The multinomial logistic regression analysis was used to investigate the associations.

**Results:** Adolescents with competitive goals in sports perceived their body size as about the right size more frequently than reference youths (68% vs 47%,  $p < 0.001$  in girls; 74% vs 61%,  $p < 0.001$  in boys). More than one-fourth of girls with competitive goals in sports perceived themselves as overweight, although only 7% of them were overweight. Adolescents with appearance/weight motives to exercise and poor perceived physical fitness had higher odds of perceived fatness. Additionally, BMI was positively associated with perceived fatness and negatively with perceived thinness. Having competitive goals in sports was not independently associated with perceived fatness or perceived thinness.

**Conclusions:** Adolescents' BMI, appearance/weight motives to exercise, and perceived physical fitness were more strongly associated with body size perception than their competitive goals in sports. However, perceived fatness among girls with competitive goals in sports should be considered in organized sports.

**Keywords:** Body satisfaction, Organized youth sports, Competitive sports, Athlete, Cross-sectional

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## Background

Body image has been defined as an individual's thoughts, perceptions, feelings, and beliefs about his or her body [1]. Adolescence is a critical period for body image development because of the various physical, psychological,



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and sociocultural changes occurring during that period [2]. The prevalence of adolescents' body weight dissatisfaction has been shown to range between 18 and 57% [3]. Body dissatisfaction is mainly thought to originate from pressures to comply with sociocultural ideals of appearance that are virtually unattainable for most as well as internalization of these ideals [2, 4]. Increased body dissatisfaction weakens self-esteem and has been associated with the development of eating disorders and extreme weight-loss behaviours [5, 6].

According to a recent meta-analysis among females, athletes have lower levels of body dissatisfaction than non-athletes [7]. A previous meta-analysis proposed athletes' lower body image disturbance be due to athletes resembling the cultural aesthetic ideal more than non-athletes or due to the positive effect of physical activity on self-esteem [8]. Higher levels of functionality appreciation among athletes than non-athletes can also explain their more positive body image [9]. Despite of lower body dissatisfaction, the prevalence of eating disorders has been reported to be higher among elite athletes than adolescents and adults in general [10]. Differences in disordered eating behaviour have been suggested to relate to, for example, athletes' personality, such as high achievement orientation and perfectionism, and coaching behaviours [11, 12].

Findings on athletes' body image have varied between competition levels and sport types [13–15]. Competitive athletes can experience the same pressures to reach body ideals than non-athletes, but also have coach and uniform pressures and teammate influences on body image [15, 16]. Highly competitive female athletes may also be more likely to struggle with achieving both athletic and thin body ideals [13]. However, only few studies have focused on adolescent sport participants' body image and the findings are inconclusive [17–19]. One recent study found that adolescents' sports participation was related to higher body image satisfaction, but differences were not found between competitive athletes, leisure athletes, and non-athletes in body size perception (BSP) [18].

Sport specialization and assessment of the desired level of competition are usually topical in adolescence. Although findings on athletes' body image have varied by competition level [13, 15], the role of competitive goals in adolescent sports club participants' BSP has not previously been examined. Furthermore, despite adolescence is a pivotal stage in body image development, most of the studies concerning athletes' body image and competition level have been conducted in older adolescents or adults [13, 15].

The present study aimed to examine the factors associated with adolescents' competitive goals in sports and BSP as well as the associations between adolescents'

competitive goals in sports and BSP among a representative sample of Finnish sports club participants and non-participants. It was hypothesized that adolescent sports club participants with competitive goals in sports are more likely to perceive themselves as about the right size than non-goal-oriented sports club participants and non-participants.

## Methods

### Study setting and design

This cross-sectional study was part of the ongoing longitudinal Finnish Health Promoting Sports Club study [20]. The baseline data used in this study were collected in 2013–2014. The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was received from the Ethics Committee of Health Care District of Central Finland (record number 23 U/2012).

For the questionnaire data, written informed consent was received from the participating youth and their guardians were informed about their child's participation in the study. According to the approval of the Ethics Committee of Health Care District of Central Finland, written or verbal consent was not required from the guardians for the questionnaire data. For the accelerometer-measured physical activity data, written informed consent was obtained from a guardian and the adolescent him/herself.

The study protocol has been described in detail earlier [20]. In short, sports club participants were recruited via sports clubs in two stages. First, the clubs were stratified depending on 1) winter and summer sports (according to the main competition season) and team and individual sports, and 2) club's magnitude, geographical location, area type, and certification by the Young Finland Association. Ten most popular sports disciplines in Finland were included in the study: basketball, cross-country skiing, floorball, gymnastics, ice hockey, orienteering, skating, soccer, swimming, and track and field. Twenty-four sports clubs from each of the sports disciplines were targeted and 156 clubs took part.

In the second stage, sports club participants aged 14–16 years were invited to the study. Individual sports participants were randomly selected from name lists provided by clubs. Of the team sports clubs, one team was randomly chosen, and the researchers randomly selected the individuals from team participant name lists. In total, 1889 sports club participants were invited and 759 (40%) of them completed the study questionnaire.

