

## Original Article

# Perception of being “about right size” and high body satisfaction by BMI in adolescents

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## ABSTRACT

**INTRODUCTION.** The slim and muscular body ideals are well-established, and adolescence is a phase sensitive to developing negative body image. This study aimed to identify the BMI at which most adolescents 1) perceive themselves as being the right size and 2) experience high body satisfaction.

**METHODS.** Data from the Danish National Youth Study included 64,451 adolescents aged 15-19 years. Multilevel logistic regression using restricted cubic splines modelled associations between BMI, body size perception and body satisfaction.

**RESULTS.** The highest ORs for perceiving oneself as “about right size” and experiencing high body satisfaction were at BMIs of 19.0 kg/m<sup>2</sup> and 15.9 kg/m<sup>2</sup> in females, corresponding to the 21st and second percentiles of the BMI distribution. In males, the highest ORs were at BMIs of 22.2 kg/m<sup>2</sup> and 21.9 kg/m<sup>2</sup>, near the male median of 21.6 kg/m<sup>2</sup>. Significant variations in ORs for both body size perception and body satisfaction were observed across the entire BMI range, even within the healthy weight range of 18.5-24.9 kg/m<sup>2</sup>.

**CONCLUSIONS.** Among females, the perception of being “about right size” and experiencing high body satisfaction was most prevalent at BMIs well below the median, whereas for males, these perceptions were most common around the median. These findings strongly confirm that gender-specific body ideals are highly internalized, placing many adolescents at risk of developing a negative body image.

**TRIAL REGISTRATION** not relevant.

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Body image is a construct with multiple interrelated dimensions, encompassing perceptions about body size and shape, along with thoughts and emotions related to one’s own body and physical appearance, irrespective of objective measures of body size and shape [1]. Body image is of particular concern during adolescence, where worries about looks and body weight are prevalent, and the risk of developing a negative body image increases dramatically [2].

For males, it is a culturally defined ideal to attain muscularity, muscle tone and leanness [3], whereas thinness remains the culturally defined ideal for the female body shape [4]. This has also been shown experimentally. For example, one study engaged male and female participants in using an interactive software system to create visual representations of what they perceived to be the ideal male and female body. Subsequently, BMI representing these ideal bodies were estimated. Perceived physical attractiveness of women strongly and inversely correlated with BMI, with a BMI around 19 kg/m<sup>2</sup> being rated most attractively by both male and female participants [5]. Such body ideals are frequently portrayed in movies, commercials and social media. This

thin ideal can manifest as broader sociocultural appearance pressures from significant others and society in general [6] and individuals with higher weight often face both conscious and unconscious prejudices and discrimination. This is often based on the misconception that high body weight is primarily self-inflicted, leading to the attribution of negative qualities such as laziness and lack of self-discipline [7]. Such prejudices are present even in young children [8], and experiences of stigmatisation and the internalisation of body ideals increase the risk of developing a poor body image [9].

Interestingly, BMI of the idealised body contrasts with the generally accepted healthy BMI range of 18.5-24.9 kg/m<sup>2</sup>, as the idealised range covers only the very lower end of the healthy range. Disagreement between culturally defined body ideals and an individual's actual weight and body appearance has the potential to seriously harm body image, including their body size perception and body satisfaction [10]. As these body ideals are somewhat unrealistic, many adolescents across the BMI range are potentially at risk of experiencing such a disagreement. Regardless of an adolescent's actual weight status, body dissatisfaction and perceiving oneself as being too fat can be detrimental to mental health and well-being, including depression [11], disordered eating [12] and excessive school absenteeism [13].

Therefore, this study aimed to understand how adolescents' body size perception and body satisfaction vary across the BMI range. Specifically, we aimed to identify the BMI at which most adolescents aged 15-19 years 1) perceive their body size as appropriate and 2) experience high body satisfaction. By doing so, we will examine two different, although interrelated, dimensions of body image. We believe that this provides an important understanding of how different dimensions of body image vary across the BMI range.

## Methods

We used data from the Danish National Youth Study 2014, which is a large-scale and high-quality national survey that monitors the health, health behaviours and well-being of young people attending upper secondary education in Denmark [14]. All Danish high schools and 12 selected vocational schools were invited. In high schools, 87% (n = 119) of the invited schools participated. Among these, 96% (n = 3,214) of the high school classes participated, and 85% (n = 70,674) of the students participated. Among vocational schools, 83% (n = 10) of schools decided to participate, and in these schools, 69% (n = 5,179) of the students answered the survey. In total, 75,853 students participated by answering the survey, and almost all these participants were linked to their unique personal identification number (CPR). This enabled linkage to the Danish national registers.