Similarly, the age-matched sample of non-participants was collected via schools in two stages. First, ten secondary schools from each of six different areas in Finland were targeted, and the schools were stratified depending on school's magnitude and area type. Second, one



randomly selected class of ninth graders from each school was asked to respond to the questionnaire. Overall, 2074 pupils were invited from one hundred schools and 1650 (80%) of them responded to the study questionnaire.

Adolescents with missing information about age, who were not 14–16 years old, who had inadequate information about weight or height, or who had contradicting answers regarding sports club participation, duplicate answers, improper answers, or who forbade the use of data for research were removed from the data (166 sports club participants and 285 pupils). The school-based sample included both sports club participants and non-participants. The questionnaire of the school-based sample did not include the competitive goal question. Hence, pupils participating in sports clubs ( $n=547$ ) were not included.

In total, 593 adolescents via sports clubs and 818 adolescents via schools participated in the study. Sports club participants who did not have competitive goals in sports ( $n=118$ ) were included in the reference group in the analyses. Therefore, the competitive goals in sports (CGS) group comprised 475 participants and the reference group consisted of 936 participants.

### Study questionnaire

The data were collected using two Internet-based questionnaires. Sports club participants replied to the questionnaire on their spare time and pupils in class during a school day. Whether participants had competitive goals in sports were assessed by the question: “What is your competitive goal as an athlete?” Adolescents who aimed to succeed in junior competitions (at the regional, national, or international level) or adult competitions (at the international or national level) were considered as the CGS group. Those who replied that “I have no competitive goals, I exercise to develop in sports” or “I have no competitive goals, I exercise in a recreational sense” formed the reference group.

Body size perception was assessed with the question described in the Health Behaviour in School-aged Children study [21]: “Do you think your body is [much too thin / a bit too thin / about the right size / a bit too fat / much too fat]?” The test-retest stability of the question has been good among Finnish adolescents [22]. The initial variable with five categories was re-coded into a three-class variable, where the “a bit too thin” and “too thin” categories and the “a bit too fat” and “too fat” categories were combined. “Too thin” and “too fat” were considered as the examined responses and “about the right size” was a reference category.

The motives to exercise were investigated by a modified version of the Nigg’s questionnaire [23]: “Are the following issues important for your exercising [not important

/ somewhat important / very important]?” The answers were re-coded into binomial variables with answer options “very or somewhat important” and “not important”. The motives to exercise were categorized into four categories [24, 25]:

- *appearance/weight* (to look good, to control weight, to lose weight)
- *health/fitness* (to improve health, to improve physical fitness, to gain muscle)
- *social* (to win, to be good in sports, to make new friends, to meet my friends, to please my parents, to be “cool”)
- *enjoyment* (to have fun, to appreciate the sensations during exercise, exercise is exhilarating)

For further analysis, initial responses were scored as: not important=0, somewhat important=1, and very important=2. The values were summed (range 0–12 for social motives and 0–6 for other motives) and a higher score indicated a higher motive.