### Study population

Eligible students for this study were those aged 15-19 years (n = 72,091). Among these, 7,640 were excluded due to missing information on one or more important variables. A total of 3,724 had missing information on BMI, 4,388 on parental educational level, 26 on ethnicity and 2,246 had missing information on both outcome measures. Thus, a total of 64,451 upper secondary students aged 15-19 years were included in the study.

### Measurements

#### *Exposure*

BMI was included as a continuous variable calculated from self-reported weight (in kg) divided by the squared self-reported height (in m).

#### *Outcomes*

Body size perception was measured using the question "Do you think your body is..." with the responses dichotomised into "too thin or too fat" (much too thin, too thin, too fat, much too fat) and "about right size"

(about right size). Body satisfaction was measured using the question, “On a scale from 1 (very unsatisfied) to 10 (very satisfied), how satisfied are you with your body?”, which was dichotomised into “low/medium body satisfaction” and “high body satisfaction”. High body satisfaction was defined as the upper quartile of the distribution. For male students, this corresponded to scores ranging from 8 to 10, for female students, 7-10.

## *Covariates*

The covariates included age (continuous), ethnicity (Danish, Danish and other, other), type of school (vocational school, high school, higher preparatory examination), school year (first, second, third) and the highest level of education attained by parents (elementary/short, medium, long).

## **Statistical analysis**

Logistic regression was used to examine the association between BMI and odds for high body satisfaction and perceiving oneself as “about right size”. Given the hierarchical data structure with participants being clustered within schools, we included school as a random effect in the statistical models. We modelled BMI continuously using restricted cubic splines [15], enabling description of fluctuations across the entire BMI range. From this modelling, we illustrated the OR for each of the two outcomes across the BMI range, with the sex-specific median BMI serving as the reference point. Analyses were stratified by sex due to gender differences in body size and ideals [5], and we adjusted for all the included covariates. All statistical analyses and data processing were performed in STATA 18.

## **Ethics**

Ethics approval was unnecessary under Danish law, but the study was approved by the Danish Data Protection Agency. By participating, students consented to using their data for research purposes. School coordinators gave oral information about the study, and the students received written information that participation was voluntary and that all data would be treated confidentially.

*Trial registration:* not relevant.

## **Results**

### **Population characteristics**

The study included a total of 64,451 participants with a median age of 17.8 years (**Table 1**), of whom 60% (n = 38,669) were female and 40% (n = 25,782) were male. The majority of participants were high school students (96%), identified as Danish (91%), and had parents whose highest level of education was elementary/short (39%) or medium (39%). The median BMI was 20.8 kg/m<sup>2</sup> for females and 21.6 kg/m<sup>2</sup> for males, serving as sex-specific reference points in all statistical analyses.

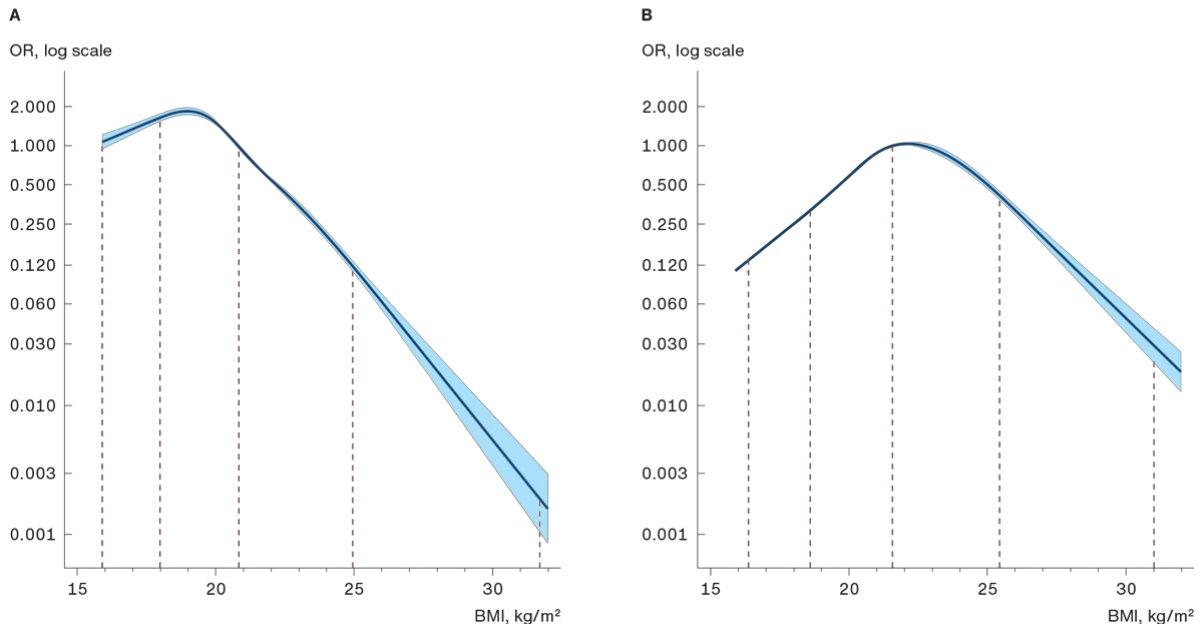
**TABLE 1** Population characteristics of included participants from the Danish National Youth Study (N = 64,451).

	<b>Females (n = 38,669)</b>	<b>Males (n = 25,782)</b>	<b>Total (N = 64,451)</b>
<i>Age, yrs</i>			
Median (IQR)	17.8 (17.1-18.5)	17.9 (17.1-18.6)	17.8 (17.1-18.6)
<i>School type, n (%)</i>			
High school	38,166 (99)	23,834 (92)	62,000 (96)
Vocational school	503 (1.3)	1,948 (7.6)	2,451 (3.8)
<i>Parental highest educational level, n (%)</i>			
Elementary/short	16,057 (42)	9,384(36)	25,441 (40)
Medium	14,939 (39)	9,947(39)	24,886 (39)
Long	7,673 (20)	6,451(25)	14,124 (22)
<i>Cohabitation, n (%)</i>			
Both parents	26,179 (68)	18,163 (70)	44,342 (69)
1 parent	10,156 (26)	6,192 (24)	16,348 (25)
Other	2,125 (5.5)	1,286 (5.0)	3,411 (5.3)
Missing	209 (0.5)	141 (0.5)	350 (0.5)
<i>Ethnicity, n (%)</i>			
Danish	35,360 (91)	23,086 (90)	58,446 (91)
Danish and other	866 (2.2)	854 (3.3)	1,720 (2.7)
Other	2,443 (6.3)	1,842 (7.1)	4,285 (6.6)
<i>BMI, kg/m<sup>2</sup></i>			
Median (IQR)	20.8 (19.3-22.8)	21.6 (20.0-23.4)	21.1 (19.5-23.1)

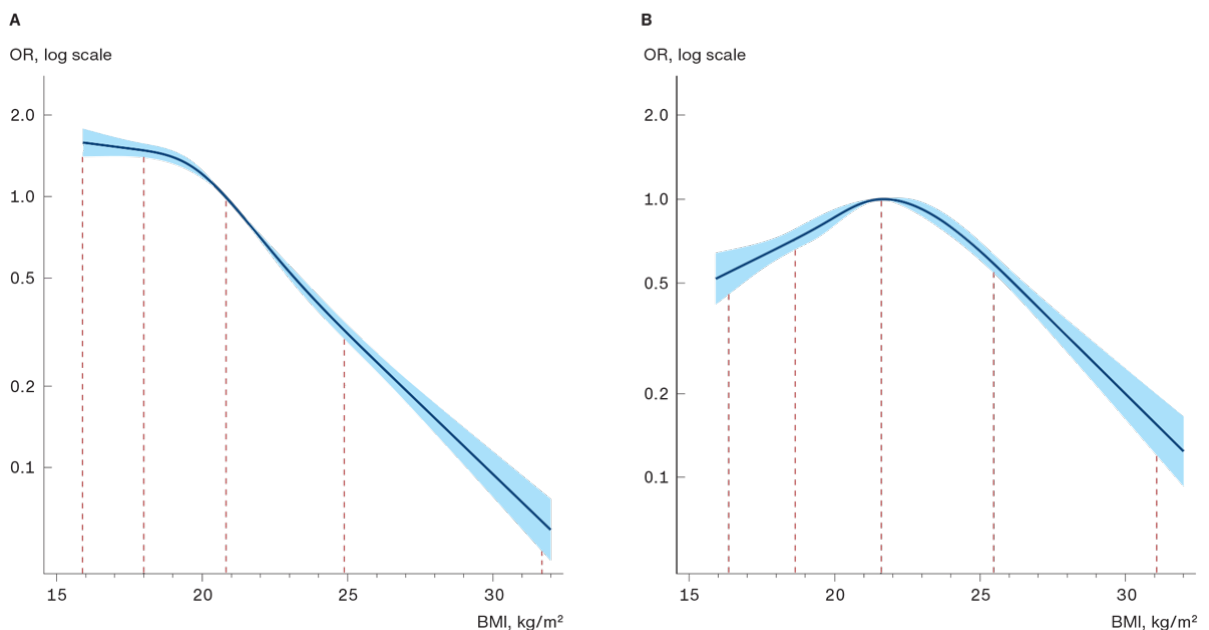
### Association between BMI, body size perception and body satisfaction