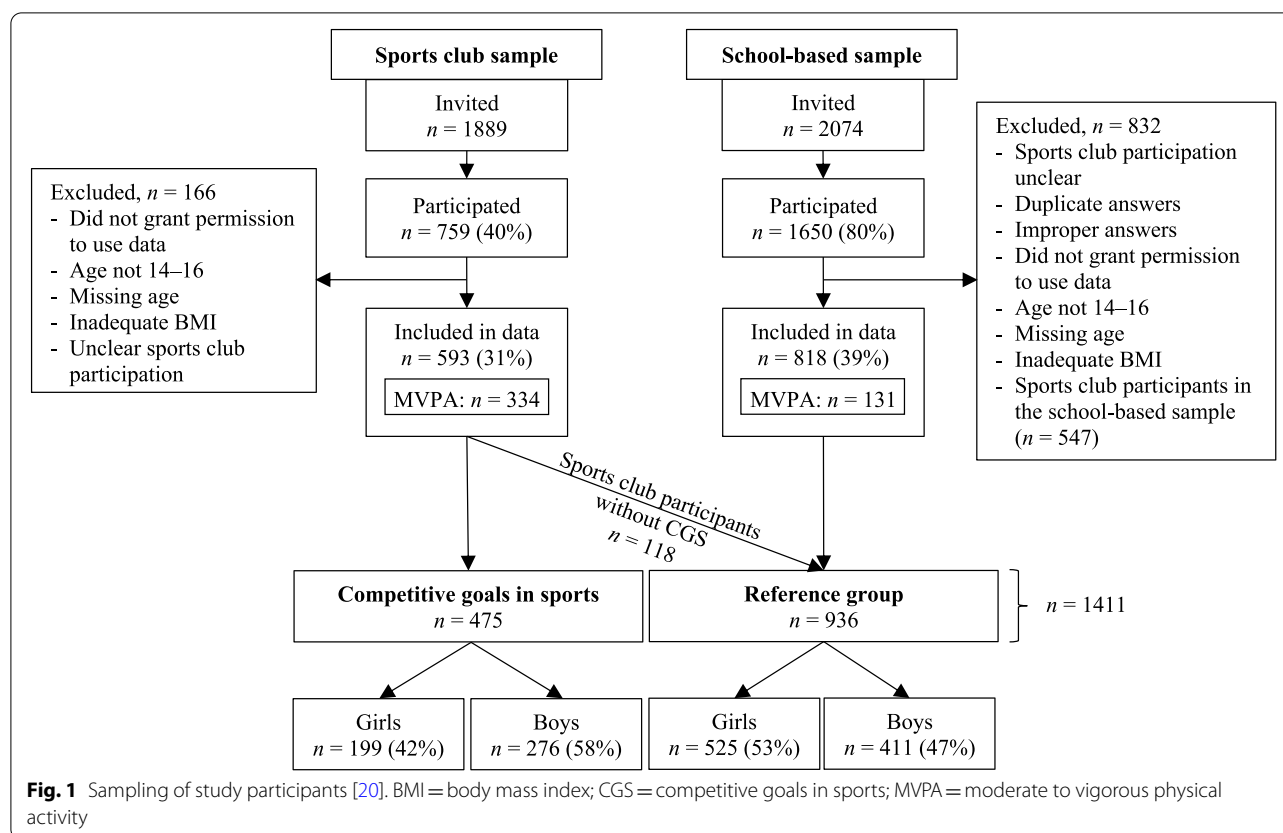
Self-rated health and perceived physical fitness were separately assessed by the question: “Would you say your health/physical fitness is... [excellent / good / fair / poor]?” The responses were dichotomized as “good” (excellent/good) and “poor” (fair/poor). BMI was calculated from self-reported height and weight data. Age- and sex-specific cut-off points for adolescents’ BMI were based on the international growth reference data [26, 27]. Cut-off points for underweight individuals were set for BMI < 17 kg/m<sup>2</sup>, for normal weight at BMI = 17–25 kg/m<sup>2</sup>, and for overweight at BMI > 25 kg/m<sup>2</sup>.

### Accelerometer-measured physical activity

Moderate to vigorous physical activity (MVPA) was measured from a randomly selected sample of sports club participants ( $n=334$ ) and non-participants ( $n=131$ ) (Fig. 1). Adolescents were instructed to use a hip-worn, light tri-axial accelerometer (AM20 Activity Meter, Hookie Technologies Ltd., Helsinki, Finland) for seven consecutive days during waking hours with the exception of during shower or water activities. Swimmers ( $n=31$ ) were excluded as they were unable to use the accelerometer during water activities. The device has been shown to be a valid measurement tool for continuous monitoring of physical activity among both youths [28] and adults [29, 30].

The tri-axial data were collected with a sampling frequency of 100 Hz. The mean amplitude deviation (MAD) of the resultant was analysed in 6 s epoch length and converted to metabolic equivalents (MET). Cut-points were set as 3.0–6.0 MET for moderate activity and over 6.0 MET for vigorous activity. The





mean daily moderate and vigorous activities were summed to obtain the amount of MVPA.

### Statistical analyses

All the statistical analyses were stratified by gender. The descriptive analyses were performed using cross-tabulation and  $\chi^2$  test for categorical variables. For continuous normally distributed variables, the independent samples  $t$  test and one-way ANOVA were used. For non-normally distributed variables, Mann Whitney U test and Kruskal-Wallis test were employed. The multinomial logistic regression models were built to assess the associations between competitive goals in sports and BSP: “too fat” and “too thin” were used as the examined responses and “about the right size” was a reference category. The models were controlled for competitive goals in sports, BMI, perceived physical fitness, self-rated health, appearance/weight motives, enjoyment motives, health/fitness motives, social motives, and MVPA. Statistical analyses were performed using SPSS version 25 (Armonk, New York, IBM Corp.). The significance level was set at  $p < 0.05$ .

## Results

### Competitive goals in sports

We compared adolescent competitive goal-oriented sports club participants ( $n = 475$ ) to the reference group including non-goal-oriented sports club participants ( $n = 118$ ) and non-sports club participants ( $n = 818$ ). Adolescents in the competitive goals in sports (CGS) group and in the reference group were of similar age, weight, and height, except CGS girls were taller than other girls (Table 1). CGS youths were more likely to perceive their health and physical fitness as good and had higher accelerometer-measured MVPA than reference youths.

CGS youths were more likely to perceive themselves as about the right size than reference youths, whereas the proportion of normal weight adolescents was similar between the groups. Adolescents in the CGS group were less likely to perceive themselves as too fat and less frequently overweight compared with the reference group. There was no difference between the CGS and reference groups in those perceiving themselves as too thin.