In females, the highest ORs for perceiving oneself as “about right size” and for having high body satisfaction were observed at the very lower end of the BMI range. Specifically, the ORs were highest at BMIs of 19.0 kg/m<sup>2</sup> (OR = 1.84, 95% confidence interval (CI): 1.73; 1.96) (Figure 1 A) and 15.9 kg/m<sup>2</sup> (OR = 1.58, 95% CI: 1.41; 1.78) (Figure 2 A). This corresponds to the 21st and second percentiles of the female BMI distribution.

**FIGURE 1** OR for perceiving oneself as “about the right size” in females (A) and males (B) with the median BMI as reference level. Red dashed lines represent the 1st, 10th, 50th, 90th and 99th percentiles of the BMI distribution. The solid blue line represents OR, and the blue shaded areas represent the 95% CI. The highest OR for perceiving oneself as “about right size” was observed at a BMI of 19.0 kg/m<sup>2</sup> in females and 22.2 kg/m<sup>2</sup> in males.



**FIGURE 2** OR for high body satisfaction in females (A) and males (B) with the median BMI as reference level. Red dashed lines represent the 1st, 10th, 50th, 90th and 99th percentiles of the BMI distribution. The solid blue line represents the OR, and the blue shaded area represents the 95% confidence interval. The highest OR for high body satisfaction was observed at a BMI of 15.9 kg/m<sup>2</sup> in females and 21.9 kg/m<sup>2</sup> in males.



In contrast, in male students, we observed an inverted U-shaped association between BMI and OR for perceiving oneself as “about right size” (Figure 1 B) and high body satisfaction (Figure 2 B). For both measures, the highest OR was observed at BMI values in near proximity to the male median BMI. Specifically, the OR for perceiving oneself as “about right size” was highest at a BMI of 22.1 kg/m<sup>2</sup> (OR = 1.04, 95% CI: 1.01; 1.06) and for high body

satisfaction at the male median BMI of 21.6 kg/m<sup>2</sup> (OR = 1.00, reference). This corresponds to the 59th and 50th percentiles of the male BMI distribution.

Large variations in OR for perceiving oneself as “about right size” and for having high body satisfaction were observed across the entire BMI range, with a higher BMI being associated with lower odds for perceiving oneself as “about right size” and having high body satisfaction. In both females and males, the lowest OR for perceiving oneself as being “about right size” and experiencing high body satisfaction was observed in students with the highest BMIs. Compared to the sex-specific median BMI, the OR for perceiving oneself as being “about right size” and experiencing high body satisfaction were 0.002 (95% CI: 0.001; 0.003) and 0.06 (95% CI: 0.05; 0.08) in female students with a BMI of 32.0 kg/m<sup>2</sup>, and 0.02 (95% CI: 0.01; 0.03) and 0.12 (95% CI: 0.09; 0.17) in male students with a BMI of 32.0 kg/m<sup>2</sup>.

While the lowest OR for perceiving oneself was observed at the highest BMI values, substantial variations were also observed within the range of BMI values normally considered healthy (18.5 to 25 kg/m<sup>2</sup>). In females, the OR for high body satisfaction ranged from the highest OR of 1.45 (95% CI: 1.37; 1.53) at a BMI of 18.5 kg/m<sup>2</sup> to the lowest OR of 0.32 (95% CI: 0.30; 0.34) at a BMI of 24.9 kg/m<sup>2</sup> (Figure 2 A), compared to the reference value. In males, the OR for high body satisfaction ranged from the highest OR of 1.00 (reference) at a median BMI of 21.6 kg/m<sup>2</sup> to the lowest ORs at both ends of the healthy BMI range. Specifically, the OR for high body satisfaction was 0.71 (95% CI: 0.65; 0.77) at a BMI of 18.5 kg/m<sup>2</sup> and 0.66 (95% CI: 0.62; 0.72) at a BMI of 24.9 kg/m<sup>2</sup> (Figure 2 B), compared to the reference value.