Among girls, the ratio of perceived fatness and being overweight was higher in the CGS group than it was in the reference group (4.2 vs 2.7, respectively). More than



**Table 1** Characteristics of the study groups by competitive goals in sports

Characteristics	Girls (n = 724)				Boys (n = 687)			
	CGS (n = 199)		RG (n = 525)		CGS (n = 276)		RG (n = 411)	
Age (years), mean (SD)	14.9	(0.7)	14.9	(0.5)	15.0	(0.5)	15.0	(0.5)
Weight (kg), mean (SD)	58.1	(7.7)	57.5	(11.0)	64.4	(9.3)	65.2	(11.5)
Height (cm), mean (SD)	166.8	(6.4)	164.9	(6.2)***	175.2	(7.3)	174.6	(7.8)
BMI (kg/m <sup>2</sup> ), mean (SD)	20.8	(2.1)	21.1	(3.5)	20.9	(2.2)	21.4	(3.2)*
Normal BMI <sup>a</sup> , n (%)	185	(93.0)	429	(81.7)	243	(88.0)	318	(77.4)
BMI < 17 <sup>a</sup> , n (%)	1	(0.5)	7	(1.3)	0	(0.0)	1	(0.2)
BMI > 25 <sup>a</sup> , n (%)	13	(6.5)	89	(17.0)***	33	(12.0)	92	(22.4)**
Self-rated good health, n (%)	191	(96.0)	407	(77.5)***	272	(98.6)	340	(82.7)***
Perceived good physical fitness, n (%)	181	(91.0)	272	(51.8)***	265	(96.0)	284	(69.1)***
MVPA (min/d) <sup>b</sup> , mean (SD)	83	(27)	60	(21)***	104	(33)	74	(32)***
<i>Body size perception</i>								
About the right size, n (%)	135	(67.8)	244	(46.5)***	204	(73.9)	250	(60.8)***
Too thin, n (%)	10	(5.0)	39	(7.4)	56	(20.3)	74	(18.0)
Too fat, n (%)	54	(27.1)	242	(46.1)***	16	(5.8)	87	(21.2)***
<i>Motives to exercise</i>								
Appearance/weight motives, median (IQR)	3.0	(3.0)	4.0	(3.0)***	2.0	(2.0)	3.0	(2.0)
Health/fitness motives, median (IQR)	5.0	(2.0)	5.0	(2.0)*	5.0	(2.0)	4.0	(3.0)***
Social motives, median (IQR)	7.0	(3.0)	5.0	(3.0)***	7.0	(3.0)	6.0	(3.0)***
Enjoyment motives, median (IQR)	6.0	(1.0)	4.0	(3.0)***	5.0	(2.0)	4.0	(2.0)***

BMI body mass index, CGS competitive goals in sports, IQR interquartile range, MVPA moderate to vigorous physical activity, RG reference group

<sup>a</sup> Classification based on the international BMI cut-off points [26, 27]

<sup>b</sup> Measured using a accelerometer from a randomly selected sample of adolescents (241 girls and 193 boys)

P values are presented for differences between CGS and reference groups: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

one-fourth of girls with CGS perceived themselves as too fat, although only 7% of them were actually overweight. In the reference group, about half of girls perceived fatness and 17% were overweight. Among boys, the ratio was lower in the CGS group compared with the reference group (0.5 vs 0.9, respectively). None of the boys with competitive goals in sports were underweight, but every fifth boy perceived himself as too thin. In terms of motives to exercise, CGS youths more frequently reported health/fitness, social, and enjoyment motives, and fewer CGS youths than reference youths exercised to lose weight in both genders (Supplementary Table 1).

### Body size perception

Girls perceived their body as about the right size less often than boys (52% vs 66%,  $p < 0.001$ ) and were more likely to consider themselves too fat (41% vs 15%,  $p < 0.001$ ; Table 2). Most girls who did not perceive themselves as about the right size considered themselves too fat (86%), whereas boys with body size dissatisfaction more equally perceived fatness or thinness (44 and 56%, respectively).

BMI increased according to body size perception categories. The adolescents who perceived their body

too fat more often rated their health and physical fitness as being poor than did those who perceived their bodies to be about the right size. Perceived fatness was also negatively associated with MVPA. Perceived fatness was associated with greater emphasis on exercise for appearance/weight management and smaller importance placed on enjoyment motives. Adolescents who perceived themselves too thin less frequently self-rated their health as good and exercised to lose or control weight (Supplementary Table 2).

### Multivariable models

Perceived fatness was positively associated with BMI and appearance/weight motives to exercise, and negatively with perceived physical fitness among all participants (Table 3). In addition, girls who perceived themselves as too fat were less likely to have health/fitness motives to exercise. Perceived thinness was negatively associated with BMI. Having competitive goals in sports was not associated with perceived fatness ( $p = 0.53$  in girls;  $p = 0.11$  in boys) or perceived thinness ( $p = 0.77$  in girls;  $p = 0.52$  in boys).



**Table 2** Characteristics of the study participants by body size perception

Characteristics	Girls (n = 724)						Boys (n = 687)					
	Too thin <sup>a</sup>		About the right size		Too fat <sup>b</sup>		Too thin <sup>a</sup>		About the right size		Too fat <sup>b</sup>	
	49	(6.8)	379	(52.3)	296	(40.9)	130	(18.9)	454	(66.1)	103	(15.0)
BMI (kg/m <sup>2</sup> ), mean (SD)	18.0	(2.2)***	20.0	(2.0)	22.8	(3.6)***	19.5	(2.0)***	20.9	(2.2)	24.4	(3.4)***
BMI < 17 <sup>c</sup> , n (%)	6	(12.2)***	2	(0.5)	0	(0.0)	1	(0.8)	0	(0.0)	0	(0.0)
Normal BMI <sup>c</sup> , n (%)	42	(85.7)	359	(94.7)	213	(72.0)	122	(93.8)	397	(87.4)	42	(40.8)
BMI > 25 <sup>c</sup> , n (%)	1	(2.0)	18	(4.7)	83	(28.0)***	7	(5.4)*	57	(12.6)	61	(59.2)***
Competitive goals in sports, n (%)	10	(20.4)*	135	(35.6)	54	(18.2)***	56	(43.1)	204	(44.9)	16	(15.5)***
Self-rated good health, n (%)	38	(77.6)*	350	(92.3)	210	(70.9)***	114	(87.7)*	423	(93.2)	75	(72.8)***
Perceived good physical fitness, n (%)	30	(61.2)*	288	(76.0)	135	(45.6)***	105	(80.8)	396	(87.2)	48	(46.6)***
MVPA (min/d) <sup>d</sup> , mean (SD)	81	(26)	75	(27)	65	(25)*	92	(38)	97	(34)	63	(28)**
<i>Motives to exercise</i>												
Appearance/weight motives, median (IQR)	2.0	(3.0)	3.0	(2.0)	5.0	(2.0)***	2.0	(2.0)*	2.0	(2.0)	3.0	(2.0)***
Health/fitness motives, median (IQR)	5.0	(3.0)	5.0	(1.0)	5.0	(2.0)	5.0	(3.0)	5.0	(2.0)	4.0	(3.0)
Social motives, median (IQR)	6.0	(3.0)	6.0	(3.0)	5.0	(3.0)	6.0	(4.0)	6.0	(3.0)	6.0	(4.0)**
Enjoyment motives, median (IQR)	4.0	(3.0)	5.0	(2.0)	4.0	(3.0)**	5.0	(3.0)	5.0	(2.0)	4.0	(2.0)**

BMI body mass index, BSP body size perception, IQR interquartile range, MVPA moderate to vigorous physical activity

<sup>a</sup> P values for difference between the groups "too thin" and "about right size": \* $p < 0.05$ , \*\*\* $p < 0.001$

<sup>b</sup> P values for difference between the groups "too fat" and "about right size": \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

<sup>c</sup> Classification based on the international BMI cut-off points [26, 27]

<sup>d</sup> Measured using a accelerometer from a randomly selected sample of adolescents (241 girls and 193 boys)

**Table 3** Multinomial logistic regression models for (a) girls and (b) boys on the body size perception

	Perceived thinness		Perceived fatness	
<b>a) Girls (n = 724)</b>				
Variable	OR	95% CI <sup>a</sup>	OR	95% CI <sup>a</sup>
Competitive goals in sports, yes vs no	0.88	0.38–2.06	0.86	0.53–1.39
BMI	0.56	0.45–0.70***	1.36	1.25–1.48***
Appearance/weight motives, per unit increase <sup>b</sup>	0.92	0.74–1.16	2.22	1.88–2.64***
Perceived physical fitness, good vs poor	0.57	0.28–1.17	0.30	0.19–0.47***
Health/fitness motives, per unit increase <sup>b</sup>	1.04	0.80–1.35	0.76	0.63–0.91**
<b>b) Boys (n = 687)</b>				
Variable	OR	95% CI <sup>a</sup>	OR	95% CI <sup>a</sup>
Competitive goals in sports, yes vs no	1.16	0.74–1.80	0.58	0.29–1.14
BMI	0.69	0.62–0.78***	1.46	1.31–1.61***
Appearance/weight motives, per unit increase <sup>b</sup>	0.90	0.75–1.07	1.58	1.26–1.99***
Perceived physical fitness, good vs poor	0.60	0.34–1.07	0.20	0.11–0.36***
Health/fitness motives, per unit increase <sup>b</sup>	1.05	0.88–1.25	0.82	0.64–1.04

"About the right size" was the reference category. The models were controlled for competitive goals in sports, BMI, perceived physical fitness, self-rated health, appearance/weight motives, enjoyment motives, health/fitness motives, social motives, and moderate to vigorous physical activity

BMI body mass index, CI confidence interval, OR odds ratio

<sup>a</sup> Significance of the OR: \*\* $p < 0.01$  and \*\*\* $p < 0.001$

<sup>b</sup> Range between 0 and 6, a higher score indicating greater emphasis

## Discussion

In this study, competitive goal-oriented adolescents more frequently perceived their body as about the right size, perceived their physical fitness as higher, and rated

their overall health as better than that of adolescents in the reference group. In multivariable analyses, competitive goals in sports were not associated with BSP. After adjustments, those with appearance/weight motives to



exercise and poor perceived physical fitness had higher odds of having a perception of a too fat body. Additionally, BMI was positively associated with perceived fatness and negatively with perceived thinness.