## Discussion

Among 15-19-year-old females, those with a BMI well below the female median BMI were most likely to perceive themselves as being “about right size” and to experience high body satisfaction. Notably, the highest level of body satisfaction was observed in females within the underweight category (BMI < 18.5 kg/m<sup>2</sup>). In contrast, most males perceived themselves as being “about right size” and had high body satisfaction at BMI values just around the male median BMI. Substantial variations in the odds for perceiving oneself as “about right size” and for experiencing high body satisfaction were observed across the entire range of BMI values. The lowest ORs were generally observed at the highest BMI values, though considerable variations were also observed within what is typically considered the healthy weight range. This pattern was evident among both sexes. The existence of variations within the healthy weight range agrees with the constricted muscular and slim body ideals that do not correspond to what is considered a normal BMI range in health terms .

Findings from this present study are consistent with previous research that found that the prevalence of body dissatisfaction was lowest among female adolescents with the lowest BMI and among males with a BMI around the median or within the healthy weight range [16, 17]. In both females and males, the lowest prevalence of weight and shape concerns was observed in those with the lowest BMIs [16].

Our findings indicate that culturally defined body ideals, portrayed in popular media and identified in experimental studies [5], are highly internalised. This internalisation may encourage efforts to achieve this very thin ideal and also places a large proportion of adolescents at risk of a negative body image when their ideal and actual body weight and size do not align [10]. While the primary focus often centres on individuals with the highest BMIs, findings from this study generally emphasise the importance of recognising that considerable variations exist across the entire BMI range. This highlights the need to consider body image issues regardless of body weight. Moving beyond the sole focus on BMI and use of BMI categories is especially relevant, as such a focus and categorisation will contribute to even greater weight stigmatisation [18].

Addressing low body satisfaction and negative body size perception is crucial, as these issues may cause considerable psychosocial harm, regardless of BMI. The large variations observed across the entire BMI range underscore the need to move beyond traditional BMI measures and consider how adolescents perceive and feel about their body size and appearance. This concerns not only individuals with higher body weights but also potentially everyone who perceives themselves as deviating from societal body ideals to varying degrees. Ignoring the fact that poor body image may occur at any body weight carries a risk of overlooking the substantial proportion of adolescents who may be susceptible to poor body image and its related consequences, regardless of their body size and composition.

Finally, future research and interventions must adopt a broader focus, addressing the need for and methods to create a shift away from body weight and the internalisation of established body ideals. Approaching these underlying causes is crucial for preventing poor body image and its related harms in adolescents. Generally, increased knowledge and awareness about body ideals and stigmatisation are essential for changing such attitudes and behaviours and promoting acceptance of body diversity. For healthcare professionals, this may include reflecting on how their own practices are weight-inclusive and how they can offer supportive environments to all patients regardless of body weight.

## Strengths and limitations

A notable strength of this study is the analysis of the entire BMI range. This approach enhances our understanding of graduations in body size perception and body satisfaction across the BMI continuum rather than limiting our insights to established categories. Moreover, the large number of participants and the high response rate are key strengths, naturally improving data quality in terms of reliability and validity.

A limitation of the study is its cross-sectional design, with measures obtained at one time point only. Furthermore, we employed a simplified measure for both body size perception and body satisfaction. More multidimensional instruments are often recommended [19], maybe especially for males, where the ideal of the muscular body is not well identified by BMI only. A final limitation is the self-reporting of weight and height used to calculate BMI. This introduces a risk of information bias, although research has found self-reported weight and height data from adolescents reliable [20].

## Conclusions

Among females, the perception of being “about right size” and experiencing high body satisfaction was most prevalent at relatively low BMIs, and, for experiencing high body satisfaction, even in the underweight category. For males, these perceptions were highest among those with BMIs in near proximity to the median value. These findings indicate that the prevailing body ideals – thinness for females and muscularity and leanness for males - are highly internalised across the BMI range. This places adolescents who perceive themselves as deviating from these ideals at risk of developing a negative body image.

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