To our knowledge, this is the first study concerning associations between adolescents' competitive goals in sports and BSP. One recent study observed that adolescents in competitive sports had greater body appreciation and lower body dissatisfaction than non-athletes [18]. The authors found no difference between competitive athletes and leisure exercisers, and BSP did not differ between young competitive athletes, leisure athletes, and non-athletes [18]. Due to different measures, these previous findings cannot be directly compared with our results, but they are in line with the suggestion that adolescents' BSP is mainly determined by other factors than having competitive goals in sports.

In accordance with a previous meta-analysis [8], our findings suggest that it is not having competitive goals, but rather the accompanying leanness and/or fitness that mediate the lower body image disturbance in competitive goal-oriented athletes than others. In addition, our results support the previous findings among adolescents on the association between higher BMI and body dissatisfaction [4, 31]. Gender differences have also been reported: the association between BMI and body dissatisfaction has been suggested to be linear in girls and U-shaped in boys [32]. We found that BMI was inversely associated with perception of a too thin body among both genders. Our finding is in line with a recent study which found that Finnish adolescents with thinness were more likely to wish for a bigger body than their normal-weight peers [33].

Perceived good physical fitness and health were more frequent among adolescents who perceived their body to be about the right size, and nearly all adolescents with competitive goals in sports self-reported good health and fitness. These findings are consistent with previous studies that have reported a relationship between poor perceived health and body dissatisfaction in adolescence [34]. Body and weight dissatisfaction does not seem to motivate healthy weight-management behaviours, but rather motivates unhealthy ones, such as disordered eating and lower levels of exercise and physical activity [35–37]. Our finding supports the current research among adults suggesting that perceived physical fitness is related to body image, and the association between physical activity and body image would be mediated via better perceived physical fitness [38].

Appearance and weight-related reasons to exercise have previously been associated with higher body dissatisfaction in adolescents and adults [39, 40]. In this study, adolescents with competitive goals in sports generally

reported more importance placed on motives to exercise on nearly all measures, excluding weight control motives. Appearance and weight management as exercise motives were also positively associated with perceived fatness. This association remained in logistic regression analyses and was therefore found to exist independent of BMI as well. Additionally, girls who exercised to improve their health and physical fitness had lower odds of perceived fatness. One previous study among adolescents found no association between body dissatisfaction and positive reasons to exercise, such as improve health and body fitness, but girls and boys were analysed together [39].

Adolescents who had competitive goals in sports had higher MVPA than youths in the reference group, which may have confounded the association between having competitive goals in sports and BSP. After adjustments, physical activity was no longer associated with BSP in this study. It appears that among competitive goal-oriented adolescents, the actual weight status, perceived physical fitness, and appearance and weight-related motives to exercise also determine BSP more strongly than the amount of physical activity. A previous study among Finnish adolescents [36] also found that physical activity was not related to weight dissatisfaction among girls, but boys who were more physically inactive were more dissatisfied with their weight.

Fourteen percent of the girls were overweight in this study but half of the girls felt they were too fat. The ratio of perceived fatness and being overweight was higher among girls with competitive goals in sports than it was in the reference girls. This might suggest that although competitive goal-oriented girls generally view their weight more positively, they also experience more pressure to reach a certain leanness/fitness level or they may have a stricter body ideal. These findings are in line with the previous studies [13, 15], where body dissatisfaction was positively associated with competition level among collegiate female athletes. A similar effect was not found among boys in our study.

The strength of this study is that it is the first to evaluate the associations between adolescents' competitive goals in sports and BSP among a representative sample of Finnish sports club participants and non-participants. The study contributes to our understanding of BSP among mid-adolescent athletes, whereas most previous studies on athletes' body image have been conducted among older adolescents or adults. There are also some limitations in the present study. First, our study design was cross-sectional and does not allow differentiation between causes and consequences.

Second, our analysis was mainly based on self-report questionnaire data, where a large proportion of invited adolescents (60% of the sports club sample and 20% of



the school-based sample) did not participate in the study. We have no details on non-respondents, but one previous Finnish study on adolescents' weight perception [36] has suggested that adolescents who did not participate in the study were more often boys from families with low socioeconomic status, and therefore, boys' body size dissatisfaction might be underreported.

Third, single-item measures were used both for competitive goals and BSP that might have simplified those complex constructs. Due to the diversity of goal orientations and BSPs, we recommend using validated questionnaires in future studies. Fourth, sports types, such as leanness-focused and non-leanness-focused sports, were not differentiated in this study. In future, the possible associations between various types of physical activity and adolescents' BSP should be examined.

## Conclusions

BMI, importance placed on appearance/weight motives to exercise, and poor perceived physical fitness were more strongly associated with adolescents' BSP than having competitive goals in sports. Perceived fatness in relation to being overweight was common among girls with competitive goals in sports that should be considered in youth organized sports. The role of competitive sports participation for body image development needs to be examined in qualitative and prospective studies using validated measures, especially in girls.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-022-14511-z>.

**Additional file 1: Supplementary Table 1.** Motives to exercise by competitive goals in sports. **Supplementary Table 2.** Motives to exercise by body size perception.

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## Authors' contributions

SK and JP coordinated and managed all parts of the study. LM and LH carried out the literature search. SK and JV conducted data collection and performed preliminary data preparations. LM and LH conducted data analyses, and all of the authors contributed to the interpretation of data. LM, LH, MV, and RK wrote the first draft of the paper, and all authors provided substantive feedback on the paper and contributed to the final manuscript. All authors read and approved the final manuscript.

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## Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

Ethics approval was received from the Ethics Committee of Health Care District of Central Finland (record number 23 U/2012). All the participants gave their written consent to the study.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

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## References

- Grogan S. Body image: understanding body dissatisfaction in men, women, and children. 2nd ed. London and New York: Routledge; 2008.
- Voelker DK, Reel JJ, Greenleaf C. Weight status and body image perceptions in adolescents: current perspectives. *Adolesc Health Med Ther*. 2015;6:149–58.
- San Martini MC, Assumpção D, Barros MBA, Mattei J, Barros Filho AA. Prevalence of body weight dissatisfaction among adolescents: a systematic review. *Rev Paul Pediatr*. 2022;41:e2021204.
- Knauss C, Paxton SJ, Alsaker FD. Relationships amongst body dissatisfaction, internalisation of the media body ideal and perceived pressure from media in adolescent girls and boys. *Body Image*. 2007;4:353–60.
- van den Berg PA, Mond J, Eisenberg M, Ackard D, Neumark-Sztainer D. The link between body dissatisfaction and self-esteem in adolescents: similarities across gender, age, weight status, race/ethnicity, and socioeconomic status. *J Adolesc Health*. 2010;47:290–6.
- Shagar PS, Harris N, Boddy J, Donovan CL. The relationship between body image concerns and weight-related behaviours of adolescents and emerging adults: a systematic review. *Behav Chang*. 2017;34:208–52.
- Chapa DAN, Johnson SN, Richson BN, Bjorlie K, Won YQ, Nelson SV, et al. Eating-disorder psychopathology in female athletes and non-athletes: a meta-analysis. *Int J Eat Disord*. 2022;55:861–85.
- Hausenblas HA, Downs DS. Comparison of body image between athletes and nonathletes: a meta-analytic review. *J Appl Sport Psychol*. 2001;13:323–39.
- Soulliard ZA, Kauffman AA, Fitterman-Harris HF, Perry JE, Ross MJ. Examining positive body image, sport confidence, flow state, and subjective



- performance among student athletes and non-athletes. *Body Image*. 2019;28:93–100.
10. Sundgot-Borgen J, Torstveit MK. Prevalence of eating disorders in elite athletes is higher than in the general population. *Clin J Sport Med*. 2004;14:25–32.
  11. Donti O, Donti A, Gaspari V, Pleksida P, Psychountaki M. Are they too perfect to eat healthy? Association between eating disorder symptoms and perfectionism in adolescent rhythmic gymnasts. *Eat Behav*. 2021;41:101514.
  12. Bratland-Sanda S, Sundgot-Borgen J. Eating disorders in athletes: overview of prevalence, risk factors and recommendations for prevention and treatment. *Eur J Sport Sci*. 2013;13:499–508.
  13. Varnes JR, Stellefson ML, Janelle CM, Dorman SM, Dodd V, Miller MD. A systematic review of studies comparing body image concerns among female college athletes and non-athletes, 1997–2012. *Body Image*. 2013;10:421–32.
  14. Kantanista A, Glapa A, Banio A, Firek W, Ingarden A, Malchrowicz-Moško E, et al. Body image of highly trained female athletes engaged in different types of sport. *Biomed Res Int*. 2018;2018:6835751.
  15. Kong P, Harris LM. The sporting body: body image and eating disorder symptomatology among female athletes from leanness focused and nonleanness focused sports. *Aust J Psychol*. 2015;149:141–60.
  16. Reel JJ, Soohoo S, Petrie TA, Greenleaf C, Carter JE. Slimming down for sport: developing a weight pressures in sport measure for female athletes. *J Clin Sport Psychol*. 2010;4:99–111.
  17. Dyremyhr ÅE, Diaz E, Meland E. How adolescent subjective health and satisfaction with weight and body shape are related to participation in sports. *J Environ Public Health*. 2014;2014:851932.
  18. Jankauskiene R, Baceviciene M. Body image and disturbed eating attitudes and behaviors in sport-involved adolescents: the role of gender and sport characteristics. *Nutrients*. 2019;11:3061.
  19. Tebar WR, Gil FCS, Werneck AO, Delfino LD, Santos Silva DA, Christofaro DGD. Sports participation from childhood to adolescence is associated with lower body dissatisfaction in boys — a sex-specific analysis. *Matern Child Health J*. 2021;25:1465–73.
  20. Kokko S, Selänne H, Alanko L, Heinonen OJ, Korpelainen R, Savonen K, et al. Health promotion activities of sports clubs and coaches, and health and health behaviours in youth participating in sports clubs: the Health Promoting Sports Club study. *BMJ Open Sport Exerc Med*. 2015;1:e000034.
  21. Inchley J, Currie D, Cosma A, Samdal O. Health Behaviour in School-Aged Children (HBSC) study protocol: background, methodology and mandatory items for the 2017/18 survey. St Andrews; 2018. <http://www.hbsc.org/>
  22. Ojala K, Tynjälä J, Välimaa R, Villberg J, Kannas L. Overweight adolescents' self-perceived weight and weight control behaviour: HBSC study in Finland 1994–2010. *J Obes*. 2012;2012:180176.
  23. Nigg C, Rossi J, Norman G, Benisovich S. Structure of decisional balance for exercise adoption. *Ann Behav Med*. 1998;20:211.
  24. Markland D, Ingledew DK. The measurement of exercise motives: factorial validity and invariance across gender of a revised exercise motivations inventory. *Br J Health Psychol*. 1997;2:361–76.
  25. Ingledew DK, Markland D. The role of motives in exercise participation. *Psychol Health*. 2008;23:807–28.
  26. Cole TJ, Bellizzi MC, Flegal KM, Dietz WH. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*. 2000;320:1240–3.
  27. Cole TJ, Flegal KM, Nicholls D, Jackson AA. Body mass index cut offs to define thinness in children and adolescents: international survey. *BMJ*. 2007;335:194.
  28. Aittasalo M, Vähä-Ypyä H, Vasankari T, Husu P, Jussila AM, Sievänen H. Mean amplitude deviation calculated from raw acceleration data: a novel method for classifying the intensity of adolescents' physical activity irrespective of accelerometer brand. *BMC Sports Sci Med Rehabil*. 2015;7:18.
  29. Vähä-Ypyä H, Husu P, Suni J, Vasankari T, Sievänen H. Reliable recognition of lying, sitting, and standing with a hip-worn accelerometer. *Scand J Med Sci Sports*. 2018;28:1092–102.
  30. Vähä-Ypyä H, Vasankari T, Husu P, Mänttari A, Vuorimaa T, Suni J, et al. Validation of cut-points for evaluating the intensity of physical activity with accelerometry-based mean amplitude deviation (MAD). *PLoS One*. 2015;10:e0134813.
  31. Buccianeri MM, Arikian AJ, Hannan PJ, Eisenberg ME, Neumark-Sztainer D. Body dissatisfaction from adolescence to young adulthood: findings from a 10-year longitudinal study. *Body Image*. 2013;10:1–7.
  32. Austin SB, Haines J, Veugelers PJ. Body satisfaction and body weight: gender differences and sociodemographic determinants. *BMC Public Health*. 2009;9:313.
  33. Leppänen MH, Lehtimäki A-V, Roos E, Viljakainen H. Body mass index, physical activity, and body image in adolescents. *Children*. 2022;9:202.
  34. Meland E, Haugland S, Breidablik HJ. Body image and perceived health in adolescence. *Health Educ Res*. 2007;22:342–50.
  35. Mäkinen M, Puukko-Viertomies L-R, Lindberg N, Siimes MA, Aalberg V. Body dissatisfaction and body mass in girls and boys transitioning from early to mid-adolescence: additional role of self-esteem and eating habits. *BMC Psychiatry*. 2012;12:35.
  36. Mikkilä V, Lahti-Koski M, Pietinen P, Virtanen SM, Rimpelä M. Associates of obesity and weight dissatisfaction among Finnish adolescents. *Public Health Nutr*. 2003;6:49–56.
  37. Neumark-Sztainer D, Paxton SJ, Hannan PJ, Haines J, Story M. Does body satisfaction matter? Five-year longitudinal associations between body satisfaction and health behaviors in adolescent females and males. *J Adolesc Health*. 2006;39:244–51.
  38. Zamani Sani SH, Fathirezaie Z, Brand S, Pühse U, Holsboer-Trachsler E, Gerber M, et al. Physical activity and self-esteem: testing direct and indirect relationships associated with psychological and physical mechanisms. *Neuropsychiatr Dis Treat*. 2016;12:2617–25.
  39. Furnham A, Badmin N, Sneade I. Body image dissatisfaction: gender differences in eating attitudes, self-esteem, and reasons for exercise. *Aust J Psychol*. 2002;136:581–96.
  40. Panão I, Carraça E. Effects of exercise motivations on body image and eating habits/behaviours: a systematic review. *Nutr Diet*. 2020;77:41–59.

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